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Case No: HT-2013-000003

IN THE HIGH COURT OF JUSTICE
QUEEN'S BENCH DIVISION
TECHNOLOGY AND CONSTRUCTION COURT

The Rolls Building
Fetter Lane, EC4A 1NL

Date: 27 July 2016

Before:

THE HONOURABLE MR JUSTICE STUART-SMITH

OCENSA PIPELINE GROUP LITIGATION

Between:

PEDRO EMIRO FLOREZ ARROYO & OTHERS

Claimants

- and -

EQUION ENERGIA LIMITED
(formerly known as BP EXPLORATION
COMPANY (COLOMBIA) LIMITED)

Defendant

Alexander Layton QC, Sudhanshu Swaroop, Justine Thornton, Angharad Parry and
Claire McGregor (instructed by Leigh Day) for the Claimants
Charles Gibson QC, Oliver Campbell QC, Christopher Lewis, Noel Dilworth and
Kathleen Donnelly (instructed by Freshfields Bruckhaus Deringer LLP) for the Defendant

Hearing dates: 2 October 2014, 15 October 2014 – 5 March 2015

Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

.....
MR JUSTICE STUART-SMITH

Mr Justice Stuart-Smith :

1. Preliminary

1. Large-scale civil engineering and infrastructure projects routinely give rise to public benefit and private detriment, whether they be in the Cotswolds or the Andes. This case involves the consequences of laying a pipeline in Colombia in the mid-1990s, which ran from the oil-fields of Cusiana and Cupiagua in the South to the sea at Coveñas in the North. Construction work commenced in about December 1995 and continued until August 1997 {J24/82T/1}. The pipeline is known as the Ocesa pipeline for reasons that will appear. It passed through regions characterised by difficult terrain, fragile soils, tropical rainfall, and a lawless lack of security; and in doing so it passed through many and varied private land-holdings. For all of these reasons it was a challenging undertaking.
2. The benefits of such a pipeline to the Colombian economy and public need hardly be stated. At the same time, the potential detriments to private landowners whose properties were affected by the creation of and works on a Right of Way [“the ROW”] that was seldom (if ever) less than 25 metres wide and in which the pipeline was laid are easy to imagine. In particular, it was well known at all material times that the stripping of the land, storage of quantities of soil, working with heavy machinery, and crossing of watercourses gave rise to a risk of erosion of materials from the ROW, especially if disturbed or newly reinstated soil was subject to heavy rainfall. To obviate that risk, temporary and permanent works were undertaken that were intended to minimise or prevent erosion.
3. There was nothing new in the recognition of the risks inherent in the laying of the Ocesa pipeline, though the protective techniques were subject to development with time. One of the features of the Ocesa project was that for much of its course it followed the path of another pipeline [“the ODC pipeline”] so that much of the work for the Ocesa pipeline took place on or adjacent to what had been the ROW for the ODC pipeline when it had been laid in about 1990-1992.
4. This litigation is brought by 109 claimants in respect of 73 farms, each of whom claims that the Ocesa pipeline caused damage for which he or she should be compensated. It is brought in England because the Defendant was at the relevant time an English subsidiary of BP and was involved in the Ocesa project. The substantive claims are subject to the Colombian law of torts and contract. The State of Colombia formally recognises the public benefit attaching to oil pipeline projects and has established a regulatory legal framework that reflects the tension between public benefit and private detriment to which I have already referred. Whether and to what extent that framework creates, limits or excludes private law rights is only one of the elements of Colombian law affecting the outcome of this litigation.
5. The existence of 74 claims led the parties and the Court initially to choose 10 and to treat them as “lead cases” in the hope that decisions of the Court on those 10 would lead to resolution of all or most of the others. This approach was proportionate, sensible and inevitable given that each claim is fact specific and, although financially significant for the individual claimants, the claims are not enormous in absolute terms. In the event, as the accumulated evidence for the lead cases expanded, the parties agreed that it was only feasible to try four cases in the period allotted by the Court for

the trial. This judgment is the result of the trial of those four cases, which took 62 court days of openings, evidence and closing submissions. The time spent in court was only the tip of an iceberg of time and effort invested by the parties. The trial bundle was about 135,000 pages, including expert evidence that took up about 45,000 pages. The Court did not visit Colombia but over 20 hours of film footage and many photographs have been available which provide important evidence both for the experts and for the Court. Closing submissions were formidably ordered, cross-referenced and presented in texts of over 2400 pages plus numerous attachments. It might be thought that, with such an abundance of material, no stone has been left unturned, and so it has sometimes felt. Even so, the documentation was not complete, not every witness who might have had relevant evidence to give was called, and the pressures on those conducting the litigation to concentrate on a selection of the most important aspects of the litigation were considerable.

6. Because I have been unable to make the judgment shorter, I should issue two health warnings for anyone tempted to read it. First, while the trial and its outcome are of intense interest to those directly involved, I doubt whether my attempts to determine how the Supreme Court of Colombia would apply Colombian law to the facts of these cases will interest or influence either English or Colombian lawyers who are not obliged to read them. Second, I think it unlikely that the detailed facts underlying the individual claims will be of general interest. Also, it should be understood that, although I have considered and taken into account the entirety of the closing submissions on both sides (including following every hyperlinked reference in those submissions) when preparing and writing the judgment I have not attempted to set out every argument or to refer to every piece of evidence in the judgment. To follow the traditional format of setting out both sides' arguments and all of the evidence relied upon would probably have doubled the length of the judgment and the time taken to produce it. I have therefore attempted to synthesise the positions adopted and the main arguments advanced by the parties, without necessarily setting out everything on which the parties have relied, and have referred to evidence to the extent necessary for coherence. In particular, I have generally given the page reference for the evidence on which I have relied for my findings rather than setting out all relevant evidence either by reference or in full.
7. In briefest outline, I have concluded that all four of the Lead Claims that are the direct subject of this action fail. Very largely they fail on the facts; but I have in each case also considered the legal basis on which the Claims were brought and the application of relevant principles of Colombian Law to each claim. The purpose of this judgment is to decide the four Trial Lead Claims and to provide a basis for the resolution of the claims regarding the 69 farms that were not considered in detail at the trial. To that end I have, as requested, made extensive findings about Colombian Law irrespective of their direct applicability to the four Trial Lead Cases. I have also considered the entire body of expert evidence in considerable detail, outlining what appear to an English Court to be the strengths and weaknesses of the expert evidence that was led and tested at trial. That has been made necessary partly in order to reach necessary findings in the Trial Lead Cases and partly so that the parties may appreciate their general position on the expert evidence when considering the merits of the cases that were not tried.

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3. The Legal Framework.

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Applicability of Colombian Law

9. With one exception, it is common ground that Colombian Law applies to all issues of liability, causation and heads of loss. The exception is that the Defendant contends that issues of extra-contractual liability arising out of acts and omissions occurring before 1 May 1996 are not actionable unless they satisfy the dual actionability principle set out in *Boys v Chaplin* [1971] AC 356. The Claimants submit that Colombian Law applies to issues of extra-contractual liability arising out of acts and omissions both before and after 1 May 1996, relying primarily upon the exception which is summarised in Clause 2 of Rule 203 in *Dicey & Morris 12th Edn* in the following terms:

- “(1) As a general rule, an act done in a foreign country is a tort and actionable as such in England, only if it is both
 - a) actionable as a tort according to English law, or in other words is an act which, if done in England, would be a tort; and
 - b) actionable according to the law of the foreign country where it was done.
- (2) But a particular issue between the parties may be governed by the law of the country which, with respect to that issue, has the most significant relationship with the occurrence and the parties.”

10. The general rule has with good reason been described as “parochial” and as “[begging] the question as it presupposes that it is inherently just for the rules of the English domestic law of tort to be indiscriminately applied regardless of the foreign character of the circumstances and the parties.”: see Law Commission Report No 193 of 1990, *Private International Law: Choice of Law in Tort and Delict* at [2.7]. However, as Lord Wilberforce said in *Boys v Chaplin* at 391H, the general rule applies unless there are clear and satisfying grounds why it should be departed from and what other solution should be preferred.

11. The Defendant relies upon *Red Sea Insurance Co v Bougues SA* [1995] AC 190 at 206D in support of this principle, which is not materially disputed by the Claimants. The *Red Sea Insurance Co* decision has a wider relevance in providing indicators of what considerations may lead to a conclusion that there are clear and satisfying grounds why the general rule should be departed from. In the course of its decision, the Privy Council cited from the judgments of the High Court of Australia in *Breavington v Godleman* (1988) 169 CLR 41, identifying differences in the approaches adopted by different Justices in that decision. Mason CJ said at p. 77:

“No doubt a court, in deciding whether the powerful primary claim of the law of the place of the wrong should be discarded, may find it necessary to take account of the policy which underlies law of a relevant jurisdiction. However, for my part the interests of the parties themselves are likely to be more material in ascertaining whether another law has a closer connection with the parties and the occurrence with respect to

the issue to be litigated. The justice of the case turns very largely on the need to give effect to the legitimate or reasonable expectations of the parties. They may have acted in reliance upon an assumption that the courts would apply a certain rule or they may have expected that their rights would be determined by the law of a particular place ...”

12. In *Red Sea Insurance Co* at 206G-H the Privy Council expressed the view that the exception can in principle be applied in an appropriate case to enable a Claimant to rely exclusively on the *lex loci delicti* and, at 207A-B, that the exception may apply not merely to specific isolated issues but may apply to a whole claim “for example where all or virtually all of the significant factors are in favour of the *lex loci delicti*”. I respectfully agree. The Privy Council identified features of that case which made the arguments in favour of the *lex loci delicti* “overwhelming”. They were:

“Thus the policy of insurance was subject to Saudi Arabian law, the project was to be carried out in Saudi Arabia and the property was owned by the government. The main contract, the supply contract and the ... service contract are all subject to the law of Saudi Arabia and were to be performed there. The breaches and the alleged damage occurred in Saudi Arabia. The defence of repairing alleged damage occurred in Saudi Arabia. The defendant, though incorporated in Hong Kong, had its head office in Saudi Arabia.”

13. In identifying the relevant factors as it did, the Privy Council was at least implicitly endorsing the approach of Mason CJ as set out in [11] above. Whether or not that is so, I would respectfully endorse the approach of Mason CJ in attempting to see whether the policy of the law of Colombia and the interests of the parties show that Colombian law has a connection with the facts of this litigation of sufficient strength as to provide clear and satisfying grounds for departing from the general requirement of dual actionability; and in doing so I look to features that are similar to those identified on the facts of the *Red Sea Insurance Co* case.
14. In favour of dual actionability are that the Defendant is a British registered subsidiary of BP and that the Claimants exercised their jurisdictional right to bring these proceedings in the United Kingdom. Of those called to give evidence for the Defendant, Mr Spence and Mr Jones are now resident in England and gave the impression of being from the United Kingdom. To the contrary, however, Mr Allison is resident in South Australia and gives the impression of being Australian. The other witnesses give the impression (by name, language and current address) of being South American and, in general, it cannot be said that the nationality of those employed by the Defendant provides a substantial connection between the Defendant in its dealings with the Claimants and the United Kingdom. The project was carried out in Colombia. The day-to-day management of the administration of the contract had some connection with Houston but was overwhelmingly in Colombia. The Claimants are Colombian and their land (the subject of this litigation) is in Colombia. To the extent that any contracts were entered into between the Defendant, Ocesa or Saipem and the Claimants, it is common ground that they were governed by Colombian Law. Any breaches of contract and any breaches of non-contractual obligations happened in Colombia. The alleged damage was suffered in Colombia. The Defendant, though

incorporated in England, had a branch legally established in Colombia by means of registered public deed and was dedicated (in name and in practice) to working in Colombia. The works were carried out subject to the regulatory regime in force in Colombia, upon which the Defendant relies as excluding any liability it might otherwise have to the Claimants: see [24] ff below. On the Defendant's case, therefore, Colombian law is integral to the issue of non-contractual liability before 1 May 1996 just as it is to the equivalent issue after that date.

15. I am sure that the Claimants never considered access to Courts before or during the laying of the pipeline, so that it would be quite unreal to suggest that they assumed that the Courts would apply a certain rule. But if they had been asked, I am equally sure that they would have expected that their rights would be determined by the law of Colombia, particularly in circumstances where the Defendant went to considerable lengths to present its involvement as being Ocesa's thereby removing any real perception of United Kingdom involvement: see [386] below. If uninfluenced by the pressures of potential litigation I strongly suspect that the Defendant would have had the same expectation: if it didn't, in my judgment, it should have done.
16. To my mind, weighing these factors brings the scales down firmly in favour of applying the exception and concluding that the issue of extra-contractual liability in respect of acts or omissions occurring before 1 May 1996 is governed by Colombian Law. This means that it is not necessary to attempt to disentangle pre- and post-1 May 1996 acts and omissions with a view to judging them by different systems of law; but that is a consequence of my conclusion rather than a reason for it.

The Experts

17. Professors Castro and Vallejo are both distinguished Colombian lawyers who fully justify being called Experts. As will be seen below, there was eventually a large measure of agreement between them and, where they disagreed, on some occasions I prefer the evidence of Professor Castro and on others the evidence of Professor Vallejo. Each party attempted fundamentally to undermine the approach and evidence of the other side's expert and, in my judgment, neither party succeeded. There were, however, distinct differences in the characteristics and approach of each expert. Professor Vallejo grounded himself more closely and more rigorously on the provisions of the various norms of Colombian law (as explained below). His original report was also more thorough in identifying relevant legal provisions than was Professor Castro's. His approach was criticised by the Claimants as being too narrow and doctrinaire. Had he been giving evidence about English law (or another common law system) this might have had more force; but I am persuaded that his approach is and was appropriate when giving evidence about Colombian law, rooted as it is in written laws of various well defined hierarchical status with less emphasis being placed on the organic development of law by the Courts than appears under common law systems. Contrary to the Claimants' submissions, I generally preferred Professor Vallejo's levels of rigour to those of Professor Castro, who on occasions frankly accepted that her view of what the law should be differed from a strict (and, in my view, correct) interpretation of what it is. That said, I do not accept that her objectivity was seriously compromised: the two examples cited by the Defendants in their closing submissions {C4/4.6/37} seemed to me at the time and still seem to be examples of comments that might come naturally to an academic foreign lawyer who

is not experienced in the adversarial systems of English law. They do not justify wholesale down-grading of her evidence.

18. More serious are the criticisms that the Defendant makes of her failure to give proper attention to the Colombian regulatory background pertaining to the oil industry. She did not give adequate consideration to the regulatory framework, even when it should have been apparent from Professor Vallejo's first report that it was an important area where the Court would be assisted by thorough expert evidence. And (as I detail later at [82]ff below) her use of citations was not always reliable. While these are valid criticisms, they fall far short of persuading me that I should always prefer the evidence of Professor Vallejo without further thought. Therefore, while recording that there were valid criticisms to be made of her evidence, I have reviewed all areas of material dispute between her and Professor Vallejo in an attempt to identify where each expert was or was not correct on given points; and I do not think it would be useful to add yet further to this judgment by discussing each of the criticisms made of her, any more than it would be profitable to discuss each criticism made by the Claimants of Professor Vallejo.
19. Because of the extensive final agreement between the experts, I am able to set out their agreed position on various topics either verbatim or nearly so. Where I have done so, I find that their agreement as I have set it out is a correct statement or summary of the law of Colombia except on a few occasions where (I hope) I make my qualifications clear.

The Hierarchy of Colombian Law

20. Colombian private law (civil and commercial) is rooted in the continental law system. It consists mainly of written statutory laws contained in Codes, following the French tradition of the Napoleonic Codes. The Courts are bound by Article 230 of the Constitution to observe this codified law, with fairness, jurisprudence, and the general principles of law and scholarly authorities being "auxiliary criteria of judicial proceedings." What this means is that the judge's primary obligation is to comply with and apply the law; but the judge may turn to the auxiliary criteria if she or he needs them in order to interpret and apply the law {Day22/21:14}.
21. The established hierarchy has at its head *the Constitution*, Article 4 of which provides that "the Constitution is the supreme law. In all cases of incompatibility between the Constitution and the law or any other legislation or regulation, the constitutional provisions will apply." The Constitution must be taken into consideration for the proper understanding of other laws, all of which are subordinated to the Constitution {H15/1/35} at [196]. The next level is that of *the laws enacted by Congress* or laws in a strict sense. Laws have their own hierarchy, with the Constitution differentiating between (a) "Frame Laws" which set out governmental objectives in regard to public income and debt, foreign trade and customs, financial stock and insurance activity, salaries, pensions and education (Article 150-19), (b) "Organic laws" which relate to legislative activity, national budget, Colombia's general development plan and the jurisdiction of the territorial provinces (Article 151), (c) "Statutory laws" which relate to fundamental rights, administration of justice, political parties and participation of the community (Articles 152-153), and (d) "Ordinary laws" which include the laws approving Codes. The Civil Code and the Commercial Code have the status of Ordinary laws (Article 150). Below the Laws come *Supranational Norms*, which do

not require further consideration here. Then come *Administrative Regulations* which include decree laws, legislative decrees, regulatory decrees, general resolutions, State Agency enacted resolutions of a general character, and Departmental and Municipal Regulations. Then come *Customary Rules/Custom* which do not require further consideration here. Finally come the *Auxiliary Criteria for the Interpretation of the Law* to which I have already referred {H23.2/7/427}. Court decisions on interpretation of laws are not generally binding except when the Constitutional Court decides on the constitutionality of a law.

22. There was a dispute between Professor Castro and Professor Vallejo on the status of arbitral awards. I prefer the view of Professor Vallejo that, in the absence of any legal provision to the contrary and because of the essentially private nature of arbitration, arbitral awards are neither law nor auxiliary criteria for the interpretation and application of the law, though they may command respect by virtue of their contents {Day23/173:5} {I2/12.1/539.2}. His view is endorsed by Article 230 of the Constitution which states that “fairness, judicial precedents, the general principles of law and the scholarly authorities are auxiliary criteria of the judicial function”: arbitral awards are not included.

Rules for the Interpretation of the Law

23. The Civil Code contains rules for the interpretation of the law which are applicable to both civil and commercial matters. Professor Vallejo provided a list of rules at [200]-[210] of his original report, which were not controversial. In particular, it is common ground that:
- i) Pursuant to Article 10 of the Civil Code, norms which relate to a special character take precedence over norms of a general character. In case of incompatibility between provisions of the same special or general character in the same Code, the provision which appears in the latter article (in number) shall be preferred;
 - ii) When the meaning of a law is clear, its terms should not be disregarded on the pretext that that it is necessary to consult the spirit of the law: Article 27 of the Civil Code;
 - iii) The court should not have regard to arguments that a law is too harsh or too generous when interpreting that law;
 - iv) Laws and special laws can restrict the amount of compensation to which a person would otherwise be entitled under the Civil or Commercial Codes; though those restrictions would not apply in cases where a Defendant is guilty of dolo or gross negligence.

The Regulatory Framework

24. By Article 332 of the Colombian Constitution, the Colombian state is the owner of all natural non-renewable resources and the subsoil, including oil. The oil industry has a special status in Colombian law. In 1953 a Petroleum Code was established, Article 4 of which declared that “the oil industry in its different branches of exploration, production, refining, transportation and distribution” is of public benefit.

25. The potential relevance of the State's ownership of oil and its recognition that the oil industry is of public benefit is two-fold. First, Article 58 of the Constitution provides that "When, in the application of a law passed on account of public necessity or social interest and recognized as essential, a conflict should occur about the rights of individuals, the private interest will yield to the public or social interest." Second, it has led to the creation of a regulatory structure which seeks to strike the balance between private and public interests. The regulatory structure provides the context for the laying of the OcenSA pipeline and therefore needs to be considered in some detail.

The Codes of Mines 1887, 1947 and 1988

26. In Colombian Law, there has at all material times been a close connection between the law relating to mining generally and the law relating to the exploitation of hydrocarbons in particular. Law 38 of 1887 laid down Colombia's first Code of Mining ["the 1887 Mining Code"]. It included at Chapter XII provisions for the creation of necessary easements over servient land and at Chapter XIII provisions for the periodic assessment and payment of compensation to landowners for the damage caused.

The 1947 Mining Code

27. A new Mining Code was introduced by Decree 805 of 1947 ["the 1947 Mining Code"], which amended parts of the 1887 Mining Code. Articles 109 to 118 of the 1947 Mining Code amended the provisions for assessing and payment of compensation for damage caused by exploration and exploitation. Specifically, Article 112 of the 1947 Mining Code provided that exploration of mines could be carried out freely in all the territory of the Republic, but that where land was settled or privately owned it was necessary to notify the owner or occupier in advance. The owner or occupier could not oppose the carrying out of the works but was entitled to demand from the miner the value of the damages caused to him. Article 115 provided that, when dealing with prospection or exploration, the mining company "will" guarantee with a sufficient bond, granted before the Mayorality of the Municipality where the mine is located, the payment of the value of the damage which is caused to the owner of the lands or crops. If the parties were not in agreement on the amount of the security, it was to be fixed by the Mayor, at the request of any of the parties, and based on an expert assessment of the possible damage. There was nothing in Article 115 or elsewhere to suggest that an expert assessment of the possible damage under Article 115 is provisional. Article 116 was specific to exploitation works and provided that:

"In the case of damages caused by the exploitation works in properties or improvements, its owner or either may demand advance payment of the amount of the compensations every six months according to the damage assessment of the respective period. If the parties fail to reach an agreement on the amount of the compensation, it shall be fixed by the Mayor of the Municipality in which jurisdiction the land or improvements are located, with the previous provisional and non-appealable appraisal of the damages suffered. Payment of such compensation shall be made immediately in accordance with the valuation.

The parties may request a revision of the valuation within one month from the date of the official decision ordering the payment; but if it is the entrepreneur who uses this recourse, he must deposit previously with the Mayor's Office the total amount of the compensation that is fixed in the official decision which revision is requested, under the penalty of his petition being dismissed."

28. It is to be noted that Article 116 contemplates that compensation *may* be demanded to be paid in advance; but in the absence of such a demand, there is nothing in the terms of Article 116 or elsewhere to displace the natural possibility that compensation may be demanded to be paid after the works have been completed. Where the owner has demanded payment in advance at intervals of six months, Article 116 does not expressly provide for a final and retrospective revaluation of the damage; nor does it expressly exclude it. It merely states that the six monthly payments shall be "according to the damage assessment of the respective period", which does not specify when that damage assessment will have been carried out but implies that it will have been carried out before the payment of the periodic compensation. The expert evidence does not resolve when and how the compensation will be fixed under Article 116 where periodic payments are not requested.
29. The Colombian Petroleum Code was introduced in 1953 with additional regulations in 1954. It will be convenient to introduce the code and regulation after tracing the further revisions to the Mining Code.

The 1988 Mining Code

30. A new Mining Code was established by Decree 2655 of 1988 ["the 1988 Mining Code"], which substantially replaced the 1947 Mining Code.
31. Article 167 of the 1988 Mining Code requires the owner or occupier to be notified, either directly or through the Mayor, before exploration work is begun on private land or settled waste lands. The owners or occupiers may not object, but may require the explorer to provide a prior security bond to guarantee payment for any damages caused during exploration. Payment for occupation of the land should be paid quarterly in advance, and restoration work should be carried out immediately¹.
32. Article 165 of the 1988 Mining Code confers a right to all easements needed to conduct the exploration and exploitation of mines technically and economically. The easement right authorises the carrying out of the mining works and involves the obligation upon the beneficiary to grant a surety bond and to pay the owner or holder of the affected properties the respective compensation: the easement may not be exercised ("carried out") without this requirement being satisfied. Easements so conferred are transferable to third parties for the same purposes as those for which they were set up. They are exercisable on previous formal notice to the owner or occupier of the servient land who can be notified directly or through the Mayor: Article 179. The easement carries with it the right to occupy those areas of land that

¹ These provisions are similar to but superseded those relating to exploration in Article 112 of the 1947 Mining Code.

are strictly necessary for the construction and works and to perform excavations: Article 169; and the beneficiary of the easement is entitled to an easement to enable him to transit necessary staff, materials and equipment from the public road to the work fronts: Article 175. Formal notice to the owner of the exercise of an easement is required, after which the miner is entitled to occupy the land unless the owner requests a prior security to be posted: Article 179.

33. Article 180 entitles the owner or occupier to request the Mayor to order the miner provide a security bond in order to guarantee the payment of the damages that he may suffer due to the easements. A procedure is laid down for the Mayor to consult with an appraiser or an expert from a list held by the court to assist him in designating the appropriate security. The parties can apply to the court for a review of the security bond or the assessment of compensation for undertaking the easements. The assessment and provision of the security bond (if requested by the owner) are a prerequisite to the carrying out of the work, which may not start or will have to be suspended while the security bond is set up.
34. Article 181 of the 1988 Mining Code sets out the criteria to be applied when designating the amount of the security bond as well as the damages caused in the course of the easement. Those criteria include that the exercise shall be dealt with in an objective manner, taking into account the current market value of the use of the goods affected or damaged by the exercise of the easement.
35. Under Article 182 of the 1988 Mining Code, the Mayor fixes the compensation to be paid to the owner or occupier, and his ruling cannot be appealed against. However, if one or other party does not agree on the amount of compensation or payment form designated by the Mayor, they can request its final determination by the Court. It appears that the Article 182 procedure does not necessarily or probably take place before the works happen, at least in the case of permanent occupancy. Another point of potential interest in the light of the terms of the 1954 Regulations, is that the 1988 Mining Code distinguishes between temporary and permanent occupation by the works and makes different provisions for payment of compensation from those that applied under the 1947 Mining Code. Under Article 181:
 - i) Temporary occupancy is defined as being where “works, equipment, portable or mobile components are installed or operate that can be removed without harming the land and whose presence on the property does not exceed two (2) years”;
 - ii) Permanent occupation is defined as being where “works are installed or built, and there is equipment or components that cannot be removed due to their nature and location, without destroying or deteriorating the land or which are intended to serve the mining work for longer than [two years]”;
 - iii) If the occupation of the premises were temporary “the value of its use will be estimated by the time needed to maintain the works and carry out the mining work and the compensation must be paid in advance for periods of three (3) months, if the occupation were to be permanent the value of the use of the land would be paid in cash.”

36. Under the 1988 Mining Code, public officials are closely involved in many aspects of the process (as had also been the case under the 1947 Mining Code). Thus, for example, the determination of the surety bond in relation to exploration shall be done by the Mayor with the previous opinion of an expert appraiser; and the Mayor's decision may be appealed before the Governor, Provincial Governor or Commissioner: Article 167. Notice of the exercise of an easement pursuant to Article 179 shall be notified either directly or through the Mayor, following which, the miner is allowed to occupy the areas for the construction and works "with the support of the Mayor". The Mayor is integral to the Article 180 procedure for designating the security bond relating to the exercise of the easements. And, as set out above, pursuant to Article 182 the Mayor fixes the amount of compensation, subject to review and final determination by the local Court if requested by either the mining industry or the owner or occupier.

The Exploitation of Oil and the Petroleum Codes

37. The exploitation of oil in Colombia can be traced back to the end of the 19th Century. From early in the 20th century until 1974 the Colombian State operated a concession system for the exploitation of oil. The concession system was superseded by the association contract system, which was introduced by Decree 2310 of 1974, and which from then on was the system by which the Colombian state regulated the exploration and production of hydrocarbons in its territory. Association Contracts cover exploration and exploitation activities in a given area. I refer to the association contract system in further detail at [44] below.

The 1953 Petroleum Code

38. The Petroleum Code was established by Decree 1056 of 1953 ["the 1953 Petroleum Code"]². Article 9 made "Chapters XII, XIII and XIV of the Code of Mines on mine easements and compensations that the miners are obliged to pay" applicable to the oil industry in the absence of special regulations. This was a reference to the 1887 Code Code as amended by the 1947 Mining Code. The route and the location of all pipelines are subject to Government approval after submission of plans and detailed budgets for the construction and the relevant specifications for Government approval: Article 54. Article 4 provided that, as a result of its being of public benefit, interested parties may be ordered by the relevant government ministry to carry out necessary expropriations for the exercise and development of the oil industry. In order to take advantage of the statement of public utility in this way, interested parties are required to submit to the Ministry of Mines and Petroleum a documented application which, amongst other things, explains why the expropriations are necessary together with a list of the names of owners of affected properties and a "list of the steps that have been taken to get what is required through a contract freely entered into with [them]": Article 84.
39. Articles 93 and 94 of the 1953 Petroleum Code refer back to the 1947 Mining Code and provide for involvement by the Mayor. Article 93 provides that, where it was not possible to give notice to a landowner because their whereabouts are hidden or

² Relevant extracts from the Petroleum Code and the other instruments referred to in this section from 1947 are in {12}. For that reason, they are not all set out in full here.

unknown, the Mayor may appoint a guardian ad litem. Article 94 provides that once the valuation provided in Articles 115 and 116 of the 1947 Mining Code is done, if the oil or pipeline entrepreneur pays directly to the owner, or posts a guarantee, or deposits the amount of the compensation, whichever be the case, the Mayor will authorise within two days the commencing of the works in which the entrepreneur has interest. This provision applies where the entrepreneur is using the mechanisms under Articles 115 or 116 of the 1947 Mining Code to obtain consent to the starting of his works of exploration or exploitation as the case may be.

40. In 1954 regulations [“the 1954 Regulations”] were issued as temporary legislation in times of public disturbances; but due to their importance they were subsequently given permanent character by Law 10 of 1961. They therefore have the force of a law within the hierarchy of norms since they were passed by the Government³. They laid down special regulations referring to the petroleum industry. Articles 1, 2, 3, 4, 5, 6 and 7 are important and justify being set out at length here:

“Article 1: The provisions of articles 109 to 118, both included, of [the 1947 Mining Code], will apply to the petroleum industry with the amendments set forth in this Decree.

Article 2: When an Expert valuation is to be made of damages caused by the exploration or exploitation works, as referred to in article 116 of [the 1947 Mining Code], the respective procedure will comply with the following rules:

The valuation will be made before the Municipal Judge in whose jurisdiction the land or improvements are located, following a request by the oil explorer or exploiter, or by the owner or occupant of the land or improvements, with the intervention of two Experts: one designated by the oil explorer or exploiter and the other by the owner or occupant of the land.

If the Experts are not in agreement in their valuation, they must immediately designate a third Expert.

Article 3: When the principal Experts do not reach agreement in appointing a third Expert, it will be designated, at the request of either of the parties, by the Collector of the National Treasury in the relevant Circuit, drawing lots from the list of Experts for successions and donations corresponding to the Municipality in whose jurisdiction the properties are located.

Article 4: Any of the parties can request before the Judge of the Circuit of the jurisdiction in which the property subject to the procedure is located, the revision of the valuation and of the amount of compensation fixed on the basis of the valuation, within one month of the date of the valuation process.

³ Castro cross-examination {Day20/36:5} agreeing with Dr Vallejo.

If the oil explorer or exploiter uses this recourse, it shall first make a deposit in cash in the Agency or branch of the “Caja Colombiana de Ahorros”, if it exists, or in the relevant collector of the National Treasury of the Municipality, 50% of the value of the compensation fixed by the Experts. Without this requirement, revision of the request made by the oil explorer or exploiter will not be taken into account.

The expenses arising from the revision shall be paid by the party that requests it.

Article 5: In the case of works or activities that implicate the permanent occupation (of land), the compensation shall only be accrued and paid once and shall cover all the time that the oil explorer or exploiter occupies the land, and will comprise all damages.

Permanent works shall be understood as the construction of roads, of oil pipelines, of camps and office buildings, the installation of drilling equipment and other analogous works.

Regarding works and activities entailing a temporary occupation, the compensation will cover periods up to six months.

Temporary occupation shall be understood as the execution of surface exploration works with geophysical equipment, plotting layouts of oil pipelines, of roads, etc., that entail the destruction of fences, the opening of penetrative paths or trails, surface digging and other analogous works.

Article 6: Once the revision has been performed, if the explorer or exploiter of petroleum refuses to pay the amount of the compensation to the owner or occupant of the land, the Judge of the relevant Circuit, at the request of the interested party, shall order the agent of the agency or branch of the “Caja Colombiana de Ahorros”, or the collector of the National Treasury of the Municipality, to make the payment from the amount deposited by the explorer or exploiter of petroleum in accordance with article 4 of this Decree.

If the amount deposited is insufficient to cover the compensation, the petroleum industrialist shall pay the balance to the owner or occupant of the land. Otherwise, the latter is entitled to request of the Mayor the suspension of the permit to execute or continue the works, as referred to under article 7 of this Decree.

Article 7: Once the valuation proceedings referred to in this Decree have been performed, and once the corresponding amount has been deposited or the compensation to the affected

party has been paid, as the case may be, the explorer or exploiter of petroleum is entitled to initiate the works immediately, and the execution of those works cannot be prevented even if the valuation is called to review. The municipal Mayor will assist the petroleum industrialist as far as necessary in order for him to pursue his works without impediments of any kind.

...”

41. Significant differences are immediately apparent between the provisions of the 1947 Mining Code and the 1954 Regulations:
- i) Under Article 116 of the 1947 Mining Code, the owner was entitled to demand advance payment of the amount of compensation for damage caused by exploitation works every six months “according to the damage assessment of the respective period.”
 - ii) By contrast, Article 5 of the 1954 Regulations divides works and activities into two categories, involving permanent and temporary occupation respectively. Temporary occupation includes surface exploration works with geophysical equipment, plotting layouts of pipelines, roads etc “that entail the destruction of fences, the opening of penetrative paths or trails, surface digging and other analogous works.” Compensation payments for such works and activities are to cover periods up to six months, which is similar to the provision for six-monthly payment of damages under Article 116 of the 1947 Mining Code. The position in respect of permanent occupation is different. Permanent works include the construction of roads, of oil pipelines, of camps and office buildings, the installation of drilling equipment and other analogous works. In the case of such works, “the compensation shall only be accrued and paid once and shall cover all the time that the oil explorer or exploiter occupies the land, and will comprise all damages.”
 - iii) Under Article 116 of the 1947 Mining Code, if the parties fail to reach an agreement on the amount of the six-monthly compensation, it shall be fixed by the Mayor of the local Municipality and payment of such compensation shall be made immediately in accordance with the valuation. Although the parties may request a revision of the Mayor’s valuation, if it is the entrepreneur who does so he must deposit previously with *the Mayor’s office* the *total amount* of the compensation fixed by the decision under review, failing which his petition *may* be dismissed.
 - iv) By contrast, under the 1954 Regulations, if the parties fail to reach agreement on the amount of compensation, the valuation shall be made before the local Municipal Judge with the intervention of two experts (or three experts if the two cannot agree). Either party can request a revision of that valuation before the Judge of the local Circuit; but if it is the entrepreneur who requests revision he shall first deposit *in cash* in *the Agency or branch of the “Caja Colombiana de Ahorros”, if it exists, or in the relevant collector of the National Treasury of the Municipality, 50% of the value* of the compensation fixed by the experts. If he does not do so, his request for revision *will not be*

taken into account. There are then the additional provisions under Article 6 providing for payment of the revised amount which, if the entrepreneur does not comply, may lead to the suspension of his permit to work;

- v) The provisions for the appointment of experts differ. Under Article 117 of the 1947 Mining Code, there are to be principal experts and, if they do not agree on the naming of the third expert, the Mayor shall make the appointment of a valuer of the Agrarian, Industrial or Mining Credit Fund who provides his services in the agency or branch of the same or nearest municipality. Under the 1954 Regulations, by contrast, when the principal experts do not reach agreement in appointing a third expert, it will be designated by the Collector of the National Treasury in the relevant Circuit, drawing lots from the list of experts for successions and donations corresponding to the Municipality in whose jurisdiction the properties are located.
42. Taken as a whole, it is apparent that the 1954 Regulations contemplate that the compensation to which it refers (whether for permanent or temporary occupation) will be paid in advance, either in an agreed amount or in an amount fixed by the specified valuation and revision procedure: see in particular Articles 6 and 7. To this extent the approach differs from that under the 1947 Mining Code, which does not exclude retrospective payment of damages if periodic payments in advance have not been demanded by the owner. I will consider the consequences of these similarities and differences below. The most important issue, also to be considered below at [206], is whether the effect of Article 5 of the 1954 Regulations means that, once a payment has been made in respect of the permanent works, no further compensation is payable irrespective of the extent and severity of the damage that may be caused by the permanent works.
43. Law 93 of 1993 was a new environmental statute which required an environmental licence for the construction of an oil pipeline, as an integral part of the regulatory process. The environmental licence for the OcenSA pipeline was issued pursuant to that law.

Ecopetrol and Association Contracts

44. The Colombian state oil company (Ecopetrol) was given a central role in the association contract system of which three aspects are relevant to these proceedings. First, Ecopetrol was given the right to carry out the exploration and exploitation activities, directly or indirectly, or through contracts entered into with national or international individuals or companies other than the parties to concession contracts. Second, Article 1 of Decree 2310 of 1974 and its regulatory Decree 743 of 1975 vested in the Board of Directors of Ecopetrol the power to design various contracting schemes and the terms of model contracts. Ecopetrol's decisions on such matters were subject to the approval of the Ministry of Mines and Energy. Third, Ecopetrol could participate in any projects by declaring the commerciality of a given Association Contract. If it did so, it would then acquire a 50% interest under that contract.
45. Two Association Contracts are directly relevant to the present case. They were contained in Public Deeds dated 11 June 1982 (Santiago de las Atalayas) and 5 May 1988 (Tauremena). The Santiago de las Atalayas Association Contract may be taken as illustrative. The parties were Ecopetrol and Triton Colombia Inc ("Triton"). By

Clause 1 the parties recorded that the prospecting and exploitation of nationally owned hydrocarbons is run by Ecopetrol, which had agreed with Triton to prospect the Contracted Area (defined as an area of 159,150 hectares) and to exploit any oil which may be found there on the terms set out in the Association Contract. It provided for risks and costs to be shared on the terms there set out. Clause 9 provided that exploitation works should be started on the date on which the parties recognised the existence of a commercial field (defined as “that portion of the Contracted Area that is capable of producing oil in quantities and of a quality that is economically exploitable.”). A commercial field would be recognised by Triton informing Ecopetrol of the discovery of a commercial field and Ecopetrol accepting its existence. By Clause 10 Triton was the Operator (defined as “the entity designated by the parties which, on behalf of the parties, directly carries out the necessary operations to exploit the oil which may be found in the Contracted Area.”) and, as such, was to have control of all the operations and activities which it deemed necessary for a technical, efficient and economical exploitation of any oil it might find in the Contracted Area. The Operator had the obligation to carry out all the development and production operations in accordance with the known industrial standards and practices, using the best technical methods and systems to do so. It was to be considered as a distinct entity from the parties for the purposes of the contract, as well as for the application of civil, employment, and administrative law.

46. Clause 18 of the Association Contract provided for a Board of Directors to be formed within 30 days of the acceptance of a commercial field. Each party had to nominate a representative, whose vote would be a commitment of the party. The Board of Directors was to hold regular meetings in which the Operator’s exploitation programme, annual programme of operations and expenditure and investment budgets were to be reviewed. Amongst other roles established by Clause 19, the Board of Directors could authorise the Operator to conclude contracts on behalf of the joint operation and the value of which was in excess of US\$10,000.
47. Triton was entitled to transfer all or part of its interests, rights and obligations in the Association Contract, with the prior written approval of Ecopetrol: Clause 27.1. By Clause 35, the Association Contract was governed in all its parts by Colombian Law. By subsequent amendments the Defendant and Total Exploratie en Productie MIJ BV (“Total”) were added as parties to the Association Contracts, reflecting their role as joint venturers in the overall project.

The Requirements for the existence of a contract and/or valid contractual obligations

48. The major legal issues in the case included (a) whether and to what extent the Claimants entered into legally binding agreements before the works were carried out, and (b) whether and to what extent the Claimants entered into legally binding settlements after the works had been completed. It is therefore necessary to review various fundamental aspects of the law of contract under Colombian Law. The Experts agree that Articles 1500, 1501 and 1502 of the Colombian Civil Code set out the necessary elements for the formation of a contract. Those Articles provide as follows:

“1500. A contract is real [in rem] when its formation requires the transfer of the object referred to in the contract. A contract is solemn when it needs to comply with certain special

formalities, in such a way that without them no civil effect is produced. And a contract is consensual when it is formed by the mere consent of the parties.

1501. In every contract it is necessary to distinguish the essential elements, the natural elements and the accidental elements of the contract. Essential elements are those required for the contract to produce legal effects or whose absence would turn the contract into a different contract. Natural elements are those which are not essential to the contract but are deemed incorporated into the contract without the need of a special clause. Accidental elements are those that do not belong essentially or naturally to the contract and are added to the contract by contracting parties.

1502. In order for one person to assume an obligation towards another person, by an act [which includes a contract] or declaration of will, it is necessary: 1) that he is legally capable, 2) that he consents to the respective act or declaration, and his consent is non-vitiated, 3) that the subject matter is a lawful object, and 4) that the purpose (causa) is lawful.”

49. Accordingly it is common ground that, in order for one person to assume an obligation to another person by an act [which includes a contract] or declaration of will, it is necessary:
- i) That the person is legally capable (i.e. has legal capacity). It is not suggested that any of the Claimants in the current litigation lack the necessary capacity to enter into contracts;
 - ii) That he consents to the respective act of declaration, and his consent is non-vitiated. This is explained further at [52] below;
 - iii) That the subject matter is a lawful object (objeto lícito) which is determined or determinable. This is explained further at [62] below;
 - iv) That the purpose is lawful [causa lícita]. It is not suggested that any relevant contract has an unlawful purpose.
50. The experts are agreed that for any particular contract to exist, its essential elements must be met, and mutual consent must cover those elements. For example a sale purchase contract requires the agreement on the object sold and on the price. Special formalities are required by law in certain circumstances. For present purposes the relevant circumstance is the constitution of an oil easement, where it is a legal requirement that the contract is executed by means of a public deed before a Notary public and is duly registered.
51. At the start of the trial the Claimants were relying upon alleged oral agreements as giving rise to enforceable claims for breach of contract. By the time of closing

submissions, those claims were no longer pursued. It is therefore sufficient to record that the legal requirements for an oral agreement to be valid and binding were agreed by the experts {H23.2/7/435} and included agreement on the essential elements of the purported contract and an intention on the part of both parties to enter into a binding legal contract.

52. It is common ground that any contracts which may be held to exist in the present case are commercial in nature and therefore subject to the provisions of the Colombian Commercial Code as well as those of the Civil Code. The Commercial Code provides for ‘inexistence’, absolute nullity and relative nullity. In the present case relative nullity is the only one of these three concepts to be potentially relevant. It is common ground that consent is established where consensus is expressed without one or more vitiating vices being present and affecting the will of a party expressing that consent {H23.2/7/437}. Article 900 of the Commercial Code identifies the vices that may vitiate consent by providing that:

“A transaction is avoidable when executed by a relatively incapable person, and when consented by error, duress or dolo according to the civil code.”

53. For a contract (or a specific term of a contract) to be avoided relying upon the Article 900 vitiating vices, it is necessary for an action to rescind to be brought by those persons with an interest in the contract according to the law, their heirs or assignees {H23.2/7/432}. If such an action were to have been brought, the annulment of the contract (or contract term) would have retroactive effect in that it would have no binding effect as of the date of its execution. However, if effects produced by the contract (or contract term) cannot be undone retrospectively, the contract (or contract term) is terminated for the future as of the date of the Judicial decision (Civil Code, Article 1746) {H23.2/7/437}. The limitation period for an action to set aside a contract or term to which the Commercial Code applies is two years from the date of execution of the contract: {H23.2/7/562} at Item 57.
54. No action to set aside any relevant contract or contract term has been brought in Colombia by the Claimants, their heirs or assignees; and the claim in this litigation to set aside contracts is no longer pursued: {C4/3.4/89} at [267]. It is therefore possible deal with the concepts of error and dolo as vitiating vices more shortly than would otherwise have been the case; but they remain potentially relevant as part of the framework of Colombian law that was available to the Claimants had they decided to use it.
55. Although the Claimants rely upon an inequality of bargaining power for other purposes, it has not been suggested that any relevant contract would have been avoidable for duress, and the experts are agreed that duress is not a relevant issue in the case. It need only be said that duress may render a contract voidable in Colombian law if it has the effect of vitiating consent. That leaves error and dolo as the possibly relevant vices in the case.
56. Error as a vice that vitiates consent is covered by Articles 1509-1512 of the Civil Code. Error of law cannot vitiate consent because knowledge of the law is presumed (Articles 9 and 1509 of the Civil Code). Error in point of fact may in limited circumstances vitiate the will of a party. The types of error that may vitiate consent

are (a) error regarding the nature or type of the contract (Article 1510 of the Civil Code), (b) error regarding the identity of the contractual object (Article 1510 of the Civil Code), (c) error as to the substance of the contractual object, objectively considered (Article 1511 of the Civil Code), (d) error as to the accidental qualities of the object, if the accidental quality is the principal motive for entering into the contract and the motive is known to the other party and raised to be a contractual condition (Article 1511 of the Civil Code), and (e) error in the person (Article 1512 of the Civil Code). Any other error is “indifferent error” and does not have the power to avoid the transaction (Article 1511 of the Civil Code).

57. The test to be applied is that the error must be determinative of the will to become obliged, meaning that the error was the principal motive of one of the parties to enter into the contract and that motive was known to the other party (Articles 1511, 1512 and 1524 of the Civil Code). It must not result from the deliberate actions of one of the parties: if it does, the remedy lies in *dolo* not error. And the error must be excusable, which means that the person in error must not be at fault. In this regard it is material that all persons with capacity, whether literate or not, should take reasonable steps having regard to their position to understand a contract and its implications before entering into it {Day21/38:14} ff. “Having regard to their position” is not simply a reference to their own abilities in isolation: it takes into account the resources that are available to enable them to understand a contract and its implications. I have already outlined the close involvement of public officials under the mining and petroleum codes and the requirement that petroleum easements must be contained in public deeds: see [50] above. This requirement gives contracting parties access to notaries (whose role is discussed at [117] below). In addition people in Colombian municipalities have access to an Ombudsman’s office which takes an active interest in the processes and effect of laying pipelines, as evidenced by their involvement in the public meetings that preceded the laying of the OcenSA pipeline: see [338, 339] below.
58. Dolo as a vitiating vice has a well established meaning in Colombian Law. It consists in the positive intention to harm another person or its property (Article 63 of the Civil Code). It only vitiates consent when it is the deed of one of the parties and when additionally it appears clear that without it the other party would not have entered into the contract (Article 1515 of the Civil Code). The Supreme Court of Colombia has said (11 April 2000) that “Dolo implies a machination, a wilful assault against the rights and interests of the fellow man ... it consists of a cunning, a deceitful conduct whose purpose is to take by surprise the consent of the victim, that is vitiated accordingly.” In summary, (a) there must be a sort of artifice used by one party to deceive the other party, either by acts or omissions; and (b) the *dolo* must be determinant of the consent of the other party, meaning that the party consented to the act or contract under a mistaken belief induced by *dolo*. In the absence of these two conditions, *dolo* does not vitiate the will and the contract remains valid, though the fact of the *dolo* may give rise to an action for damages for the damage it has caused {H23.2/7/442} ff.
59. There is no free-standing doctrine of misrepresentation in Colombian law. Issues which in English law might be categorised under the heading of misrepresentation fall in Colombian Law to be dealt with under the doctrines of error and *dolo* (see above) and good faith (see below).

60. Professor Castro argued that, in addition to the requirement that a person's consent be non-vitiated, the requirement that there be consent carried the additional requirement that the consent be "genuine, free and spontaneous, with clear understanding of the meaning and effects of the legal act that is being consented." {H14/1/14/} at [24], {H23.2/7/432}. Although this assertion generated quite considerable cross-examination of the experts on either side, by the time of Closing Submissions, it was the Claimants' case that Professor Castro's use of the phrase "genuine, free and spontaneous" was merely intended to give the court an understanding of what the vices of consent mean in practice in Colombian Law. In case there remains any ambiguity in the Claimants' position it is necessary to state that I reject the suggestion that there is any additional requirement as originally formulated by Professor Castro. Neither Article 1502 of the Civil Code nor Article 900 of the Commercial Code imposes any such additional requirement and the use of the word genuine seems entirely superfluous since, if consent is not genuine, it is not consent. Professor Vallejo's objection to the use of the word "genuine" was based on the concern that it might be used to introduce a subjective element into the notion of consent rather than looking for the external expression adopted by the party, which is not justified. His objection is sound. Similarly, if "free" is intended to mean something other than "not subject to the vitiating vice of duress" it is not clear what, if anything, it adds to the Article 1502 requirement that there be non-vitiated consent. Professor Castro did not explain what she meant by "spontaneous" except to say that "the proof that consent must be genuine, free and spontaneous is on [sic] the provisions regarding vices of consent." {Day20/186:10}. I do not accept that the use of the word "spontaneous" is a legal requirement additional to the requirement that consent must not be vitiated by the vices referred to in Article 900 of the Commercial Code and Article 1502 of the Civil Code.
61. I also reject as an unjustified additional gloss or requirement the suggestion that, if the person giving consent does not have a clear understanding of the meaning and effects of the legal act that is being consented, the consent is not contractually effective. The Experts agree that a lack of understanding (or even being unable to read or write) is not an issue of legal capacity or incapacity under Colombian Law and that illiteracy does not equate to legal incapacity. Instead, the issue of lack of understanding can be properly addressed under the provisions governing error and dolo {H23.2/7/453}. This is not merely theoretical. Professor Castro accepted that many normal people do not read or understand the contracts they enter into, it being implicit in her answer that they may remain bound by the contracts {Day21/33:19}. I address the consequences of lack of equality in bargaining power and abuse of rights at [79]ff and [105]ff below; but lack of understanding is not without more a ground for avoiding contractual obligations either on the grounds of incapacity or as if it were a vice that vitiates consent.
62. The requirement that the contract should have a "determinable object" led to disagreement between the experts, particularly by reference to what the Claimants call the preliminary contracts and I call the First Letter, the terms of which are set out at [368] below. The starting point is Article 1518 of the Civil Code, which is the legal norm describing the object or subject matter of the contract and its requirements. Article 1518 provides:

“Not only things that exist, but also those that are expected to exist, can be the object of a declaration of free will. But it is necessary that both are commercial, and that they are determined, at least in their nature. *The amount may be uncertain as long as the act or contract provides rules or includes information which makes it possible to determine it.* If the object is a fact, it must be physically and morally possible. Facts are physically impossible when they are contrary to nature, and morally impossible when forbidden by law, or contrary to good customs or public order.” [Emphasis added]

63. In his first report, Professor Vallejo expressed the opinion that an agreement between parties to pay “full compensation” is insufficiently certain to create a binding obligation under Colombian Law {H15/1/141} at [625]. By way of comparison he said that an agreement between parties to buy an object for a “reasonable price” or to pay “full value” would not create a binding contract under Colombian Law, relying upon Article 1518.
64. Professor Castro did not address this point in her reports. In her joint statement with Professor Vallejo she referred to the requirement under Article 1518 that the amount must be determined or determinable and said “If the obligation is to pay compensation, the law or the subsequent agreement of the parties can establish the specific amount, under the circumstances.” {H23.2/7/466}. Later in the joint statement, she gave as her opinion that “the specific amount payable” [under the preliminary contracts] “is determinable, as permitted by article 1518 of the Civil Code” {H23.2/7/468}. This amounts to saying that an agreement to pay “full and equitable compensation” satisfies the requirement that the specific amount payable is determinable.
65. In cross-examination, Professor Vallejo’s opinion was tested by reference to three separate forms of agreement, namely insurance, guarantees and agreements relating to pharmaceutical trials {Day22/87:21} ff. To my mind, only the last of these three forms of agreement is informative. Adopting normal English understanding of insurance policies, a policy may be a valued policy or a policy providing for payment subject to an overall limit of indemnity. If it is a valued policy, the sum payable upon the occurrence of a contingency is determined. If it is an unvalued policy, the basis of indemnification will (as a matter of normal practice) be defined: for example, by reference to the replacement cost of a chattel, new for old (or not), diminution in value, loss of profits (which typically includes a formula to be applied in calculation), a person’s liability to a third party, and so on depending on the type of policy concerned. If an insurance policy were to be so deficient that it did not enable the sum payable in the event of the occurrence of an insured risk to be determined with certainty, it is not obvious why Colombian Law should regard that policy as compliant with Article 1518. That was Professor Vallejo’s view too because “the amount, the amount of the loss, the scope, the size of the loss, is a condition, obviously a condition *that would have to be defined by the insurer.*” {Day22/88:4}. Similarly, a policy of guarantee permits the sum payable to be determined with certainty, typically by reference to the amount or sum of non-performance of the primary obligor. As Professor Vallejo put it in cross-examination “a contract of guarantee to pay in the case that the principal debtor doesn’t pay a set amount of

money, that corresponds to the lender or they are joint and severally liable there, yes.” {Day 22/90:5}.

66. The position of an agreement to compensate for adverse results suffered by the subject of a drug trial is less straightforward. The Claimants submit that it is “highly infeasible that a Colombian court would provide no redress to the victim of a drug trial simply because the contract did not provide a precise mechanism as to how compensation would be calculated.” To an English lawyer that seems intuitively attractive and there are various tools or devices that might be used to ensure that compensation was paid. However, on closer examination, problems become apparent. First, an obvious mechanism that a lawyer would use under English law where the terms of the contract are deficient would be the use of an implied term. But what would be the precise scope of the implied term? A number of alternatives present themselves of which two suffice to illustrate the problem: compensation equivalent to that which would be awarded by a Court awarding damages for losses caused by established negligence; or compensation amounting to an indemnity against all losses caused by involvement in the trial, whether foreseeable or unforeseeable. Second, English law does not have Article 1518, which on its face requires the contract itself to ensure that the sum payable is determined or determinable and appears to me to be relevant to the question whether the Colombian Court would resort to the use of an implied term to remedy the deficiency to which Article 1518 is directed. Third, as a matter of fact pharmaceutical trials in the United Kingdom are closely regulated, one imposed requirement typically being the putting in place of an insurance policy (with a determined limit of indemnity) as protection for the subject in the event of an adverse outcome. The existence and terms of that regulation may affect the intuitive reaction about what redress a Court should award (if any) to the victim against the manufacturer. Transposing this by analogy to Colombia, the State has imposed a detailed regulatory system upon those involved in laying pipelines, which will be considered in some detail later in this judgment. As will be seen, part of the regulatory process in this case was the imposition of a requirement under the Environmental Licence that the licensee should “establish a system for the evaluation of the damage caused during the construction works and the adoption of immediate mitigation, recovery and compensation measures”: see [341] below. Little is known about the Licensee’s compliance with this requirement or how, if at all, it was monitored or approved by the Ministry; but it is to my mind not self-evident that the words “full and equitable compensation” would in these circumstances be regarded as giving rise to an obligation to pay more than provided for under a system imposed as part of the regulatory structure that seeks to balance private and public interests.
67. These considerations demand a re-examination of the initial, intuitive, willingness to accept that the Colombian Court would accept that an agreement to provide “full compensation” or “full and equitable compensation” satisfied the requirement that the sum payable should be determined or determinable. Professor Vallejo’s opinion is that it would not, for the reasons outlined in his report, the joint statement and in cross-examination. Professor Castro suggested in cross-examination that it would be sufficient to leave determination of the sum to be paid “to the process of the law” {Day 21/5:6}. I would be prepared to accept that parties could frame an agreement by reference to provisions of the law which would make clear how the sum payable should be determined, but that is not the issue that has arisen in this case since no such formula was adopted. The issue that falls to be decided in this case is whether a

general statement that a party would pay compensation is sufficiently precise to satisfy the terms of Article 1518. On that Professor Castro was ultimately constrained to agree with Professor Vallejo although she described his view as a narrow one. More than once, she accepted that this was what Article 1518 said: {Day21/6:11} ff, {Day21/7:5} ff, {Day21/9:10}. Apart from referring to “the process of law”, Professor Castro also referred to and relied upon Article 920 of the Commercial Code which provides for the market to fix the price in certain circumstances which do not apply here. She did not refer to any other provision or authority in support of her views.

68. The Supreme Court of Colombia has given guidance in its decision dated 8 July 1997 at pp 174-175. Having said that in the case of a promise the price should be determined it said that it is:

“sufficient that the contract contains the elements that allow [one] to know for certain its amount at the moment the obligation becomes enforceable. ... It is necessary to state that the elements of reference fixed in the contract may not be influenced by the intervention of the parties after the execution of the agreement and must be absolutely independent from the future will of the contracting parties. ... The promise is effective when the price has not been determined but is determinable *with the basis provided in the contract to know the amount with certainty...*” [Emphasis added]

69. This is a powerful endorsement of Professor Vallejo’s opinion on the application of Article 1518. The last words from the citation emphasise that, if the sum payable is not actually determined, it must be determinable “with the basis provided in the contract” to know the amount with certainty. For the reasons I have outlined above, a mere statement that compensation, or full compensation or full and equitable compensation will be paid does not of itself provide the basis to know the amount with certainty and therefore fails to satisfy the requirements of Article 1518. A contract may define what is meant by compensation elsewhere so as to satisfy Article 1518; or the parties may enter into a subsequent agreement which enables the sum payable to be determined with certainty – in which case it will be the subsequent agreement that is operative. But on the basic issue I prefer the evidence of Professor Vallejo for the reasons he gave and for the reasons I have set out above. In the light of the decision of the Supreme Court of Colombia to which I have referred, the criticism that his view is a “narrow” one is misplaced and I reject it.
70. I shall consider the proper interpretation of the preliminary contracts separately later, at which point it will be appropriate to keep in mind Articles 13 and 230 of the Constitution, which state general principles about how the Court should act in relation to those who are in a position of inequality: see [79]ff and [105] below.

Principles and rules for the interpretation of contracts

71. The Civil Code sets out the primary rules of construction at Articles 1618-1634:

“1618: The clear known intention of the contracting parties prevails over the literal words used by the parties.

1619: Irrespective of the generality of the contractual term, they will only apply to the subject matter which has been agreed in the contract.

1620: The sense, in which a contractual provision may produce legal effect, is preferred to that which is not capable of producing any effect.

1621: In those cases where no intention to the contrary appears, the interpretation that best fits the nature of the contract should prevail. Common usage clauses are implied even if not expressed.

1622: The clauses of the contract shall be interpreted by reference to each other, giving to each of them the sense that best suits the contract as a whole.

They may be also interpreted resorting to another contract executed between the same parties and on the same subject matter.

Or by the practical application of those clauses by both parties, or by one of the parties with the approval of the other party.

1623: When in the contract a case is expressed to explain the obligation, it shall not be considered that the intention [of the parties] was to restrict the agreement to that case, excluding other cases.

1624: If the previous interpretation rules cannot be applied, the ambiguous clauses shall be interpreted in favour of the debtor/obligor.

However, ambiguous clauses drafted or dictated by one of the parties, either the creditor/obligee or the debtor/obligor, will be interpreted against the drafting party, provided that the ambiguity results from a lack of explanation which said party should have provided. ”

72. The Judge’s temptation to rewrite contracts is apparently not confined to common law jurisdictions. In a landmark decision given on 29 August 1980 the Supreme Court of Colombia issued a salutary warning:

“Judges have an ample power to interpret obscure contracts, but may not forget that this function does not authorise them, under the pretext of interpretation, to distort or denaturalise agreements which meaning is clear and forthright, and far less deprive or reduce its legal effects, even when some of its clauses appear before them rigorous or unfavourable to one of the parties.”

73. Two points may be highlighted from the codified provisions set out at [71] above. First, Article 1622 permits the Court to interpret the terms of a contract by reference to other terms of the same contract as well as by reference to the terms of another contract executed between the same parties and on the same subject matter. This permission is of particular value when the Court is interpreting a series of related contracts, whether they are formally linked or not. Second, Article 1624 provides for ambiguous clauses to be interpreted against the drafting party, but only if the previous rules of interpretation cannot be applied so as to resolve the ambiguity.

The Duty of Good Faith in Contract

74. Article 1603 of the Civil Code provides that:

“Contracts must be performed in good faith, and consequently they bind not only with respect to the stipulations therein contained, but also in respect to all matters resulting precisely from the nature of the obligation or pertaining to it, as a matter of law.”

75. The Articles of the Commercial Code that are of prime relevance are Articles 822, 863 and 871 which provide as follows:

“822: The principles governing the formation of acts and contracts and the civil law obligations, its effects, interpretation, manner of becoming extinguished, avoided or rescinded shall be applicable to the commercial obligations and transactions, unless otherwise provided in the law [...].

863: The parties shall proceed in good faith exempt of fault in the pre-contractual stage, under the penalty of compensating the damages caused.

871: Contracts must be executed and performed in good faith, and consequently they bind the parties not only by their terms, but also by everything that pertains to their nature, according to written and customary law, as well as fairness.”

76. There is a substantial measure of agreement between the experts about the role of good faith in the various stages of pre-contractual and contractual dealings {H23.2/7/448}:

“Both experts agree that there is a duty of good faith at the pre-contractual stage, at the moment the contract is executed, and at the performance stage.

Bad faith does not constitute a free-standing cause of action. If bad faith is relied on it must be framed within a legally recognized cause of action. Departure from the standard of good faith in contractual relations has the following consequences:

(1) At the pre-contractual stage: if the Defendant intentionally revokes an offer communicated to the Claimant and frustrates the contract, he may become liable for any damages that are caused.

(2) At the stage the contract is being formed, the relevance of bad faith is that it may give a right to avoid the contract if the bad faith amounts to dolo (Civil Code Article 1502-02, 1508 and 1509).

(3) At the performance stage, the relevance of bad faith is that if the conduct amounts to dolo (approximating to the English concept of “fraud”), the Claimant is entitled to be compensated for all damages (whether foreseeable or not) that were the immediate or direct consequence of the breach (Civil Code Article 1616).”

77. I accept this statement of agreed opinion as being accurate. It became apparent during the experts’ evidence that there were differences of opinion lying behind these clear statements of agreement. Some were, to my mind, matters of semantics; but others require resolution.
78. The first issue to have exercised the parties is whether the duty of good faith imposes additional duties beyond those expressly provided in a contract. The answer to this is to be found in the terms of Article 1603 of the Civil Code and Articles 863 and 871 of the Commercial Code, which say that (whether or not this is expressly provided in a contract) “the parties shall proceed in good faith in the pre-contractual stage” (Article 863) and that “contracts must be executed and performed in good faith” (Article 871 and see Article 1603). Therefore, to the extent that the duty of good faith has substance which is not expressly provided for in the contract, there will be additional duties imposed on the parties, which supplement the strictly contractual obligations by establishing how those obligations should be performed. Whether these additional duties are described as autonomous or supplemental seems to me to be a matter of semantics rather than substance.
79. A more contentious issue concerns the substance of the duty of good faith both as a matter of principle and as it is worked out in particular circumstances. As a matter of principle, there is very little between the experts. They agree (and I accept) that the duty of good faith imposes an objective standard of conduct, namely the conduct that is required/expected from a competent and dutiful professional in the relevant industry placed in the same external factual circumstances of the contracting party – in this case the Defendant {H23.2/7/449} {Day21/66:24}. It goes without saying and the experts agreed that a competent and dutiful professional deals honestly with other contracting or potentially contracting parties. Both in his report {H15/1/10} at [26] and in evidence {Day22/136:20} ff Professor Vallejo accepted that every person is obliged to exercise his rights and perform his duty with diligence and in a fair way, which I accept as providing further understanding of the scope of the duty of good faith.
80. Real differences emerged between the experts when considering what would be required or expected of such a professional in practice. Professor Castro maintained

in the Joint Statement that a person negotiating or contracting with someone who was in a weaker negotiating position because of cultural, social or economic circumstances was obliged by the duty of good faith to provide “complete and timely information to the other party.” Her opinion was that, in such circumstances the stronger party is obliged “to orientate and warn the other party about the true implications and risks of the contract.” {H23.2/7/449}. She expanded on this by saying that:

“This duty includes a complete explanation about the magnitude of the project and the disclosure of all material information about the negative impact and probable losses, including damage to the land and other natural resources that are needed by the Claimants (farmers) for their livelihood.” {H23.2/7/476}

81. Professor Castro did not develop this opinion in her first report, merely opining that “it is a duty of good faith at the time of negotiation and execution of the contract, that the parties provide sufficient information to each other, especially when one of them is unable to read or understand and the other is a professional, experienced party” {H14/1/22}; and (specifically in relation to adhesion contracts) “Adhesion contracts are binding but when the parties do not have the same level of knowledge and expertise there is a burden of information and a qualified duty of good faith imposed on the professional party to explain to the other the meaning and legal scope of the agreement” {H14/1/45}. She did not provide any further explanation in her Supplemental Report or her second supplemental report. Since Colombian law requires agreement on the essential elements of a contract in order for it to be binding, it is not self-evident that an obligation to explain as stated in the first of these passages is an obligation to explain more than the essential elements of the contract into which the parties may enter, particularly where Colombian law recognises an obligation upon even the uneducated to take reasonable steps having regard to their position to understand a contract and its implications before entering into it: see [50] and [57] above.
82. Professor Castro’s opinion is not supported by the learned texts to which she originally referred {I2/2T/35}, {I2/13T/550}. They are concerned with the existence of a duty of good faith in the pre-contractual stage and do not mention a positive obligation of disclosure. At the Court’s invitation, she submitted a short paper after the conclusion of her evidence, listing material which she said supported her views {I2/12/533}. The list included extracts from one Supreme Court decision, two arbitral awards and three learned texts.
83. The Defendant did not have the opportunity to cross-examine Professor Castro on these materials, but Professor Vallejo provided a note responding to her citations {I2/12.1/539.1}. His note primarily addressed the question whether breach of the duty of good faith at the pre-contract stage could give rise to a claim for damages if a contract was concluded, which I address below at [99]. However, he also touched on the present issue. I review the passages cited by Professor Castro in turn.
84. Professor Vallejo’s note asserts (and, having read the decision in full, I accept) that Professor Castro’s citation from the Supreme Court decision of 5 August 2014 is inappropriate because it comes from a passage where the Court is reviewing the historical development of the doctrine in other jurisdictions (referring specifically to

Fegelle and Saleilles, respectively Neopolitan and French authors) and is not setting out the current state of the law in Colombia. Neither the citation nor the decision as a whole provides support for Professor Castro's position.

85. The First Arbitral Award on which Professor Castro relies (15 March 2001) supports some but not all aspects of her position. It maintains that, in the pre-contractual stage, the due fulfilment of the duty of information includes providing information about "those characteristics which avoid the assumption, on the part of either contracting party, of risks which are excessive, unforeseen, hidden or abnormal contingencies such that all the risks assumed by the parties are duly compensated." {I2/12/535}. It does not, however, suggest that the obligation extends to all of "the true implications and risks of the contract." Professor Vallejo disputes that the supportive elements of the decision are a correct statement of Colombian Law, pointing to the absence of any Supreme Court decision that supports them. In his view the duty to inform should cover only known risks (i.e. those that are likely to occur in the absence of any breach of contract) because good faith is also presumed – as a matter of law – at all stages so that it would be wrong to anticipate a future breach of contract. In addition, it is entirely unclear why or how a party should be expected as part of a duty of good faith to explain "hidden or abnormal contingencies", still less unforeseen ones. Although this award provides some support for Professor Castro's opinion, arbitration awards are neither law nor auxiliary criteria, though they may command respect by virtue of their contents: see [22] above.
86. I have read the second Arbitral Award on which Professor Castro relies (29 November 2006 {I2/14T/600}) in full as requested although the Claimants made no detailed submissions on it. It concerned the sale of shares by a contract made between people who had been business partners (albeit with a degree of informality based upon mutual trust) for over three decades, which (the tribunal found) imposed a requirement of "the utmost loyalty and honesty in behaviour" towards each other. The central allegation was that some of the shares were grossly undervalued to the Claimants' disadvantage. The undervalue stemmed from a report ("the Zitzmann report") which had been commissioned by the Defendants and which made various adjustments for which there was no apparent justification. Much of the award is taken up with matters that are not directly relevant, including an interesting discursion on the need for agreement on the essentials of the contract at p. 621ff. Professor Castro's note said that the award included the statement: "the duty of information is granted in favour of whomsoever could legitimately rely on the counterparty, by reason of the nature of the contract or the parties ... each of the parties has to inform the other regarding all points that could be of interest to the other" {I2/12/536}. The Claimants have provided a full translation of the award. The equivalent passage appears in significantly different terms at {I2/14T/636} as follows:

"The duty of information applies to those who legitimately trust their counter party, particularly because of the nature of the contract and the quality of the parties to it. But in addition, "It could be said, in conclusion, that when there is a relationship of trust between the parties, the reciprocal duty of information should be automatic. That is, that each party has to inform the other of all points which could be of interest to the other. As such, the relationship of trust excludes, for both parties, any

responsibility to investigate or get informed.” It is added that this doesn’t entirely exclude this responsibility (negligence cannot be encouraged) but it does diminish it, as a result of the mutual trust and bonds of friendship of many years between contracting parties.”

The passage continues:

“Article 871 of the Commercial Code sets the rules under which contracts must be signed (and implemented) in good faith. That is, prohibiting reproachable attitudes that could affect either of the contracting parties in the process, not just in the implementation of the contract, but also in its drafting. The commercial relationship between [the defendant] and [the claimants] involved, as we have seen, a special level of trust between the two parties. As a result, good faith, in the objective sense imposed a special duty of loyalty and correctness, which was not met for [the claimant] in [the defendant’s] reference to a questionable study of the true reality of the firms within the agreement.

The above equates to failure to comply with a legal duty (which forms part of the content of the deal) and means as a result, that the contract was broken, because at the moment of its signing the duty of correctness was not adhered to, which constitutes this *litis*, to satisfy the duty to inform on the basic aspects of the agreed contract. An untrue report influenced the contract drafting and, of course its signing, as [the defendant] transferred some stocks and shares at an intrinsic value far in excess of the value of shares he received from [the claimant] the latter violated, without a shadow of doubt, the good faith requirement which should be evident in all legal dealings. That breach of duty to act in good faith, which ultimately caused damage to [the claimant], in negotiating shares at a much lower price than their intrinsic value is what shall be compensated in the manner detailed below.”

87. When seen in context, it is apparent both that the citation advanced by Professor Castro did not fully set out the sense of the award and that the award was not seeking to lay down a general principle that the duty of good faith always imposes an obligation upon a party to the extent contended for by Professor Castro in the Experts’ Joint Statement. The apparently broad statement of principle derived from the particular relationship of trust (not simply inequality), which gave rise to an obligation to inform of all points of interest. The specificity of the circumstances to which the citation relates is clear from the (qualified) indication that the relationship of trust excludes any responsibility upon the parties to investigate or to get informed. Understood in this way, the passage has obvious logic and coherence; but I do not accept that it provides material support for the very broad statements of principle advanced by Professor Castro. It is also material to note that the arbitral tribunal did not regard the breach of trust as giving rise to *pre-contractual* liability. This is clear from the reference to the contract being broken “because at the moment of its signing

the duty of correctness was not adhered to ...”; and from the passage at {I2/14T/637} which follows those set out above:

“The court considers that failure to act in good faith can constitute a breach of contract: abusing the trust of the other is to contradict the principle of good faith and, more specifically, the normative value which affects every aspect of the contract. Article 1603 of the civil code states “Contracts must be executed in good faith, and this accordingly obliges parties not only to what is contained therein, but also to all matters which emanate from the nature of the obligation, or which relate to it by law”, or conceived more broadly “Contracts must be entered into and executed in good faith and, as a consequence, oblige parties not only to what is expressly stated therein, but also everything which relates to their nature, according to law, customs and natural justice”, as stated by article 871 of the Commercial Code.

Our understanding of contractual obligations in this ruling is based on the aforementioned articles 1603 of the Civil Code and 871 Commercial Code, which represent the ruling laws (*ius cogens*) and provisions, good faith, customs and natural justice. With regards good faith, in its condition as a legal principle, it must be said that this plays an integral function in the contract in that it gives rise to special duties of conduct (to information, to advice, to loyalty), each of which are required in all cases, in accordance with the nature of the agreement and with what each party seeks. As a consequence, good faith serves an integral function in defining the content of the obligation and the determination of the service that is due. Good faith imposes on the debtor the obligation to supply the creditor with whatever assistance is required to satisfy his interests and, at the same time, the concepts of loyalty and correctness impose a duty to respect and safeguard the interests or utility of the counterparty, and consequently the obligation to avoid any behaviour which may cause damage to the other party.

The obligations which arise from a contract are not limited to what is expressly contained within them, but to all those duties which emanate from the nature of the commitment and interest, as stipulated by the law when it ascribes good faith to binding commitments between parties.”

88. These passages form the high-point of support for Professor Castro’s argument in suggesting that, as a general proposition, good faith imposes on the debtor an obligation to avoid any behaviour that may cause damage to the other party. It is said that these principles derive from Article 1603 of the Civil Code and Article 871 of the Commercial Code; but Article 1603 concerns performance of contracts and not their execution or any stage before that; and Article 871, while imposing an obligation on

the parties to execute contracts in good faith, states that the consequence of the obligation is that contracts “bind the parties not only by their terms, but also by everything that pertains to their nature.” Neither article provides support either expressly or by necessary implication for the existence of a free-standing right to claim damages for failure to discharge the duty of good faith in the pre-contractual period where a contract is concluded and not set aside.

89. I remind myself that I am required to apply Colombian Law as it would be applied by the Supreme Court of Colombia, which is notably silent on the existence of a right to claim compensation as a general consequence of a breach of good faith in the pre-contractual period and at the moment of execution. While I accept that the terms of the Arbitral Award of 29 November 2006 support the broad proposition for which Professor Castro contends, the reasoning goes well beyond what is required by the terms of the Civil and Commercial Codes, and is not supported by any judicial decision of the higher courts of Colombia that has been cited to me. On the materials that I have, I find the Arbitral Award of 29 November 2006 to be unjustifiably expansive and not corroborated by Colombian Law or Auxiliary Criteria for the Interpretation of the Law.
90. Professor Castro cited one passage from her first learned text (on the Formation of Contracts, by Professor Pedro Munar Cadena, which Professor Castro edited and to which both experts referred in the course of their evidence); but the Claimants requested that I read the chapter from which it came, and I have done so {I2/15T/661}. The context for Professor Castro’s citation is provided by the preceding paragraph, in which the author states (at p. 666) that the old principle of *caveat emptor*:

“...has a fairly relative scope, in that there are many hypotheses in which, both in the pre-contractual and the contractual sphere, those involved are obliged to provide true and complete information to the other party, particularly, but not exclusively, when concerning consumer relationships or when one of the parties is a professional in the matter and the other is not.

That being the case, as has been highlighted by the Supreme Court of Justice, deceitful indications or, where applicable, the reticence of the contracting parties in the preliminary phase of the negotiations are not indifferent to legislation, given that within the duties of correctness and loyalty which are demanded from all persons involved in business deals, is the duty concerning information or declarations which they are called to provide, where applicable, as regards to the object, circumstances or distinctive features of the agreement on track for completion and whose importance, although variable, is substantial for the purposes of freeing the consent of the counter party from artifices or defects which may affect it.”

91. Later in the chapter (at p.667) the learned author summarises the scope of the obligation as follows:

“As regards the object and content of information which subjects must provide, it is important to highlight, firstly, that its aim is to make the other aware of the “scope, extent or magnitude of the obligations which are to be addressed”, which entails giving notice of the different risks which may arise from the consolidation of the deal. In that vein, the information must be provided:

- a) Objectively, in that any additional reflection that stands to influence the decision of the counter party must be taken as advice;
- b) It must be given completely, properly and truly;
- c) It must [be] limited to what the informant knows;
- d) It must refer to questions of importance, that is, those that influence the counter parties consent, as tends to occur with questions relating to the negotiable object, the cause and effect.”

Implicit in this statement is that the obligation to provide information does not extend to information which is or should be known to the other party. This is made explicit at (p.669) where the learned author says:

“Limits of the obligations to inform and give advice.

It must be stated that these two obligations are truly relevant in situations where one of the parties is a professional and the other a lay person. If both parties know or should know by virtue of their work, the scope of the contract which they aspire to execute, the obligation to inform or to offer advice disappears or is at least attenuated.”

- 92. Both parties referred in closing submissions to a passage at {I2/15T/671} where, after referring to the well-recognised liability that may arise if a party breaks off negotiations in bad faith, the learned author refers to “*other hypotheses of pre-contractual liability.*” What is suggested is that where there is an action for nullity (on the basis of error or dolo) there may be scope for compensatory damages. The passage is not straightforward and, as a result of a reference to “foreign doctrine” is not obviously making a clear statement of current Colombian law as opposed to a hypothesis of what Colombian law might be where the right to nullity is established.
- 93. Professor Castro’s second academic text is an Article by Chinchilla (2011). It provides a general description of the duty to inform with loyalty and diligence in order that the contract serves the purposes of both parties and that the parties are required to cooperate for its performance, under objective good faith, a proposition with which Professor Vallejo agrees. Echoing a passage from Professor Cadena’s chapter, where he uses the example of the obligation upon a surgeon possessed of special skill and knowledge of risks to provide sufficient information to enable the patient to decide whether to go ahead with an operation, Chinchilla says:

“The duty of information is an obligation upon the parties, for the purposes of fulfilment of the postulate of good faith. In addition, we can establish that the duty of information finds its reason for being in two assumptions: first, in an imbalance of knowledge between the contacting parties, which allows the informed counterparty to be required to communicate regarding the full content of the contract to be agreed. Secondly, in the clarity that must sustain consent, a clarity which includes not only understanding the contractual operation to be entered into, but also the full understanding of the extent of the rights and obligations which are thereby acquired, including an evaluation of the risks involved in the contract.

...

In that regard, the qualities of the contracting parties will determine the scope of the fulfilment of the duty of information, such that its specialised role or its privileged position with respect to the other increases the duty of information and makes it more rigorous at the time it is required, in which case the duty of advice arises to complement this duty.”

94. Taken together, these passages make the important points that the scope of the obligation to give information is a function of the respective positions of the parties; and that the reason for the existence of a duty of information lies in the need to sustain consent. These points support the agreed position as expressed by the experts that breach of the duty at the stage the contract is being formed may give a right to avoid the contract. They do not support the proposition that there will be a free-standing right to claim damages even if the contract is not set aside on the grounds that consent has been vitiated.
95. Professor Castro’s final citation does not appear to comment on Colombian laws or precedents. I am unable to attach any weight to it.
96. Pulling these strands together, I conclude that:
 - i) The duty of good faith in the period up to execution of a commercial contract is a general duty aimed at ensuring that the parties can reach a reasonably informed decision about the important aspects of a proposed contract and whether they wish to enter into it. The scope of the duty may vary depending upon the relations between the parties: for example, a relationship of trust may impose higher obligations than would otherwise exist. Similarly, the obligation upon a surgeon with a patient who is contemplating an operation may be very extensive so that the patient can make an informed assessment of whether to enter into the contract for surgery or not: the scope of the obligation would be a function of the degree of known reliance of the patient upon the surgeon. The variable scope of the duty is implicit in the experts’ agreement that it is to comply with the conduct that is required/expected from a competent and dutiful professional in the relevant industry placed in the same external factual circumstances of the contracting party: this test contains two

variables, namely (a) the external factual circumstances and (b) the standard to be expected of a professional in the relevant industry.

- ii) Since the purpose of the duty is to ensure that parties enter into contracts on the basis of sufficient information, the duty on a contracting party disappears or is at least attenuated in relation to information that the other party already has or should have. There is no obligation upon a party to disclose information which he does not know. Furthermore, the duty does not extend to requiring a party to inform the other party of the risks that could occur if the informing party were to breach his contract, since Colombian law assumes in the period up to and including the conclusion of the contract that the continuing duty of good faith will be adhered to and that parties will not breach their contracts. The situation might be otherwise if at the time of contracting, the disclosing party had already formed the intention that it would breach its contractual obligations: I would reject any suggestion that this possible exception applies on the facts of this litigation.
 - iii) In general the duty of disclosure imposed on one party in the period up to execution of a contract does not obviate the duty on the other to take reasonable steps to understand a contract before entering into it.
 - iv) Professor Castro's formulations of the duty of good faith in the pre-contractual period set out at [80] are too wide and I reject them. There is no duty to provide "complete" information "to orientate and warn the other party about the true implications and risks of the contract." Nor is there a duty to provide "a complete explanation about the magnitude of the project" or to disclose "all material information about the negative impact and probable losses." I prefer the formulations in the extracts from Professor Munar's book that the party owing the obligation is called to provide information "as regards to the object, circumstances or distinctive features" of the agreement "whose importance ... is substantial for the purposes of freeing the consent of the counter party from artifices or defects which may affect it." In other words, "It must refer to questions of importance, that is, those that influence the counterparties' consent, as tends to occur with questions relating to the negotiable object, the cause and effect." Provided the counter party is furnished with this important information, either from his own knowledge or from information provided to him in the course of negotiations, he is in a position to weigh the risks for himself and to decide whether or not to enter into the contract on the terms being proposed.
 - v) These conclusions are consistent with and take into account the terms of Article 13 of the Constitution that "The State will especially protect those individuals who on account of their economic, physical or mental condition are in obviously vulnerable circumstances and will sanction abuses or ill-treatment perpetrated against them." The framework I have outlined is elastic in its application because the level of information to be provided will depend upon what is required to enable a counterparty to exercise consent that is not liable to be vitiated if challenged subsequently.
97. I will review whether the Defendant acted in breach of its obligation of good faith towards the Claimants with whom it contracted on a case by case basis. A number of

features will be relevant when considering the scope of the duty of information in any given case:

- i) The fact that Colombian law and the regulatory structure provided for the provision of information by public meetings may affect what else (if anything) the Defendant was required to disclose to individual contracting farmers in order to discharge the duty of good faith; but the taking of the steps required by the regulatory system would not necessarily of itself discharge the duty where it existed;
 - ii) Although technical knowledge and expertise rested with the Defendant rather than the landowners through whose land the pipe was to be laid, neither expertise, technical knowledge nor imagination would be required for the landowners to understand in advance the main consequences of laying a pipe in a 25 metre ROW passing through their land. On many occasions it was submitted that the Claimants understood their land, a submission that is easy to accept in the case of all working farmers. They would all be immediately alert to the general consequences for their fragile land of bulldozing a strip for the ROW, piling up mounds of earth, and working on the exposed surface with heavy machinery before attempting to reinstate the land. Many had prior experience of the ODC pipeline which, as outlined below, will have caused major disruption during construction. While the ODC ROW had recovered well over parts of its length, in other parts it was still in a worse condition in 2005/2006 than it had been before the ODC works; and a number of landowners had suffered damage off the ROW in respect of which claims had been made and settlements achieved: see [393]ff below. In the close-knit agricultural communities with which this litigation is concerned, the impact of the ODC ROW and the likely impact of the Ocenca pipeline works would have been matters of common (though not necessarily universal) knowledge, at least at a general level of understanding. If further evidence is required for this conclusion it is to be found in the comments made at the public meetings, which showed a clear appreciation that the damaging mistakes made during the construction of the ODC pipeline should not be repeated with the Ocenca pipeline: see [338]ff below.
98. Allied to the dispute about the scope of the duty of good faith was a dispute between the experts about what remedies were available in the event that the duty was breached. The experts agreed that the remedy for pre-contractual breaches of the duty of good faith if no contract is concluded as a result is compensatory damages: see [76] above.
99. It is also agreed that if a contract has been concluded as a result of a breach of the duty of good faith, it is open to the offended party to apply to set aside the contract on the grounds of dolo. Embedded in Professor Castro's disagreement about the scope of the duty, as shown by the citations she subsequently provided, was the proposition that in such circumstances the offended party could maintain an action for damages even if the contract was not set aside.
100. In his note in reply to Professor Castro's list of materials, Professor Vallejo provided two further citations at {I2/12.1/539.3}:

- i) The Supreme Court decision dated 23 May 2005 involved a case in which the Claimants had claimed damages arguing that the Defendants acted fraudulently in the pre-contractual, contractual and post-contractual stages. The Appellate Court confirmed the Circuit Judge decision dismissing the complaint on the basis that "... since the Defendants published a lease offer in a newspaper of ample circulation, which was the basis for the lease contract executed on the 12 of July 1996, the pre-contractual stage was closed, and accordingly, that way to claim damages precluded." The Supreme Court upheld the Appellate Court decision and made no doctrinaire rectification on the point;
 - ii) A citation from an academic text by Bianca which states that "a recurring case of pre-contractual liability takes the form of the unjustified breaking off of negotiations. Unjustified breaking off of negotiations happens when the party withdraws without justification from negotiations conducted up to the point of leading the other party to be reasonably confident of the conclusion of the contract. Pre-contractual liability does not presuppose an obligation to conclude a contract. On the contrary the existence of such a contract excludes pre-contractual liability because in that case the party under obligation will be liable for non-performance."
101. The citation from Bianca is consistent with passages from the Decision of the Supreme Court dated 23 May 2005 which support the existence of an entitlement to compensation where contract negotiations are frustrated to place the affected party in the same economic situation as if the frustrated negotiations had not taken place. This is the well-established doctrine identified by the experts in their agreed statement. The relevant passage continues "...however, such compensation may not be claimed under the same conditions to those that would originate due to failure to perform an obligation, as if the purported contract had been concluded.": see {12/12.1/539.2}. This emphasises that the agreed doctrine is dependent upon no contract having been concluded. Although the passage does not expressly say that no other remedy may flow as a result of pre-contractual bad faith, there is no suggestion that it may do so. Specifically, there is no support for Professor Castro's contention that pre-contractual bad faith may give rise to a free-standing claim for damages where a contract has been concluded.
102. Professor Castro has not referred to any article of the Civil or Commercial Codes that supports the existence of such a free-standing remedy; nor has she referred to any judicial authority establishing or supporting its existence. Professor Vallejo's evidence is that he is not aware of a single reported case in which damages have been awarded for breach of the duty of good faith, in circumstances where the parties have subsequently entered into a contract. In his opinion, to do so would be clearly a contravention of Colombian Law. His position is supported by his two additional citations, which include a decision of the Supreme Court that is in point. The existence of such a remedy would also be inconsistent with the agreed statement of the experts that "Bad faith does not constitute a free-standing cause of action. If bad faith is relied on it must be framed within a legally recognised cause of action." To my mind, the system of remedies agreed between the experts as set out at [76] above provides a coherent structure: Colombian law provides a compensatory remedy in the event that the Defendant frustrates the formation of a contract; if, however, a contract

is concluded and the parties' consents are not vitiated by error or dolo, each party is to perform its obligations in good faith and, if a party does not do so, the other party will be entitled to be compensated for all damages (whether foreseeable or not) that were the immediate or direct consequence of the breach. While English law's approach is different, that is no reason to add to the established and agreed framework of Colombian law.

103. For these reasons I prefer the evidence of Professor Vallejo and conclude that, where parties enter into a contract, it has not been shown that Colombian law recognises a free standing action for damages for loss suffered as a result of breach of the duty of good faith in the period up to and including its execution.

Due Care in the Performance of the Contract

104. It is common ground that the contracts in issue in this litigation are contracts of mutual benefit of the parties {Day21/69:3} ff. Under such contracts the debtor/obligor must perform his obligations with due care and diligence and will be liable for breach resulting from medium or ordinary fault pursuant to the provisions of Articles 1604 and 63 of the Civil Code {H23.2/7/451}. The relevant standard of care is that of the dutiful merchant placed in the same external circumstances of the merchant {H23.2/7/451}. The exercise of contractual rights is governed by the doctrine of abuse of rights, which is connected but different {Day21/60:3} ff. The Claimants submit that it is implausible that the victim of a negligent exercise of *rights* under a contract would have no remedy under Colombian law. Professor Vallejo disagreed, and so do I. The submission takes no account of the clear separation that Colombian law recognises between claims in contract and in tort, and attempts to elide tortious principles with those that apply in contract. Where a contract confers rights upon a party, they must be exercised in good faith; and an abuse of those rights can give rise to a remedy as set out below. In addition, if a party's conduct amounts to a breach of contract, Colombian law provides remedies. There is, to my mind, no compelling reason why conduct in good faith which falls within the terms of the agreement between the parties should give rise to a quasi-tortious remedy in contract.

Abuse of Rights in Contract and Tort

105. The experts agreed the following {H23.2/7/455}:

Principle: There is no legal definition of abuse of rights. A person may not abuse his legal or contractual rights and cause damage to another person. Such abuse is the exercise of rights to prejudice another person or to obtain an improper advantage at the expense of that person.

Scope: Abuse of rights may occur in contract or in tort.

Legal effect: The abuser is liable to compensate the damages caused to the other person.

Test for abuse of rights in contract: In order for a Court of Justice to be satisfied that a party to a contract abused its rights,

it is necessary in our opinion to demonstrate all of the following:

- The existence of a contract between the Claimant and Defendant.
- Identification of the nature and scope of the contract according to the law governing the contract.
- Either (i) the inclusion of an abusive contractual stipulation, in the sense of a provision which significantly departs from the standard permissible terms governing the respective contract or activity, and in a manner contrary to the normal practices of the trade; or (ii) exercising a right in an improper way and which distorts its genuine purpose. And,
- That the abusive contractual stipulation or abusive behaviour causes an unfair economic loss to the Claimant.

Test for abuse of rights in tort: The abuse of rights may give rise to a non-contractual liability. In order for a Court to be satisfied that an abuse of rights exists, it is necessary for the Claimant to prove:

- That the Defendant possesses a right, which must be defined precisely in its nature and legal scope.
- That the Defendant acted or took particular steps on the assumption that it was exercising its right.
- A contradiction between the scope of the right (as previously defined) and the scope of the conduct performed by the Defendant; in the sense that the Defendant's conduct deviated from the purpose of the right by exceeding its normal boundaries.
- Damages resulting to the Claimant as a consequence of the conduct of the Defendant exceeding the legitimate exercise of the right or deviating from it.”

106. Two areas of disagreement emerged which were:

- i) The relevance or effect of inequality of bargaining power; and
- ii) Whether negligence in the exercise of rights is, of itself, sufficient to lead to a finding of abuse of rights.

107. Both experts relied upon passages from the decision of the Supreme Court on 19 October 1994. The case concerned a loan obtained by a building entrepreneur from a

special bank that financed construction projects. The bank exerted very onerous conditions by demanding collateral deposits at very low rates and by restricting the use of the monies disbursed to the borrower. The Court held that the bank had abused its dominant position towards the customer and engaged in prohibited banking practices, because the banking statute prohibits every bank from abuse of its dominant position by inserting exorbitant clauses to the prejudice of consumers: {H15/1/48} at [253].

108. The passages relied upon from the judgment are as follows:

“According to the jurisprudence doctrine accepted by the Court, there is abuse of rights when the owner of the right exercises it with malice *or negligence*, that is, when in the exercise of a right harm is caused to another, either with the intention to cause harm *or without the diligence and care that men ordinarily employ in their actions and business*. Fault in the exercise of the right, the absence of legitimate interest or deviation from the purpose for which the rights have been granted are used by the judge as an orientating criterion in the application of the above mentioned theory. It may be present at the formation stage of the contact, during its performance, and even in the post-contractual period.

(...) regarding the autonomy of private will and the set of faculties that persons have by virtue of the same, which are condensed into the power to enter into, or not enter into a contract, to decide with whom to execute the contact and to agree on the provisions that will govern such relationship, abusive conducts may arise which, if causing harm to interests not protected otherwise, entitle the aggrieved party, even whilst bound by the agreement, and [because of its binding consequences], to demand the corresponding compensation.

And a persuasive example of this type of irregular behaviour can be found in the exercise of ‘bargaining power’ by a party who is in fact or by law in a dominant position in the trading of capital, goods and services, and has not only determined from the outset the conditions in which the contract is executed, but in the formation and performance phases has the control of such conditions, giving rise to clear abuse – bearing in mind the particular circumstances of the case - advantage is taken of the dominant position, by action or omission, with detriment to the financial balance of the agreement” (Italics added)

109. Professor Castro relies upon Article 333 of the Constitution which provides that the Colombian State shall avoid or control any abuse of dominant positions in the domestic market by persons or companies. Professor Vallejo responds that dominant position is defined for the purposes of Article 333 as being able to determine directly or indirectly the conditions of a market, and that Article 333 is concerned with

conduct in relation to competitors and the protection of the relevant market {H23.2/7/456}. It is neither possible nor necessary to resolve this sub-issue, because it is clear from the facts of the Supreme Court decision on 19 October 1994 that the existence of a dominant position as between individual contracting parties (in that case the bank and the borrower) is relevant when investigating the issue of abuse of rights. It is virtually self-evident that an imbalance in power may enable the dominant party to impose “a provision which significantly departs from the standard permissible terms governing the respective contract or activity, and in a manner contrary to the normal practices of the trade” or to “[exercise] a right in an improper way and which distorts its genuine purpose” but does not justify an assumption that it will have done so. To that extent, I prefer the evidence of Professor Castro that what she calls an asymmetry of information or power may be relevant to the question whether there has been an abuse of rights.

110. The italicised extracts from the judgment of 19 October 1994, if taken on their own, support the proposition that negligence in the exercise of contractual rights may of itself justify a finding of abuse of rights. If that were correct, it would give an extended meaning to the term “abuse”; but it is not. As set out above, the experts are agreed that an element of abuse of rights is that the right should be exercised in a way which “distorts its proper purpose” or, in the case of imposition of terms, “significantly departs from the standard permissible terms governing the respective contract or activity, and in a manner contrary to the normal practices of the trade.” Professor Castro expressed this requirement in different terms in her original report as follows:

“The conditions that have been established as to create the abuse of rights are: i) a behaviour permitted by law; ii) *the use of the right, contrary to the clear purposes of the law*; iii) intention or negligence by the author of the abusive behaviour.”
(Italics added) {H14/1/24} at [50].

The need for the additional element of deviation from the proper purposes of the right is also clear from the judgment of 19 October 1994 in the statement that “the absence of legitimate interest or deviation from the purpose for which the rights have been granted are used by the judge as an orientating criterion in the application of the above mentioned theory”.

111. I therefore reject the submission that the negligent exercise of rights, without more, may give rise to a finding of abuse of rights. There is no conceptual limit to the circumstances in which abuse of rights may occur either in the process of contract formation or during contract performance, but the test to be applied will be that agreed by the experts, including all of the elements identified by Professor Castro in her original report. The mere fact that a contract term is onerous may raise a question; but it does not demonstrate or necessarily evidence abuse of rights. In this regard I accept the evidence of Professor Vallejo (at {Day23/63:19}) that, while a contract term providing for compensation of damage which was not a genuine pre-estimate of the damage *could* be the result of an abuse of rights, it is necessary to apply the agreed test to determine whether it is so. Amongst the factors to be taken into account in determining whether there has been an abuse of rights would be the existence of a statutory regulatory scheme and whether the contract as a whole (or the particular provision) fits in or is compatible with that scheme, the approach adopted in

other similar circumstances, and whether, viewed overall, the contract was unfair to either party in all the circumstances.

112. The Claimants submitted that in addressing the issue of abuse of rights, the Court should pay special attention to the fact that the landowners “must accept the establishment of the ROW on their properties, or else they face potential expropriation by the State.” I accept that this is a feature to be borne in mind, and I will do so. At the same time, it should not be forgotten that the backdrop of potential expropriation is part of the balance between private and public interests established by the Colombian State and that the articles establishing that balance treat expropriation as a last resort, which only comes into play once the entrepreneur makes an application and provides a list of “the steps that have been taken to get what is required through a contract freely entered into with [the landowners]”: see [38] above. It is therefore clear that the Colombian legal framework does not treat the possibility of expropriation as automatically depriving the landowner of freedom of contract. That does not, of course, determine whether there has or has not been an abuse of rights in a given case.

Circumstances in which a contract is superseded or extinguished by a later agreement.

113. The experts agreed the following {H23.2/7/458}:

- “(i) The parties may contractually stipulate that an existing agreement is superseded or extinguished by a later agreement. But this does not mean that a specific contractual provision is required in order that one obligation replaces the other.
- (ii) There are contracts that are preliminary and temporary by their own nature, such as promissory agreements, which are entered to prepare the execution of a future and definitive contract. When the promised (future) contract is executed, the preparatory contract is superseded and no longer produces effects. ...
- (iii) A third hypothesis is ruled by the law: an obligation is superseded and extinguished by a later obligation, even without an express agreement, when it appears undoubtedly that the intention of the parties was to replace or substitute an existing obligation for a new obligation (*animus novandi*). It is for the Court to decide whether in the absence of an express contractual provision, as already explained, the parties had the intention that the previous agreement (and its obligations) is superseded by a new agreement amongst them.
- (iv) If no intention to novate appears, the two obligations shall be regarded as coexistent and the old obligation will produce effects in what is not contrary to the new obligation, and the privileges and guarantees of the former shall subsist to that extent.”

114. In response to questions from the Court, Professor Vallejo said that even if the inconsistency between the first contract and the second contract does not cover the whole of the first contract, the Court may be driven to the conclusion that the inconsistencies between the two contracts, though not complete, was so great that the second contract superseded the first as a whole {Day22/114:15} ff. I accept that evidence, the question in any given case being whether the extent of the inconsistencies between the contracts demonstrates an intention on the part of the contracting parties that the first contract is to be superseded as a whole.

Framework Agreements

115. Framework agreements are not defined as such in Colombian law but the expression is used and well understood by lawyers in Colombia. The experts are agreed on a working definition: a framework agreement is a transaction whereby the parties set forth general parameters to subject future or eventual contracts amongst them but without assuming specific obligations. The framework agreement provides rules that must be taken into consideration in future agreements between the same parties. This agreement does not impose any formal requirements and no such requirements are imposed by Colombian law.

Unilateral Agreements

116. By then end of the trial any suggestion that there existed unilateral agreements on the facts of this case had fallen away: {Day20/187:10} ff.

The role of Notaries

117. The role of notaries in the Colombian legal system is governed by Decree 960 of 1970, among other regulations. The articles that are of particular interest in the present case are:

Article 7: “The Notary is at the service of the law and not of the parties; he must provide advice and counselling to all the parties executing the documents in a conciliatory attitude.”

Article 9: “Notaries are responsible for ensuring that the instruments they authorize comply with the relevant formalities, but they are not responsible for the veracity of the statements made by the interested parties, nor for the legal capacity or aptitude of the same to execute the act or contract concerned.”

Article 12: “Acts and contracts for the transfer or the encumbrance of real estate property must be executed by means of a public deed, and in general all contracts in respect of which the law requires this formality.”

Article 14: “The **reception** consists in the Notary perceiving the declarations made by the interested parties before him; the **extension** is the written version of what has been declared [by

the interested parties]; the **conferment** is the express consent of the parties to the written document, and the **authorisation** is the faith impressed by the Notary in the document, in view that the pertinent requisites have been fulfilled and that the declaration has been made by the interested parties.” (Emphasis added)

Article 17: “The Notary will review the declaration presented by the parties, drafted by them or on their behalf, to verify its consistency with the purpose of the attendants, the legal norms and the clear idiomatic expression; and may suggest, consequently, the corrections that he deems necessary.”

Article 21 as amended by Article 35 of Decree 2163 of 1970: “The Notary will refrain from authorising the instrument [deed] if, due to the content of the declarations of the parties, or based on convincing evidence, or in facts directly perceived by him, he is convinced that the act would be absolutely null and void, according to Article 1504 of the Civil Code” [cases of absolute incapacity].

Article 35: “Once the deed has been written it will be read entirely by the Notary or by the interested parties or by the person appointed by them, who may modify or amend whatever they consider appropriate and once they reach an agreement, they will express their acceptance. The Notary will leave the written testimony of all the above in the same deed and the signature of the parties executing the deed demonstrates their approval.”

118. The experts reached agreement as follows {H23.2/7/475}:

“Both experts agree that the constitution of the oil easement requires the formality of a public deed with the intervention of a Notary, according to Colombian law.

The Notary shall provide legal advice to the interested parties, if his assistance is requested.”

They disagreed about the extent of the Notary’s duty to provide legal advice.

119. Article 7 refers to the provision of advice and counselling to all the parties having first established that “the Notary is at the service of the law and not of the parties.” Taken together with the public function of notarising documents that are to become public deeds capable of affecting legal rights and obligations of non-parties, this implies both that the primary function of the Notary is to ensure that the notarised document is valid and reliable for its public purpose and that it is not the function of the Notary to advise either or both of the parties as to the merits of the proposed transaction for that party. Those implications are strengthened by Article 9, which places on the Notary

the responsibility for ensuring that the instruments they authorize comply with the relevant formalities but specifically excludes from the Notary's area of responsibility all questions of the veracity of statements made by the parties, the legal capacity of the parties, or the aptitude of the parties to execute the act concerned. The reference to the "aptitude" of the parties to execute the act appears to be a reference to the ability of the parties (falling short of questions of legal capacity) to make apt decisions about whether or not to execute the act, which in turn indicates that it is not the Notary's function to advise the parties on the aptness of their decision to execute it on the proposed terms.

120. Articles 14, 17 and 35 establish the procedure to be adopted when the parties present themselves before a Notary with a view to executing a public deed. Pursuant to Article 14, the first two stages of the process overseen by the Notary ("reception" and "extension") involve the reduction to writing of the declarations of the parties. Article 17 requires the Notary to review the parties' declarations and to verify that the presented draft is consistent with the purpose of the attendants. If and to the extent that it is not, he may suggest amendments that are necessary in order to achieve consistency. To that extent he is clearly entitled to give legal advice about the content of the document, but that advice goes to its consistency with the parties' declared purpose of the transaction: it does not go to whether the transaction is in the interests of the parties (or either of them). Article 35 then requires the deed to be read in its entirety either by the Notary or by the interested parties or by the person appointed by them, who may modify the deed as they consider appropriate before expressing their acceptance. This would naturally be an opportunity for a prospective party to try to modify the deed to his advantage, but it does not follow that it is the Notary's function to address or advise on that question. Rather, it would be consistent with his previously stated obligations for the Notary's interest at this stage to be to ensure that the necessary formalities are all in place and that the document is consistent with the parties' declarations and purpose.
121. Professor Castro did not mention Article 7 in her report. She gave as her opinion that the main function of the Notary is to give authenticity to the acts executed with his/her intervention. Her opinion was that "a Notary does not ensure that the parties understand the content or that the contents are true. ... [The] Notary does not have a function or obligation to give legal advice to the parties as to the contents of a particular deed that is to be signed"; and that "for contracts where a public deed executed before a Notary Public is required by law, notarization amounts to compliance with [the] formal requirement[s]." {H14/1/46} at [113], [116]. At one point in her evidence, she said that the Notary does not review the contents of the document {Day21/77:18}, but it was not clear whether she meant this as an absolute statement or as meaning that the Notary would not review the contents of the document with a view to giving partial legal advice to one side or the other. If she meant the former, she would have been wrong since it would be directly contrary to the express terms of Article 17. If she meant the latter, the position is more complicated.
122. Professor Vallejo gave more detailed consideration to the role of the Notary in his report at {H15/1/157}, [700] ff. Relying upon Articles 14, 17 and 35 he stated as his opinion that "the Notary has a duty to ensure that both parties enter into the transaction freely and that the transaction reflects the will of both parties"; and that

“the Notary ... will review the document to ensure that it complies with those requirements and formalities. The Notary has an obligation to review the declarations proposed by the parties to verify their conformity with the purpose that the parties want to achieve through the transaction and verify that a clear language has been used in the document.” Professor Castro agreed with both of these statements, subject to her over-riding qualification that the function of the Notary was formal and did not include giving advice on what she described as the “substance” of the agreement. The furthest that she would go was to accept that, if a party came before a Notary and said he or she did not understand the proposed agreement, the Notary would provide a general explanation of the nature of the agreement (for example, that it is a contract for the sale of property) but not of specific provisions (such as waivers or settlement clauses). And she accepted that if an illiterate campesino farmer were to ask the Notary for advice on material or substantial aspects it might be given, though that is not the role of the Notary {Day21/80:20}.

123. In his original report Professor Vallejo had not stated as his opinion that the Notary was under an obligation to provide legal advice on the merits or substance of the agreement. He appeared to go further in his supplemental report when saying, in reliance on Article 7, that “Notary public offices in Colombia have the duty to advise and counsel the parties requesting their assistance; especially in the case of contracts that are executed with their intervention as a matter of law (for example an easement deed affecting real property). Under the good faith principle, a party may not sign a contract without understanding its terms, without seeking explanations from the other party and without requesting clarifications from the Notary (a third independent expert), and later plead avoidance of the contract/further compensation with the argument of illiteracy.” {H15/2/254} at [111]. By Professor Vallejo’s normal high standards of precision, this passage is surprisingly vague in two respects. First, he did not identify the scope of the duty to advise, leaving it unclear whether his reference to the parties “requesting [the Notary’s] assistance” was a reference to seeking the overall assistance outlined in the Articles or to seeking specific assistance on a matter of legal substance. Second, his reference to a party’s failure to request “clarifications” from the Notary gave no indication of the nature of the clarifications that he had in mind. He provided no further precision or elaboration in the joint statement, merely saying that “the Notary has a duty to ensure that both parties enter into the transaction freely and that the transaction reflects the will of both parties”; and “the law does not limit the counselling function of the Notary to the verification of the compliance of the legal formalities required for a public deed. As per the quoted norms, this function of the Notary is much wider, and covers all the issues raised by the parties executing the contract related to the content of the agreement, including doubts, misunderstandings or lack of knowledge of the parties requesting the notarial advice.” {H23.2/7/474}. He did not state that the function of the Notary included advising on the merits for the particular party of the proposed transaction.
124. Professor Vallejo was extensively cross-examined on the role of the Notary at {Day22/115:21} ff. I accept that Professor Vallejo has direct experience of the workings of Notaries in very small municipalities {Day22/116:21}. He gave a general account of how a Notary in a small municipality would approach his obligations {Day22/120:4}. In summary, the Notary would ensure that the parties understood the transaction they were about to enter. If it became apparent that a party did not understand, the Notary would give an opportunity for discussion and explanation,

before checking whether the lack of understanding was solved; but he would not give advice on the desirability or otherwise of undertaking the obligations in the proposed deed. If it appeared that the party had concerns or doubts, he could and would recommend further discussion between the parties, or that a party should go and talk to a lawyer or to the human rights ombudsman, with a view to returning to the Notary when matters were resolved.

125. By the end of this evidence, it appeared that there was virtually no difference between the opinions of the two experts. The Claimants, however, submit that Professor Vallejo changed his evidence on the role of the Notary and that “the implausibility of Dr Vallejo’s original evidence on the role of the Notary is perhaps symptomatic of the credibility of his evidence generally.” I disagree on both counts. As summarised above and set out in greater detail in his original report, Professor Vallejo did not assert that the Notary was under a general duty to give legal advice on the desirability or otherwise of undertaking the obligations in the proposed agreement or to advise on how the relative position of a party to the proposed agreement might be improved; nor did he advocate such a general duty in his Supplemental Report. The nearest he came to it was in the passages in the Joint Statement that I have set out above, particularly the phrase “all the issues raised by the parties executing the contract...”. However, he had (typically) made clear in his report that his opinion was closely based upon the terms of the relevant Articles, including Article 7 with its reference to the Notary being at the service of the law and not the parties. His additional words in the Joint Statement “including doubts, misunderstandings or lack of knowledge of the parties requesting the notarial advice” as examples of issues on which the Notary would advise was consistent with the overall thrust of his evidence, namely that it was the Notary’s function to ensure that the parties understand the agreement they are proposing to execute; and he did not include any examples that necessarily went outside those limits.
126. Each expert said in cross-examination that a Notary might give a general explanation of a transaction if requested. I do not see that as inconsistent with the Notary’s responsibility under Article 17 to review the declarations presented by the parties and to establish that they are consistent with the purpose of the attendants. Nor is the giving of a general explanation inconsistent with the Article 7 obligation to be at the service of the law and not of the parties: the giving of a general explanation may be an essential step in ensuring that the legal norm established by Article 17 is properly served.
127. In case there be any residual doubt about the scope of the Notary’s duty, I would summarise it as being based upon the terms of the Articles to which I have referred. The Notary is required to ensure that the formal requirements of the proposed transaction are complied with. He is also required to ensure that the written transaction complies with the purposes and will of the parties as declared to him. He will provide explanations (which may involve giving his legal opinion) about matters raised with him concerning the content of the proposed agreement so far as they concern establishing that the proposed transaction complies with the purposes and will of the parties as declared to him. He will not, as a general rule, give partial legal advice to one or more of the parties on the desirability of entering into the transaction as a whole or on how to improve their relative positions by amending the proposed draft and is under no formal duty to do so. Whether the parties make enquiries of him

or not, it will be necessary for the Notary to review the documentation thoroughly in accordance with the requirements of Articles 9, 14, 17, 21 and 35. If it becomes apparent (for whatever reason) that the parties need to discuss matters further or that a party needs partial legal advice in order to get to the stage of expressing consent to the transaction, the Notary will either afford the opportunity for further discussion or refer the needful party elsewhere. For the avoidance of doubt, I accept Professor Vallejo's general account of how things would work before a Notary in a small community, which I have summarised briefly above. However, I would not exclude the possibility that, if asked, a Notary might give an illiterate campesino farmer some legal advice on the substance of a proposed agreement, as accepted by Professor Castro. He would not be under a duty to do so and should remember that he is at the service of the law and not of the parties. To suggest that a Notary would never respond in this way is quite contrary to both human and professional nature.

128. I do not consider that either expert's general credibility is adversely affected by their evidence on the topic of Notaries.

Assignment of Contractual Rights and Obligations

129. Under Colombian law it is generally possible to assign either part or all of a party's contractual rights and contractual obligations. Unless prohibited by law or by prior agreement of the parties to the contract, the assignment can be effected without the consent of the other party to the contract {H14/1/52} at [132], [133]. The parties affected by an assignment are described as the assignor, the assignee and the assigned. In the context of this litigation, where the Defendant claims that it has assigned its obligations under the contracts it had entered into with the Claimants, the Defendant would be the assignor and the Claimants the assigned. An assignment takes effect between the assignor and assignee on execution of the agreement to assign, but to make the assignment binding (oponible) on the assigned, a notice of the assignment must be served so that the assigned is bound to satisfy any obligations towards or demand any rights from the assignee from that moment forward; or the assigned must demonstrate acceptance of the assignment {H14/1/53} at [134], {H23.2/7/487}.
130. The most relevant articles of the commercial code are:

“Article 888: The substitution can be effected in writing or orally, depending on whether the contract is in writing or not. (888-1)

If the contract is contained in a public deed, the assignment may be effected by means of a private written document, with the previous authentication of the assignor's signature, if it is not authentic or is not presumed to be authentic; but it shall not produce effects with respect to third parties until it has been recorded in the corresponding registry. (888-2)

If the contract is contained in a registered document which, although it is not a negotiable instrument, is granted or includes the clause “to the order of” or another equivalent clause, the endorsement of the document shall be sufficient for the

endorsee to substitute the endorser in the relations derived from the contract.” (888-3)

Article 893: “If the assigned party makes reservation of not releasing the assignor, at the moment of authorising or accepting the assignment, or when its notified to him, in the case that he had not previously given his consent to it, the assigned party may demand from the assignor the performance of the obligations resulting from the contact, in case the assignee fails to perform such obligations, in which case the assigned party must inform the assignor of the default of the assignee within the following 10 days.”

Article 894: “The assignment of a contact produces legal effects between both the assignor and the assignee from the date of its execution; but with respect to the assigned party and third parties, it shall only produce effects from the [date of] notification or acceptance, except as provided under paragraph three of Article 888.”

131. Two issues divided the experts. The first was whether the assigned is deemed to be notified of an assignment contained in a deed on registration of the deed. The second is whether and when there may be tacit acceptance of an assignment.

Notice by Registration of a Deed

132. The dispute between the experts centres on Articles 888-2 and 894 of the Commercial Code. It is accepted on all sides that Article 888-3 is not applicable. The Defendant contends that the effect of Article 888-2 is that if a contract of assignment is contained in a public deed, it binds the assigned whether or not the assigned is otherwise given notice of the assignment. The Claimants respond that the purpose of Article 888-2 is to lay down the formalities that must be complied with for a public deed to become effective as against third parties and is not to give notice of an assignment to the assignor’s counterparty to the original agreement. The Claimants submit that Article 894 is applicable and requires actual notice to be given to the assigned counterparty to the original agreement. The dispute is important because the Defendant says that it has effectively assigned both its rights and its obligations under the various ROW agreements it had entered into with the Claimants by Public Deed 4317 of 9 October 1995 {J13/51T/1} and that notice of that assignment was given by registration of the deed in the real property registry on and from 21 November 1996.
133. The high point for the Defendant’s argument is the general principle of Colombian law that once a deed has been registered it creates a presumption that everyone is informed of the transaction. Application of that principle would lead to the conclusion that everyone (including the Claimants) was informed of the assignment on and from 21 November 1996. That said, I accept the evidence of Professor Castro that the public registration of transactions over real estate has a special, public interest function: to record the legal status of the property for different purposes, in order to disclose the legal standing of the property for potential buyers or lenders, inheritance taxes and the like. Property and other legal rights existing over real estate must appear in the public registry, such as usufruct, easements, mortgages, as well as liens

and attachments. The registry is open for public consultation and any person is allowed to obtain information contained in its files for real estate property purposes {H23.2/7/488}. It is implicit in this description that the public interest purpose behind public registration is to give notice to those who otherwise would have no direct connection with the transactions in question and no means of obtaining (by enquiry or entitlement) the relevant information.

134. I also accept the evidence of Professor Castro that the provisions of the Commercial Code establish a self-contained (*sui generis*) system for the assignment of commercial contracts {H23.2/7/490}. Viewed in isolation, the main thrust of Article 888 goes to formalities for executing assignments. Thus Article 888-1 lays down the general rule that the formalities for effecting an assignment are dependent upon whether the original contract was oral or in writing. Seen in this light, Article 888-2 is primarily concerned with how to execute the assignment of a contract that is contained in a public deed. That does not, however, determine the meaning to be attributed to the second clause of Article 888-2.
135. The language of the second clause (“... but it shall not produce effects with respect to third parties ...”) bears comparison with the language of Article 894, which is agreed to establish the general requirement of notification or acceptance. First, the language of Article 894 (“... it shall only produce effects from the [date of] notification or acceptance ...”) is very similar to that of the second clause of Article 888-2, set out above. Second, Article 888-2 refers only to “third parties” while Article 894 refers to “the assigned party and third parties” (in Spanish “*contratante cedido y de terceros*”). There is no reason to think that this distinction is accidental. It supports the conclusion that the second clause of 888-2 neither refers nor applies to the assigned party. On this interpretation the combined effect of Articles 888-2 and 894 would be that an assignment by public deed only produces effects as against the assigned party on actual notification or acceptance (Article 894) but, as against third parties, recording the public deed in the corresponding registry is the formal prerequisite to the producing of effects. That is coherent and intelligible since it combines the public purpose of registration (namely informing those who would not otherwise have access or entitlement to the information) while preserving the right of the assigned (because of its much closer connection with the transaction) to be notified. It is not without difficulty because it requires “third parties” in Article 888-2 to be taken as meaning “third parties to the original contract” rather than “third parties to the assignment”. However, that is not an insuperable objection given that third parties to the original contract will also be third parties to the assignment unless they happen to be the assignee, in which case their position is express and clear. Interpreting “third parties” in Article 888-2 in this way enables consistency to be achieved with Article 894 and seems to me to be logical and correct.
136. I would therefore reject the Defendant’s submission purely as a matter of the correct interpretation of Article 888 in the light of Article 894. If, however, that interpretation were not correct and there is a conflict between Articles 888 and 894, the terms of Article 894 should prevail pursuant to Article 10 of the Civil Code: see [23] above.
137. This conclusion has the desirable side-effect of avoiding what Professor Castro rightly described as “extremely unfair consequences” that could and probably would follow from the Defendant’s interpretation {H14/3/265} at [27]. Article 893 (set out above)

provides valuable protection for an assigned contracting party, which is irrelevant to strangers to the contract: he has 10 days following notification to demand performance of the obligation from the assignor. That protection would be lost unless the Claimant happened to inspect the property register (which would carry a cost) within 10 days of registration. The arbitrary nature of that state of affairs is demonstrated by the fact that the public deed in question, though dated 9 October 1995, was not registered until 21 November 1996. No reason has been advanced why any of the Claimants should have inspected the register in the 10 days after 21 November 1996 and none is readily conceivable. The Defendant's interpretation would have the bizarre consequence that the provisions for public registration, which are intended to provide information and protection for third parties, would have precisely the opposite effect on the assigned, who would lose the right to actual notice and, with it, his protection.

138. On this issue I prefer the evidence of Professor Castro and reject that of Professor Vallejo.

Tacit Acceptance of Assignment

139. The Experts were agreed that:

“... the acceptance of the assignment of a contractual position can be effected either expressly or tacitly by the assigned party. It is understood that tacit acceptance takes place when there is an unequivocal behaviour of the assigned party amounting to performance or continuance [sic] performance towards the assignee.” {H23.2/7/492}

140. Professor Castro's view is that there cannot be tacit acceptance unless the accepting party has a clear understanding that an assignment has occurred:

“It is true that the law does not forbid tacit acceptance to take place. It may happen when there is an unequivocal behaviour of the “*contratante cedido*” accepting the assignee instead of the assignor as a new contracting party, but it requires a clear understanding by the other contracting party that an assignment has been effected.” {H23.2/7/493}

141. Professor Vallejo relies upon Article 894 (see above), which provides that an assignment shall produce effects against the assigned “from the [date of] notification or acceptance”: this shows that acceptance can take place without notification. He also relies upon his agreement with Professor Castro that tacit acceptance occurs where there is unequivocal conduct on the part of the assigned “amounting to performance or [continued] performance towards the assignee”; and upon the general principle of Colombian law that takes account of intentions that are externalised and not those that remain hidden in the mind of the party. These principles, in his opinion, show that Colombian law will look to unequivocal externalised conduct to determine whether a party has accepted an assignment in a case where notice has not been given. He added that:

“Tacit acceptance consists of any conduct which would be consistent with his acceptance of the assignee as the new party to the contract. Tacit acceptance would include, for example, any of the following: entering into negotiations related to the same contract with the assignee, receiving payment from the assignee, demanding compliance from the assignee and not from the assignor, accepting compliance of obligations by the assignee and not the assignor.” {H23.2/7/493}

142. In cross-examination, Professor Castro appeared to accept that unequivocal behaviour would be sufficient but was at pains to point out that behaviour that appears to be merely *consistent* with acceptance is not sufficient: she gave the example of an assigned who pays the assignee in circumstances that would be consistent with acceptance of an assignment but which would also be consistent with paying the assignee in the belief that the assignee is in fact acting as the assignor’s mandated agent: see, for example, {Day21/114:12}. Having emphasised that point, she accepted that it is necessary to assess the conduct of the parties objectively in order to ascertain whether there has been an unequivocal tacit acceptance {Day21/121:6} ff. Later she appeared to revert to a requirement of actual understanding (as opposed to unequivocal externalised behaviour) when asserting that dealing with another person (i.e. the assignee) without any reservation “does not necessarily imply a tacit acceptance if there is absence of at least some knowledge ... that there has been an assignment of contract ...” {Day21/126:15} ff.
143. If and to the extent that Professor Castro’s final position was that the assigned must have actual subjective knowledge of an assignment before he can tacitly accept it, I reject that evidence. I prefer and accept Professor Vallejo’s evidence about the approach that Colombian law will take to objectively unequivocal acts and the distinction drawn by Article 894 between notification and acceptance. In consequence, what is required for tacit acceptance is (as the experts agreed) “unequivocal behaviour of the assigned party amounting to performance or [continued] performance towards the assignee.” That said, acceptance of Professor Vallejo’s reasoning leads me also to conclude that he went too far in saying that tacit acceptance “consists of any conduct which would be *consistent* with his acceptance of the assignee as the new party to the contract.” Mere consistency with acceptance is not enough: for conduct to be objectively unequivocal it must also be *inconsistent* with any other interpretation.
144. It may well be that a payment to the assignee that is made by an assigned without understanding even in general terms that there has been an assignment (or, in normal language and understanding, a change) will be seen to be equivocal when all the circumstances are considered; but subjective understanding is not the touchstone to be applied. Thus, for example, to let a third-party engineering contractor onto one’s land to carry out works pursuant to an agreement with someone else may well be equivocal because, without more, it may be consistent with the engineering contractor carrying out works on behalf of that other person; but entering into a formal settlement agreement with the engineering contractor in respect of the damage he is alleged to have caused may carry other implications.
145. I consider the application of these principles to the facts of the present cases later in Section 3 and when reviewing the individual Lead Cases.

Establishing Liability in Contract

146. The conditions that must be satisfied to establish civil contractual liability and for a claimant to be entitled to an award of compensation for damages are agreed {H23.2/7/495}:

- “a) An existent valid and binding contract between the Claimant and the Defendant;
- b) The Defendant has not fulfilled his contractual obligation;
- c) There is fault or dolo on the side of the Defendant. The Defendant is liable when his conduct falls below the legal or contractual standard which is applicable depending on the kind of contract.

Fault is presumed against the Defendant when he has assumed a specific result obligation towards the Claimant and the result is not achieved (*obligaciones de resultado*). When the obligation is of “best efforts” (*obligaciones de medio*), the negligence of the Defendant is not presumed if the desired result is not achieved, and the Claimant has the burden to prove the negligence of the Defendant.

Regarding the above classification of contractual obligations, Colombian Professor Alvaro Perez Vives has observed: In the obligation to achieve a specific result, the obligor/debtor undertakes to produce a specific, precise and determined outcome. Relevant examples of this type of obligations are: to transfer the property of the goods sold to the buyer, to refrain from certain conduct, and the transportation of persons or goods. Failure to obtain the promised result makes the obligor/debtor contractually liable. In order to escape liability, the obligor/debtor must demonstrate an extraneous cause (i.e. force majeure, acts of God, the exclusive negligence of the obligee/creditor, and the exclusive conduct of a third party).

Differently, in obligations of best efforts the obligor/debtor does not undertake to achieve a precise and determinate result in favour of the obligee/creditor; but instead to act with due diligence and care. In this type of contractual obligations, the obligor/debtor only commits himself to use the means which are ordinarily adequate to obtain the required result, without the obligation to achieve it. When the desired result is not obtained, in spite of the diligence employed, there is no fault from the debtor/obligor and no liability attaches to him. Such are the obligations assumed by certain professionals, as for example, doctors. In other words, in best efforts obligations the obligor/debtor may escape liability by proving due diligence and care in the circumstances of the case.

d) Damage has been caused to the Claimant by the Defendant. To be recoverable, all damages must be both certain and direct.

e) A direct causal link exists between the malicious or negligent act or omission of the Defendant and the alleged damage suffered by the Claimant.”

147. In the absence of *dolo*, the Claimant is only entitled to recover for direct damage which was foreseen or could have been foreseen at the time the contract was executed {H23.2/7/497}. In order to prove *dolo*, the Claimant must prove that the Defendant deliberately breached the contract with the intention to cause harm to the Claimant; or entered into the contract knowing in advance that it could not perform its contractual obligations towards the Claimant {H23.2/7/499}. If *dolo* is proved, the Claimant is entitled to recover unforeseeable as well as foreseeable and foreseen damages {H23.2/7/498}. For these purposes, gross negligence is equated with *dolo* as a matter of law. Thus demonstration of reckless behaviour on the side of the Defendant would entitle a Claimant to rely on Article 1616 of the Civil Code and to recover as if *dolo* had been proved {H23.2/7/499}.

Bringing Claims in Contract and in Tort

148. The experts recorded agreement was in the following terms:

“Contract liability and tort liability are different under Colombian law. Each type of liability is governed by a different set of rules in the Civil Code. There are exceptional cases in which liability in tort may arise even if there is a contract between the Claimant and the Defendant. There is no statute under Colombian law dealing with this particular issue.

The reason why concurrent liability claims – for breach of contract and tort – are prohibited is the avoidance of collecting the same damages twice, because this could lead to the unjust enrichment of the Claimant.

A Claimant must select the type of action intended properly, so as to channel his claim against the Defendant either under the contractual rules or under the tort rules, which are different.

The decision as to whether to bring the claim in tort or in contract is not a matter of choice for the Claimant: if the alleged damages result from the breach of a contractual obligation, the Claimant must pursue his claim under the contract liability regime.

Test on concurrent liability claims:

(a) If the parties entered into a contract which governed the activities which are the subject matter of the alleged claim, they cannot pursue damages in tort. If, on the other hand, the alleged wrong and the acts or omissions relied on by the Claimant are

extraneous to the contract, he would *prima facie* be entitled to pursue a claim in tort.

(b) In order to determine whether the alleged wrong and the act or omissions are extraneous to the contract, it is necessary to identify the nature and scope of the obligations of the parties arising under the contract.” {H23.2/7/500}

149. This agreement gave rise to some debate which focussed on the distinction between (a) the right to *pursue* a claim simultaneously in tort and contract (in the sense of presenting both claims within one set of proceedings) and (b) the right to *recover* in both tort and contract where the parties’ relations are relevantly governed by a contract.

150. In its decision of 11 September 2002 the Supreme Court said:

“Although it was not unusual for this Court to handle a case in which the facts can constitute a breach of contract and at the same time give rise to non-contractual responsibilities between the two parties, its jurisprudence has always taken care not to confuse one type of responsibility with another, because it is not indifferent under law or the nature of the action, not [?] the consequences of one or the other, or the evidence in the assignation of blame or the terms of prescription. This is why it has affirmed that it is legally inadmissible to accumulate them simultaneously, nor the exercise of a “hybrid action, as it says, because the juxtaposition or accumulation of these types of responsibility is impossible, because contractual responsibility excludes that which is generated by misdemeanours”. Therefore, the Court adds in its sentence, it is sometimes necessary to distinguish with precision where the source of contractual or non-contractual responsibility lies, such as “When the consequences of the injury whose redress is sought have been expressly foreseen and regulated in the contract”, [*since in those cases the Claimant may not leave the agreement aside and turn to the provisions of the culpa aquiliana (a name given to non-contractual liability) without incurring an inadmissible accumulation of forms of liability that could lead to*]⁴ the protection of injuries that fall outside the agreement, or to abandon the rules of contract with regard to the regulations of compensation”. However, there are cases ... where the source of responsibility is indifferent, “This occurs ... in cases where the same obligation to compensate arises without a contract when there is a clear violation of one’s rights by another by acting with malice or negligence”. In these

⁴ The translation in Professor Vallejo’s report at {H15/1/95} has been inserted in brackets because it makes much more sense than the passage in the main translation at this point which is: “in these cases the claimant move away from the domain of the contract to the arrangements of Aquilian liability “without accumulating an inadmissible number of forms of responsibility that could lead to...””.

circumstances, it continues, “there is not accumulation of responsibilities, but only the determination to assign the blame that stands out the most. If there is culpability; but it is not clear that this has breached any specific contractual clause, but has caused injury, the consequences as regards compensation do not need to specify where the fault lies” {I1/2.1T/41.46}

151. This passage is not entirely easy to understand in translation, even edited as above, but the general principle is clear: Colombian law is not indifferent to the difference between tort and contract because a contract may regulate the parties’ obligations and the potential remedies that may be available. Where that is so, Colombian law looks to the contract and does not permit an accumulation of forms of action that could lead to levels of protection and recovery which are excluded by the contract. On the other hand, there may be circumstances where it is not necessary to identify the cause of action as being tort or contract, because either cause of action may lead to recovery and the contract does not preclude recovering the greatest relief (whether that is provided by contract or tort).
152. This distinction between contract and tort, and the acceptance that the parties may by contract regulate their mutual obligations and the consequences of conduct that breaches their agreed obligations is also reflected in decisions of the Supreme Court dated 19 April 1993 and 24 June 1942: {H15/1/96} at [434], [435]. Specifically, the reference in the decision of 11 September 2002 to determining the source of the liability involved when the consequences of the damage have been regulated by contract is shown to be a facet of a wider principle that obligations and remedies may be regulated by contract and that, where they are so regulated, the claim must be pursued in contract, not tort. This is particularly relevant in circumstances where, as here, one party is engaged in what would be regarded by the law of tort as dangerous activities. Thus, in its decision of 19 April 1993, the Supreme Court said:

“It is worth reiterating that since both liabilities are different and having been treated in a different manner, the contractual fault and the tort fault, the liability that each of them produce may not be claimed jointly, as it is an aspect that determines that when the first one is invoked and the lack of performance originated in the exercise of that dangerous activity, it is not possible to resort to the presumption of fault stated by Article 2356 of the Civil Code, because, as this norm regulates tort liability it has no acceptance in front of undertakings governed by the previous agreements of the parties. If the obligation is necessary to prove the fault of the debtor or author of the damage, while if the obligation is of result fault then it is presumed in accordance with Article 1604 of the Civil Code. *Therefore, if there is a contractual liability that simultaneously implies the exercising of a dangerous activity, the exoneration of the burden to prove fault does not depend on the presumption stated under Article 2356 of the Civil Code but rather on the obligation assumed to it being a result obligation, under Article 1604 ibidem, which is the appropriate specific norm for contracts.* ... Neither law nor doctrine authorise the

exercising of a hybrid action, an expression used by the commentators, because the juxtaposition or accumulation of these two differentiated types of liability is impossible, because the contractual, by its own nature, excludes liability generated by tort liability.” {H15/1/96} [Emphasis added]

153. This passage supports the view of Professor Jaramillo (quoted by Professor Vallejo at {H15/1/97}) that:

“When the damage caused by a dangerous activity is the consequence of a breach of a contractual obligation, the victim may not rely on the dangerous activities regime, even if the victim themselves or the contractual debtor carried out the activity which caused the damage and which was being performed pursuant to the contract.”

154. To the same effect, the Supreme Court in its decision dated 24 June 1942 had said:

“The Court considers to quote the relevant parts of the ruling of December 1 of 1938 G.J. No. 1943, where the Court made the distinction between contractual fraud and non contractual fraud, and stated that such liabilities could not be involved under the same juridical relationship. *Neither law nor doctrine, stated the Court in that ruling, authorises this hybrid action, [an] expression used by the commentators, because the juxtaposition or accumulation of these two differentiated species of liability is impossible, because the contractual one, by its own nature, excludes liability generated by the tort.*” [Emphasis added]

155. It will immediately be noted that the italicised words were reproduced verbatim by the Court in its decision of 19 April 1993, as set out above. But the Court in 1942 had continued by saying:

“What may happen is that there are facts that in addition to being culpable with relation to a determined contract, for its own juridical nature, independently of any contractual connection, may also constitute a source of liability in tort, with the possibility of two actions that may be independently exercised, but may not be accumulated because the result would be an unfair and unlawful duality in the compensation of the damage.”

156. Returning to the two questions at issue, as set out at [149] above, I accept that (whether it is characterised as an issue of substantive or of procedural law) it is open to a Claimant to include claims in contract and in tort in the alternative in the same proceedings. This does not offend against the requirement that the legal doctrines of contract and tort are and should be kept separate and distinct; but it guards against the unfairness of a wrongdoer escaping all liability simply because the Claimant has chosen the wrong cause of action when issuing proceedings. As in English procedure, the Claimant may keep claims in tort and contract open simultaneously right up to judgment, it being a matter ultimately for the Court in the light of all evidence and

submissions to determine whether and to what extent the parties' mutual rights and obligations are governed by contract {H15/1/98} at [441].

157. Turning to the second question, in accordance with the guidance from the Supreme Court that I have set out above, to the extent that the parties' rights and obligations are governed by contract, a claim in tort is excluded. Ultimately, Professor Castro appeared to agree that this is so because, in relation to a personal injury claim arising out of contractual carriage of passengers, she agreed that an extra-contractual claim was dismissed because "if the contract is breached, the tort claim should be dismissed." {Day21/139:5} ff. But, as made clear in the last citation from the decision of 24 June 1942, even where there is a contract, the facts of the claim may be such that some of them are not within the ambit of the parties' agreement. If that happens, it is open to the Claimant to look to the law of tort to see whether those facts that are not regulated by contract may give rise separately to a claim over and above that which he has in contract. In this way, the guiding principle that there should not be double recovery is preserved.
158. It is important to bear in mind that what is required is that the parties' rights should be *relevantly* governed by a contract so as to exclude a concurrent remedy in tort. It does not follow (and none of the citations set out above suggest) that tortious remedies are restricted or excluded whenever there is a contract between the parties, whatever its content. This is important in the present case because the contracts between claimants and the Defendant (or, in some cases, Ocesa) did not seek to regulate the manner in which the pipeline works were to be carried out; nor were they contracts for the carrying out of the pipeline works as such. The First letter, if it was a contract (as to which see later), merely requested and provided authorisation to carry out works on the landowner's land, without which the works would (without more) be an illegal trespass: see [368] below. It did not oblige the Defendant to undertake the works, nor did it impose any terms about how the works were to be carried out. It was not in any sense a contract to achieve an object or imposing a "result obligation". The passage relied upon by the Claimants as a contractual guarantee of "fair and equitable compensation" does not (assuming it has contractual force) affect the manner in which the pipeline works are to be carried out. At most it could be said to affect the level of compensation that would be due to the landowner in the event of damage to his property.
159. The documents that are agreed to have contractual force are the ROW agreements and the subsequent Public Deeds: see [369] and [371]. They were concerned with the creation of easements across the landowner's land; they did not impose any obligation upon the Defendant to carry out the works or to carry them out in a particular way. Although it may be said that the contemplation of the pipeline works "implies the exercising of a dangerous activity", that is not of itself sufficient to exclude the dangerous activities doctrine. As the passage from the decision of 19 April 1993 that I have highlighted makes clear, what is being contemplated and required is a contract which is relevant to the tortious doctrine of dangerous activities because it imposes a "result obligation" (i.e. to bring the works to a satisfactory conclusion) and therefore relevantly regulates the relations between the parties so as to exclude the need to prove fault *as a matter of contract*. No such contract has been identified in the present litigation.

Claims in Tort – General

160. For a Claimant to succeed in tort the general rule is that he must show (a) that he has suffered direct and certain damage, (b) fault or dolo of the Defendant, and (c) an adequate causal connection between the damage and the negligent or malicious conduct attributed to the Defendant {H23.2/7/502}. Fault (culpa) is broadly equivalent to negligence in English law {H14/1/70}.

Claims in Tort – Dangerous Activities

161. Colombian law applies special rules when considering liability in tort for “dangerous activities”. The essence of dangerous activities is that they are those activities that are intrinsically dangerous, objectively considered, so that their exercise is potentially harmful to others, even if carried out with utmost care and diligence. It is common ground that the construction of a pipeline is a dangerous activity, though some related activities (e.g. the accounts function or drawing of plans) would not be included {H14/3/269}. In its decision of 30 April 1976 the Supreme Court propounded a test that does not readily lend itself to achieving greater precision in defining the limits of dangerous activities. There is dangerous activity:

“... when a person, in order to perform a task, adds an extraneous force which increases his own strength, and by doing so disrupts the existing balance with respect to third parties, which are, therefore, placed in imminent danger of being injured, even if the task is performed with all the due diligence required.”

I return to the nature of the pipeline project as a dangerous activity at [166] below.

162. The experts agreed the prerequisites to liability for dangerous activities as follows:

“... in order for the Claimant to succeed in a claim for damages brought under the dangerous activity doctrine, the following requirements must be met:

- (i) That he has suffered a damage (to his property or person) that is real, direct and certain.
- (ii) That there is an adequate causal connection between the damage and the dangerous activity exercised by the Defendant.
- (iii) That the Defendant was the guardian of that dangerous activity.
- (iv) The Claimant is not required to demonstrate fault on the side of the Defendant.

Compliance with the above requisites triggers a fault presumption against the Defendant, who may not escape liability just by proving due diligence and care.

The Defendant may only then escape liability by proving an extraneous cause, which is either:

- (i) Force majeure or fortuitous case, which are equated notions under the Civil Code,
- (ii) The victim's exclusive fault (for example fault of the Claimant), or
- (iii) The intervention of a third party.

In these three cases, the Defendant would break the causal link between the dangerous activity attributed to the Defendant and the damages claimed.

This is without prejudice to ordinary defences in any civil action, such as inexistence of the damage claimed and time limitation." {H23.2/7/513}

163. Liability in tort under the dangerous activities doctrine is imposed on anyone who satisfies the test of guardianship. The experts agreed (at {H23.2/7/510}) that "in order to qualify a person as a guardian of a dangerous activity, he must *exercise* an independent power to manage, direct or control the activity." This agreed test was restated at {H23.2/7/511}: "... the guardian to be held liable is the person ... which at the time of the occurrence had exercised an effective and independent power of direction, governance or control over the instrument or the activity which generates the harm, whether or not he is the owner"; and that "relevance is given to the de facto power over the thing or activity... ." The experts cite numerous decisions of the Supreme Court including that delivered on 18 May 1972 where the Court said:

"The liable party for the acts of inanimate objects is their guardian, that is, whoever has the independent power to manage, direct and control them.

And it is not true that the condition of the owner necessarily and inevitably implies that of the guardian, but the latter is presumed as a simple attribute of ownership, as long as there is no proof to the contrary.

Therefore, if it is proven that a given person is the owner or entrepreneur [i.e. exploiter] of the object with which the damage was caused in the course of a dangerous activity, the said person is covered by the presumption of being the guardian of the said object – which of course admits evidence to the contrary – because even though guardianship is not inherent to ownership, it is presumed in the case of the owner. In other words, the liability of the owner for the acts of inanimate objects derives from his capacity as guardian thereof, which he is presumed to have.

And the presumption of being the guardian can be dispelled by the owner if he can prove that he transferred the possession of the object to another person by virtue of a legal act, such as a lease, a gratuitous loan, etc., or that he was deprived of the object without any fault on his part, as in the case it was stolen.”

164. This last citation diverges from the test agreed by the experts in concentrating on *having the independent power* to manage rather than actually exercising that power. This divergence was not explored or resolved with the experts. Reconciliation can be achieved by holding that a person who exercises an independent power to direct, govern or control is liable as guardian; and also holding that the failure to exercise a power to manage that is vested in a person should not, without more, relieve them of liability. There may be more than one co-guardian, often with different angles of responsibility and interest, each of whom will be jointly and severally liable for damage falling within the scope of the doctrine: see the citation from the decisions of the Supreme Court of 22 April 1997 and 19 December 2011 at {H23.2/7/507}. There is no reason in principle why an employer and an independent contractor engaged by that employer should not be co-guardians of a dangerous activity (Professor Castro at {H23.2/7/516}).
165. Professor Castro suggested that, in addition to the “dangerous activities” doctrine there were separate principles relating to “risk-benefit” and “created risk” theories. This appeared to be the basis for the Claimants’ formulation of their pleaded case at, for example, {B1.3/5/483} and {B1.3/5/485}. In their closing submissions the Claimants invited the Court to consider the case law she cited, which I have done. To my mind, what the authorities show is that the Supreme Court (as is the way of higher courts in many jurisdictions) has considered the extent to which the theories might be said to underpin the dangerous activities doctrine, without coming to any clear or unanimous conclusion. They do not show that the theories are a proxy or substitute for the dangerous activities doctrine; nor do they generate additional rights or obligations over and above those clearly understood as falling within the dangerous activities doctrine. Nothing in the cited authorities suggests that, on the facts of this litigation, Claimants who would otherwise fail on any material issue would or might succeed if separate consideration were given to the risk theories. It is therefore not necessary to say more about them.
166. Another point of principle that divides the parties is whether a person who becomes guardian of a dangerous activity automatically becomes liable under the doctrine for all adverse consequences of the dangerous activity. The Claimants submit that he does; the Defendant submits that there must be a causal link between the damage and the specific conduct of the guardian. This point was raised but not fully developed during the trial and closing submissions. On the material that is available to the Court, I consider that the root of this division is a concentration by the parties and the experts upon “laying the pipeline” as a single “dangerous activity.” Without going behind the agreement that I have already rehearsed, this all-embracing description obscures the reality of a huge engineering project, which is that “laying the pipeline” involves many different activities, with many different people having responsibilities for different aspects of the project. So, for example, a person might have complete control over the early stripping works but have gone off site and been relieved of all

responsibility by the time that the trench for the pipe was dug, the trench was laid, and any restorative works were carried out. It is not obvious in principle why such a person, though he might satisfy the definition of guardianship for the stripping works, should have any responsibility for damage caused in those later operations to which he made no contribution and with which he had no involvement. This suggests that, in principle, Professor Vallejo should be right in asserting that there must be at least some causal link between the activities of the person said to be the guardian and the damage that occurs. This is not a difficult concept if (in the illustration) the stripping works and the subsequent works are treated as separate dangerous activities, even though they all contribute to the aggregated project of laying the pipeline which, viewed overall, is also regarded as a dangerous activity.

167. This approach also seems consistent with the agreed statement of the experts that the person held liable is the person who “*at the time of the occurrence* had exercised an effective and independent power of direction, governance or control *over the instrument or the activity which generates the harm*”: see [163] above.
168. I therefore find that under Colombian law it is too simple merely to treat an aggregation of dangerous activities as if they were one and indivisible; and that liability under the dangerous activities doctrine will be imposed upon a person in respect of damage caused by a dangerous activity (or element of a dangerous activity) falling within his area of responsibility. Once it is established that the cause of damage fell within his area of responsibility, he will be liable and, if he has co-guardians responsible in respect of the same area of activity, he will be jointly and severally liable with those on whom equivalent liability is imposed. In this way the object of the dangerous activities doctrine will be satisfied by joint and several liability being imposed on any and all of those responsible for exercising independent powers of control or management over the activity that causes the damage; but it does not arbitrarily impose liability on those who may have nothing at all to do with the cause of damage. Whether sub-dividing the activities and responsibilities in this way has any relevance for a party having overall control of the project will be a question of fact. In the absence of submissions directly on the point, I would hold that, where there is evidence that would otherwise lead to the conclusion that a party had overall control of a project as a whole, it would be for such a party to demonstrate that he was *not* involved in or responsible for the particular area of interest, and not for a claimant to demonstrate separately that he was. This seems to me to be consistent with the Supreme Court’s treatment of owners in the passage I have cited above.
169. I note in passing that, in its opening submissions relating to LC74, the Defendant said that it would rely upon the adverse security situation as being an “extraneous cause” capable of relieving it of any liability it would otherwise have had under the dangerous activities doctrine. That submission was not pursued at the end of the trial. It is therefore not necessary to investigate or decide the interesting question whether, despite the generality of the security situation being well known, specific factual circumstances could amount to an extraneous cause.

Liability in Tort for the Acts or Omissions of Third Parties

170. An employer is directly liable for the acts or omissions of his employees acting within the scope of their employment. An employer can also be held directly responsible for damages caused by their employees acting to fulfil the duties of the employer or

acting by reason of those duties. Where an employer seconded employees to another entity, he will only remain liable for their acts or omissions if they continue to act under his exclusive and effective direction and control. If, following secondment, they act under the exclusive and effective direction and control of the latter entity, then such employees would be considered as dependants of the latter entity and that entity alone would be liable for their acts or omissions. The application of this test is a question of fact. It is for the Court to decide which entity exercised direct effective control over the seconded personnel {H23.2/7/516}.

171. In their Joint Statement there was apparent disagreement between the experts on the scope of liability for the acts or omissions of independent contractors. The potentially relevant Articles of the Civil Code are:

“Article 2341: A person who commits a crime or fault, which causes damage to another is bound to compensate, without prejudice to the principal penalty that the law imposes for the crime or fault committed.

Article 2347: Every person is liable not only for its own actions to the effect of compensating the damage, but also for the acts of others under his custody.

Article 2349: The masters (employers) are liable [for] the damage caused by their servants (employees)”

172. Professor Vallejo relied upon Articles 2347 and 2349 of the Civil Code in support of his opinion that a person is not liable for the acts or omissions of an independent contractor whom he has retained unless he exercises a sufficient degree of control over the activities of the independent contractor in such a way that his conduct is covered by Article 2347. If he does exercise a sufficient degree of control over his independent contractor, he would be liable for any direct damage caused by that independent contractor when carrying out the activity, unless he proves that he could not have avoided the damage despite the exercise of all due diligence and care in the course of controlling the independent contractor {H23.2/7/517}.
173. Professor Castro maintained in her Supplementary Report that the two articles referred to by Professor Vallejo were inapplicable. In her opinion, the relevant Article is Article 2341 of the Civil Code. However, she acknowledged in her Supplementary Report that, even where the principal is a legal person, indirect liability may arise in some cases “because some degree of subordination was found between parties” {H14/3/274-275}. In cross examination she confirmed that, in general, independent contractors are not subordinates or dependants of the principal so that, as against third parties in tort, people who engage independent contractors are, without more, not liable for the negligent acts or omissions of the independent contractors; but the principal may be liable for those acts or omissions (without reference to the dangerous activities doctrine) if he exercises a sufficient control over the contractor. And she described Professor Vallejo’s position as “one possible solution” to the juridical basis for this result {Day21/158:13}.
174. In the light of this passage of evidence I accept Professor Vallejo’s evidence about the test to be applied when considering the question of liability for independent

subcontractors, including the qualification set out at [172] above. If and to the extent that there remains any residual difference between the experts, I prefer the evidence of Professor Vallejo, based as it is upon the two articles he cited and the concept of control (or subordination) which runs as a consistent thread through the Colombian law relating to liability for the acts or omissions of others (whether that liability is characterised as direct or indirect). I leave to later the question whether and to what extent the facts of the present cases make the Defendant liable for the acts of third parties.

Extinguishment of Obligations - General

175. Article 1625 of the Civil Code lists the means by which obligations may be extinguished, as follows:

“Article 1625: All obligations can be extinguished by means of an agreement in which the parties, being able to dispose of their rights in a free manner, consent in considering it null.

Obligations also become extinct, totally or partially:

By effective payment.

By novation.

By settlement.

[...]

Extinguishment by Settlement

176. The relevant provisions of the Civil Code are:

“Article 1522: An agreement whereby a party stipulates to refrain from further claims related to an approved account is invalid in regard to the dolo contained therein, except if expressly waived. Forgiveness of future dolo is not valid.

Article 1619: Irrespective of the generality of the contractual terms, they will only apply to the subject matter which has been agreed in the contract.

Article 2469: Settlement is a contract whereby the parties conclude a pending dispute out of court, or prevent an eventual lawsuit between them. The sole renunciation of a non-disputed right is not settlement.

Article 2484: A settlement agreement will only be effective between the contracting parties. If there are many principals interested in the transaction which is subject to settlement, the settlement consented to by one of them does not harm or benefit the others; except, nevertheless, for the effects of novation in the case of joint and several liability.

Article 2485: If a settlement agreement relates to one or more specific objects, general surrender over any right, action or claim shall be understood to refer only to the rights, actions and claims related to the object or objects over which the settlement is being undertaken.”

177. On the basis of these provisions, the experts agreed that:

“A binding settlement requires, aside from the conditions for its legal existence ... three essential elements:

- (1) The existence of a present or an eventual dispute of a patrimonial content amongst the parties.
- (2) A declaration/expression by the parties of their intention to terminate their differences in a direct and amicable way.
- (3) Mutual sacrifices and concessions by the parties in order to reach the settlement agreement.

...

The experts agree that the settled matters may consist of actual or future disputes. The Experts disagree on the meaning of the legal expression “eventual lawsuit”, included in article 2469 of the Civil Code.” {H23.2/7/518-519}

178. The major disagreement between the experts was about what will satisfy the requirement of Article 2469 that there be “an eventual lawsuit.” Professor Castro’s opinion is that “the controversy between the parties must be actual or imminent, not just probable or hypothetical” {H23.2/7/519}. She relies upon Article 1522 as establishing that an agreement to forgive future dolo cannot be valid. She then states her opinion that a settlement cannot be used as a means to avoid the duty to act with care in the future “as it is intended to finish or prevent litigation between the parties as long as the settled matter is identified as dubious and litigious at the time of the agreement, excluding future misconducts” {H23.2/7/520}. She then relies upon Articles 1619 and 2485 of the Civil Code in support of her opinion that settlement agreements must be restrictively construed and “limited to the matters on which the parties did agree upon. In other words, in this case, the alleged settlement can only refer to damages that were foreseen by the Claimants at the time of its execution” (ibid).

179. In her report {H14/1/29}, Professor Castro relied upon a citation from the decision of the Supreme Court on 6 June 1939 (to which Professor Vallejo also referred in his report {H15/1/185}) in support of her opinion that “it is necessary that the parties have identified an actual controversy so that mere awareness that a conflict may hypothetically arise or is probable in the future is not enough as a condition for the settlement.” This is similar to what she said in the Joint Statement, as set out above, namely that a settlement can only be effective in relation to damages that were

foreseen at the time the settlement is executed. The passage from the Supreme Court to which the experts referred is:

“In settlement contracts the parties resolve by themselves their own differences... What really defines this legal concept is that it terminates litigation or prevents litigation, by means of a reciprocal sacrifice of the parties, which does not mean that its sacrifice should be commutative or equivalent, but that each party voluntarily renounces a part of what they believe they are entitled to. In this way, in order for a settlement to exist, three requisites must be present: 1. The existence of a litigious difference, not necessarily before a Court; 2. The will to settle such differences or to prevent them out of Court, and 3. Reciprocal concession of the parties for that purpose.”

180. A number of points arise. First, the fact that it is not possible to agree to forgive future *dolo* (i.e. *dolo* that has not yet occurred) and that a settlement cannot be used as a means to avoid the duty to act with care in the future (on which I accept Professor Castro’s evidence) does not of itself answer the question whether it is possible to settle disputes arising out of *past dolo* or *past* breach of the duty to act with care, whether they be known or unknown. Second, in her Supplemental Report {H14/3/279}, Professor Castro referred to Professor Vallejo’s opinion that “a settlement agreement may compromise a claim in respect to future loss and may compromise a potential claim for damage of which the party is unaware at the time the settlement agreement is executed”, responding that “this general statement may be accepted under Colombian law, provided there is a litigious difference between the parties who execute the settlement agreement. The parties can make mutual concessions aimed at preventing or ending a claim that must be actual or imminent. Mere waiver of future, undetermined undisputed rights is not deemed as a settlement, as provided in Article 2469 [of the Civil Code].” Seen in this context, her description of a claim as “imminent” means “about to happen (or become actual)” as distinct from “actual”. In other words, claims of which a person is unaware and which have therefore not been brought into existence by being formulated may be “imminent” and susceptible to settlement. Third, the passage just cited accepts as a general principle that a potential claim for damage of which the party is unaware at the time the settlement is agreed may be effectively compromised. Fourth, the word “eventual” in Article 2469 does not mean or imply that the dispute which may eventuate in a lawsuit must be either formulated or known at the time that a settlement is concluded. To the contrary, Article 2469 differentiates between concluding a pending dispute (which, by definition, must be formulated and advanced) and preventing an eventual lawsuit (which, as a matter of language and context, need be neither). Fifth, during her oral evidence Professor Castro accepted that an agreement that purported to settle not only matters that had been the subject of discussion or claim but also any disputes which may subsequently arise could in principle be valid if the subject matter is well identified {Day21/179:1} ff. This evidence, which is consistent with the terms of Article 2485, I accept. Sixth, Professor Castro accepted the analysis of Professor Jaramillo at {I2/4T/240} - {I2/4T/242} including the following passage, which supports the possibility of settling of disputes that have not yet been identified:

“In the doctrine field, amongst other authors, MESSINEO explains that such cases “... are essentially as follows: a) an existing litigation already between the parties (called “settlements”), or the possibility of a litigation arising between them; b) a lack of certainty (*res dubia*), or a *res litigiosa*; c) reciprocal concessions, through which the parties put an end to the litigation started, or anticipate a litigation which could arise; d) also, as this is not expressly decided by the legislator, the issue is discussed about whether the out-of-court settlement is constitutive, or declarative...”

It is inherent to the out-of-court settlement that there is a *res litigiosa et dubia* between those who will in the future sign the out-of-court settlement, given that failing an object - right, power, prerogative, duty or obligation – in relation to which there is doubt, hesitation or uncertainty – *res dubia* – or whose real purpose or scope is not, at present or potentially, object of judicial debate – *res litigiosa* -, there will be no interest in making reciprocal sacrifices in order to obtain, under conditions of certainty, the definition of a certain legal situation.

In other words: failing uncertainty and dispute there cannot be an out-of-court settlement, which is a state of lack of knowledge, hesitation or doubt surrounding the development of a pending claim or the possibility of future litigation arising, which move[s] or induces the parties, in the interests of certainty or security, to sign the respective out-of-court settlement contract. That uncertainty, source of dispute or litigation, is precisely what drives the subjects to foresee any unfavourable result or even the claim itself through the out-of-court agreement.”

181. In the light of these considerations, I conclude that neither party has accurately characterised the true effect of Professor Castro’s evidence that a dispute must be “actual or imminent”. Her use of the word “imminent”, when properly understood as set out above, is not (as was submitted by the Defendant) “an inaccurate gloss” applied to the words of Article 2469. Although it took time to identify precisely what her opinion is in this area, my impression at the time and my finding now is that this was due to nuances of language rather than any significant lack of objectivity. On the other hand (contrary to what was submitted by the Claimants) it is possible to settle future controversies that are not foreseen or not specifically identified at the time of the agreement if appropriate wording is used, since that is what Article 2469 contemplates when referring to the prevention of eventual lawsuits. The pre-requisites for a valid settlement are those set out at [177] and the principle underlying those pre-requisites is, as explained by Jaramillo, the freedom of the parties to resolve uncertainty by agreement. Normal principles of construction apply to the interpretation of settlement agreements. Article 1624 of the Civil Code applies in case of ambiguity: see [71]. There is otherwise no specific rule requiring a restrictive or partial interpretation of settlements; but Article 2485 emphasises the need for

clarity when including both specific and general provisions in a settlement agreement. When interpreting a settlement agreement (as with other contracts) it is correct to have regard to other agreements “whether before or after [the settlement agreement] which are interrelated or connected, as applicable, which due to their type or scope can be used as a compass in order to reconstruct” the common intention of the parties {I2/4T/262} {Day21/186:7}. Specifically, in the present litigation, it could be appropriate to construe the settlement agreements and Paz y Salvos together, as Professor Castro accepted and explained at {Day21/187:13}.

Extinguishment by Payment

182. Extinguishment by “effective payment” is listed in Article 1625 of the Civil Code as separate and distinct from extinguishment by settlement: see [175] above. Effective payment is defined by Article 1626 as “performance of the obligation that the debtor/obligor assumed towards the creditor/obligee.” On their face, these articles are capable of referring to original obligations (which might themselves have been extinguished by settlement), or to an obligation to pay damages, or to obligations arising under a settlement and the experts did not suggest otherwise. In the light of the relevant Articles they agreed:

- “1. Due performance of the obligation is not limited to the payment of money, for it includes many other types of payment, depending on the nature of the obligation. For example, in relation to the obligation to transfer property, payment consists in the delivery of the particular object or the amount of the general specie agreed. [...] In relation to an obligation that consists in refraining from doing something, the debtor/obligor pays while it refrains from the prohibited conduct.
2. Payment must be effected in accordance with the terms of the obligation. However, in some specific cases the law allows payment to be made otherwise than in accordance with the terms of the obligation.
3. Payment made in full discharges the obligation.”
{H23.2/7/523}

183. It is almost self-evident that the parties can agree on the nature and scope of their obligations to each other and, therefore, what payment is required to constitute effective payment {Day21/188:20}. It is not necessary to investigate here whether and when such an agreement would amount to a settlement agreement: whether such an agreement is regarded as ancillary or preparatory to an effective payment extinguishing the obligation in question or is regarded as a settlement agreement compromising pre-existing obligations will be fact-sensitive and, on either interpretation, obligations will be extinguished on the agreed payment being made.

Extinguishment by Novation

184. The Civil Code provides:

“Article 1687: Novation is the substitution of a new obligation for a previous one, which is therefore extinguished.

Article 1690: Novation may be effected in three ways:

- 1) Substitution of an existing obligation by a new obligation, without the intervention of a new debtor/obligor or creditor/obligee.
- 2) By the debtor/obligor assuming a new obligation towards a third party and obtaining, accordingly, the release of the original creditor/obligee.
- 3) By a new debtor/obligor substituting the previous debtor/obligor who, accordingly, is released.

The third kind of novation may be done without the consent of the first debtor/obligor. When effected with his consent, the second debtor/obligor is a delegate of the first debtor / obligor.

Article 1693: In order for novation to take place the parties must so declare, or that it appears undoubtedly that their intention has been to novate because the new obligation involves the extinguishment of the old obligation.”

185. Based on these Articles, the experts agreed that:

- “1) Novation is an agreement whereby the parties (debtor/obligor and creditor/obligee) substitute one obligation for another obligation, and as a result the former obligation is extinguished. Novation requires a change of one of the structural elements of the obligation. Minor changes do not constitute novation (for example, a change in the place where the obligation must be discharged, or the granting of an additional term to perform the obligation, do not constitute novation).
- 2) There are three modes in which novation can take place:
 - i) Novation by the substitution of the old obligation by a new obligation, without the intervention of a new creditor / obligee or a new debtor / obligor. This type of novation is called *objective* and may take place either (a) by the change in the object of the obligation, or (b) by the change in the cause (source) of the obligation: An example of novation by change in the object is: “I owe \$1,000 and I agree with my creditor that instead of said amount I will give him a horse...”. An example of novation by change in the cause is: “I owe you \$1,000 as the price of a thing that I have purchased and I agree

with my creditor / obligee that I will withhold the money as a loan.”

The other types of novation are called subjective, because one of the parties is substituted for another:

- ii) Novation due to the change of the creditor / obligee;
 - iii) Novation due to the change of the debtor / obligor.
- 3) *Animus novandi*: this is a material [and]⁵ essential requirement of novation and consists of the intention of both parties to replace an existing obligation for a new obligation.
- 4) The intention to novate may be expressly declared or result tacitly. In this respect, Chilean professor Claro Solar has observed:

“[...] Therefore, the intention to novate, the animus novandi, may be expressly declared or result tacitly as a necessary and inescapable impossibility that the two obligations coexist.”” {H23.2/7/525}

186. Point 4 of the experts’ agreement and the citation from Professor Claro Solar establish that the intention to novate does not need to be expressed. Consistently with the general approach of Colombian law, which is to consider only those intentions that are externalised and not those intentions that remain hidden in the mind of the party, an intention to novate may be identified whether or not the party is consciously thinking in terms of novation. I accept Professor Vallejo’s statement, founded on Article 1693 of the Civil Code, that “tacit acceptance results from external unequivocal conduct of the party irrespective of his undisclosed intentions” {H23.2/7/528}.
187. The dispute between the parties on novation concerns whether the settlement agreements and Paz y Salvos entered into by the Claimants with Ocesa and Saipem constituted novations. The Defendant’s case is that the agreements amounted to a novation because (as between the Claimants and Ocesa/Saipem) they substituted an obligation in contract which was incompatible with the continued existence of their prior obligation in tort. In her written evidence, Professor Castro gave as her opinion that, for the agreements between the Claimants and Ocesa/Saipem to affect the position of the Defendant, there had to be an unequivocal intention not merely to enter into a novation as between themselves but also to affect the position of the Defendant {H23.2/7/527}. She did so on the basis that Ocesa/Saipem’s new obligation was not incompatible with the more general obligation of the Defendant to compensate all damages caused by its fault or dolo. However, in her oral evidence her position changed. She accepted that *if* a settlement agreement did amount to a novation as

⁵ The Joint Statement said “or” but it is clear from the experts’ evidence as a whole that the *animus novandi* is both material *and* essential.

between the Claimants and Ocesa/Saipem, the settlement would be effected not only between the parties to the agreements but also between the Claimant and those originally having joint and several liability with Ocesa or Saipem {Day21/207:14}⁶.

188. This acceptance by Professor Castro (and the Claimants in closing submissions) was correct in the light of the terms of Article 2484, which means that if a settlement agreement amounts to a novation, it can and will affect other interested parties who have joint and several liability for the transaction which is subject to the settlement. The clear implication of Article 2484 is that the settlement can affect them by discharging their liability to the extent covered by the settlement agreement.
189. I shall deal with the question whether the settlements amounted to novations when dealing with the facts.

Extinguishment by Renunciation/Waiver

190. Renunciation is generally a unilateral act, which is to be distinguished from the sacrificing of rights in the context of a mutual consensual settlement agreement, though Professor Castro accepted that a renunciation can be included in a settlement agreement {Day21/197:1} ff. Article 15 of the Civil Code provides that “Rights conferred by the law can be renounced / waived, provided that the only interest affected by the renunciation/waiver is the interest of the person who resigns and that such renunciation/waiver is not prohibited.” The experts agree that a party may renounce a right by a clear expression that he no longer wants to pursue the right or bring actions with regard to the right. Professor Castro added that a waiver of rights must be “clear, unequivocal and precise.” It is not obvious that the words “unequivocal and precise” add anything to the agreed formulation, which I accept. She also added that the waiving party must be aware of the scope of its relinquishment, which must never be global or unspecified, so to benefit another party without limitation in the future. Once again, it is not obvious what this adds to the agreed formulation: if the party renounces a right by a clear expression that he no longer wishes to pursue a right or to bring actions with regard to the right, Colombian law will take that externalised expression as showing that the party is aware of the scope of the relinquishment that has been so clearly expressed. Although it is common ground that a person cannot renounce the right to bring claims for damages arising from (future) malicious breach of contract or a malicious tort {Day21/197:9} ff, I am not satisfied that there is any other conceptual limit on what rights may be renounced provided that the agreed test is satisfied.

Remedies and Recoverable Damages

191. Article 16 of Law 446 of 1998 provides that “In all claims made before the Courts, the valuation of damage caused to persons and property, will follow the principles of full compensation and equity and shall comply with actuarial technical criteria.”
192. There is a very substantial degree of agreement between the experts, as follows:

⁶ The word “if” requires to be inserted at line 14 (Q. And IF there is a novation ...) and Professor Castro’s answer requires to be understood as assenting to the proposition if (and only if) the test is satisfied – whether or not she in fact used the word “if”. This is clear when the passage is read in the context of what had just passed. I accept the submission to this effect at {C4/3.4/64} at [197].

“i) **Principle of full compensation:** In principle, damages must be compensated in full. This means that the amount of direct damages caused exclusively by the Defendant and proven in the proceedings by the Claimant is the amount to be awarded, but only to the extent to reasonably compensate the actual loss and to place the Claimant in a position as similar as possible as the Claimant had proven to have had before the damage. As a result, indemnification must be complete without turning it into unjust enrichment of the Claimant.

Compensation can be awarded by replacing or repairing the damaged object, but a Court would also award monetary compensation when it is impossible or impractical to place the victim in the same position it had prior to the wrong. This is so, because money is a pecuniary equivalent that allows the acquisition of one or more similar objects as those being affected by the damaging action, in which case it should be preferred by the Court.

This principle of full compensation has important exceptions. There are cases in which the law itself fixes certain limits to compensation rights. The parties may also agree that the Defendant in breach of contract is released by paying a limited compensation, provided that such limitation is not prohibited by law, does not contradict public policy, nor eliminates the essential obligations assumed by the Defendant.

ii) Certainty of damage: Damages must be certain in order to be recoverable. Both the existence and the extent (or amount) of the damages must also be proven by the Claimant. In order to determine whether damage exists, the Judge asks himself whether the Claimant would be in a better position if the Defendant had not committed the wrong. When the answer is affirmative, there is damage and the next issue is to estimate the amount of the damage, for which the Court normally relies on Expert evidence.

iii) Burden of proof: [The burden of proof is on] the Claimant.

iv) Types of recoverable damages: Pecuniary damage and non-economic damages are recoverable.

Pecuniary damages: There are two types of pecuniary damage: Patrimonial damage (daño emergente), consisting of the financial loss suffered by the Claimant, and loss of profit (lucro cesante), which is the loss of economic benefit from which the Claimant has been deprived as a result of an unfulfilled obligation or an imperfectly performed obligation or an obligation in which performance was delayed. These two types of monetary damages are applicable to compensation under both contractual and non-contractual liability rules.

Under Colombian law, compensation must be paid for harm that has already occurred (past and present damages) and/or future damages, which are continuous and ongoing. Future damages are recoverable provided they are not contingent, hypothetical or speculative. Instead, they must be certain; in the sense that they are the necessary consequence and foreseeable outcome of the wrong and are the prolongation in time of the current state of things created by the wrong. In addition, there must be a reasonable high probability of such damages occurring in the ordinary course of events, and according to the rules of experience.”

Non-economic: [Moral damages and loss of amenities will be covered later: see [194] below.]

Test for the award of damages:

[The court must be satisfied that:]

1. The Claimant has suffered damage.
2. The damage suffered by the Claimant is certain, direct and fully demonstrated, in both its existence and amount.
3. The damage has not been already compensated to the Claimant.
4. There is a causal connection between the damage and the conduct of the Defendant.
5. The action to claim the damage is not time barred
6. For *contractual claims*, the Defendant is only liable for direct and foreseeable damages, except when the breach is caused by the *dolo* (to which gross negligence is equated).

...

Causality is the link between the fault or *dolo* of the Defendant and the damage claimed. In order for the contractual and non-contractual claims to be successful, Colombian Law requires the damages to be the direct consequence of the Defendant’s breach or tort, as the case may be. Remote, hypothetical, speculative or indirect damages are not recoverable. The causal connection must be legally relevant and adequate to produce the damage.

... [T]he Supreme Court ... has formulated the test known as *casualidad adecuada* (adequate causation).

In regard to tort liability, the Supreme Court in a decision dated 21 February 2002, delivered by Justice Jose Fernando Ramirez, observed:

“5. As has been upheld by the doctrine and the case law of the Supreme Court, one of the configurative elements of patrimonial non-contractual liability, as in this present case, is defined by the appropriate causation link between the damage and the conduct of the agent from whom compensation is sought, or has been stated by this Court, it is necessary that “a legally relevant causal relationship exists between the damaging event that harms whomever claims compensation, and that as a result and origin of that damaging event, there is a factor of legal allocation of liability to the agent from whom such compensation is sought”. ... Likewise, it has also been declared that such a link is broken when it is demonstrated that between the activity and the damage, an extraneous element not attributable to the one who appears to be the perpetrator of the damage has intervened, which may be the activity of the victim or force majeure or the intervention of a third party.”

In a decision dated 30 March 1993, delivered by Justice Alberto Ospina Botero, the Supreme Court held on this subject:

“According to the adequate causality criteria, the effects of a cause are only those which according to the rules of common sense and experience are normally its consequence. Therefore, the criteria to be followed, is that of the laws of nature. It is not sufficient to establish the participation of different occurrences or elements in the damages that have been caused. It is necessary to determine the aptitude of the fault or the risk, according to the particular cases, in normally producing the damage. Once the circumstances that produced the damage have been assessed in abstract, it must be determined, in the particular case, which of those circumstances, according to the normal course of events, was the efficient cause of the damage, rejecting those causes that only favoured the occurrence of the result or eliminated an obstacle for its occurrence”. These same concepts were reiterated by the Supreme Court in a decision dated 24 April 2009, delivered by Justice Cesar Julio Valencia Copete.

The theory of *adequate causality* is the test used by the Supreme Court when there are various possible causes intervening in the production of the damage and it becomes necessary to establish, amongst them, which was the efficient cause of the damage. This theory is presently applied by the Supreme Court. It should be noted that the theory is applicable both in contractual and non-contractual liability claims for damages.

...

Both experts agree that for contractual and non-contractual claims, Colombian law requires the damages to be real, certain, not contingent or hypothetical/speculative, and also to be a direct consequence of the Defendant's breach or tort, in order to be recovered.

i) In contract liability, a damage is direct when it is the natural or immediate consequence of the failure of the Defendant to perform the contractual obligation, or performing it defectively, or delaying performance.

According to the Supreme Court of Justice, a breach of contract imposes on the non-performing party the duty to compensate the innocent party for the direct damages caused by the breach. The Civil Chamber has defined direct damages as those "*which constitute a natural or immediate consequence of non-performance of the contract, to the point that said damages should be regarded as the necessary and logical effect of failing to perform the obligation. Direct damages are classified, and our law is concerned about it, [as] foreseen and unforeseen damages. The former are those that were foreseen or could have been foreseen at the time the contract was executed, and the latter, those damages which the parties did not contemplate or could not contemplate at such moment. The debtor is only liable to compensate foreseen/foreseeable damages when they breach the contract without dolo. The debtor is liable for foreseeable and unforeseeable damages when he breached the contract with dolo*" (Decision dated October 29, 1945, delivered by Justice Pedro Castillo).

ii) Under tort liability, both for the general type or for the special regime of dangerous activities, the Defendant must compensate the Claimant for all direct damages, foreseen and unforeseen. Direct damages are those which the victim suffers as a certain and necessary consequence of the wrong committed by the Defendant, and are to be differentiated from indirect / remote damages.

...

In summary: direct damages are those which are the natural consequence of the breach or tort; and indirect/remote damages are not recoverable, neither in contract nor in tort. The notion of direct and indirect damages is associated with the test of causality already explained.

...

Both Experts agree that according to the Civil Code (applicable to commercial contracts), if the breach of the contractual obligation is not caused by dolo, the debtor / obligor is only liable for the damages that were foreseen or foreseeable at the time the contract was executed. However if the breach is the result of dolo, the debtor/obligor becomes liable for all the damages that were the immediate or direct consequence of having failed to perform the obligation or delayed the performance of the obligation (Article 1616), whether foreseeable or not.

... Dolo is equated to gross negligence (Article 63 of the Civil Code) neither of which is presumed.” {H23.2/7/538} ff

193. There are no material differences of view between the experts that need resolution by the Court. It is agreed between the parties that, when determining what was or was not foreseeable, the Court should adopt an objective test. Professor Castro says that the objective test that should be applied is what was or could have been foreseen by a professional party at the time of contracting; Professor Vallejo’s formulation of the test is what was “reasonably contemplated by a diligent debtor” at the time of contracting as the probable consequence for the other party of the debtor not performing the contract or performing it defectively. I am not persuaded that these alternative formulations will make any difference on the facts of the present cases.

Moral Damages

194. Moral damages are a type of non-economic damage that a Claimant can recover in special circumstances. They relate to the pain experienced in the Claimant’s internal subjective sphere (feelings and affections). They are commonly awarded in cases of death or personal injury. They must be demonstrated but their valuation is solely for the Court {H23.2/7/549}. In a decision dated 27 September 1974 the Supreme Court said:

“Since the subjective moral damage influences the orbit of affections, the world of the most intimate feelings, and consists of the grief that the victim suffers, who is the only one capable to measure its intensity ... it is clear that such damage may not be assessed by Experts. ... It is for the Courts that must in each particular case determine the so-called price of the pain. ...”

195. When it was put to Professor Castro that the cases where moral damages have been awarded for breach of contract are all personal injury or fatal cases arising out of clinical negligence where the claimant had a contract with the hospital or doctor or in transport-related contracts where a person has been injured or killed, she agreed with the qualification “There could be others but I think those are the main cases.” She did not know of any case of moral damages being claimed or awarded when land is expropriated {Day21/211:9} ff (where she used the phrase “not to my knowledge” in the same way as at {Day21/96:13}). Professor Vallejo had broader experience, including knowledge of moral damages being awarded in relation to conduct which affects rights such as freedom, honour and reputation. He was not aware of moral damages being awarded in the case of harm caused to real estate property, though he

said that the Court had rarely and very exceptionally awarded moral damages for damages to other types of property, including intellectual property {H23.2/7/551}. In his oral evidence he accepted that there was no reason in principle why moral damages could not be awarded after damage to land {Day23/162:20}. He expressed the opinion, however, that the Colombian Court is very stringent and quite conservative traditionally when it comes to granting damages in extra-contractual terms {Day23/162:5} ff.

196. The most recent award of which the experts were aware was also the largest, being COP 55,000,000 awarded in August 2013 to claimants who were close relatives of a deceased person. At current conversion rates, COP 55,000,000 is in the region of £13,000-14,000.
197. Drawing the strands of this evidence together I find that there is no reason in principle why moral damages should not be granted in a case arising out of damage to land. That said, I accept that the Colombian Court is conservative both in the circumstances in which such awards will be made and in the amounts awarded. No award of moral damages has, to the knowledge of the experts, ever been made in a case arising out of damage to land although very many such cases of varying degrees of severity must have come before the Courts over time. This is not surprising, even if such damages are theoretically available, when one considers the basis and justification for an award of moral damages. The language of the Supreme Court, cited above, speaks of “the most intimate feelings” and “the grief that the victim suffers, who is the only one capable to measure its intensity.” This suggests that there is a high threshold, which is more likely to be achieved in a claim where a Claimant has suffered loss of their own bodily autonomy or functions, or where a Claimant is bereaved by the death of a close relative, than in a claim where land is damaged. An attack on a person’s honour, freedom and reputation is also, in universal experience, liable to stir intense and intimate feelings that may be as destructive as grief. Without in any way underestimating the strength of feelings that can be generated by damage to a person’s land or the deleterious effect that may have on their general quality of life, those feelings are not readily equated with the grief and pain suffered on the loss of a child, partner or parent except, perhaps, in extreme and unusual cases. Nor does it seem appropriate to create a linear scale from COP55,000,000 down to zero to cater for all feelings of upset that may be experienced. On the evidence that is available to this Court, moral damages are not appropriate until a person’s most intimate feelings are affected to a high degree.

Damages for Loss of Amenities of Life

198. The experts agreed that damages for loss of amenities of life are non-economic damages that are to compensate for an impact on the external (social) sphere of the victim. The Supreme Court in its decision of 13 May 2008 said that such damages are concerned with the “... decrease in the quality of life of the victim, in the loss or difficulty in making contact to or to relate to persons or things, in order to enjoy a normal existence, as well as depriving the affected person from the possibility of performing the more elementary actions that characterise the reality of their everyday life.” The Court defined the loss of amenities as the deterioration of the quality of life of the victim due to an accident, and held that this type of damage produces the loss of or difficulty of enjoying an ordinary life, and the victim is compelled to live his life under far more complicated or demanding circumstances than other people insofar as

he must overcome abnormal obstacles so that even the simplest task become difficult. As a result, the quality of life is reduced and the possibilities, options, projects and goals disappear or the level of difficulty to achieve them is increased. In this regard, the victim will suddenly find worries and obstacles that formerly did not exist, which close or frustrate the access of the victim to culture, pleasure, communication, entertainment, science, development and so forth, all of which is supposed to be part of a normal existence, with the correlative lack of satisfaction, frustration, suffering and deep discomfort {H23.2/7/551}.

199. The Supreme Court's decision made clear that damages for loss of amenities could be awarded for "an encumbrance that could originate from a physical or corporeal injury, as it could also, for example, originate from a slanderous or harmful accusation, from the discussion of the right to use a name or the use of it by someone else, from very intense suffering or, even, from a loss of an asset or economic loss" {I1/4.1T/111.129}. Thus, although neither expert is aware of any reported case where damages for loss of amenities have been awarded in a case based on damage to property, Professor Vallejo was right to accept that it is conceptually possible that they could be. Professor Castro, however, accepted that it would require exceptional circumstances where a person's entire way of life was seriously affected by damage to his property to justify such an award {Day21/212:5} ff. Her next answer indicated that to award damages in the circumstances of this case would be regarded as novel but something she regarded as possible.
200. I accept that it is conceptually possible for damages for loss of amenities to be granted in a case based upon damage to property; and I do not regard the fact that damages for loss of amenities have not been awarded by the Courts of Colombia in such a case as this as a bar to an award in the present case. But it is pertinent to ask why there has been, to the knowledge of the experts, no award in similar circumstances before and why Professor Castro regarded the award in circumstances such as this as being a possible application of existing principle rather than being one which she could be confident that the Colombian Court would adopt. It seems most likely that the answer lies in the Supreme Court's description of what the damages are for, as summarised by the experts and set out above. The picture that emerges is of an impediment, the core characteristic of which is that it prevents the Claimant from enjoying the normal amenities of life because even the normal tasks and activities of everyday life become difficult. This picture is more readily applicable to someone who is struggling with a physical disability after an accident than to someone whose land suffers a loss of productivity by reason of damage and deterioration. I would therefore accept Professor Castro's evidence that what is required is something exceptional so that the Court may be tempted to take an incremental step by analogy with established cases rather than simply adopting a conceptual possibility.
201. Both in relation to moral damages and damages for loss of amenities Professor Castro said that the principle of equity (fairness) can assist the Court in determining the quantum of damages. I accept that any award should be fair. That does not obviate the burden upon the Claimant to show that an award should be made and to put before the Court the materials on the basis of which the Court can make an informed assessment of what quantum of these damages (which would be regarded as non-pecuniary and unliquidated in English legal parlance) is fair. While assessment will necessarily be imprecise, I would not accept (if that is what Professor Castro was

implying) that the Court can resort to principles of fairness or equity as a substitute for evidence that enables the Court to make a rational assessment of what falls to be compensated.

The Duty to Mitigate

202. As an incident of the principle of good faith, there is a duty to mitigate damages in both contract and tort. Mitigation is the duty of the Claimant to minimise the damage by taking reasonable, opportune and appropriate actions. What is reasonable will be affected by the level of resources available to the Claimant {H23.2/7/553}.

Contributory Fault

203. Damages may be reduced by the court to take account of contributory fault, in both contract and tort. If damage is caused partly by the Claimant's own imprudent conduct the Defendant is not thereby exonerated, whatever the degree of the Claimant's contributory negligence, but the Defendant is not required to compensate the Claimant for that part of the damage caused by the Claimant's own fault. The onus is on the Defendant to adduce evidence of contributory fault. The appropriate reduction is that proportion of the damage which in considering the evidence the Court assesses as the relative causative importance of the Claimant's conduct when compared with that of the Defendant {H23.2/7/554}.

The Awarding of Interest

204. The Courts have the power to award interest. The Defendant did not put in any evidence about rates of interest. I accept Professor Castro's evidence which may be summarised as follows:
- i) Interest on past losses is at 6% p.a. from the date the loss was suffered;
 - ii) Interest on present and on-going damages will be at 6% p.a. from the date of the loss until the date of judgment;
 - iii) Future damages are calculated for each year in which damage is reasonably assumed to continue to affect the Claimant in the future. A 6% effective discount rate must be applied to bring the sum to its present value (what in England would be described as discounting for accelerated receipt). The number of future years (for whole life losses) is calculated taking into account the life expectancy of the Claimant as recorded by the official mortality schedules for life insurance, published by the Financial Superintendency {H23.2/7/541}.
205. Professor Castro's opinion that "a 6% discount rate must be applied to bring the sum to its present value" is an accurate statement of the practice adopted by the Colombian courts, further evidence on this point was given by the Economics and Pricing experts, which leads me to adopt the different discount rate of 3.5%, for the reasons set out at [911] below.

The Effect of Article 5 of the 1954 Regulations

206. I have set out the relevant paragraphs of the 1954 Regulations at [40] above. For convenience I reproduce Article 5 here, while not forgetting that it must be read in the context of its surrounding Articles:

“Article 5: In the case of works or activities that implicate the permanent occupation (of land), the compensation shall only be accrued and paid once and shall cover all the time that the oil explorer or exploiter occupies the land, and will comprise all damages.

Permanent works shall be understood as the construction of roads, of oil pipelines, of camps and office buildings, the installation of drilling equipment and other analogous works.

Regarding works and activities entailing a temporary occupation, the compensation will cover periods up to six months.

Temporary occupation shall be understood as the execution of surface exploration works with geophysical equipment, plotting layouts of oil pipelines, of roads, etc., that entail the destruction of fences, the opening of penetrative paths or trails, surface digging and other analogous works.”

207. The Defendant submits that Article 5 of 1954 Regulations, where applicable, has the effect of extinguishing all claims not founded upon dolo or gross negligence {C4/4.6/63}. The Claimants submit that a payment made pursuant to Article 5 is to be seen as compensation for the use and occupation of the ROW, including compensation for such damage as is necessarily caused by the normal disruption which is to be anticipated from the construction works {C4/3.4/68}. They submit that Article 5 does not prevent a landowner from recovering damages in respect of damage that is not within the contemplation of the parties when the Article 5 payment is assessed or for damage caused by culpa, or for damage that is not “normal”.
208. The Experts and parties agree that Article 5 forms part of a special decree relating to the establishing of pipeline easements, the laying of pipelines and compensation payable to the owners of private property affected. Article 5 applies in the case of the constitution of an oil easement affecting private property; and it distinguishes between permanent and temporary occupation of the private property. It is also common ground that:
- i) Oil pipelines are considered to be permanent occupation of property for the purposes of Article 5;
 - ii) The 1954 Regulations operate to amend the 1947 Mining Code so that Articles 109 to 118 of the 1947 Mining Code survive and apply subject to the amending effect of the 1954 Regulations: see Regulation 1; and

- iii) The compensation to be paid to the land owner can be determined by agreement between the parties or by implementing the machinery laid down by the law. The machinery for determining the level of compensation payable on the laying of a pipeline is set out at Articles 2, 3 and 4 of the 1954 Regulations {C4/3.4/66} {H23.2/7/532}.
209. On the clear wording of Article 5, the compensation that is to be accrued and paid once in the case of works or activities that implicate the permanent occupation of land (such as the laying of a pipeline) has two defining features. First, it shall cover all the time that the oil explorer or exploiter occupies the land. Second, it will comprise “all damages”. The phrase “all damages” is not qualified in any way in the Article. The agreed translation clearly implies and means that the compensation which is to be accrued and paid once will comprise “all damages” referable to all the time that the oil explorer or exploiter occupies the land. This would cover the entire period from when the oil explorer or exploiter came onto the land and commenced his works of exploration or exploitation.
210. There is, however, a third feature of equal importance on the clear wording of Article 5: it does not define the scope of what is to be included in “all damages”. It does not (for example) say “all damages which may in the event be caused by the entrepreneur’s activities, whether contemplated and included in the compensation as assessed or not”; nor does it say “all damages within the scope or contemplation of the assessment of damages that has been carried out”. This absence of definition permits the parties to adopt their opposing positions. I bear in mind at all times that the agreed rules for the interpretation of the law include that (a) when the meaning of the law is clear, its terms should not be disregarded on the pretext that it is necessary to consult the spirit of the law, and (b) the court should not have regard to arguments that a law is too harsh or too generous when interpreting the law. However, it has not been suggested that the Court is not to have regard to the implications of one possible interpretation when choosing between two or more interpretations of a law whose meaning is not clear. And I am not satisfied that the terms of Article 5 itself, or of the 1954 Regulations when read as a whole, clearly define what is meant by “all damages”. As is apparent from the rest of this judgment and from the basic nature of the Defendant’s case, it is not to be assumed in advance that the laying of a pipeline will cause damage outside the ROW even though there is a well-recognised risk that such damage could be caused and that it could be very severe (sometimes for reasons outside the entrepreneur’s control). There is no satisfactory evidence which enables me to make findings about how the experts, the Mayor or the Court would approach their tasks and, in particular, whether the experts, the Mayor or the Court would assume that damage would be confined to the ROW (or, more generally, the area of the mining or petroleum easement). On the available evidence it is entirely possible that practices and assumptions may vary from case to case or area to area where the machinery of the 1947 Mining Code or the 1954 Regulations is adopted. However, it seems safe to assume that where the machinery is adopted, the opinion of the experts and the decision of the Mayor or the Court would state the assumptions upon which they have reached their conclusions and decisions. It also seems likely that they would and should assume that good faith and reasonable skill would be used in exercising the easement. If that is right, it is not clear why they should or would assume damage outside the area affected by the ROW or easement as the case may be. These considerations contribute to my assessment that the meaning of “all damages”

in Article 5 is unclear since the arguments (to which I will refer later) based on the need for entrepreneurs to be able to assess their future liabilities seem far less potent if the Article 5 determination excludes any assumption of damage outside the area affected by the ROW or easement than if it includes and compensates on the basis that at least some such damage will occur.

211. I therefore turn to the various submissions and to the expert evidence that has been advanced in support of the parties' contrasting positions.
212. Under Article 5, the single accrual and payment of compensation for works and activities that implicate the permanent occupation of land is to be contrasted with the regime governing works and activities entailing a temporary occupation, where the compensation will cover periods up to six months. The significance of this distinction appears once the 1954 Regulations in general and Article 5 in particular are read in the context of Articles 109 to 118 of the 1947 Mining Code, with which the 1954 Regulations co-exist and which they amend.
213. I have summarised the relevant effect of Articles 109 to 118 of the 1947 and 1988 Mining Codes and immediately noticeable differences between their approach and the approach under the 1954 Regulations to determining and paying compensation at [26] ff. The Claimants, while accepting that the relevant machinery for oil pipeline works are to be found in Articles 2, 3 and 4 of the 1954 Regulations, point to the fact that the mechanism under the 1947 Mining Code includes the periodic fixing of compensation in advance, leading to payment of compensation every six months for the damage so calculated (in advance) for the respective period. The experts agree that "[the 1954 Regulations] together with Article 116 of [the 1947 Mining Code] sets out the procedure for the valuation with the intervention of Experts before the municipal Court of the local jurisdiction" {H23.2/7/532}. The Claimants rely upon the fact that, under Article 116, the compensation amount is fixed by the Mayor "with prior provisional expert assessment of the damages suffered, which cannot be appealed." Relying upon Article 116, the Claimants then submit that Article 5 of the 1954 Regulations is an amendment of the 6-monthly payment arrangement provided for by Article 116 of the 1947 Mining Code but that "nothing in Article 5 derogates from the principle in Article 116 of the 1947 Decree that the assessment of the compensation is to be a "prior provisional assessment" {C4/3.4/70} at [214]. The Claimants rely upon answers given by Professor Vallejo at {Day23/116:9} as Professor Vallejo "effectively accept[ing]" that this was the correct interpretation and a passage of discussion with the Court at {Day23/127:22} as the Court accepting that this was the effect of his evidence.
214. Whatever the view of the Court in the course of Professor Vallejo's cross-examination, I have now concluded that the Claimants' submission that an assessment of compensation in accordance with Article 5 is merely a "prior provisional assessment" is wrong and should be rejected, for a number of reasons. First, the phrase "prior provisional assessment" does not appear in Articles 2, 3 or 4 of the 1954 Regulations. Second, the notion of a "prior *provisional* assessment" (which, under Article 116, cannot be appealed) is inconsistent with (and cannot survive) an amendment to the mechanism by Articles 2-4 pursuant to which the expert's determination leads to a ruling by the Court on the proper level of compensation that is to be accrued and paid once. It can only have meaning in relation to periodic payments, which may permit a subsequent revision of a previous periodic assessment.

Where the expert's intervention leads to a single payment of compensation that is stated to include all damages, there is no room for further expert involvement in the process laid down by Article 116 as amended by the 1954 Regulations. Nor is there any meaningful other sense in which the expert's intervention under the machinery is provisional, as the experts in question have no further involvement even on the Claimants' case that a separate action for damages may be brought. The Claimants' submission to the contrary seems to me to fall into the twin errors of assuming that the part of the machinery under Article 116 upon which they wish to rely survives and qualifies the mechanism under Articles 2-4 of the 1954 Regulations and of being essentially circular.

215. Third, the passage of Professor Vallejo's evidence upon which the Claimants rely does not provide the support for which they contend, because the critical question was ambiguously formulated and the true meaning of the answer is not clear. At {Day23/116:8} Professor Vallejo agreed with the proposition that Article 5 was obviously intended as an amendment to Article 116 of the 1947 Mining Code "that the landowner has the option to ask for the value of the compensation to be paid every six months." The next question was:

Q. What is being undertaken, that is to say that the assessment, now by the judge and not by the mayor, is to be undertaken with prior provisional expert assessment of the damages suffered; do you agree that that part of 116 remains in place under this regime?

Professor Vallejo was, not unreasonably, uncertain about what the question meant and said that he wanted to listen to the question again. Instead of repeating the question, a different question was asked, and the critical sequence was:

Q. If we look at Article 116 of the 1947 decree, on page {I2/8T/378}, we see that: "If the parties are not in agreement regarding the compensation amount, it shall be fixed by the Mayor ... in whose jurisdiction the land or improvements are situated, with prior provisional expert assessment of the damages suffered, which cannot be appealed.

A. That's correct, yes.

Q. Now that provision remains in place, but with the difference that, by reason of Article 4 of the 1954 decree, it is the Circuit Judge who undertakes that assessment; do you agree with that?

A. Yes. This clarity that I have just made -- clarification that I have just made, we are in Article 4 of Decree 1886 of 1954, this is a subsidiary option for establishing the compensation.

216. Having reviewed this passage again, it seems to me more probable that Professor Vallejo was assenting to the difference being that the compensation was fixed by the judge rather than the mayor and not that he was assenting to that proposition *and* that Article 116 remained as part of the 1954 Regulations machinery so that the expert opinions upon the basis of which the Judge would make his decision were to be

regarded as provisional even when the decision by the Judge was in respect of a single payment for permanent occupation. I reach that conclusion because (assuming that was what was intended to be put) I consider that the question was unclear and that if Professor Vallejo had been assenting to the wider proposition that I have set out above it would be inconsistent with the rest of his evidence, which was that the single accrual, assessment and payment of compensation for permanent occupation and damages is not susceptible to subsequent revision. If I am wrong in that assessment of Professor Vallejo's answer, I consider his answer to be inconsistent with the rest of his evidence and the other considerations that I set out in this section and I reject it as incorrect.

217. Professor Vallejo's opinion as summarised in the Joint Statement is clear {H23.2/7/534}:

“Under Article 5 special treatment is given to compensation of damages resulting to property due to the construction of an oil pipeline, in the following sense: (1) The compensation – whether agreed or alternatively fixed by the authorities – shall be paid only once, which means only one payment by way of compensation. (2) The compensation covers the entirety of the period during which the property is occupied by the entrepreneur in accordance with the oil easement. (3) The compensation covers all damages resulting from the construction works performed in the property. (4) The right of the oil entrepreneur to affect the occupied area (thus causing damage to the property) is justified by special laws enacted for the benefit of the oil industry, based in public policy considerations.

Therefore for public policy reasons, Article 5 is a special rule which limits a landowner's right to compensation for damage caused to his land by the occupation and construction of an oil pipeline. The intention of Article 5 is to prevent a landowner from obtaining compensation in respect of the damage caused by the construction and occupation of an oil pipeline more than once and therefore to preclude further claims whether in tort or contract.

... Article 5 does not make a distinction on the type of damages covered by the legal provision, nor does it contain an exclusion limiting compensation to certain type of damages. Furthermore, the principle behind Article 5 is to determine the amount of compensation at that stage (pre-construction), and by doing so avoid, prevent or preclude future disputes that would give rise to endless claims and litigation, taking into consideration that the oil industry is for the public benefit as a matter of law.

Whenever there is a valid agreement for the determined amount to be paid as compensation in relation to the permanent occupation of private-owned land by an oil entrepreneur for the

purpose of building an oil pipeline and constituting an oil easement, such agreement is to be considered as a definitive binding agreement as to the amount of the compensation and for all the damages caused by the construction of the oil pipeline. In other words, such agreement prevents additional claims for damages resulting from the occupation of the property and from the construction of the oil pipeline.

As long as the damage is not caused by dolo or gross negligence, all damages are covered under Article 5 of [the 1954 Regulations], which is the applicable legal provision to the subject of damages caused by the constitution of an oil easement affecting private property. This norm must be interpreted in a way that produces a legal effect. So, this norm may not be interpreted to avoid its special effect by pretending that it only covers foreseeable damages and without prejudice to additional damages because that would deprive Article 5 of any meaning or utility. Article 5 is a special applicable rule which prevails over the general compensation rules of the Civil Code. ...

However, the limitation benefit of Article 5 would be disregarded by a Colombian Court in the case of damages caused to the property due to dolo or gross negligence, in which case the landowner is entitled to file administrative or judicial actions to obtain additional compensation for the damages resulting from such wrongs, and to be successful he must prove the three elements of tort liability against the Defendant: his dolo or gross negligence, the damage to his property and the causal connection between the first two elements.

The effect of Article 5 of [the 1954 Regulations] includes limited compensation for damages due to medium negligence. ... It is [Professor Vallejo's] opinion that only in the case of dolo or gross negligence can the landowner ask the Court to disregard the effects of Article 5 in limiting compensation."

218. I will return to this statement of Professor Vallejo's opinion later. At this stage I merely note two points. First, in his first paragraph Professor Vallejo states at (3) his opinion, which supports the Defendant's case, that the compensation covers all damages resulting from the construction works performed in the property. I take this to be an opinion on the legal effect of the payment of compensation pursuant to a valuation and determination in accordance with the Article 5 machinery. As I have already pointed out, it is impossible to assert with any confidence what assumptions will be made by the experts, the Mayor or the Court about what damage will be caused when the works are carried out; in particular, it is impossible to assert with any confidence whether they will assume that any damage will be caused outside the area of the easement or the ROW as the case may be. Second, in his second paragraph he states that "the intention of Article 5 is to prevent a landowner from obtaining compensation in respect of the damage caused by the construction and occupation of an oil pipeline more than once and therefore to preclude further claims whether in tort

or contract.” I accept his opinion that the intention of Article 5 is to prevent multiple claims for damage that falls within the scope of the assessment that has been made operating the Article 5 machinery. It is clearly referable and apposite to the scope of damages predicted by those involved in the Article 5 machinery. However, his opinion is at least double-edged if the Article 5 determination of compensation is made on the basis of assumptions that exclude a certain scope of damage which, in the event, occurs. Thus, for example, if the assessment of damages assumes that damage will be confined to the area of the ROW or the easement as the case may be, the intention of Article 5, as stated by Professor Vallejo, does not provide support for preventing recovery in respect of damage occurring outside the ROW or the easement since, by definition, there will be no double recovery.

219. Professor Castro’s opinion appeared to shift with time. In her first report she wrote {H14/1/49}:

“119. Article 5 cannot be interpreted or applied as an isolated rule. Its context must be studied as well in order to understand its true meaning and purpose. Decree 1886 of 1954 modified certain provisions of Law 805 of 1947, articles 112-118 included, the latter referring to compensation of all damages caused by oil companies, payable to the owners of land and to farmers. Pursuant to Law 805, such damages should be calculated by the Mayor of the town or city with the support of experts.

120. Later on, Decree 1886 established specific rules of compensation for damages caused during oil exploration or exploitation, which must be appraised by two experts, before a municipal judge (Article 2). If the experts disagree, a third shall be appointed (Article 3). The parties are entitled to file for review of the appraisal, with the circuit judge (Article 4). And then, Article 5 states that if the land is occupied on a permanent basis, the compensation for damages, calculated under the previously explained rules, must be paid.

121. It is clear that the compensation referred to in Article 5 is paid once and for good, provided that there has been an objective and independent appraisal of all damages, with the possibility of judicial review in case of disagreement.

122. Article 5 should be applied in this case because it concerns works performed by an oil company which require permanent occupation of the land. However, it is my opinion that the rule about one-time all-included compensation can only be applied if the procedure set forth by Articles 2-4 is followed completely.

123. If Article 5 is applied in full compliance with the above mentioned procedure, then the compensation paid should be final and no further assessment would be possible. On

the contrary, if the procedure is not followed, there are, in my opinion, legal grounds to deny conclusive effect to the damages otherwise fixed. In my view, this method of assessing damages was not intended to exclude future, long term losses that were not within the contemplation of the parties at the time the initial assessment was made. That would be clearly unfair and contrary to general principles of Colombian law regarding full compensation for damages.”

220. At that stage Professor Castro was maintaining that the only way that Article 5 could be brought into play was by operating the mechanism under Articles 2-4. This was wrong and Professor Castro later agreed that it can be brought into play by agreement between the parties that obviates the need to operate the Article 2-4 mechanism; but it explains and provides the context for Professor Castro’s opinion. On that basis, Professor Castro’s opinion was that “the compensation referred to in Article 5 is paid once and for good” because the Article 2-4 mechanism provided “an objective and independent appraisal of all damages, with the possibility of judicial review in case of disagreement”: see [121]. She used similar language in [122] when she said that “the rule about one-time all-included compensation can only be applied if the procedure set forth by Articles 2-4 is followed completely”; and again in [123]: “If Article 5 is applied in full compliance with the above mentioned procedure, then the compensation paid should be final and no further assessment would be possible.” However, the apparent clarity of these statements was qualified by the last two sentences of [123]. The first sentence was an assertion that damages which were “long term losses that were not within the contemplation of the parties” were not included in the ambit of Article 5 where “this method of assessing damages” was followed. What is clear is that Professor Castro did not seek to make an exception based on whether or not the damage was caused by culpa. But her opinion was that damage that was not addressed in the course of the Article 5 machinery was therefore “not within the contemplation of the parties” and was therefore not covered by the blanket exclusion which otherwise she recognised.
221. In her first report, Professor Castro made no reference to the Petroleum Code, or to the fact that the 1954 Regulations are a special norm (which therefore take precedence over general norms), or to the leading cases on this point (to which I refer below) where the Supreme Court had stressed that the 1954 Regulations are special instruments which take precedence over general rights. These were surprising omissions given the importance of the normative context for Article 5 and the suggestion being made by Professor Castro that general rights of recovery survived or superseded the effect of Article 5. They suggest a lack of familiarity with the subject in hand, but do not demonstrate that her opinion is necessarily wrong.
222. In her supplementary report, Professor Castro summarised her position differently {H14/3/285}:

“76. In summary, article 5 applies to general situations where compensation for a ROW is paid at the outset. No further damages may be collected. However, if subsequent damages occur due to malice or negligence of the beneficiary of the easement, general rules of civil liability may apply. To

conclude otherwise would be to authorize the oil companies to pay a small amount to get a permission to pollute, destroy and harm others without any legal remedy available. This is clearly in conflict with the fairness principle (equidad) of our Constitution, explained below.”

223. The substance of this paragraph of Professor Castro’s supplementary report lies in its reference to malice or negligence. Here there is a measure of agreement between the experts because it is common ground that damage caused by dolo or gross negligence (which would include damage caused by malice) is an exception to the Article 5 bar on future action or recovery. The point of conflict between Professor Castro and Professor Vallejo is therefore in regard to damage caused by simple culpa, or what Professor Vallejo described in the Joint Statement as medium negligence.
224. Professor Castro’s opinion as expressed in the Joint Statement was different again {H23.2/7/532}:

“[T]he purpose of the procedure set forth in Articles 2-4 of [the 1954 Regulations] is to assure that there is a fair and complete assessment of damages payable to landowners when permanent works will be effected by an oil company. Only if such procedure is complete and objective, Article 5 applies.

It is true that an agreement regarding compensation of damages can be reached between the oil company and the landowner. In this event, the procedure of Articles 2-4 would not be necessary. However, in order to determine if an agreement was reached, it would be necessary to establish whether the amount of compensation was the result of a genuine agreement based on complete information and objective parameters, or whether it was unilaterally imposed by the oil company.

An additional consideration would be whether compensation was fixed by the oil company in abuse of its rights, in circumstances where the land could be expropriated by the Colombian State for the establishment of the oil easement in the event that the occupants did not voluntarily agree to the granting of a right of way. In the absence of a genuine agreement between the parties, in the Expert’s opinion, the procedure for fixing damages by Experts would be applicable.

Assuming that there is an agreement and that it is valid, the amount paid was intended to cover the normal, anticipated damages that arise from the occupation of the land and from the construction works. This is what is meant by “all damages” in article 5, which is not to be taken as an isolated provision but to be construed in the context of a legal system that provides for “full compensation” when damages have been caused with malice (dolo) or negligence (culpa). ...”

225. In this passage Professor Castro:

- i) Restated her opinion that, where the Regulations' procedure is implemented, Article 5 only applies where the procedure is "complete and objective", without explaining what this means;
 - ii) Addressed the position where agreement between the oil company and the land owner obviates the need to implement the procedure under Articles 2-4, making the following points:
 - a) Any agreement must be "genuine" and based on "complete information and objective parameters" and that it should not be "unilaterally imposed by the oil company";
 - b) The compensation must not be fixed by the oil company in abuse of its rights, in circumstances where there is the ultimate threat of expropriation if the parties did not voluntarily agree to the granting of a ROW;
 - c) Assuming that a valid agreement had been reached, the amount paid would be intended to cover "the normal, anticipated damages that arise from the occupation of the land and from the construction works".
226. Taking these points in turn, I agree and accept that a contract made between the entrepreneur and the landowner must comply with the requirements of a legally binding contract, as set out elsewhere in this judgment. The fact that there is the residual possibility of expropriation does not of itself either evidence or suggest that the entrepreneur has acted in abuse of its rights, as is clear from the terms of Article 84 of the 1953 Petroleum Code. Assuming that the parties have entered into a legally binding agreement, Professor Castro's third point begs the essential question, namely what are the terms of the agreement that have been reached. For present purposes I simply note that it would be contrary to the principles of contractual construction that I have summarised elsewhere in this judgment to impose a blanket meaning on any agreement for compensation, whatever its terms.
227. In the course of her oral evidence, Professor Castro made a number of significant statements and concessions:
- i) She accepted that the purpose of the Petroleum Code and the 1954 Regulations was to provide a special autonomous regime and a comprehensive code dealing with the compensation payable to landowners both for temporary works and for the permanent occupation of their land {Day20/49:14} {Day20/149:4}. She agreed that the intention (or wording) of Article 116 of the 1947 Mining Code was to provide compensation throughout the life of a mine, albeit on a six monthly basis {Day20/45:23}; and, subject to one important qualification, she agreed that the 1947 Mining Code and the 1954 Regulations provided a comprehensive code, stipulating the compensation that an owner is entitled to throughout the life of the easement {Day20/46:21}. Her qualification, expressed in a long answer, was that the compensation included what she called "normal disruption" of the landowner's activity. She maintained that the intention of the various regulations was to make an estimate of what damages would be caused in the normal operation and construction and maintenance of the permanent works {Day20/48:15};

- ii) She acknowledged that the Government of Colombia had been very interested in attracting foreign investment and exploitation in the mining and oil industries {Day20/48:5}; and that the government has been consistent in providing companies with the very advantageous framework for establishing business and oil business in Colombia {Day20/143:21}. Amongst these advantages was trying to assure investors that their activities would not be unduly interrupted {Day20/140:23}. Another aspect of the legal certainty that the government was attempting to foster, even on Professor Castro's evidence, was that those undertaking investment and operations should have at least a serious and objective estimate of the damages which would be payable to landowners {Day20/141:6};
 - iii) She accepted that the purpose of Article 5 is to limit the amount of compensation that would otherwise be payable under the Civil Code and that its effect would be that sometimes landowners have to accept less than the full value of what they lost {Day20/140:8};
 - iv) She accepted that the absence of any qualification for the phrase "any damages" in article 5 was "a problem" {Day20/162:9} and that her construction was "problematic" in the face of the wording of Article 5 {Day20/165:5};
 - v) She argued for the need for "balance" but did so by reference to examples that would not be within the ambit of Article 5 because they would not be examples of damage caused by the works or occupation of the land as such {Day20/162:14}. For example, she suggested the case where the oil company made a voluntary or intentional spill of oil or placed a bomb or killed a farmer. None of these would be within the ambit of Article 5. The example of an oil spill would be closest to inclusion, but even that would usually if not inevitably be a consequence of mis-management of the pipeline in situ rather than of the carrying out of the works and occupation of the land as such;
 - vi) When asked whether she would expect the legislature to specify an exception for damage caused by culpa if such an exception was intended, she effectively accepted that she would by answering "that would be nice, yes" {Day20/166:2};
 - vii) She recognised Professor Vallejo's opinion as "very solid argumentation in his document and statement", qualifying her answer only by saying that she had seen cases where damages for spills had been awarded in cases where there was a pipeline easement, which is a repetition of (v) above {Day20/167:7};
 - viii) When it was put to her again that the natural and obvious meaning of Article 5 is that compensation should be paid once, and should cover all damages, whether or not they are caused with culpa she replied "that is the literal reading of the law, and the Colombian system is getting away from that strict interpretation of the law" {Day20/168:22}.
228. Earlier in her oral evidence Professor Castro had attempted to articulate the defining characteristics of her opinion at {Day20/117:10} ff by distinguishing "normal disruption" from the situation where there is negligence, including at one point "I

would say that it depends on where the damage is originated. If it is normal to the operation, the people know the public interest prevail, people know or have to know that this one-time-only compensation is for the benefit of the industry, for the progress of the regions, everything, but any other damage that is due not to the operation itself, or to the normal disruption, the normal use of the land, the normal risks of oil pipeline operation, but to other factors that can be attributed, far beyond the normal operation of this type of piping, should be treated differently, because otherwise the benefit would be excessive to the industry and would be very detrimental to the owners” {Day20/118:8}. In this passage Professor Castro concentrated on the scope of damage as being the determining feature: “normal” damage falls within Article 5 but if there are other factors that go “far beyond the normal operation of this type of piping”, they should be treated differently.

229. The Defendant raises a number of objections to the opinions expressed by Professor Castro on this issue. The first is what the Defendant characterises as the clear and unqualified terms of Article 5, which Professor Castro acknowledged to be “a problem.” For the reasons I have set out above, it is not right to import the notion of a “prior *provisional* expert assessment” in the way suggested by the Claimants. Professor Castro’s acceptance that her construction was problematic in the face of the wording of Article 5 was reasonable, since the wording of Article 5 does not provide express support for her views and it would be possible to interpret the words “all damages” as meaning “all damages which may in the event be caused by the entrepreneur’s activities, whether contemplated and included in the compensation as assessed or not”. However, for the reasons I have given, I do not consider that the terms of Article 5 are clear so as to preclude any other interpretation.
230. Second, the Defendant submits that interpreting Article 5 as applying only to “normal” damage or damage that was within the contemplation of the parties is a recipe for multiple claims, which is the very thing that Article 5 was intended to prevent; and it would prevent investors from having a serious and objective estimate of the damage which would be payable to landowners. Professor Castro did not provide a ready definition of “normal” damage, but that should not prove to be a difficult problem in any given case. Furthermore, in any given case the assumptions that have been made by the experts, the Mayor or the Court as to what damage would be caused by the pipeline should be clear and will provide the starting point for assessing what was and was not in contemplation and assumptions that were applied. Those assumptions may with good reason differ from case to case, as the facts of the lead cases and the evidence at trial show: a pipeline may run through widely differing topographies and present widely differing challenges. It is only necessary to compare the gentle slopes of LC54 with the much more challenging terrain of LC50 or LC74. What damage is “normal” or to be contemplated in such circumstances? On the evidence that is before this Court it is neither necessary nor desirable to try to lay down strict parameters. It is not desirable because the assumptions that have been made in the course of the operation of the Article 5 machinery should be clear; and it is not necessary because a Colombian Court would be just as well able to determine whether a subsequent claim fell within the ambit of the prior assessment and decision or not. The Defendant’s floodgates argument can readily be overstated. On the Claimants’ interpretation, it is not open to an aggrieved landowner to bring a further claim simply because the damage he suffered was more severe than that assessed by the Article 5 machinery. He will only be entitled to bring a further claim if he can

show that the damage for which he now seeks compensation was not within the scope of the assessment. As I have said, the Court does not have direct evidence of assessments made pursuant to Article 5 as the cases in this litigation involve agreements, which require separate consideration. But, taking the analogy of a typical ROW Agreement in this case, where an assessment determined that the relevant compensation for the passage and occupation of the pipeline comprised damage to the land taken by the ROW (which necessarily contemplates watercourses crossed by the ROW), destruction of certain fences, loss of certain trees and destruction of certain structures, it would not be open to the landowner subsequently to argue that he had been undercompensated for the damage to his land taken by the ROW, that the length or value of his fences had been underestimated, that he had in fact had more trees on the ROW or that they were more valuable than assessed, or that the value of the structure had been underassessed. All such matters would clearly be within scope of the assessment and the ambit of the Article 5 exclusion. On any view, that is a substantial protection for the oil entrepreneur and will, or should, preclude many claims.

231. The Defendant submits, and I accept, that the 1947 Mining Code, as applied to mining operations, is clearly intended to provide a mechanism for the awarding and payment of compensation to landowners throughout the life of the mine, as Professor Castro accepted: see [17.1]. It is also correct that the terms of the 1954 Regulations do not state that the amendments made by those regulations were intended to provide a more limited regime which required or permitted that it be topped up by additional claims for damages through the courts. However, that does not of itself either point to or determine the proper interpretation of Article 5 because, if it is right that the Article 5 assessment does not contemplate or include certain types of damage because they cannot be assessed at that time, the 1954 Regulations are simply silent on how that omission is to be addressed.
232. I reject the suggestion that the presence or absence of culpa is the criterion which determines whether particular damage is within or outside the ambit of Article 5. The laying of pipelines is a dangerous activity so that culpa is presumed and does not have to be proved. Professor Castro did not directly address this difficulty, but it is real: if cases where culpa is either proved or presumed are outside the ambit of Article 5, the Article would provide no protection to the pipeline layer at all. The Claimants rely upon the experts' agreement that damage caused by dolo or gross negligence is outside the ambit of Article 5. That is of no assistance to the Claimants because of Article 1522 of the Civil Code, which declares invalid any agreement that forgives future dolo: see [176]. Nor is there any reason to assume that, simply because dolo and gross negligence are not expressly mentioned as founding an exception to Article 5, culpa is to be treated in the same way because (or although) it is not mentioned either.
233. I also reject Professor Castro's evidence that Article 1494 of the Civil Code gives the landowner a right of recovery over and above the compensation paid under Article 5. The 1947 Mining Code and 1954 Regulations are special laws which (on any view) restrict the amount of compensation to which a landowner might otherwise be entitled under general provisions of the Civil or Commercial Codes. The issue is simply to determine the extent to which they do so.

234. The parties have cited two authorities, both of which post-date the introduction of the 1991 Constitution. The factual background for each case was similar. The landowners' predecessors in title had granted easements to HOCOL in respect of oil drilling sites. HOCOL had erected drilling sites and had made payments to the landowners under Article 5. Subsequently HOCOL's concession was terminated and its rights were transferred to Ecopetrol, representing the state. The Claimants claimed that they had suffered damage since the original payment of the Article 5 payment and that the damage was not covered by the Article 5 payment. They therefore claimed further damages. Both claims failed.
235. In "*El Recreo*" (2008) {I1/4T/103} the Supreme Court confirmed that the relevant decrees, including the 1954 Regulations were special regulations so that it was not possible to apply exclusively the rules contained in the Civil Code for contractual and easement matters {I1/4T/110} at [6]. At {I1/4T/108} the Supreme Court noted the position taken by the Court below in reaching the decision that the Supreme Court upheld:
- "... [I]n the case of the permanent occupation of the mentioned property, derived from the creation of an oil easement, article 5 of [the 1954 Regulations] provides for the payment of a one-time compensation, which will cover the entire duration of same, including any and all damages which may be caused and that in the present case there is proof that said compensation was settled in due course, and the claimant did not express any disagreement at the time."
236. In "*El Cebu*" (2010) {I1/5T/152} the Claimants alleged that the original easement had been terminated so that the assignment to Ecopetrol was invalid. On that basis they claimed damages for illegal occupation of their land which, they alleged, prevented them from exploiting it for raising livestock. Once again the Supreme Court upheld the decisions of the Courts below, which were to the effect that the original easement persisted and that the Article 5 payment covered all damage. In the Course of its judgment the Supreme Court underlined (physically) the provision of Article 5 that the compensation paid "shall cover all damages" {I1/5T/162}, referred to and accepted the statement in *El Recreo* that the contract and easement rules in the Civil Code cannot be applied exclusively in the face of the 1954 Regulations {I1/5T/166}, referred to the central importance of oil to the Colombian state and the welfare of its people, and described how "a new variety of real property right was also configured around [the property of the State in the subsoil] long ago, known as public benefit easements, which are tools created by the lawmaker or by the constituent, placed at the service of the general interest, for the convenience and benefit of the community" {I1/5T/167}.
237. The Supreme Court also stated that
- "the easement regimen is so peculiar that, although of public interest, the hydrocarbon fuel operator, as holder of said sui generis right in rem, is forced, vis-à-vis the owner or holder of the asset, to pay a compensation for his use of the corresponding areas, given that, as known, the constitutional regulation not only authorizes the legislature to impose

expropriations or to end ownership outside the framework laid down in articles 34, 58 and 59 of the Constitution, but guarantees private property, given that, as a fundamental right on which all social institutions are based, it is the cornerstone of the economy, the heart of the entire legislation and the core of free enterprise ... which gave rise to the current Constitution” {I1/5T/168}

And it concluded its judgement:

“... we must stress again, quoting the fifth article of [the 1954 regulations], in dealing with works that entail an occupation of a permanent nature, “*the compensation shall be due and payable all at once and shall cover the entire time that the oil prospector or operator occupies the land, and shall encompass all the damages.*”” {I1/5T/169}

238. The Claimants rightly point out that the primary question in each case was whether the easements had terminated and that it was not alleged that damage had been caused to the land over and above the fact of occupation and use. The statements about the one-off nature of payments under Article 5 were therefore not directed to the issue of damage outside the area of the easement that arises in the present litigation. The Claimants can also take modest comfort from the terms of the judgment in *El Cebu* set out above which, to some extent at least, suggest that the compensation is for use of the areas occupied by the operator. Viewed overall, I do not consider that either authority determines the issue I have to decide.
239. The final major strand of the Claimants’ argument rests upon the assertion that Professor Vallejo’s view, if upheld, would be extremely unfair to landowners. The Defendant responds to this submission by pointing to the wider balance of interests including the impact of the regulatory regime. I do not find either submission strongly persuasive, because it was for the Colombian law makers to establish the balance that was to be struck between landowners and oil entrepreneurs. The Court’s task is to identify that balance, not to strike its own. Whether the correct interpretation is the Claimants’ or that of the Defendant, compensation payments made under Article 5 may be insufficient to provide full compensation for damage that is caused to affected land, because the Article 5 assessment may clearly comprehend, but undercompensate, damage that will occur – for example on the ROW or the area of the easement. From the point of view of the landowner that is obviously disadvantageous and regrettable, but it is implicitly accepted even on the Claimants’ interpretation. In some cases the effect of Professor Vallejo’s view would be to increase the discrepancy between the Article 5 payment and the damage that is caused - for example if the Article 5 assessment assumes that there will be no damage off the ROW or the area of the easement. That is, equally obviously, more disadvantageous and more regrettable from the point of view of the landowner. However, the extent of the disadvantage can only be determined by deciding the correct interpretation of Article 5, and not the other way round. And, as the discussion above has already made clear, the landowner retains the right to claim further compensation if he can prove *dolo* or gross negligence; and the private law rights of the landowner are not to be viewed in isolation, being balanced against the beneficial status of the oil industry.

240. The balance that has been struck by the Colombian legislature includes the limitations upon the right of compensation imposed by the 1954 Regulations. It also includes the regulatory structure described elsewhere in this judgment. Particular aspects of that structure include the requirement that the oil entrepreneur must obtain approval from the Ministry (including approval of the route to be taken) and must obtain an environmental licence which, as the licence in the present case shows, may impose substantial requirements; and the structure provides for detailed technical standards to be imposed. As Professor Castro agreed, the regulatory structure gives rise to ongoing monitoring to ensure compliance with the Licence {Day20/88:2}. The environmental licence in this case stated that the Ministry would supervise the execution of the works and verify compliance with the licence; and it provided for the Ministry to determine and stipulate corrective measures in the event of unforeseen environmental effects; and the licence itself required the licensee to establish a compensation scheme for damage caused during the construction works: see [341]. There is evidence of continuing monitoring and investigation, including an investigation in 2002 which required Ocesa to take various steps {K60/588/1}. In addition, there are public law remedies that a landowner can invoke, including bringing an “action for compliance” or an “action popular” {H15/1/190}.
241. These considerations on the balance of fairness do not ultimately determine or indicate what Article 5 means. However, any interpretation of a legal provision which deprives a landowner of any compensation for damage however extensive and whether or not that damage could have been, would have been or was contemplated when the Article 5 compensation was fixed requires careful scrutiny, particularly when it would have been simple and straightforward for the lawmakers to clarify their meaning if that was what was intended.
242. Before reaching a final conclusion on Article 5 it is necessary to mention the fact that, on the evidence, additional compensation was routinely paid to landowners after the pipeline had been laid, and that the Defendant evidently considered that it was bound to make payments if damage was caused by failures of maintenance and repair in addition to damage caused by the original construction, and that it did so by reference to the terms of the agreements it entered into with landowners {K19/154T3/1}.
243. There can be no doubt that, in advance of building the pipeline, it was contemplated that damage caused outside the strip of land required for the ROW would be the subject of future agreement and further compensation over and above the initial evaluation for the purposes of the ROW Agreement, which would be of those damages which may be caused to the occupied strip of land {K9/34T/39}: see [359]. This was reflected in the Land Acquisition Manual, which included in the Final Phase of activities that “the Land Negotiator will verify the payment of the damages caused by the Ocesa contractors out of the area negotiated by the Company” {K66/618T/13}; and it was also reflected in the contractual arrangements between Ocesa and Saipem, which made the payment of final sums due under Saipem’s contract dependent upon provision by Saipem of Paz y Salvos from affected landowners {J14/54.1/66}. Mr Allison, of whom more later, was equally in no doubt that the processes that were to be undertaken for negotiating compensation in advance would not preclude the need for later re-evaluation and further compensation. To the contrary, his evidence was that there was very likely to be damage outside the ROW and so there had to be a mechanism for coping with that {Day15/25:18}. It is beyond

argument that the oil entrepreneurs in this case considered that there would be additional compensation that had to be paid after the works were completed.

244. The short answer to their views is that they do not determine the meaning of Article 5, which I am bound to decide as a matter of fact on the basis of the expert evidence I have heard. It remains of interest, however, that someone (evidently a lawyer) said, in a sentence that resonates with Professor Castro's opinion: "Let's remember that in our uncouth and sometimes disorganised legislation, there are norms which ought to be studied and analysed as a whole and that no matter how specialised the matter they should not be put to one side. This is the case with the provisions regarding contractual and extra contractual civil responsibility to which we respectfully refer" {K19/154T3/1}.
245. I have concluded that Professor Vallejo's statement of opinion as stated in (3) of the first paragraph of the summary of his opinion set out at [217] requires qualification in the light of Professor Castro's evidence that the Article 5 exclusion of future claims applies when the assessment is "complete and objective". I have reached this conclusion on the basis of the considerations I have set out at length above, my primary reasons being that I do not regard the terms of Article 5 as being clear and that, even allowing for the acknowledged fact that the Colombian State has deliberately established a regime that is favourable to the oil industry, I can see no good reason for extending the protection given by Article 5 beyond the scope of an assessment or decision that is made when operating its machinery. I do not need or attempt to lay down a comprehensive or prescriptive code to define what will and will not be considered to be within the scope of a particular assessment or decision, for the simple reason that this case does not involve any case where the Article 5 machinery was operated so as to give rise to an assessment of damages by either the Mayor or the Court. However, the mere fact that, in the event, the Article 5 compensation proves to be under-compensation for the damage that is within the scope of the assessment will not be good grounds for claiming further compensation, which has some relevance for what comes later. An interpretation of Article 5 which precludes any further claim in respect of damages that were within the scope of the original assessment but permits claims for damage falling outside the scope of the assessment that has been carried out under the Regulations still provides considerable protection for the oil industry. I would expect that any assessment by the experts, the Mayor or the Court would include within its scope damages that would be regarded as "normal" but what is regarded as "normal" may vary from case to case. However, what was within the scope of the original assessment will be determinable on the facts of the case because the assumptions underlying the assessment should be clear from the operation of the Article 5 machinery by the experts, the Mayor or the Court exercising their respective functions. As I have said, I do not know what basis or scope of assessment is in fact applied by the Colombian courts that are charged with this responsibility. My conclusion is therefore purely one of principle on the meaning of Article 5 without knowing whether it would have any application in real life after an assessment by the Colombian court.
246. Turning to agreements that invoke Article 5, I have already highlighted Professor Vallejo's statement of opinion about the interpretation of an agreement for a predetermined amount to be paid as compensation in relation to the permanent occupation of private-owned land by an oil entrepreneur. I can see no justification for

his broad assertion that “such agreement is to be considered as a definitive binding agreement as to the amount of the compensation and for all the damages caused by the construction of the oil pipeline.” I reject his evidence on this point and find that the meaning of such agreements is to be decided in accordance with their terms and the principles I have outlined elsewhere in this judgment, and that the mentioning of Article 5 does not of itself give rise to a necessary bar to all further claims. So, for example, if on the proper construction of an agreement it covered only damage on the ROW and not any future damage off the ROW and did so on terms that did not prevent such damage from being subject to later assessment or compensation, effect should be given to that agreement because the oil company would voluntarily have given up its potential protection pursuant to Article 5 for damage off the ROW. I see nothing in Article 5 which renders it impermissible for an oil company to contract on those terms, if it so wished. The fact that the Ocesa works were carried out (and could only be carried out) pursuant to an Environmental Licence which required Ocesa to establish a system for the evaluation of the damage caused during the construction works and the adoption of immediate mitigation, recovery and compensation measures is material. It means that Ocesa could not have contended at any stage that the payments it made to landowners pursuant to the ROW Agreements excluded the possibility of future payments being made without putting itself in breach of the Licence. I consider the contracts in this litigation elsewhere as appropriate: see [374] below.

4. The Lay Witnesses

247. Both before and during the trial the Claimants submitted that witnesses that they were calling were vulnerable in a number of ways that differed from witness to witness. I have kept those submissions in mind at all times when assessing the quality and reliability of the evidence that each witness has given. It is true that the environment of an English court hearing, whether the witness travelled to London or gave evidence by videolink from Colombia, was alien for all of the lay witnesses called on behalf of the Claimants and, to a lesser extent, for those called on behalf of the Defendant. It is also true that it took some time before some of the Counsel on each side shed some of the bad habits that can creep into the technique of even the most expert examiners and cross-examiners. In general, where questions were liable to confuse a witness, either the witness made clear that the question was not understood or the Court or Counsel intervened to obtain more acceptable formulations. In reviewing the evidence for the purposes of writing this judgment, there have been very few occasions where it has seemed that there was a significant misunderstanding between Counsel and the questioner.
248. The Claimants' lawyers consistently voiced the concern that that the witnesses may be overawed or intimidated by the proceedings or be inhibited by an undue sense of deference. All of the witnesses for whom English was not their first language were courteous and some used phrases which might not have been expected of a witness from England. A recurring example was to respond to Counsel who said "thank you" after an answer by saying "you are welcome" or "my pleasure". But these and other courtesies did not appear to be the product of undue deference. On the contrary, the canny toughness to which I refer elsewhere in the judgment was often in evidence.
249. The main difficulty with the lay evidence is that a number of witnesses were poor historians. This applied extensively to evidence where chronology was important. As will be seen in the analysis and review of the evidence in the Sections dealing with the four Trial Lead Cases in detail, there are a number of critically important points where I reject the evidence of the lay witnesses about when things happened. The Claimants accepted and submitted in relation to a number of witnesses that they would have difficulty in putting events in chronological order for cultural reasons. I accept and have made due allowance for the fact that this is so. But the problem went deeper than that. Reviewing the lay evidence overall as one of the last parts of writing this judgment, I find myself driven to the conclusion that the Claimants' inherent difficulties with chronological memory have on occasions been reinforced by the process of litigation. For numerous reasons, including time constraints, this trial and this judgment have not investigated in detail how that came about; but it certainly did. The problem showed itself in ways that were both general and particular. Particular instances include the timing of Snr Sequeda's (LC39) house move and when Snr Buitrago and Snr Manco (LC50) dug their fish ponds – there are numerous others that are to be found in the Sections dealing with the Lead Cases in detail. More generally, the mantra that the ODC pipeline caused no damage and that all of the Claimants' troubles started with the Ocesa pipeline pervaded the evidence and was frequently wrong for the reasons that I have detailed elsewhere.
250. The evidential difficulties were not confined to chronology. This was recognised by the Claimants in oral closing submissions. The Court was referred to text books and authorities reminding that it is always the task of the Court or tribunal to go on

looking for a kernel of truth even if a witness is in some respects unreliable {Day54/15:18} ff. That is a reminder that I have kept well in mind throughout the process of writing this judgment.

251. I accept wholeheartedly and have attempted always to apply the wise advice of the High Court of Australia that exaggeration or even fabrication of parts of a witness' testimony does not exclude the possibility that there is a hard core of acceptable evidence within the body of the testimony and, since that possibility exists, care must be taken that an over-stringent approach does not result in an unjust exclusion from the consideration of the totality of some evidence where a portion of it could reasonably be accepted. The mere fact that there are inconsistencies or unreliability in parts of a witness' evidence is normal in the Court's experience, which must be taken into account when assessing the evidence as a whole and whether some parts can be accepted as reliable. I also accept wholeheartedly the observation of the Court of Appeal, made in a different context in *Re A (a child)* [2011] EWCA Civ 12 at [20], that "wading through a mass of evidence, much of it usually uncorroborated and often coming from witnesses who, for whatever reasons, may be neither reliable nor even truthful, the difficulty of discerning where the truth actually lies, what findings he can properly make, is often one of almost excruciating difficulty. Yet as Baroness Hale of Richmond tartly observed ... "it is a task which we are paid to perform to the best of our ability". The task, as she acknowledged, is a difficult one, to be performed without prejudice and preconceived ideas." Those observations are directly applicable to the task of fact finding in this case. The task has been difficult; and I have not ducked it.

Both during the trial and subsequently I have of course made an assessment of each witness as an individual. I have been very conscious that cultural difficulties and the fact of hearing evidence in translation may have made that process less secure than might otherwise have been the case and have made as much allowance for those features as possible. I have also, inevitably, had to look at the internal quality of the evidence, and to use the other techniques and cross-checks that will always be used by the English courts when assessing witness evidence. I have at all times looked for what the Claimants called a kernel of truth in even the least satisfactory evidence. The length of this judgment is in no small measure because of the need for extreme care in assessing the witness evidence and because, where unreliable, its unreliability was often not apparent simply on the face of what the witness came to court to say.

5. General Narrative

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The oilfields and the two pipelines

253. At the foot of the Andes, about 100 miles northeast of Bogota, lie the Cusiana and Cupiagua oil fields. The Cusiana field was discovered in about 1988; the Cupiagua field was discovered about four years later. Two pipelines were constructed at an early stage. The Oleoducto Central de los Llanos (or “OCL”) pipeline ran from El Porvenir in the south to Vasconia and the Oleoducto de Colombia (or “ODC”) pipeline ran from Vasconia to Coveñas in the north. The ODC pipeline was laid in 1990-1991 and is important for this litigation and judgment.
254. Comparatively little is known about the ODC pipeline project. Its installation would have been subject to the regulatory regime then in place. It commenced before the introduction of law 93 of 1993 and no environmental licence is available to the court. It is, however, clear that those responsible for the ODC pipeline engaged with affected landowners in advance of laying the pipeline. As happened later with the Ocesa pipeline, notice was initially given of the intention to carry out the works. Later, agreements were entered into with the landowners pursuant to which a payment would have been made that would have fallen within the terms of Article 5 of the 1954 Regulations.

255. It is instructive to see the terms of notification of the ODC works, which was given by Ecopetrol, both for the similarities to and the differences from the documents that were subsequently generated in relation to the Ocesa pipeline works. I set out the Ocesa First Letter at [368] below. The notifications of the ODC works were in standard form and were issued on 24 August 1988 by Ecopetrol. The notifications are available for LC39 {M/71.1T/234.2}, LC50 {M/87T/294.1} and LC74 {M/169T/586.2} and for sufficient numbers of the Lead Claimants to justify the finding that they were prepared for all people through whose land the ODC pipeline was to run⁷. The notifications stated as follows:

“ECP No. []

Bogota, D.E. 24 AUGUST 1988

Mr [Name of Landowner]
PROPERTY: []
Location: []

Dear Sir,

The Empresa Colombiana de Petroleos – ECOPETROL, in the development of its programmes to improve the transport and distribution of oil derivative products and in compliance with the objectives indicated in the Law and its Articles of Association, shall soon start the construction of an Oil Pipeline of approximately 460 kilometres between the Vasconia pumping station, Boyacá Department and the Coveñas Storage Terminal, Sucre Department.

Due to the fact that the work on this Oil Pipeline may possibly affect plots of land which you own, I respectfully [contact/address myself to]⁸ you in order to obtain your authorisation in order for the execution of the works aimed at satisfying a public service of national interest.

ECOPETROL guarantees for you fair and equitable compensation for the losses which this State Company may cause to you taking into account the area that the Company requires, crops and assets which are affected in the specific area and the payment for the easement which is established. For the above purposes, ECOPETROL will duly commission the civil servants who will be entrusted with advancing the respective processes.

ECOPETROL can assign to any individual or legal entity the rights acquired under this permit without requiring the authorisation from the owner or their successor.

⁷ No notification appears in the trial bundle for LC54. Its absence is unexplained but does not undermine the general proposition.

⁸ The use of the word “contract” in {M/169T/586.2} appears to be a mistranslation.

The Company officially requests your permission and for the purpose of which you are asked to sign the copy of this communication as a sign of approval.

Yours faithfully,

EMPRESA COLOMBIANA DE PETROLEOS
[Illegible flourish]
FRANCISCO JOSE CHONA CONTRERAS
Chairman”

Today, November 6/88, I give my consent in order to enter and execute the indicated work on the aforementioned plot of land.

Signed: [] Citizen Card No. []
Address: [] Telephone: []”

256. Agreements pursuant to which a payment would fall to be made are available in respect of LC39 {M/71.2T/234.11}; LC54 {M/118.1/411.1} (a public deed that would probably have been preceded by what the parties have called a ROW Agreement: see [369],[371]); LC74 {M/183T/726.0.13} (an agreement that was subsequently amended, {M/170T/592.1} (another public deed); and other Lead Claimants. Once again, their prevalence in the trial bundle justifies the inference that those carrying out the ODC works would have at least attempted to enter into such agreements with all affected landowners, with the provisions of the Petroleum Code and the 1954 Regulations being in place and the long-stop prospect of expropriation in the event that the landowner chose not to enter into a contract. The terms of one of LC74’s agreements {M/183T/726.0.13} may be taken as typical and included the following provisions:

“ ...

The undersigned, Rogelio Velez Montoya, ..., who acts on his own behalf and that hereinafter shall be referred to as THE BENEFICIARY, on the one hand, and on the other Hernando Montes C. ... who acts on behalf and representation of OLEODUCTO DE COLOMBIA S.A., ..., which hereinafter shall be referred to as THE COMPANY, have entered into an PERMANENT PROMISE OF EASEMENT ESTABLISHMENT OF PIPELINE AND TRANSIT agreement governed by the following clauses:

ONE: THE BENEFICIARY currently occupies and owns a property called La Nieve, located in the Township of Paraje de la Cooperativa, jurisdiction of the municipality of Remedios, Department of Antioquia, with a surface area of 47 ½ Ha,

TWO: ...

THREE: Within the property, the works necessary for the construction of the VASCONIA - COVEÑAS Pipeline with buried pipes of 24” (Inches), affecting a section of the land of

Twenty Meters (20 mts) in width by 424 Meters in length for a total of 8,480 Square Meters, area comprised within the following special boundaries: ...

FOUR: In the aforementioned property, and in particular but not exclusively in the land area set out in the previous clause, THE OWNER grants THE COMPANY rights of use and occupancy established by the Law in favor of the oil industry, pursuant to which THE COMPANY or individual or legal entity to whom it transfers its rights, may perform the works necessary (cuts and/or embankments) according to the technique required, to repair the Pipeline, and to perform the works required for maintenance and repairs, as well as free passage for workers, equipment and machinery used during the work, ...

FIVE: It is understood that, when due to technical reasons, it is necessary for repair and maintenance work to occupy an area greater than that negotiated, THE BENEFICIARY empowers THE COMPANY or whomever is acting as such, to perform the above, taking into account that the damage that is effectively caused shall be compensated after the final cleanup phase.

SIX: As compensation for the easement right and the Damages and injuries caused, THE COMPANY shall pay THE OWNER, the sum of \$798,000⁹ as follows: 1) 70% of the total sum, that is, the sum of \$558,600 by way of damages and injuries once this document is executed and before the subscription of the corresponding Public Deed. 2) The remaining 30%, that is, the sum of \$239,400 by way of easement to the granting of the respective Public Deed.

PARAGRAPH: The total value of this compensation, from which the tax percentage stated by the Law shall be deducted, contains, pursuant to Article 5 of Decree No. 1886/1954 not only the rights of transit, occupancy and use of the area described in Clause Three, but also the injuries or damages caused during the construction performed in the property and particularly, those related to the attached list, containing an inventory of goods that will be affected during the works, in accordance with the estimates made by the parties.

SEVEN:...

EIGHT: In any case, THE OWNER recognizes as of now and in favor of THE COMPANY, full rights of use, occupancy and

⁹ As frequently happens, the \$ sign is used to signify Colombian Pesos, which are also signified by the letters COP.

legal easement of pipeline and transit of the property identified above. Also, it declares that it expressly authorizes the immediate commencement of all works required for the construction of the Pipeline, and ensures that there will be no suspensions or disturbances during its performance, during the installation of items or during the operation of machinery, until the construction works for the Pipeline have been fully completed.

NINE: Upon conclusion of the construction of the Pipeline, THE OWNER may use the land area determined for the easement undertaking not to perform actions, such as construction of housing and real estates in general or tree planting preventing or hindering the performance of the pipeline, its dependencies or accessories; It also undertakes not to perform actions affecting the works carried out for the stability, conservation or recovery of the land and/or the work, whether inside or outside the area negotiated. As of now, THE OWNER authorizes THE COMPANY to remove trees, objects or plants found, sprouted or placed within the area delimited in Clause Three of this agreement and interfering or hindering the repair or maintenance works of the Pipeline and interfering or hindering the stability and/or the operation of the pipeline or its accessories, without being bound to the payment of any compensation. When required to remove posts, division fences, vegetation or crops not preventing or affecting the enjoyment of easement, the relevant compensation shall be acknowledged.

PARAGRAPH: In the event that THE COMPANY determines to build other pipelines ..., in the determined area of the easement, or requires performing the necessary works for the conservation, recovery or management of pipes, it shall recognize and will only pay the damages or injuries caused by this type of works. Once the OWNER receives as satisfaction the payment for the Easement promised herein, it waives to any subsequent, judicial or extrajudicial claim by this concept.

TEN: THE COMPANY may transfer the rights acquired under this agreement to any other individual or legal entity, for which THE OWNER as of now grants the corresponding authorization....

ELEVEN: The legal easement of the pipeline is subject to the rules of the Civil Code, the Petroleum Code, Decree 1886/1954, and in the pertinent, to the Mining Code.

TWELVE: ...”

257. In addition, there is direct evidence that some landowners claimed damages after the installation of the ODC pipeline. Snr Velez (LC74) is a case in point. In August 1993 he entered into a damages agreement with ODC {M/183T/726.0.8} pursuant to

which he was to be paid COP 2,500,000 as damages for the destruction of 10,000m² of grass. Later, in May 1996, he entered into another damages agreement with ODC {M/183T/726.0.5} under which he was to be paid COP 5,000,000 because the passing of a drill over land outside the ROW had caused damage in an area of 10,000m² and had formed a lake with sediments in the area of the ROW in an area of 20,000m². In 1997 he entered into a further agreement with ODC which resulted in a further payment of COP 5,000,000 {M/183T/726.0.1}. LC39 also entered into a settlement agreement with ODC {M/72T/237.1}. There is no evidence that either LC50 or LC54 entered into settlement agreements with ODC.

258. There is evidence that LC39 entered a Paz y Salvo with ODC (or, more strictly, ODC's contractors) acknowledging full payment of compensation for damage caused by the ODC works {M/72.6T/237.15}. There is no evidence that LC50, LC54 or LC74 entered into such a document with ODC or its contractors. It is probable that ODC would have attempted to enter into Paz y Salvos with landowners, at least where there had been a claim for damages over and above the damage contemplated by the original ROW agreements, but the evidence does not permit a finding that it did so in every case or in every case where there had been a claim for additional damages. The fact that the LC39 Paz y Salvo relates to damage caused outside the area covered by the original easement and was concluded with ODC's contractor suggests that ODC operated a system like that subsequently operated by Ocesa, under which ODC took responsibility for additional damage on the ROW while its contractors took responsibility for damage off it. However, not enough is known about the ODC approach to settling cases and obtaining Paz y Salvos to make specific findings on this point.
259. After the discovery of the Cupiagua field, decisions were taken to undertake two major infrastructure projects that came to be known as Phases I and II. Work on Phase I started in 1993 and was designed to increase production levels from about 12,000 barrels per day ("bpd") to about 185,000 bpd. Above 185,000 bpd production was constrained by the lack of pipeline transportation infrastructure. Accordingly Phase II had two components. The first was to increase field production up to about 500,000 bpd by about 1998. The second was to construct an 800km pipeline and related infrastructure from the oilfields to Coveñas in the North, which would expand average pipeline transportation capacity to 560,000 bpd.
260. The proposed Phase II pipeline project included laying approximately 315 kms of pipeline from the oil fields to Vasconia (which became known as "Pipeline South"), laying a further 480 kms of pipeline from Vasconia to Coveñas (which became known as "Pipeline North"), and carrying out works to improve the export terminal at Coveñas. The new pipeline as a whole came to be known as the Ocesa pipeline. This litigation arises out of the construction of Pipeline North.

The joint venturers and the formation of Ocesa

261. On 29 June 1993 Ecopetrol declared the commerciality of the Santiago de las Atalayas and Tauremena Association Contracts and thereby acquired a 50% interest under those contracts. After the declaration the undivided interests of the parties to the Association Contracts were Ecopetrol – 50%; the Defendant – 19%; Total – 19%; and Triton – 12%.

262. The Defendant, Total and Triton entered into a series of agreements to govern their respective rights and obligations, as set out below.
263. A series of Joint Operating Agreements (“JOAs”) culminated in “the 1994 JOA” {J3/11/1}, which came into effect from 29 March 1994. The 1994 JOA was governed by New York law. Article 3 provided that all real and personal joint property was to be held in undivided interests in proportions that reflected the parties’ interests in the Association Contracts (BP and Total 38% each, Triton 24%). By Article 4.1, the Defendant was appointed “Operator” (defined as “the Party appointed from time to time to conduct Joint Operations ... when acting in its capacity as Operator.”). Article 4.7 provided that “in accordance with a Work Program and Budget and subject to whatever instructions may be given from time to time by the Operating Committee, Operator shall have exclusive charge of and shall conduct all Joint Operations on behalf of the Parties under the Association Contracts and this Agreement.” The Joint Operations to which Article 4.7 referred were defined as “all activities approved by the Operating Committee ... for ... the construction and/or operation of pipelines ...”
264. The remaining provisions of Article 4 demonstrate that the Operator’s obligation to take exclusive charge of and to conduct all Joint Operations required the Operator to carry out all of the operational steps necessary to bring the Joint Operations to a successful conclusion. Thus, for example, the Operator was required to determine the number of employees and their selection, their hours of work and compensation (Article 4.8); it was to acquire and furnish all materials and equipment required in the performance of the JOA and the Association Contracts, making every effort to obtain them on terms and conditions most favourable to all of the Parties to the JOA (Article 4.9(b)); it was to select all contractors to be used in the Joint Operations and award contracts on specified criteria (Article 4.9(e)); it was to secure or cause to be secured all permits, easements and other necessary rights (Article 4.9(f)); it was to perform (or cause to be performed) in a good and workmanlike manner all engineering, design and construction work on the project in accordance with the terms of the JOA (Article 4.9(m)); and it was to carry out each Work Program within the limits of the relevant Budget. In addition it was to discharge various administrative functions such as providing to the Parties designated reports and such other reports as the Operating Committee may determine (Article 4.9(c)), keeping books, accounts and records (Article 4.9(j)), and (when and as directed by the Operating Committee) representing the Parties before Ecopetrol and the Government (Article 4.9(k)).
265. The Operating Committee was established by Article 5.1, which provided that its function was, subject to the provisions of the JOA, to “exercise overall supervision and control of Joint Operations.” Each party was entitled to a representative on the Operating Committee, which was to have the powers and duties necessary to determine an overall management of Joint Operations. These powers and duties included (by Article 5.4) “(a) the consideration and determination of all matters relating to general policies, procedures and methods of Joint Operations; (b) the consideration, revision and approval or disapproval of all proposed work programs, budgets and [authorisations for expenditure] prepared and submitted to it ... ; (e) the consideration and, if so required, the determination of any other matter relating to the Joint Operations which may be referred to it by any party or which is otherwise designated under [the JOA] for reference to it.” Work Programs and Budgets required

approval by the Operating Committee and, when given, that approval authorized and obliged the Operator to proceed in accordance with them (Article 6.1). Costs and expenses were to be borne by the Parties in proportion to their participating interests (Article 7.1).

266. The Defendant submits that the arrangements set out in the 1994 JOA were “essentially the mechanism through which the three contracting parties were to conduct their business ...” and that “the Defendant, as the Operator and in its conducting of the Joint Operations, was controlled by the three contracting parties through the Operating Committee.” While it is true that the 1994 JOA set out the Parties’ arrangements for bringing the project to a successful conclusion for their joint and mutual benefit, the suggestion that the Operator was “controlled” by the other parties through the Operating Committee requires qualification and explanation. First, the Operator was to have exclusive charge of the Joint Operations and was the party that was to conduct them. The 1994 JOA did not contemplate that the other parties (or the Defendant except when acting in its capacity as Operator) would become directly involved in the conduct of the Joint Operations: the central purpose of appointing the Operator was to relieve the Joint Venturers (as such) of the need for all to become involved in the direct running of the Joint Operations. Article 5 of the 1994 JOA identifies the degree of control to be exercised by the Operating Committee as being essentially high level and supervisory, so as to give it “overall” management: this is shown by the extracts set out above and is consistent with the authorizing and obliging effect of approval of Work Programmes and Budgets. Thus, while it would be correct to say that the Operating Committee held ultimate residual power, the Operator was charged with conducting the Joint Operations and was expected to direct them. Viewed from outside the joint venturers’ camp, it was the Operator who was going to run the Joint Operations.
267. It appears that the 1994 JOA was concluded in or about June 1994, though dated 29 March 1994. During the same period, the joint venturers entered into agreements with Ecopetrol to regulate their four-way operations.
268. The joint venturers and Ecopetrol entered into a Memorandum of Understanding dated 16 March 1994 (“the MOU”) {J1/7T/11}, which was superseded by a Revised Memorandum of Understanding dated 15 July 1994 (“the RMOU”) {J5/18T/1}.
269. The MOU {J1/7T/11} was governed by Colombian Law. The recitals recorded that the four Parties wished to enter into it “to govern operations *inter se* relating to the Initial and the Construction Stages from the effective date of the agreement”. To that end, the Parties’ objective was to “commit to carrying out technical and economic analysis, to perform the studies and designs, to determine the technical specifications related to the Project and to commence activities to incorporate a stock company ... (all together referred to as the “Preliminary Activities”), and if they find the Project feasible and agree to proceed with the Project, to order the construction ... of the Project, incorporating an SA ... to such end” (Clause 1). Clause 2 committed the Parties to conduct various Preliminary Activities including Technical Studies containing but not limited to preliminary engineering as necessary, routing, permits and rights of way, and environmental studies. These studies were to be completed to the satisfaction of all Parties as a prerequisite to forming an SA (Clause 2.4). In order to conduct the Preliminary Activities during the Initial Stage, the Parties agreed to appoint a Steering Committee consisting of one representative of each Party. The

Steering Committee was to determine the governing rules for the performance of the Preliminary Activities and was to be superseded by a similarly tasked body set up under the Articles of Incorporation of the SA (Clause 3). During the Initial Stage covered by the MOU, the Defendant was to act as Coordinator in conducting the Preliminary Activities with the mandate of the Parties and under the direction of the Steering Committee; and it was to be authorised to hire the services of third parties for the conduct of the Preliminary Activities (Clause 4).

270. The RMOU {J5/18T/1} introduced two new parties (collectively known as the Canadian Group) who were intended to operate the Project facilities following construction. The equity participation of the parties was stated to be Ecopetrol – 20%, the Defendant and Total - 15.2% each, Triton - 9.6% and the Canadian Group - 40%. The objective was stated in Clause 2 in similar terms to Clause 1 of the MOU, with the additional objective of ordering material and placing contracts for front end engineering work in connection with certain parts of the Project. Clause 4 provided that, in order to conduct the Preliminary Activities, the Parties would appoint the Steering Committee (on which the Canadian Group would have two representatives but only one vote, with the other Parties having one representative and one vote each). As with the MOU, the Steering Committee was to determine the governing rules for the performance of the Preliminary Activities; and it was to be superseded by a similarly tasked body set up under the Articles of Incorporation and the By-laws of the SA. Annex F showed the budget that had by now been approved by the Steering Committee under the MOU. Once again, the Defendant was appointed to act as the Coordinator in conducting the Preliminary Activities with the mandate of the Parties and under the direction of the Steering Committee; and once again it was to be authorised to hire the services of third parties for the conduct of the Preliminary Activities (Clause 5).
271. Annex G contained accounting provisions, including that the Coordinator (i.e. the Defendant) should select the contractors to be used in Preliminary Activities. It could let contracts for less than USD 250,000 without informing of getting approval from the Steering Committee: contracts of greater financial value required a competitive bid procedure and the approval of the contracting Parties to the recommended bid. The costs, expenses and benefits accruing or resulting from the Preliminary Activities would be borne by and accrue to the Parties in proportion to their Equity Participation interests.
272. The RMOU contained more detailed provisions about the proposed SA in Annex A. The SA was to be established to “design, finance, construct, own and operate the Project assets”. It was to be a Sociedad Anonima incorporated under Colombian law. Initially the shares were to be held by Ecopetrol, the Defendant, Total, Triton and the Canadian Group in proportion to their equity participation under the RMOU.
273. Annex C of the RMOU provided that, following incorporation of the SA, the SA would enter into various contracts with engineering, procurement and construction (“EPC”) contractors. The SA was also to appoint a Project Construction Management Team (“PCMT”) made up of representatives of Ecopetrol, the Defendant, Total, Triton, the Canadian Group and the engineering group in charge of the preliminary engineering (Brown & Root). The PCMT was to supervise the implementation of such contracts. It was currently envisaged that the PCMT would be led by Ed Truett (a BP employee) who would also lead a team charged with the project construction

management of the Fields. The SA was to enter into a technical services agreement with Brown & Root under which Brown & Root would provide EPC support and expertise including the services of their representative on the PCMT. The SA was also to enter into one or more Manpower Agreements with Ecopetrol, the Defendant, Total, Triton, and the Canadian Group to cover any personnel seconded into the PCMT.

274. On 14 December 1994 Oleoducto Central S.A. was incorporated as a Sociedad Anonima under Colombian law {K16/128/1}: it is universally referred to as Ocesa. Its corporate purpose was “to design, construct, develop, operate and own public use pipeline system and related facilities including, port facilities running from the Municipality of Tauramena ... to the Port of Coveñas In furtherance of its corporate purpose, the Company shall conduct the necessary technical-economic feasibility studies, prepare such studies and designs, and determine such technical specifications for the pipeline, its terminal and the pumping and storage stations to carry out its construction and operation.” The Defendant was not itself a shareholder in Ocesa, but its wholly owned subsidiary BP Colombia Pipelines Limited held 15.2% of the shareholding. Ecopetrol held 25%, with the balance being held by the other parties to the RMOU or their affiliates.
275. The Ocesa Deed of Incorporation also stood as the company’s by-laws: see, for example, Article 5 {K16/128/2}. No specific reference was made to any particular committee or body that was tasked in a manner similar to the Steering Committee. General provision was made for the creation of committees: see, for example Article 42(K) {K16/128/17}. So far as the court is aware, no document establishing the PCMT as such a committee or body is available.
276. On the same day, 14 December 1994, Ocesa and its shareholders entered into the Oleoducto Central Agreement (“the OCA”), which specified the terms and conditions of the shareholders’ respective investments and participation in Ocesa and the financing and operation of the project {J9/29/1}. It was superseded as set out below, and can therefore be treated shortly. It recorded that the shareholders had incorporated Ocesa “for the sole purpose of acquiring, developing, constructing, financing, completing, owning and operating the [project]” (Section 2.3). Section 3.5 provided that Ocesa would be responsible for construction activities and that, to enable it to carry out such activities it would enter into a technical services and management agreement with the Defendant (*not* its shareholding subsidiary) pursuant to which the Defendant would “provide the services of Ed Truett or another of its employees to act as manager (the “PCMT Manager”) of the project construction management team of Ocesa responsible for construction activities, together with appropriate technical support.”
277. On 31 March 1995, the OCA was replaced by the Amended and Restated Oleoducto Central Agreement (“the AROCA”) {J10/32/1}, which was governed by New York law (as had been the OCA). Once again, the parties were Ocesa and its shareholders, and not the Defendant. The AROCA recorded that the RMOU had been terminated on 14 December 1994 (by its parties, including the Defendant). As with the OCA, Section 2.3 of the AROCA recorded that the shareholders had incorporated Ocesa “for the sole purpose of acquiring, developing, constructing, financing, completing, owning and operating the [project].” Section 3.5 provided that Ocesa would be responsible for construction activities and that to enable it to carry out such activities,

Ocensa would enter into a technical services and management agreement with the Defendant for the provision of Ed Truett's services to act as the manager of the "project construction management team ... of Ocensa responsible for construction activities, together with appropriate technical support."

278. The "project construction management team" is not a defined term of art in the AROCA and the phrase does not appear except at Section 3.5. The PCMT Manager is a defined term of art (by reference to Section 3.5) and is mentioned elsewhere: (a) Ocensa was to instruct him to prepare and provide to Ocensa for approval by its Board of Directors an annual construction budget for the next year in the period before all segments of the project had been commissioned (section 3.3(b)); (b) during the same period Ocensa was to instruct him to furnish its Board of Directors with a summary of construction activities relating to each segment of the project during that month (Section 3.3(f)); and (c) not later than 30 days after the end of each fiscal quarter Ocensa was to instruct him to furnish to its Board of Directors and Shareholders a summary of construction or operations during the quarter together with accounts and budget estimates (Section 3.3(g)), which was to be considered by Ocensa's Financing Committee on a quarterly basis (Section 5(1)(b)). The Financing Committee was a committee established by Ocensa's Board of Directors which was to be composed of one member representing each shareholder (or affiliate) together with the officer of Ocensa responsible for finance, which reported direct to the Board of Directors of Ocensa (Section 5.1(b)). The AROCA did not say how the PCMT Manager would go about managing the project construction management team or, more generally, how he would go about managing the construction of the project.
279. The AROCA also recorded that Ocensa and a joint venture vehicle of the Canadian Group ("CITCOL") acting as Operator had entered into a Technical Services and Management Agreement in connection with the operation of the project after its construction ("the CITCOL TSMA") {J10/33/1}. That agreement was made on 31 March 1995 between Ocensa and CITCOL. By Section 2.1 CITCOL agreed to provide the necessary expertise, management skills and manpower to perform the technical and management services to Ocensa for the operation of the pipeline, acting as an independent contractor. Article 3.1 provided that CITCOL would assign certain of its employees (described as "the secondees") to fill the positions of Ocensa's Chief Operating Officer and various other positions. The secondees were to remain employees of CITCOL (which was to be responsible for their actions and omissions) but were to function within Ocensa's Operating Division as if they were employees of Ocensa. The Operating Division was to have "the authority and duties set forth in the guidelines and general statements of policy and procedure submitted by the Chief Operating Officer and approved by the Board of Directors from time to time, including ... the preparation, as required by the Board of Directors, of operational and maintenance manuals and, following Completion, ... ongoing technical support and maintenance of system integrity programs, quality control for field operations, [and] maintenance of design ..." (Section 3.3(viii)).
280. The agreement between the Defendant and Ocensa foreshadowed by the AROCA was dated 17 August 1995 and was the Project Construction Management Agreement ("the PCMA") {J13/52/32}. The Defendant was referred to as "the Manager" throughout the PCMA. It had retrospective effect from 1 February 1995. It commenced by recording that Ocensa had been established with the purpose of

designing, constructing, operating, commercially exploiting and owning the system of oil transportation and that the Manager, as Operator of the Association Contracts, had a managerial organization for the exploration and exploitation of hydrocarbons, as well as for any other related projects, especially those of construction of flow lines and pipelines.

281. Clause 1 set out the Object of the PCMA in the following terms:

“Taking into account that Ocesa will enter into contracts with third parties for the construction of the Pipeline, Ocesa and the Manager agree that the latter will provide the management of said contracts for Ocesa through the Project Construction Management Team (hereinafter PCMT), within the limitations established under this contract and with total technical financial, administrative and directive autonomy. During the performance of such construction, the Manager shall execute the following activities, hereinafter the services:

- i. To serve as permanent consultant in all aspects related to engineering, procurement and supply of services to OCENSA, for the construction of The Pipeline.
- ii. To provide counsel, supervise all bidding and contracting processes, and to award, under the terms hereby established on Clause Two of this contract on representation, all contracts necessary for the construction of The Pipeline.
- iii. To execute and sign in the name and on behalf of OCENSA any contracts and other legal acts required for the construction of The Pipeline pursuant to the representation provisions contained in Clause Two hereof.
- iv. To manage, supervise and adequately control all contracts executed by OCENSA for the construction of The Pipeline.
- v. The Manager will report to OCENSA following the standards and procedures set forth in the OCENSA Finance and Accounting Principles.”

282. The status of the PCMT was not defined in the PCMA. Instead, it was referred to both in the body of and in attachments to the PCMA which were stated to be part of the agreement, as follows:

- i) Attachment A was entitled “PCMT Staff Dedicated to the Transportation Project Effective June 1, 1995”. As its name suggests, the attachment listed staff under three column headings: Name, Company and Cost Distribution. The staff were subdivided into various categories (“Projects” Personnel – Bogota based; Community Affairs; Security; Land, ROW & Legal; “Projects” Personnel – Houston based.) The staff were overwhelmingly (c. 80%) listed as being from the Defendant or another BP company;

- ii) Attachment B was entitled “PCMT Staff Partially Assigned to the Transportation Project Effective June 1, 1995”. It listed staff under the same column headings and subdivisions (“Projects” Personnel – Houston Based; “Projects” Personnel – Bogota Based). All but one of the eight named individuals were listed as being from the Defendant or another BP Company;
 - iii) Clause 4 identified the Contract Value by reference to the direct costs incurred by the Defendant for the people identified in Attachments A and B and the indirect costs which “include support services for the PCMT provided by the Manager ...” It also referred to Attachment C which “contains the description and scope of the support services to be provided as prepared by each applicable department of [the Defendant] and agreed by Ocesa.” These lists of support services to be provided were subject to periodic revision, but the list in Attachment C is relevant;
 - iv) Attachment C was headed “Transportation Full Field Development/ BPXC Construction Management/ Cost Forecast for June-Dec 1995, & 1996, & 1997/ to Ocesa”. The first page set out the cost forecast by reference to Departments (Procurement & Logistics; Legal; Security; Community Affairs; and more). Subsequent pages came under the general heading “Transportation Full Field Development/ BPX Colombia Construction Management/ Forecast for June-December 1995 to Ocesa/ Support Services” with a separate page for each “BPXC Department”. Each departmental section commenced with the words “Your expected Departmental Service Requirements and Scope to Ocesa” and itemised and quantified the services to be provided to Ocesa over a stated period. The exercise was then repeated for 1996 and 1997.
283. Ocesa was not in a position to manage, supervise and control the contracts into which it entered arose because, as a new company, it had no infrastructure or even staff of its own at that time {E1/3/142} at [3.32]. It therefore needed the Defendant to manage, supervise and control them for it, just as it needed CITCOL to operate the pipeline after it was constructed.
284. I decide the consequences of this sequence of transactions in detail later: see section 7 below. However, it may be convenient to summarise the position for present purposes as follows:
- i) The 1994 JOA was concluded between the original joint venturers (the Defendant, Total and Trident). They established a contractual structure pursuant to which the Defendant was to act as Operator and, as such, was to take exclusive charge of and to conduct all of the activities necessary for the construction and operation of the project pipelines. In doing so the Defendant would be subject to the overall control of the joint venturers acting through their Operating Committee. Although the ultimate power to control resided in the Operating Committee, it was the Defendant that was to run the Joint Operations, with the Operating Committee’s involvement being high level and supervisory. Put another way, the Operating Committee was not expecting to get its hands dirty with the execution of the necessary works: that would be the Defendant’s job as Operator;

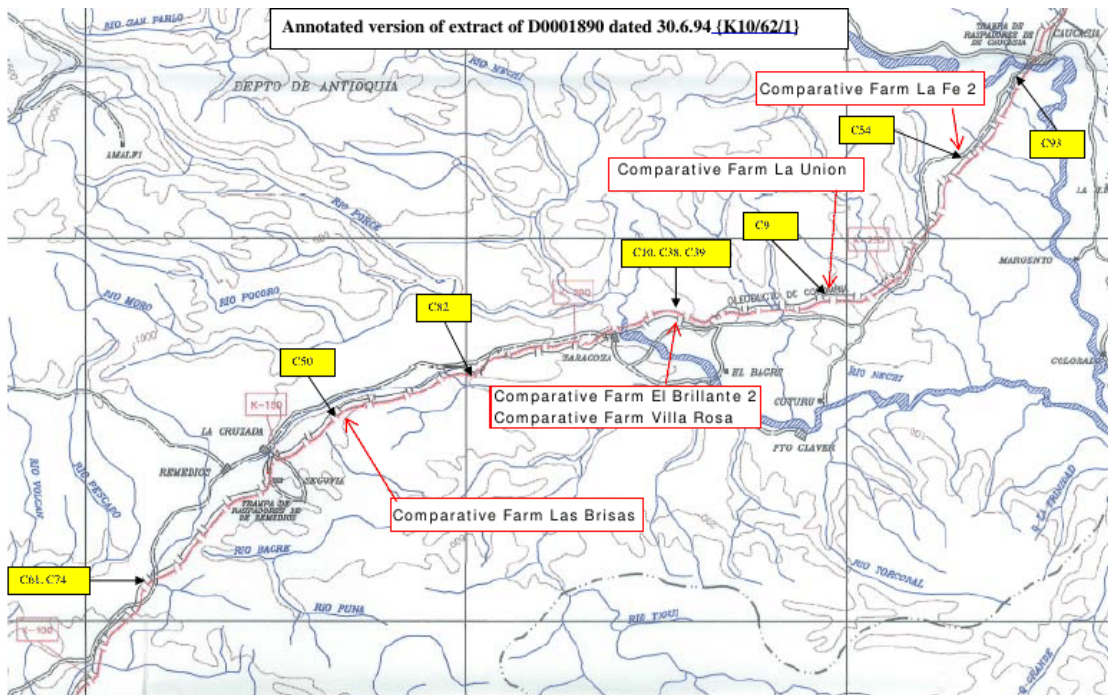
- ii) The original joint venturers then entered into the MOU with Ecopetrol, which was superseded by the RMOU after the Canadian Group had arrived on the scene. The MOU made the Defendant the Coordinator in conducting the Preliminary Activities with the mandate of the Parties under the direction of the Steering Committee, which was to determine the governing rules for the performance of the Preliminary Activities. The Defendant's role as Coordinator for the (expanded) Preliminary Activities was continued by the RMOU;
- iii) The MOU and RMOU contemplated the incorporation of Ocesa and that the Steering Committee would be superseded by a similarly tasked body set up under the Articles of Incorporation and the by-laws of the SA. Annex C said that the SA (i.e. Ocesa) would enter into the necessary contracts with EPC contractors and appoint a PCMT made up of representatives of all of the parties to the RMOU and Brown & Root. The PCMT was to supervise the implementation of the contracts into which Ocesa entered;
- iv) Ocesa was incorporated on 14 December 1994 to design and construct the pipeline (amongst other things) {K16/128/1}. On the same day the shareholders and Ocesa entered into the OCA {J9/29/1}. The OCA was superseded by the AROCA {J10/32/1} on 31 March 1995, which stated that the RMOU was now terminated. Ocesa was to enter into a TSMA with the Defendant for the provision of Ed Truett as the PCMT Manager. The PCMT was referred to but its status was not defined. With the termination of the RMOU and the conclusion of the Preliminary Activities, the Defendant's role as Coordinator of the Preliminary Activities came to an end. As had been contemplated by the RMOU it was to be Ocesa who entered into the EPC contracts for the construction of the pipeline;
- v) The Defendant did not at any stage have control of the joint venture or of Ocesa by virtue of its shareholding (either direct or via its wholly owned Colombian subsidiary) in the various agreements for the development of the oil fields or the construction of the pipeline or by virtue of its representatives on the Operating Committee (under the 1994 JOA) or the Steering Committee (under the MOU or the RMOU) or the Board of Directors (under the AROCA);
- vi) The PCMA {J13/52/32} set out the terms on which the Defendant agreed to provide the management of Ocesa's contracts for Ocesa. It agreed to do so "through the [PCMT]". Amongst the services it was to provide were "to manage, supervise and adequately control all contracts executed by Ocesa for the construction of the Pipeline." The Defendant and other BP companies were to provide most of the personnel who would make up the PCMT and the Defendant was to be paid by reference to the direct and indirect costs it incurred in providing and supporting the members of the PCMT (including those who were not originally BP employees). The attachments to the PCMA identified and costed the services to be provided by the Defendant's departments to Ocesa between 1995 and 1997, when it was anticipated that the project would be completed.

The route and the terrain

285. The route of the Ocenca pipeline is shown on Map 1 {K65/603/1}. For much, though not all, of its length it followed the route and the ROW of the ODC pipeline. In general terms the terrain was mountainous in the South, becoming progressively less so as the pipeline made its way north.



286. The ten lead cases initially selected for trial are shown on Map 2 {C5/5.7/224}. They are all in the Department of Antioquia and in the sub-regions of Bajo Cauca and North-east Antioquia and are between about 200 and 280 kms north-west of Bogota.



LC50 and LC74 (as well as LC61 and LC82) are situated in Central Cordillera, in the San Lucas Mountain Range. The topography in this area is typically mountainous with watercourses running in steeply sided valleys. LC74 is on generally steeply sloping ground which drains to the valley floors: {H1.1/1/209} at [17.1.2]. LC50 is on steeply undulating ground forming generally steep hills, ridges and steep narrow valley features. Natural drainage is to the valley floors between the hills to watercourses: {H1.1/1/170} at [14.1.2]. LC39 and LC54 (as well as LC9, LC10, LC38 and LC93) are further to the north on the Coastal Plain between the Nechi and Cauca rivers. The topography in this area is typically more undulating than to the south. LC39 and LC54 are on undulating ground with rounded hills and shallow valley features {H1.1/1/155} at [13.1.2], {H1.1/1/185} at [15.1.2]. A general impression of the properties can be obtained from the photographs collected to which I refer in the judgment, and from the 3D models prepared by Dr Card, the Geotechnical Expert instructed by the Claimants.

287. The many photographs taken over time demonstrate that only about 50 years ago, the great majority of the land through which the pipelines were to pass was primary forest. Over the last 50 years or so, extensive deforestation has occurred as land has been cleared for agriculture. It has typically been occupied by campesino farmers who have pursued a subsistence existence achieved by clearing land for pasture and animals, supplemented by other sources of food, income or barter such as pigs, hens and fish. Most of the 74 claimants are campesinos, LC54 (Snr Mesa) being the clear exception amongst the four trial cases.

288. The soils in the area of interest typically present three or four different layers or “horizons”. Where present, the surface layer will be horizon O, which is formed by the accumulation of undecomposed organic materials (such as leaves, branches or other organic debris). It is most prominent in forested areas because of the organic matter shed by the trees, but even in the forests there is little or no opportunity for significant amounts of organic matter to be added to the soil because of rapid

decomposition caused by high temperatures and high biological activity. Horizon O tends to disappear when forest is cleared for agricultural use because the existing organic material decomposes and is not replaced. Accordingly, the first horizon that is typically encountered is a surface layer of topsoil (horizon A). Topsoil is substantially comprised of decomposed organic materials which give it a relatively dark colour; it is the horizon that will be richest in nutrients and other characteristics which mean that most biological activity (e.g. root growth, worms, fungi and bacteria) will occur there. The potential productivity of the soil depends as a whole upon the depth and composition of the horizon A. The next layer (horizon B) is a sub-superficial horizon, which contains less organic material than horizon A, and is therefore lighter in colour. Root growth and other biological process can continue into horizon B but to a progressively decreasing extent with depth. Below horizon B comes horizon C, which is the soil's parent material, which has been produced by the alteration of the underlying rock¹⁰. For all practical purposes, horizon C is infertile.

289. The composition of the soils on the properties through which the Ocesa pipeline ran varied, but some generalisations can be made. First, tropical soils typically have a thin layer of topsoil (<15 cms) because the conditions do not allow for the contribution of much additional organic matter when the forest canopy is removed. Second, deforestation results in a reduction in the soil's organic content. Third, soils in the region generally have low levels of fertility because of low levels of essential minerals which are exacerbated by water run-off and leaching. Fourth, the soils tend to be very acidic. Fifth, as the depth of soil increases, so the level of organic material will decrease. Sixth, the soils are fragile, both because of the thinness of horizon A, and also because they are susceptible to erosion. The precise susceptibility to erosion will depend upon a number of variables including the composition of the soil, the extent of vegetation cover (or lack of it), the amount and heaviness of rainfall, and the flatness or steepness of the terrain. As a general proposition and rule, deforestation leads to increased rates of surface water runoff and erosion because of the absence of the protective canopy of trees. The extent to which it will do so depends upon the agricultural practices that follow and the extent to which the soil is or remains exposed to direct impact from rain.
290. The Instituto Geográfico Agustín Codazzi (IGAC) is the entity responsible for producing official maps in Colombia, including soil survey maps. It carried out a soil survey in 1979, which provides a reasonable description of the soils in the area of the four trial properties and which Professor Montenegro, the expert agrologist instructed on behalf of the Defendant, summarised as follows:
- i) LC74 and LC50: "The acidity is strong to very strong, with a high iron saturation. The cationic exchange capacity is low to very low and the total saturation bases is very low. The content of organic carbon is low in the surface horizon and very low in the other horizons. The phosphorus available is very low and natural fertility is low to very low. They are very susceptible to erosion and landslides; they exhibit terraces and footpaths.": {H4.4/4/764} at [5.110].

¹⁰ This outline description is based upon the reports of Dr Obando {H3.4/4/664} and Professor Montenegro {H4.4/4/719}

- ii) LC39: the soils were “strongly acidic, with a high content of iron, a low cationic exchange capacity and low total bases. Phosphorus content is low and the organic carbon content is low and decreases with depth. Fertility is low to very low.”: {H4.4/4/764} at [5.112].
 - iii) LC54: “pH is lower than 5.0¹¹ and its iron saturation is high, medium to low exchange capacity and low total bases, medium organic carbon in the surface horizon and low in the other horizons. There is low phosphorus and low to very low fertility.”: {H4.4/4/765} at [5.113].
291. Dr Obando, the expert agrologist instructed on behalf of the Claimants, did not challenge these summaries. He relied upon IGAC’s later survey, which was carried out in 2007 and which was to the same effect. He also made the point that IGAC categorised the susceptibility of the soils to erosion as “high” {H3.4/4/670}; and it was his opinion that the IGAC’s regional descriptions were broadly applicable to the four trial properties {H3.4/4} at 931, 986, 1028, 1109. Dr Card and Dr Savigny agreed that “the soils on Lead Claimant properties are an inseparable mixture of silts and clays classified according to the Unified Soil Classification System as (a) silts of low to high plasticity and (b) clays of intermediate to high plasticity. A very small fraction of soil falls outside these two classifications and is non-plastic. ... [The soils] exist as a uniformly heterogeneous mixture of varying constituent proportions of clay, silt and sand sized particles.” {H23.3/8/579}. I accept that the regional descriptions and the experts’ summaries (as above) are accurate general descriptions of the soils on the Lead Claimant properties. It is also common ground that once soils are disturbed, they lose cohesion {Day35/33:20}.

Social and Security Considerations

292. The central area of Antioquia has been and remains a wild and lawless place. Left-wing guerrilla groups perpetrated violence, extortion and kidnapping which led to the formation of a right-wing group known as Autodefensas Unidas de Colombia (“AUC”) in 1997. The AUC was made up of drug-traffickers and landowners who were trying to combat rebel kidnappings and extortion by left-wing groups; and it had its roots in paramilitary armies built up by the drug barons in the 1980s. In about 2003 there was a pact but the vacuum has been filled by criminal gangs, or bacrim, who are also involved in drug trafficking and extortion. All of these groups were very violent and conducted turf wars throughout the region. Snr Mesa (LC54) gave evidence, which I readily accept, that during the time of the criminal gangs he did not go to his property, La Fe, very much and that he was always frightened when he did go (though his farm manager continued to live on the property throughout the period): {D6/100/1179} at [68-69] and {Day6/15:5} ff. His wife, Rita Aranga gave evidence to like effect, saying that the situation had been bad since the 1980s, while pointing out that there is also fear in the cities that Colombians have to endure.
293. It is the Claimants’ case that there is an ever present risk that they may be forcibly evicted from their lands at short notice or no notice at all. This vulnerability is real and is illustrated by the fact that Jorge Mieles, the first claimant in LC38, was killed in 2010; three employees of one of the Claimants (not a Lead Claimant) were killed in

¹¹ i.e. very acidic

2009; one of the witnesses for the trial, who was due to give evidence by video-link, disappeared and apparently has gone into hiding; and Snr Ramirez, who did give evidence by video-link, had been shot in the neck during regional violence though, as the Claimants put it “this did not appear to impact on his ability to give testimony” {C4/3.4/129} at [365]; {C4/3.4/106} at [313].

294. The security situation was notoriously dangerous for those who lived through it and those who worked in the region at all material times. Video footage repeatedly shows soldiers of the Colombian military providing heavily armed protection against attacks on contractors working on the pipeline. Similar footage and photographs taken during evidence gathering for the current litigation illustrates the ever present danger of violence, extortion and death continuing until the present day. It is easy to admire both those who lived their daily lives under such conditions and the people who undertook substantial engineering projects through technically difficult terrain at considerable personal risk to themselves.
295. The Claimants range from those who can be described as true subsistence farmers, being dependent upon their land for the basic needs of life, to those whose properties generate surpluses of varying size. There is an active barter economy between neighbours both as to goods and in the matter of helping each other on the land. Labour is sometimes purchased, depending on the scale of the enterprise, the willingness of neighbours to help and the availability of labour for monetary hire. Normal sale transactions take place between neighbours and through markets, though access to markets can be difficult. Travelling merchants may purchase large quantities of a crop; but in the absence of that there is an ever-present risk of inability to get produce to an effective market outlet. This can and often does result in wasted production, often accompanied by generosity to neighbours who may get foodstuffs either for free or by barter that would otherwise go to waste.
296. On the assumption that the four trial cases are typical, a farmer will typically engage in the gradual clearance of his land. Newly cleared land may be cultivated before being turned over to pasture. The land will sustain crops, cattle and relatively modest levels of other livestock. Rotation of crops is practiced, with the minimum period of rotation being about three or four years and longer periods imposing less strain on the fragile and infertile soils. The wooded areas may provide timber either for use on the farm or for selling on: Snr Buitrago (LC50), for example, first fell in with Snr Manco when he proposed that Snr Manco should buy half his farm and set up a joint timber production business {D5/91/1021} at [17].
297. It is obvious but needs to be remembered that there was a substantial disparity by reference to most criteria between the Defendant, Total, Trident, the Canadian Group, Ecopetrol and Ocesa on the one hand and the Claimants on the other. The farmers were financial minnows, many of whom were illiterate and (though undoubtedly canny in the context of their daily lives) not versed in business: the opposite is true of the oil entrepreneurs, including the Defendant. Although the licensing system made provision for public education about and involvement in the process leading to the laying of the pipeline, with public hearings attended by individuals from local communities as well as public officials who actively intervened in the process (e.g. the Ministry of Environment, the Governor of Antioquia, the Attorney General’s delegates, local Mayors, the Ombudsman’s office and others {K21/197/3}, {E1/5/244} at [9.4], {K21/184T/1}), a disparity in bargaining power inevitably

remained. In negotiations between the parties, the entrepreneurs had the added benefit of their industry being declared to be of public benefit and the long-stop prospect of expropriation, as explained at [24], [38] and [112] above.

Climate

298. The Claimants' properties are in the tropics where the climate is hot and wet. Average monthly temperatures are in the region of 25-27° centigrade throughout the year. Annual rainfall increases as one progresses north towards the Coastal Plains, but even at the southern end of Pipeline North annual rainfall is very high. For the stretch encompassing LCs 74, 50, 39 and 54 annual rainfall ranges from about 2850 mm in the south to about 4100 mm in the north. By way of comparison, average annual rainfall in the South of England is in the region of 840 mm. There are two ill-defined rainy periods, the first in May and the second between August and November; however, in the intermediate months of June and July, significant precipitations take place. Furthermore, even in the dry season from late November/early December to March/April there may be heavy rainfall. 1996 was a particularly wet year.
299. The rainfall data was usefully collected by the parties at {C6/24} and {C6/24.1}. The following table, which sets out data from those summaries, provides some insight into the distribution of rainfall by reference to weather stations that are reasonably local to the Lead Claimant properties:

LC No.	Local Annual Rainfall {K44/461/4}	Local Annual Rainfall {H8.16/16/4210} et seq.	Max in Month 1996-1997	Max in 24 hours 1996-1997	Most days precipitation per month 1996-1997	Least days precipitation on per month 1996-1997
54	4090	2799	536 (8/96)	107 (7/97)	22 (8/96)	3 (12/97)
39	4090	4919	733 (9/96)	140 (11/97)	19 (8/96)	1 (3/97)
50	4137	3943	626 (6/96)	120 (2/97)	22 (10/96)	4 (12/97)
74	2840	3943	626 (6/96)	120 (2/97)	22 (10/96)	4 (12/97)

300. I accept as a general account of the area the evidence of Professor Monsalve {H8.10/10/2443} that “precipitation is relatively stable in the area between the towns of Remedios and Segovia until just north of Zaragoza ..., this decreases near the town of Caucasia In general, there is a period of increased rainfall between the months of April and November. During the rest of the year, between December and March, there is a period of less precipitation (the dry season).” While there were variations from year to year and place to place along the stretch of Pipeline North, the general pattern was well known to all: there was a severe risk of frequent and very heavy rainfall during the wet season. The risk was reduced during the dry season, but occasional outbreaks of rain, which could be heavy, were always possible.

The construction process in outline

301. The outline stages of the construction process were reflected in the weekly progress reports, which divided the operation into eleven stages {K38/390T/4}: (1)

topography, (2) preventative works, (3) opening of the ROW, (4) pipelaying, (5) trenching/excavation, (6) bending, (7) alignment, welding, x-rays, (8) joint casing, (9) lowering and covering, (10) ROW cleaning and reshaping, and (11) ROW restitution works (including long-term geotechnical works). The process is illustrated by the drawing at {K9/33/13} and by numerous photographs and DVDs.

302. A more detailed description of the process was given by Snr Gasca in his evidence at {E1/1/28}, [12.1]-[12.49], which I accept as a generally accurate account of how things were meant to be done and which forms the basis of the following summary. In addition, I refer to the Specification for Pipeline Construction (“the PCS”) {K24/221/1} and the Reinstatement & Erosion Control Specification (“the RECS”) {K21/189/1}, which provide useful (contractual) information about the steps that were supposed to be taken during construction and reinstatement. As its name suggests, the purpose of the RECS was to ensure that erosion control and other measures “return the ROW to near its original condition within the constraints of pipeline operational requirements.”: [3.1] {K21/189/4}. I will consider the extent to which the system operated successfully when looking at the Lead Cases individually.
303. There were (broadly) three stages. Stage I began with the pre-construction survey. This survey involved the following steps: identifying and marking out the ROW; identifying and flagging the location of the ODC pipeline; identifying realignments (where necessary to find a way around obstacles); soil management planning (including locating and designating specific areas for the temporary stockpiling of topsoil, where necessary); assessing whether the ROW needed to be widened; identifying terrain constraints; assessing what temporary retention structures and other short-term erosion control measures were required; and ensuring that the natural drainage of the land and other watercourses would not be disrupted.
304. Following that survey, the ROW was cleared (of vegetation) and graded (i.e. prepared by the removal of surface and lower soils so that it could be trafficked for the purposes of transporting, assembling, welding and laying the pipe), and necessary short-term erosion control measures should be put in place. How much and what soil was removed as part of the grading would depend upon the pre-existing state of the land and site-specific construction requirements. Stage I included geotechnical works to protect topsoil stockpiles. A member of the pre-construction survey team was present on site during clearance; as were members of the project environmental staff. All necessary precautions were meant to be taken by the contractor to maintain the integrity of the existing topsoil during stripping, storage and replacement operations. Topsoil was to be stripped to a maximum depth of 300mm and a minimum depth of 100 mm and was required to be stored separate from sub soil to eliminate intermixing: PCS at [4.7.1] {K24/221/30}.
305. Stage II involved the use of heavy equipment to string and weld the pipeline, dig the trench along the ROW, lower the pipeline into the trench, and backfill the trench to cover the pipeline (using the spoil which had been excavated from the trench). The periods between digging the trench, lowering the pipe into the trench and backfilling around it should be kept as short as possible: see PCS [10.1.4] {K24/221/53}; and the Environmental Management Plan (“the EMP”) {K9/35T/144}. The material which had been removed as part of the grading would then be reinstated (so that the land would be “re-formed”). Material that had been excavated from the trench was

required to be segregated and preserved in such a manner that it could be put back in the original soil sequence as it was taken out: PCS [4.6.1] {K24/221/30}.

306. As part of Stage II, further short-term erosion control measures should also be taken as necessary to ensure the stability of the graded and excavated material (see PCS at [10.6.3] {K24/221/59}); and inspections carried out to ensure that the existing measures were performing satisfactorily and to assess whether additional measures were required.
307. Where considered necessary, trench breakers would be installed in the trench before it was backfilled. These are long-term erosion control measures and are permanent structures built in the trench around the lowered pipeline, extending from the bottom of the trench to ground surface and built of soil-cement sacks or polyurethane foam formed in place and sometimes with structural reinforcing components such as steel or timber. Their purpose is to prevent erosion within the trench itself.
308. Brown & Root prepared a drawing described as “Right of Way Ideal Condition” {K21/173/1}. It was issued for enquiry in February 1995 and for construction in May 1995. Ocesa’s name did not appear on it: the name of the joint venturers did. It was accepted by Snr Loeber in evidence (and I too accept) that, at least in ideal conditions, it could apply during the period of construction. However, it was clearly an idealised representation and should be treated as such. Subject to that limitation, what it showed was a ROW of 25m width with the ODC pipeline running to the extreme left of the plan. The Ocesa pipeline was to be installed 10m to the right of the ODC pipeline. Topsoil from the ROW was to be stacked at either side of the ROW, with the left hand pile being to the right of the line of the ODC pipeline. The trench spoil was to be deposited to the left of the Ocesa pipeline trench leaving a working width of 15m to the right of the Ocesa pipeline trench for the contractors’ workspace. On the evidence at trial, it is clear that, even where the Ocesa pipeline and ROW followed the course of the ODC pipeline and ROW, there was no universal practice that the ODC pipeline would be at the very edge of the Ocesa ROW although some offset was necessary so as to avoid damaging it in the course of the Ocesa works.
309. Some of the terrain was so difficult that there would be very little room to offset the line of the Ocesa ROW from that of the ODC ROW. On the photographic evidence it appears that even in less restricting terrain, the Ocesa ROW often followed the ODC ROW with little or no extension beyond it. The Brown & Root “ideal condition” drawing and others in the same series show no substantial stockpiles of soil, although these were a recognised feature of the construction works in places along the ROW, depending upon how much soil had to be removed in the process of grading and where it could be stored – of which more later.
310. In general terms, I accept that materials excavated from the trench would be placed close to it and conveniently within the reach of a machine, to enable backfilling to be carried out. The dimensions of the trench would mean that the piles of material excavated from them would usually not be large. Much greater quantities of soil might be generated by the stripping and grading works. Sometimes this soil could be accommodated without the use of stockpiles but, particularly in hilly terrain, that might not be possible and stockpiles (which could be very large) might be required at intervals along the ROW. Photographs to which I refer during the course of this judgment show places where there are substantial stockpiles in view and other places

where there are not. In general, it appears that the steeper the slope, the more likely it would be that soil would have to be stockpiled periodically. Equally, in some places the width of the ROW itself was constricted so that soil had to be stored over the adjacent ODC pipeline {K21/174/1} or in stockpiles at some distance from its source, with or without the use of gabions or cantilever walls {K9/35T/132}.

311. In closing submissions, the Claimants suggested that the ODC pipeline was inherently likely to have caused less environmental disruption because less heavy machinery was used, this submission being based upon the model of bulldozer being used. However, a promotional film about the laying of the ODC pipeline in 1992 {L1/134} shows that, even if the laying of the Ocesa pipeline (as shown on numerous photographs and films) may have included the use of what was described as a “bigger digger”, the ODC pipeline construction process was not materially different. To the contrary, the ODC film gives a good illustration of the size and scope of both undertakings. It shows the destructive effects of guerrilla attacks (at 3.39), with the commentary frequently referring to the fact that slow progress was made and stoppages occurred because of the security situation. As will be seen when the individual lead cases are considered, these stoppages could directly affect the impact of the works upon landowners. The film also shows the use of substantial bulldozers and other heavy machinery (often tracked) for stripping the soil, moving the pipes into position, laying them in the trench, backfilling and regrading the ROW. Extracts showing bulldozers at work stripping and shifting large quantities of soil (e.g. at 5.09-5.18, 6.22-6.33 and 9.28-10.12) demonstrate the inevitability that soil from different horizons will be mixed when the ODC ROW is being stripped. They also show that the fact that the Brown & Root “ideal condition” drawing described at [308] above is an idealised representation that conveys little of the variation in the terrain and the challenges inherent in the project that was being undertaken. Other extracts show the use of the ODC ROW by large machinery of all sorts (e.g. at 7.52-8.00 and 9.10-9.15), the varying width of the scar created by the ROW (e.g. at 4.15, and 23.59-24.20), and clear examples of erosion on the ROW and stockpiles of soil (e.g. at 4.26-5.03). The film appears to have been a promotional or publicity venture; but it gives a clear impression of the scale of the work involved in laying the pipelines and the likely impact of the project on the environment even when geotechnical measures are in place to minimise erosion and damage.
312. On the basis of all of the evidence about the processes undertaken to lay the two pipelines, and in particular on the basis of comparing the ODC film with the films and photographs of the Ocesa pipeline, and subject to one qualification, I reject the suggestion that the ODC pipeline works were inherently likely to cause less environmental damage than the Ocesa pipeline works. The qualification is that the ODC ROW was typically 20 metres wide while the Ocesa ROW was typically 25 metres wide (in both cases before the addition of sobreanchos). As a result, the area disturbed by the Ocesa ROW was typically larger over a given distance than the ODC ROW. It is the Claimants’ case that no significant damage to their properties was caused by the ODC pipeline and that all of the features of which they complain were attributable to the Ocesa pipeline. That will be examined in detail later. However, at this stage I find that the ODC pipeline works will have caused some erosion and sedimentation from the ROW and the associated works. There is much less direct evidence about where, when, and to what extent such erosion and sedimentation occurred. I will return to that evidence when answering the question

whether the ODC ROW caused any significant damage to the lead Claimants properties and, if it did, the relative contributions of the ODC and Ocesa ROWs.

313. Stage III involved the installation of the other long-term erosion control measures and revegetation of the ROW. Before the Stage III works there should be a post-construction survey, which would involve someone (typically Snr Gasca during the time of his involvement) together with (typically) an environmental inspector, a civil inspector, land negotiators (if required), and one or more representatives from the relevant geotechnical subcontractors walking the length of the relevant section of the pipeline. On that post-construction survey, the team prepared pro-forma Geotechnical Design Sheets (“GDS”) in order to record the long-term geotechnical measures to be installed. Once the Stage III works had been completed, there was then meant to be a further walk-through to check that those works had been completed satisfactorily, with the preparation of punch-lists of errors or defects.
314. Special provision was made in respect of watercourses in section 13 of the PCS {K24/221/83}. The contractor was to perform all work necessary for pipeline crossing of rivers, streams and other watercourses including trenching, boring, backfilling, repairing and restoring facilities and waterways: PCS at [13.1.1] {K24/221/81}. Crossing of narrow watercourses such as streams were to be made by open trench cut in the bed of the watercourse: PCS at [13.2.2] {K24/221/83}. Material removed from the banks of watercourses were required to be stockpiled on the ROW or on work space adjacent to the watercourse crossing, from where it could be recovered to restore the banks to their original condition: PCS at [13.6.4] {K24/221/37}. After replacement of materials the contractor was to protect banks from slides and erosion and, as necessary by special stabilisation: PCS at [13.6.5]-[13.6.6] {K24/221/88}.
315. Further provision in respect of watercourses was made in the RECS at [3.8] {K21/189/10}. Watercourses disturbed by the construction activities were to be opened across the ROW and trenched for the proper flow of water. At crossings of streams and ditches, the trench backfill was to be solidly compacted to minimise erosion of the backfill. On the banks of rivers, streams, ditches or watercourses the Contractor was to replace all necessary earth and was to reinforce the backfill with earth-filled sacks, gabions rock rip-rap, concrete head walls or other suitable method. Any other precautions deemed necessary were to be exercised to prevent water encroachment during and after backfilling operations.
316. According to Snr Gasca, during his time the river bed would be protected by the placing of flume pipes and other protective measures {E1/1/76} at [17.20], {Day16/97:10}. I accept his evidence as an accurate description of the procedures that were normally followed. Two qualifications must be borne in mind. First, Snr Gasca was not in a position to say that the procedures he described were always followed; and, second, his evidence was that even when the procedures he described were followed, some sediment would find its way into the watercourse because of the disruption of the river bed by the excavation of the crossing {Day16/105:7}. This was confirmed by Dr Savigny {Day37/21:16} ff. For that reason, he accepted that erosion control matting should be placed into the stream course through the disturbed area {Day37/20:18}; and other works such as revetments may also be necessary. There is evidence that on some occasions, even small water sources were traversed by boring underneath them {D6/100/1190} at [115]. Where that happened, disruption of

and immediately adjacent to the stream bed would be avoided, though the ancillary works (e.g. to bridge the stream for traffic) might give rise to a risk of soil falling into it.

317. Throughout the construction process, there was meant to be continuous monitoring of the work fronts by survey staff, project environmental staff and other members of the PCMT as well as by the main contractor's own management team. In addition, the intention was to ensure that the trench and wider ROW were left exposed for the shortest time possible.
318. A march chart was submitted to the Ministry of the Environment as part of the Environmental Impact Statement ["EIS"] which indicated that the period from opening the ROW to either stabilising or revegetating at a given point was to be two months {K9/35T/16}. Mr Allison said that this was essentially a theoretical exercise and that the reality was very different {Day15/77:21}. I accept this observation up to a point, as the EIS was clearly not setting out a final programme for the works and, in the event, the start and subsequent dates of construction of the project changed markedly after submission of the EIS, not least because of the lengthy period before the environmental licence was granted. According to Snr Gasca the length of time between the Stage I work starting and the Stage III Work being completed was, on average, between three and four months. I accept that as a general estimate although there were significant variations. The evidence in relation to the Lead Claimants properties will be considered in detail later.

The risks inherent in laying pipelines and knowledge of those risks

319. There is broad agreement between the parties about the risks inherent in laying pipelines in general and the Ocesa pipeline in particular. It could be said that the most pronounced risks of stripping the top of a fragile ecology over a width of 25m or more and a length of 700 hilly kms are almost self-evident, namely erosion of soil from the ROW, sedimentation of land and watercourses and disruption of river beds and banks where they are crossed by the ROW. The various experts agree that the environmental risks to soil were erosion, sedimentation and loss of soil productivity {H23.1/2/99}, erosion of the soils inside the ROW {H23.2/6/363}, risks generated by soil erosion, sedimentation of the lower parts of the farms and the channels due to the movement of personnel, machinery and equipment {H23.1/4/262} and geotechnical and hydrotechnical geohazards of which erosion, bank erosion and channel aggradation, creation of wetlands and avulsion are those that represent the majority of alleged impact on Lead Claimant properties {H23.3/8/568}. I accept that evidence.
320. It is also common ground that these risks were known to and appreciated by all who were involved in the design and construction of the project and to the Government of Colombia. The regulatory regime applied because the laying of the pipeline fell within the scope of article 49 of Law 99 of 1993, which provided that "... the performance of any activity that, ..., could result in deterioration of the ... environment or that is likely to introduce considerable or notorious modifications in the landscape shall require an environmental license."

321. Because the Defendant acknowledges that it knew of the risks, it is only necessary to set out a small fraction of the numerous extracts from the published literature and contemporaneous documents which referred to them with great clarity¹². The EIS {K9/33} referred repeatedly to the risks of erosion and sedimentation and to the risks to water sources (e.g. {K9/33/38} {K9/33/46} and {K9/33/47}). Referring specifically to the area in which the Lead Claimant properties are found it said:

“Sector Central Cordillera: this sector of the route of the pipeline ... presents a considerable increase in precipitation. ... The greater humidity makes this area present more abundant vegetation cover than the other sectors, but there is also an increased risk of erosion due to the characteristics of the surface soils.” {K9/34T/61} at [3.4.1.4]

322. To the same effect, the section of the Saipem contract entitled “Scope of Work” identified the risks in the following terms:

“Between Vasconia and Caucasia the pipeline traverses a hilly terrain. The entire route has seasonally high rainfall. The Contractor can anticipate slope stability problems, consequently particular attention must be given to erosion control during the right-of-way preparation, construction and clean-up. It is important to note that the erosion control requirements will be necessarily more stringent than those encountered in pipeline construction.” {J14/54.1/245}

323. Not least because of the potential impact of heavy rain the EMP, which formed part of the EIS and which was aimed at applying measures to minimise the environmental effects generated by the construction of the Ocesa pipeline {K9/35T/2}, addressed the impact of rain. It recorded that the work schedule set out in the march chart to which I have referred in [318] above had been prepared in order to manage the pipeline construction in the most rational manner; and that it was prepared considering a number of aspects including making maximum use of summer seasons for construction and avoiding construction in the winter in the rainiest areas (of which the area of the lead cases was one) {K9/35T/13}.

324. The EIS referred to stream crossings in its description of the project at {K9/34T/41}, stating that “the course of the water current will be accommodated by local channelling, so that the work to dig the trench and place the pipe in it can be carried out. Once the pipe is installed and pressure tested, the banks and stream bed will be reformed, using the protection works required.” The EMP included specifications for stream crossings, divided between Main Stream Crossings (Specification No. B-6-1), Major Stream Crossings (Specification No. B-6-2) and Minor Stream Crossings (Specification No. B-6-3) {K9/35T/156}. The streams on the trial claim properties are not included in the schedule of streams that are said to be considered minor crossings for the purposes of the specification and “Minor Streams” are not defined. Snr Gasca said that the measures set out in the specification were only applied to the streams in the schedule {Day16/89:24}. However, photograph 1819-15

¹² Summarised in the Claimants’ closing submissions at [385]-[411] {C4/3.4/139} ff

{K9/35T/156} suggests that the specification was (or should have been) relevant to most, if not all, of them. Certainly the environmental impacts which the specification considered (including removal of the riverbed protection vegetation cover and re-suspension of riverbed sediments) and the actions specified (including that once the crossing is made, the banks where material has been removed must be reconditioned to leave them in their original condition; and that bank vegetation must be recovered), the need to protect banks with rock fill, soil-cement sacks or concrete sacks and the need to use temporary culverts are all relevant to the well-known risks that would arise where the ROW crosses a stream.

325. The Environmental Licence (see [341] below) required compliance with the EMP. In due course Saipem undertook to fulfil the requirements of the EMP when carrying out the construction of the pipeline: {J14/54.1/69} at [17.3]; and it was required to take special care “during installation of all river crossings to ensure maximum environmental protection.”: {J14/54.1/254} at [2.9(c)]. The importance attached to river crossings was made clear by the contract requirement that Saipem was to provide pictures to establish conditions before and after of the River or Stream to be crossed. A written agreement was to be prepared by Saipem to be signed by Ocesa and the affected landowner, establishing the existing flow rates and special conditions of the river and adjacent banks of the Rivers or Streams before performing any work related to the crossings. At the completion of the crossing Saipem was again to obtain written confirmation by Ocesa and the affected landowner that the present flow rates and bank conditions were to their satisfaction: {J14/54.1/254} at [2.9(d)]. Snr Loeber was unable to say whether these procedures were followed. It was not suggested to the Lead Claimants or their witnesses that they were followed, and there is no satisfactory evidence (documentary or otherwise) that they were.
326. Had it been in issue, I would have held on abundant evidence that the risks inherent in laying the pipeline were well known to all concerned with the design and construction of the pipeline, including the Defendant.

The need for protective works and an outline of the works available in accordance with good practice

327. The need for protective measures is recognised on all sides; but the measures to be adopted would vary from place to place, depending upon season, topography and risk of damage.
328. The temporary management of soil that had been stripped or excavated from the ROW primarily involved avoiding mixing different soils and protecting heaps of soil from erosion. I have already found that some mixing of soils was inevitable given the scale of the venture and the machinery that was available to strip and move them: see [311] above; but topsoil was a scarce and precious commodity and needed to be preserved and kept separate as far as possible: see [304] above.
329. The three key design objectives of protection measures are (a) to intercept runoff before serious erosion occurs; (b) to finesse the channel gradient such that flow velocity of intercepted runoff causes neither erosion nor build-up of sediment; and (c) the installation of protective structures or measures that will remain serviceable until revegetation takes place on the ROW to the same extent as exists on undisturbed

adjacent ground: {H2.1/1/42} at lines 980-998. Measures to be used as required for the protection of the ROW in general and the excavated trench in particular were:

- i) Silt fences, typically a geotextile fabric held in place with vertical timber stakes. Their intended use is to allow runoff water to pass through the fabric while catching and containing the majority of any soil sediment in the water.
- ii) Drainage ditches, designed to carry runoff water to designated discharge points.
- iii) Sediment traps, which are temporary ponds constructed for the purpose of containing sediment-laden runoff water before it reaches nearby watercourses (or ponds). The sediment is allowed to settle out under gravity before the water either flows or is pumped out.
- iv) Trench barriers, which are usually horizontal timbers or pipe sections laid across the excavated pipeline trench after pipe lowering, with geotextile suspended from the cross pieces and secured against the pipeline, the intention being to prevent erosion within the trench.
- v) Ditch diverters (also described as diverter ditches, water bars, diversion dikes or cortacorrientes) which typically are shallow excavated channels and low embankments built diagonally across the fall line of the ROW so that the structure forms a runoff interceptor channel. The purpose of ditch diverters is to divert water from the ROW at intervals so that the energy of the water is dissipated and the water is diverted from the ROW to suitable disposal points, be they drainage ditches or otherwise. The frequency and angle at which ditch diverters need to be installed is dependent upon the gradients on the ROW and will take into account the use or absence of erosion control matting.
- vi) Erosion control matting, either synthetic or made from natural fibres, is laid on exposed ROW soils, typically between and over ditch diverters or on cut slopes to attenuate the erosive effect of raindrops and the flow of water on the exposed soils, thereby reducing erosion and providing relative stability of the soils to enable revegetation to take place. Matting is held in place by stakes at regular intervals. Where the matting is made from natural fibres, they will eventually degrade and disappear once they have served their purpose, providing additional organic matter to the soil as they do so.
- vii) Longitudinal drains may be installed alongside and parallel to the ROW. Where the ROW is on a slope transverse to the line of the ROW, a longitudinal drain may be placed downhill of the ROW to catch the flow of the water coming from it and to divert the water to suitable discharge points. Longitudinal drains may be placed uphill of the ROW to protect the ROW from the flow of water onto the ROW. Typically, but not always, longitudinal drains will discharge to watercourses.
- viii) Longitudinal drains may incorporate energy dissipation structures. They are used where relatively high slope gradients exist along the drain. Their location and design tend to be a custom fit influenced mainly by specific site conditions and availability of construction materials, but also on considerations of soil

erodibility: {H23.3/8/592} at (v). I accept Dr Savigny's evidence that widespread use of energy dissipation structures as advocated by Dr Card was contrary to the design and construction practice standards in South America at the time of Ocesa design and construction and were not generally required for terrain, soil and ROW configurations that characterise the Lead Claimant Properties {H2.7/9/1755}.

- ix) Gabions are typically PVC or galvanised wire baskets which are filled with (usually) quarried rock, river rock or soil cement sacks and are placed to give structural integrity either as retaining structures or otherwise, typically on steep cut slopes or slopes that may be particularly susceptible to erosion or collapse. There are examples of stacks of sacks that are not encased in wire baskets but are still referred to as gabions, one such example being on LC50.
330. The design for the Ocesa pipeline envisaged that ditch diverters and erosion matting would work in combination to prevent erosion and promote rapid revegetation. The design incorporated a wider spacing between ditch diverters and a less robust design of the diverters themselves than had been used on previous projects, which was justified by the introduction of the erosion matting {H23.3/8/618}. The primary design documents were the EMP {K9/35T/182} and the RECS {K14/95}, {K27/262}. Although Dr Card originally criticised the design as there set out, his criticism was misplaced: see [565] below. However, in October 1996 Saipem requested permission (by TQ61) to omit erosion matting on slopes between 10 and 20% on the basis that it would guarantee reseeding between ditch diverters by TQ61. {K66/611/2}. On 27 January 1997 the request was refused by Ocesa for Spreads A and A2, but permitted for Spread B on the stated basis of different soil characteristics {K66/611/3}. The result of this was that for Spread B properties (which would have included LC50 and LC74 {Day16/78:23} ff), matting was omitted from about October 1996 on slopes between 10 and 20%. On Spreads A and A2, though Saipem's request was refused for the future, Ocesa permitted that "acceptable work performed to date will be left as it is".
331. The ultimate and most effective protection against erosion from the ROW is drainage and revegetation. It is common ground that revegetation should be carried out at about the same time as any final drainage work. This is not, however, a hard and fast rule as the sowing of new vegetation should ideally not be carried in the dry season {Day15/105:19}, and see {K40/421T/6}, {K41/425T/6}. The agronomy experts agreed that, with a view to establishing the best coverage in the least amount of time possible, considerations including (i) biophysical conditions (e.g. weather, topography, physical conditions and fertility of the soil), (ii) plant species to be used (adapted to the environment, fast-growing and with a growth pattern that would cover and protect the soil), (iii) future use of the area, and (iv) cultivation methods should be taken into account. Short and long term fertilisation should be taken into account, given the disruption of the soil that will have occurred: and detailed recommendations to that end were provided by the Bateman Ingenieria Revegetation Report {K14/102T/1}.
332. It might be thought self-evident that newly-sown soil should be protected from cattle and other traffic. The Specification for Pipeline Construction made no reference to fencing off the ROW (as opposed to maintaining existing fences) except in the context of crossing points for traffic passing over an existing pipeline {K24/221/96}

at [15.5.1]. The Defendant's Manual of Environmental Management Procedures dated January 1997 {K41/437/1} is described as a "post-construction manual" and was not a contractual document. It is, however, relevant when considering good practice. It referred to the need to maintain fenced areas "in order to prevent the destruction of crops and the migration of domestic animals toward other areas" {K41/437T/6} at [7.4.3], but this relates to the general fencing on a property, about which there is no complaint. The only reference to fencing of revegetated areas is that "the revegetated areas must be fenced off in common agreement with the property owner, in such a way that the access of cattle or people is restricted, using fences with three lines of barbed wire. It is recommended that the bottom line of wire is not barbed. Only at the sites where the company is required to do so by construction management and the environmental auditing firm" {K41/437T/18}. The video and photographic evidence indicates that the ROW was not routinely fenced off, whether or not cattle were present. The contemporaneous documents indicate that cattle were not a significant cause of damage post-construction {H1.4/22/860} – I consider cattle as a source of erosion elsewhere.

333. Stream crossings may pose particular challenges because of the conjunction of potential erosion from slopes leading to the stream and the erosive effects of the stream itself on banks that have been disrupted by the works. In addition to the use of matting and the other available geotechnical techniques outlined above, revetment may be carried out in a number of different ways. As with all other measures, the need for revetment will depend upon all of the variables in play at a given location. In some cases, direct drilling under the bed of the stream will prevent or minimise disruption to the stream bed and banks; alternatively, the trench may be excavated from the surface, in which case temporary measures will include diversion of the flow of water using flumes and culverts, after which reinstatement works will inevitably be necessary to restore the bed and banks and to preserve them from future degradation. Many of the streams in the area are peripheral (in the sense that they may be dry for part of the year). What works are necessary at stream crossings is fact sensitive in every case.

The regulatory process as applied to the Ocesa Pipeline

334. The relevant stretch of the Ocesa pipeline project was covered by the Santiago de las Atalayas and Tauremena Association Contracts as outlined at [44] ff above.
335. In October 1993 the Defendant applied on behalf of the project partners to start the process of Environmental Registration of the pipeline project {K4/16T/1}. After the introduction of law 93 of 1993 the Defendant applied on 11 July 1994 to the Ministry of the Environment for an environmental licence under the new law in order to conduct the construction of the pipeline and terminal facilities {K11/68T/1}. The Defendant described its qualification to make the application as being the appointed Operator under the Association Contracts (paragraph 2).
336. The Defendant wrote jointly with Ocesa to the Ministry of Environment on 18 April 1995, notifying the Ministry of Ocesa's incorporation, its shareholders and their respective shareholdings, and requesting as follows:

“taking into account that Ocesa will be the company in charge of building the pipeline for which [the Defendant] requested

authorization, we kindly request this Office authorize the assignment of all arrangements and proceedings carried out with that Ministry aimed at obtaining the environmental license legally required, for this license to be granted directly to Ocesa, as if obtained by the same.” {K20/158T/1}

337. Numerous reports and studies, including the EIS and EMP, were submitted to the Ministry of Environment over the course of about a year at the end of which the Ministry produced a detailed report on the application {K24/240T/1}. The report set out the background and listed the information that had been provided. The scale of the information provided is indicated by the fact that the project file sent by the Legal Office of the Ministry to the Sectoral Environmental Department was accompanied by 26 volumes of environmental studies: {K24/240T/1} at [3]. The report recorded the calling of Public Audiences by the Minister in the affected municipalities and went on to analyse the various routing options, opting for the use of the ODC corridor. It studied the likely impact of the project, concluding that the greatest negative impacts would be generated during the construction phase, that the erosion of slopes would increase as a result of opening the ROW, and that the socioeconomic component would receive the greatest positive impacts as a result of the construction of the Project {K24/240T/19} at [1.5]. While noting that some of the information that had been provided was incomplete, the report concluded with proposed conditions that should be attached to the environmental licence.
338. The Minister’s call for public audiences led to five public meetings, the closest to the Lead Claimants being held in Zaragoza on 19 May 1995 and Puerto Berrio on 23 June 1995. The meetings were advertised in newspapers and on the radio and were well attended {E1/5/244} at [9.4]. The official minutes of the meeting at Zaragoza {K21/184T/1} (which I take to be accurate) record that the route selection and environmental impact were explained. The Mayor of Zaragoza said that “the old pipeline [i.e. the ODC pipeline] left a bad impression, so they do not want to make the same mistake.” That was taken up later by the Director of the Environmental Affairs Office of the Antioquia Branch of Inderena (which had regulated environmental issues before law 93 of 1993) said that there had been breach of several obligations of the resolution granting the Environmental Licence for the previous (i.e. ODC) pipeline and that “the area of the previous pipeline will be overflowed in order to determine the damage and to recover the area and to avoid repeating the same mistakes.” The Attorney-General’s delegate said that the objective of the Attorney General’s office “is to defend the collective interest in the environment and the rights of the communities in attendance.” In terms of the project he said that “according to the fly-by made over the region, natural resources are seriously damaged; deforestation and impact due to mining activity must be addressed by adopting a recovery plan co-ordinated by the Ministry of Environment” The representative of the Ombudsman’s Office intervened. Issues of compensation were raised, including the non-payment of money for the ODC pipeline. At the end of the meeting, Ocesa answered a number of the questions that had been asked. It said that it (Ocesa) was the party responsible for the project that would address concerns at Zaragoza, Medellin and offices set up at camps along the way. One hundred and twenty people attended the meeting, which lasted from 9.20 am to 4.45 pm.

339. The Puerto Berrio meeting took a similar course as recorded in the minutes {K22/204T/1} (which again I take to be accurate). The initial presentation on behalf of Ocesa emphasised the environmental protection work and the construction techniques including various protective measures. The Attorney General's delegate "reiterated to the Ministry of Environment that this is a region and a project where basins are in a high level of degradation; plans must be drawn for managing and recovering hydric basins; ..." The Ombudsman's delegate emphasised that "Environmental laws must be applied and community must act as an inspector." One delegate asserted that there had been problems with the old pipeline but that they had been remedied.
340. Viewed overall, the record of the Zaragoza and Puerto Berrio meetings conveys the clear impression Ecopetrol had got itself a bad name over the ODC pipeline and that the community was concerned that mistakes made and damage caused by the ODC pipeline should not be repeated by the Ocesa pipeline. The meetings were a clear demonstration of democracy in action, but they do not otherwise assist in determining the issues of liability in this case.
341. On 31 August 1995, the environmental licence was issued by the Ministry {K24/232T/1}. It is central to each party's case. The most important terms of the licence are set out below. Passages of particular significance are highlighted.

"WHEREAS

In the official letter dated 11 July 1994, the [Defendant], ... , submitted an application for an ordinary environmental licence ... for the ... Vasconia-Coveñas pipeline ...;

...

On 14 December 1994, the company Ocesa was formed, whose company object is as follows: "To design, construct, operate, commercially exploit and own a petroleum transport system, including the port installations used by the public, which will begin in the municipality of Tauramena, Department of Casanare and finish in the embarkation port of Coveñas, ...".

...

In the official letter of 18 April 1995, [the Defendant], and [Ocesa] requested that the Environment Ministry authorise the transfer of all management and procedures formulated for the purpose of obtaining the Environmental Licence ... in such way that this licence would be granted directly to Ocesa.

...

In the edict of ... (3) May 1995, the Environment Minister, ..., called a public meeting in the municipality of Zaragoza on 23 May 1995, within the scope of processing the Ordinary Environmental Licence for the project.

In the edict of 24 May 1995, the Vice-Minister ..., called public meetings in the municipalities of:

- Tauramena (Casanare) on 9 June 1995
- Tunja (Boyacá) on 16 June 1995
- Puerto Berrio (Antioquia) on 23 June 1995
- Tolú (Sucre) on 30 June 1995

...

In the meetings, the common concerns presented were the collaboration of Ocesa in the environmental education of the community, supporting basic primary education, solving existing deficiencies in terms of health care, road maintenance and work opportunities for the community.

...

The project was submitted for the consideration of the communities of Antioquia and Atlántico and no objections regarding the environmental viability of the project were raised.

...

Based on the aforementioned,

THE FOLLOWING RESOLUTION SHALL BE ADOPTED

ARTICLE ONE -Approval shall be given of the transfer of the procedure formulated by [the Defendant] with a view to obtaining the Environmental Licence ... to the company Ocesa. The two companies shall, in terms of environmental matters, be jointly and severally liable for the construction of the project.

ARTICLE TWO – [Ocesa] shall be granted an ordinary Environmental License for the construction, operation and exploitation of the Cusiana-La Belleza, Vasconia-Coveñas pipeline.

...

ARTICLE FIVE - Ocesa shall implement a Forest Compensation Scheme in the 800 kilometres affected by the project, on the basis of the following:

1. For each deforested hectare, Ocesa shall compensate by reforesting 5 hectares. The total reforestation area for the entire corridor shall be 1,760 hectares.
2. Ocesa shall send the Environment Ministry the Reforestation Programme, indicating the location and distribution of the 1,760 hectares to be reforested, which shall be defined in conjunction with the local authorities. ...
3. The Environment Ministry shall authorise the location and distribution of the 1,760 hectares where the reforestation programmes are to be implemented, ...
4. The reforestation programme shall be financed by Ocesa for a period equivalent to five (5) years.

...

ARTICLE SEVEN - The Environmental Licence granted by this resolution shall, in addition to the stipulations of the Environmental Impact Study, the Environmental Management Plan and the additional information submitted, be subject to the recipient complying with the following obligations:

1. The company shall implement the Environmental Education Scheme for the project sufficiently in advance of the start of the project construction works.
- ...
4. **Ocesa shall hire the environmental supervisor for the project, which shall be independent of the construction contractors and completely independent of the project management.**
 5. The supervisor shall submit reports to the Environment Ministry every three months regarding the monitoring of the Management Plan measures.
 6. Ocesa shall notify the Environment Ministry of the work sites where the pipeline construction work will begin fifteen business days prior to the start of the construction work.
- ...
8. Ocesa shall keep the population affected by the construction of the pipeline informed and arrange the types of restrictions, monitoring measures and other activities that must take place as a result of the construction of the pipeline.

9. Ocesa shall establish a system for the evaluation of the damage caused during the construction works and the adoption of immediate mitigation, recovery and compensation measures.

10. Ocesa shall set up complaints and claims offices at the different work sites.

...

ARTICLE NINE - Prior to the start of the pipeline construction works, Ocesa shall comply with the following obligations:

1. It shall send the Environment Ministry the final outline (including the objectives, scope, location to the scale: 1:25,000, activities, time schedules, detailed costs for each one of the planned actions, anticipated goals, indicators of success) of the different Environmental Management Plan programmes, namely:

...

- Soil management,

...

- Monitoring of the under-river crossings,

...

- Environmental supervisor,

...

4. Ocesa shall provide information about the easement negotiation process and the respective property permits for the new project variants.

5. The environmental workshop cycles shall include the following components:

-Municipal jurisdiction in terms of environmental matters

-Environment policy of Ocesa

-Environmental Management Plan authorised by the Environment Ministry

...

Basic workshop content:

...

-Legal aspects relating to the payment of damages and permits

...

8. **The company shall send the Environment Ministry a videocassette record of the state of the right of way shared with ECOPETROL, and the variant sections, prior to the start of the pipeline works.**
9. **In the Vasconia-Coveñas pipeline section, the specification of the protection, prevention, recovery and geo-technical stabilisation works that must be carried out with the other pipeline construction works shall be essential, using the same level of detail as the first section. The respective designs shall be presented to this Ministry for its comments at least one month prior to the start of the construction works.**

...

ARTICLE FOURTEEN - The reforestation of 387,320 trees put forward by the company as a compensation measure shall be authorised, which shall not preclude the compensation measure imposed by this Ministry in article five of this resolution. ...

ARTICLE FIFTEEN -The Environment Ministry shall supervise the execution of the works and may verify compliance with the provisions of this resolution at any time. Any contravention of the resolution shall give rise to the application of the applicable legal penalties.

ARTICLE SIXTEEN – If unforeseen environmental effects are detected during the execution of the works, the requestor shall suspend the works and immediately notify the ENVIRONMENT MINISTRY in order that the latter may determine and stipulate the adoption of the corrective measures it considers necessary, without prejudice to the measures to be adopted by the Licence recipient to prevent the degradation of the environment. Non-compliance with these measures shall give rise to the application of the penalties referred to in the article above.

...

ARTICLE TWENTY-ONE - It is recommended that the recipient of this Licence give priority to hiring the inhabitants of the area.

...”

342. The provisions of the licence that provoked most discussion at trial were the statement in Article 1 that “[the Defendant and Ocesa] shall, in terms of environmental matters, be jointly and severally liable for the construction of the project” and the requirement under Article 7(9) that Ocesa “shall establish a system for the evaluation of the damage caused during the construction works and the adoption of immediate mitigation, recovery and compensation measures.” For present purposes it is sufficient to note the following points:
- i) “environmental matters” is not a term that is defined in the licence. Apart from Article 1, it is only used once, in Article 9(5), which requires the components of environmental workshop cycles to include “Municipal jurisdiction in terms of environmental matters”;
 - ii) Article 7(9) is not expressly limited to “environmental matters.” It imposes the obligation to establish a system for the evaluation of damage caused during the construction works and the adoption of compensation measures upon Ocesa. Although, as set out later, agreements to compensate landowners were reached, no comprehensive document setting out the measures that either were to be or were adopted is available, if any ever existed.
343. I accept Snr Gasca’s evidence that additional permits were necessary for the carrying out of the works and that around 130 environmental permits were obtained, 32 permit applications were made to cross certain water sources and that permits to cross around 120,000 minor streams and creeks along the 800km pipeline route were obtained {E1/5/248} at [11.1].
344. In addition, Ocesa entered into a concession contract with the Ministry of Mines and Energy, which was executed on 23 February 1996 and by which the ministry gave Ocesa permission for the construction of the pipeline {K66/643T/1}. The contract required Ocesa to meet identified published standards regarding the construction of the pipeline and recorded that Ocesa was entitled to avail itself to the legally established benefits for works of public interest and to request the Government to order the expropriation of any lands required during its construction. Clause 14 recorded that the Government might appoint any required number of officers “in order to supervise the execution of the works and the performance of this Contract” and that “the Contractor” (presumably Ocesa, though not stated to be so in the contract) undertook to deliver to the government officers any data or information they might require. Clause 17 provided that the Ministry could impose fines as a penalty for non-performance of the obligations assumed under the contract by the Contractor.
345. There is ample evidence of close and direct supervision of the Ocesa works by outside agencies and the imposition of sanctions on Ocesa for failures in the course of the works. By way of example, the Ministry of the Environment made a three day visit to the Northern Sector from 22-24 February 1996. The visit report identified numerous failings, including improper geotechnical management of the site where the ROW was being opened. The visit report raised the prospect of fines being levied and criminal sanctions imposed. The Recommendations and Actions to be Taken section included that there should be temporary suspension of work opening the ROW and follow up visits {K30/296T/1}. Snr Vina ordered an immediate temporary suspension of work to open the ROW {E1/5/262}. The consequences of the visit continued. In January 1997 the Ministry issued a writ by order of the Court which

was founded on the February 1996 visit and resolved that Ocesa was to take particular steps both in the carrying out of the work and in reporting on progress {K41/432T/1}; and on 29 July 1997, again based upon the February 1996 visit and while acknowledging that effective corrective action had been taken, the Ministry resolved to fine Ocesa COP 15,480,450 (subject to adjustments), and required it to replant 60 hectares of land {K47/498T/1}.

Equion, Ocesa: Arrangements and Responsibility for Construction, Management/ Control and Assignment.

346. In this section, I deal with the documentary evidence about the arrangements and responsibility. Because the Claimants' effective case is now limited to failures in the construction process rather than failures of underlying design, arrangements relating to design can be treated more shortly than would otherwise have been the case.
347. The relevant arrangements up to and including the PCMA have been described at [262] ff above. I recapitulate them briefly:
- i) The 1994 JOA contemplated that the Defendant would be the Operator and, as such would take exclusive charge of the activities for the construction and operation of the pipeline and terminal facilities: see [262] ff above. However, the JOA, which was a tripartite agreement between the Defendant, Triton and Total was superseded by the further arrangements that were later entered into by those three parties, Ecopetrol, the Canadian Group and Ocesa.
 - ii) The MOU and RMOU both provided that the Defendant should act as Coordinator in conducting (or procuring) studies and designs to determine the technical specifications to the Project and placing contracts for front end engineering with the mandate of the Parties and under the direction of the Steering Committee. Some of the preliminary activities were carried out with the Defendant acting as Coordinator. However, they are not critical to the outcome of this litigation and need not be investigated in detail here.
 - iii) If the parties to the RMOU found the Project to be feasible then the SA would be incorporated. If that happened, the RMOU's Steering Committee was to be superseded by a similarly tasked body set up under the Articles of Incorporation and By-laws of the SA; and the SA would then enter into contracts with EPC contractors and others as necessary to bring the project to fruition. In addition, the SA was to appoint the PCMT, which was to supervise the implementation of the SA's contracts. The PCMT was to be made up of representatives of the oil entrepreneurs and Brown & Root. Amongst those representatives, it was envisaged that Ed Truett, an employee of the Defendant, would be the PCMT Manager: see [268] ff above.
 - iv) On the incorporation of Ocesa, the arrangements between the parties changed: see [276] above. It was now Ocesa that would be responsible for the construction activities but the Defendant would be providing Mr Truett to act as the manager of "the project construction management team ... of Ocesa".

- v) The Defendant was not a party to the OCA or the AROCA, but each agreement stipulated that the Defendant would provide Ed Truett or another of its employees to be the PCMT Manager of the project construction team of Ocesa.
- vi) Under the PCMA the Defendant agreed that it would “provide the management of [Ocesa’s] contracts for Ocesa through the [PCMT], within the limitations established under [the PCMA] and with total technical financial, administrative and directive autonomy.” The Defendant was to “manage, supervise and adequately control all contracts executed by Ocesa for the construction of the Pipeline.” The annexes spoke of “PCMT staff dedicated to the Transportation Project” and to staff “partially assigned to the Transportation Project”. They also spoke of the services to be provided by various of the Defendant’s departments: see [280] above.
348. There was a latent ambiguity in the MOU and the RMOU about the status of the members of the PCMT. It was to be established pursuant to the SA’s by-laws, but was to be made up of representatives of the Defendant, Triton, Total, the Canadian Group and Brown & Root. The fact that it was to supervise the contracts entered into by Ocesa did not resolve the ambiguity. In any event, it was not the MOU or the RMOU which finally enshrined the arrangements and responsibility as between Ocesa and the Defendant for the construction of the pipeline. The AROCA (to which the Defendant was not a party) did not otherwise define the status of the PCMT beyond describing it as “the PCMT of Ocesa”; and it did not address the status of the members of the PCMT. It is therefore the terms of the PCMA that are contractually determinative of the responsibilities of Ocesa and the Defendant. It is not in dispute that the Defendant contracted to manage Ocesa’s contracts; but the Defendant submits that the words “through [the PCMT]” and “within the limitations established under [the PCMA]” mean that it is not to be regarded as a “guardian” of the dangerous activity of pipelaying. There is also a dispute about what is meant by “with total technical financial, administrative and directive autonomy”, which goes to the level of the Defendant’s control. Since actual or potential control is the touchstone when determining the question of guardianship, it is material to record that Mr Spence considered that “the PCMT was the vehicle through which [the Defendant] was to perform the services under the PCMA” {Day13/79:10}; and that, in answer to a similar question, Mr Allison agreed that “the [PCMT] was the vehicle through which [the Defendant] was required to discharge its role as manager” {Day15/43:5}. Elsewhere, the Defendant was referred to routinely as the project manager and as being responsible for ensuring that all contractors complied with the terms and conditions of the licence {K25/242/2}. I will return to the issue of legal responsibility to the Claimants in Section 7 below.
349. Pursuant to the MOU and the RMOU the Defendant entered into various contracts, including the contract with Brown and Root for the preliminary engineering works {J3/12/1}. By an agreement made on 9 October 1995 (after the granting of the Environmental Licence to Ocesa) but backdated to 1 February 1995, the Defendant agreed to assign those contracts to Ocesa {J13/50T/1}. On 9 October 1995 the Defendant also entered into an agreement with Ocesa to assign the benefit and burden of its agreements with landowners {J13/46T/1}. The effect of this purported assignment is disputed. I will resolve the dispute in Section 7.

350. In September 1994, before the incorporation of Ocesa, the project partners (i.e. the Defendant, Total, Triton and Ecopetrol) made a joint presentation to potential EPC contractors {K13/83}, which was attended by (amongst others) Mr Allison, Mr Jones, and Mr Truett of the Defendant and the President of Ecopetrol {E3/10/666} at [4.17]. By July 1995, when the selection of Saipem as EPC contractor was recommended, that recommendation was made by the PCMT to the board of Ocesa by a paper signed by Mr Spence and Mr Truett (and one other) on behalf of the PCMT {K13/83}.
351. The Saipem Contract was concluded between Ocesa and Saipem on 11 October 1995 {J14/54.1/42}. Saipem's primary obligation as EPC contractor was to carry out the work: Clauses 2 and 5. "Company's Representative" was defined to mean "the individual(s) appointed by [Ocesa] to supervise the Work on behalf of [Ocesa] and to instruct [Saipem] regarding all matters related to the Work.": Clause 1.2. Ocesa was to designate a Company's Representative in writing. The Company's Representative was to have authority to act for and on behalf of Ocesa on such matters connected with the contract as were notified in writing to Saipem by Ocesa: Clause 3.1. Those matters included giving instructions for variations in the works: (Clause 13) and suspending the works (Clause 27). Mr Allison, the Defendant's employee, was appointed Company's Representative and confirmed in evidence that his holding that position was one of the means by which he performed his role as project manager with the job of supervising the Saipem contract {Day15/46:7}, and that he had a right to instruct Saipem regarding all matters related to Saipem's work {Day15/45:23}. The Company's Representative was permitted to delegate any of its authorities to one or more individuals as Authorised Representatives (Clause 3.2). Mr Allison delegated authority to various other of the Defendant's employees, including Snr Loeber and Snr Daza who were the Construction Managers based in the field and who were overseeing the construction work being done on a day-to-day basis {E3/10/668} at [4.20]. The Company's Representative's responsibilities included certifying that mechanical completion, reinstatement and reforestation had been achieved, whereupon Saipem would be entitled to receive a provisional acceptance certificate from Ocesa: Clause 10.2. Saipem's invoices were to be sent to the Defendant (with whom Ocesa had by now entered into an accountancy partnership agreement which required the Defendant, among other duties, to process contractor invoices {J13/45T/1}): this arrangement is not directly relevant to the question of control of the works as such.

The Role of Equion before Construction

352. When entering into the contracts as set out above, the Defendant was acting as Operator or Coordinator *and* was acting on behalf of the project partners as a whole. The fact that the joint venturers as a group could have decided to act in a different way or that they had ultimate residual power to control the Defendant acting in its role as Operator or Coordinator does not derogate from the fact that the Defendant was therefore acting in pursuance of its own commercial purposes as well as those of the other joint venturers.
353. In addition to acting as Coordinator and Operator and entering into the various contracts as set out above, the Defendant's employees were closely involved in the other steps taken on behalf of the project before construction started.

354. As foreshadowed in the various agreements setting out the roles of the parties, a number of project structures were established to enable the project to be brought to a successful conclusion:
- i) In 1994 a body called the Project Board was set up. It was the brainchild of Mr Jones, the Defendant's employee. It had no executive authority but was a forum at which shared technical and commercial decisions could be reached by those closely involved with the project so that agreed proposals could be put to those with executive authority {E1/3/125} at [2.14]. Mr Jones chaired the Project Board, which initially met in Houston, though its focus later migrated to Colombia. It had representatives of each project partner company and was on occasions referred to as the Technical Sub-committee of the Steering Group. Although it had no executive authority, its role included identifying ways forward that could then be passed on to the management team {E1/3/147} at [4.3]ff. It would not discuss day-to-day construction issues unless there were significant financial and/or strategic implications or issues with contractors {E1/3/155} at [4.19]. After the incorporation of Ocesa the role of the Project Board was taken over by the Project Review Board, which performed the same functions.
 - ii) The JOAs referred to the Operating Committee, which had the responsibility for approving activities and the function of which was to exercise overall supervision and control of Joint Operations: see [263] and [265] above. The MOU and RMOU instituted the Steering Committee, which was the senior decision making body until early 1995: see [269] above and {E1/3/162}. It dealt predominantly with issues which affected the overall strategy of the pipeline project rather than the conduct of operations in the field. The Steering Committee was made up of representatives of the project partners (see, for example, {K10/52/1}). Mr Jones described the Steering Committee as a collaborative forum in which the project partners played an active role and typically had presentations made to them by members of the Project Management Team/PCMT {E1/3/164} at [4.41]. I accept that description. Both the Operating Committee and the Steering Committee included representatives of each of the joint venturers.
 - iii) After the incorporation of Ocesa the Steering Committee ceased to function and the board of Ocesa became the senior decision making body. The Board did not involve itself with the practical issues of constructing the pipeline any more than the Steering Committee had done, though it would have been possible for matters of sufficient importance to be referred to it had the management team felt it necessary to do so. Its involvement would typically be at the higher and more strategic level, such as deciding on whether Ocesa should enter into contracts, budgets, and financial accountability {E1/3/166} at [4.47].
355. Day-to-day management of the project before construction started was by the Project Management Team (which was part of what was sometimes referred to as the Integrated Project Management Team) and, after the incorporation of Ocesa, the PCMT. Although Mr Truett was appointed to be the PCMT Manager and a preponderance of the members of the PCMT were from the Defendant or associated

BP companies, representatives of the other joint venturers and external companies (such as Brown & Root) were also on the PCMT.

356. A few months before the letting of the Saipem Contract, Patrick Asfeld (from the Total group) was replaced by John Spence (of the Defendant) as the Project Manager (Transportation), principally because Mr Asfeld's experience was more suited to the design and procurement phase, while Mr Spence had considerable experience in overseeing the execution of construction on large projects: {E1/3/129} at [3.3]. Thus, the change mirrored the change of emphasis on the project from engineering and procurement to construction. Mr Spence fitted into the managerial hierarchy below Ed Truett, who retained responsibility both for the field facilities works and for the transportation works. Mr Spence was dedicated to the transportation works and thus effectively headed up (below Mr Truett) the PCMT. Below Mr Spence were Mr Allison (an employee of the Defendant or another BP company), who was the construction manager responsible for overseeing the Saipem Contract on Pipeline North and John Skalski (from IPL) who filled the equivalent position on Pipeline South, and various other managers. In turn Mr Allison, on Pipeline North, had various personnel reporting to him. These included the three construction managers, Snr Daza, Snr Loeber and Snr Vasquez, each of whom was an employee of the Defendant. Not all of the managers were employed by the Defendant. Mr Dave Smith, the project engineer, was from Brown & Root, reflecting the fact that they (or, more accurately, another of their group companies) held the contract with Ocesa for the detailed engineering design work {J11/37/1}. Also within the PCMT, performing geotechnical survey work and overseeing certain aspects of the construction work on Spread B (and thus reporting up to Snr Daza) was Snr Gasca, who was employed by Brown & Root's subcontractor, Tecniavance, at all material times until October 1997: {E1/1/4} at [2.5]-[2.6].
357. In summary, the PCMT contained (as had the Project Management Team before it) personnel from the different project partners and from Brown & Root and external companies. It was and remained the body through which the Defendant was required to manage Ocesa's contracts in accordance with the terms of the PCMA.
358. The Defendant was closely involved in the management of the public meetings, which it saw as part of the project's communications strategy. It also was responsible for the initial application for the Environmental Licence, which it made on behalf of the project partners: see [335] ff above. In the period before and after the grant of the Environmental Licence the Defendant managed the land acquisition process, with a team of about thirty experienced land negotiators led by Snr Arce, who reported to Mr Allison. Mr Allison's main involvement was in reviewing and approving the manual for land negotiators {K66/618T/1} produced by Mr Arce (of which more later) and in keeping the project partners up-dated on how the work was progressing: {E3/10/649} at [3.23]ff. The current situation would be included in the Monthly Progress Reports signed off by Mr Truett: see, for example, {K20/160/17}. As set out in more detail below, until the purported assignment to Ocesa in October 1995, easement agreements (known as ROW Agreements and ROW Deeds) with landowners were entered into by the Defendant in its own name.

Dealings with Landowners before Construction – General Introduction to Forms and Procedures Adopted

359. The Project Description in the EIS stated under the heading “Land Negotiation” {K9/34T/39}:

“The owners and holders of the property to be occupied by the work will be identified in order to begin a direct negotiation process by means of which the easement rights will be acquired for the strip of land or right of way required for the construction of the pipeline.

An evaluation will be made in conjunction with the owner or occupier of any damages that may be caused and of corresponding indemnification. Any damages caused outside of the strip of land required for the construction of the pipeline will be subject to a future agreement.”

360. On its face, therefore, the EIS contemplated that there would be an evaluation of damages that may be caused on the ROW and of corresponding indemnification and that there would be a separate agreement after construction of the pipeline to cover damages caused outside the ROW.

361. As set out at [341] above, the grant of the Licence was subject to Ocesa complying with the conditions laid down by Article 7. As one of those conditions, Ocesa was required by Article 7(9) of the Environmental Licence to establish a system for the evaluation of the damage caused during the construction works and the adoption of immediate mitigation, recovery and compensation measures. By closing submissions it was the Defendant’s submission that although Article 5 of the 1954 Regulations applied to both on-ROW and off-ROW damage caused by the works, the terms of the Environmental Licence gave rise to a regulatory obligation to put in place a compensation scheme in accordance with the terms of the licence. The Defendant submits that this regulatory scheme for the provision of compensation is enforceable only at public law and does not give rise to a private law remedy such as the Claimants are attempting to enforce in this litigation. I consider this submission in detail later; but what is relevant here is that the existence of two separate routes to compensation for the same damage (whether on- or off-ROW) is said to be a reason why individual landowners entered into multiple damages/settlement agreements after the ODC works had been carried out – it being said that they are either payments under a public law scheme of compensation or that they must have been essentially exgratia payments to ensure that there would be no come back from landowners alleging dolo: {Day61/35:25}.

362. The typical sequence of events before construction was that the Defendant’s team of negotiators went armed with set procedures as laid down in the Manual drafted by Snr Arce and approved by Mr Allison and Mr Connolly (who in due course became the Defendant’s representative on the Ocesa board) {K66/618T/1}. The “Philosophy for the Negotiation of Land” was stated to include “Pay all damages and negotiate the easements in order to carry out the [construction and maintenance of the pipeline] at commercial prices within the approved budget”; and “Maintain the equilibrium between the landowners or possessors of a specific area, at the price levels which are

paid in order to compensate the damages caused by the construction of the right of way and the imposition of easements which are acquired” while maintaining good relations with the owners and possessors of the properties affected by the activities which Ocesa would develop. The first phase of the process was land analysis, which involved requesting documentation from the land owner to prove right or title and taking an inventory of the agricultural and livestock elements and goods found in the area of the land to be used for the development of the project. Phase II was the Documentary Analysis Phase, during which contact was to be initiated with the notaries and recorders of public documents. It included the following important section:

“Prior to the identification of the real estate which will be affected by the activities developed by Ocesa, as well as their proprietors or possessors, and with the legal situation remaining clear in terms of ownership, the Land Negotiator ... will sign the Promissory Contract of the Constitution of Easement (Annexe No. 4) with the proprietors, and with the possessors, a contract of recognition of damages and permanent occupancy (Annexe No. 5), up to the limit of their authorisations.”

363. Phase III was described as the “Negotiation Phase” which included that the negotiations were to be made following the plan agreed by the project Manager and the Legal Department, sticking strictly to the table of prices indicated by Ocesa (Clause 2); and that “the philosophy of the Legal Department is that of paying fairly for any damages that are caused, in such a way that the proprietors or possessors feel duly compensated for the damages caused on the properties, without this meaning making excessive payments” (Clause 3); and that, save in exceptional circumstances, 70% of the total amount was to be paid when the public deed was signed, and the remaining 30% within twenty working days of delivery of the public deed by the Office of Records of Public Documents (Clause 5); and that “with the last payment counted, the proprietor or possessor will sign a Clearance Certificate (see Annexe no. 4) in which it will be indicated that they are in this state and therefore will not begin any judicial or extrajudicial claims against Ocesa for these concepts” (Clause 7).
364. Phases IV, V and VI covered the construction and post-construction phase but may conveniently be summarised here. Phase IV was the construction phase during which the land negotiators were to take all possible steps to prevent stoppages of the works by landowners or possessors. Phase V was the entitlement phase during which Easement Deeds (as set out in Annexe no. 9) were to be drafted. The land negotiator would receive the “Bill of Constitution of Easement” from the solicitors and was to remind the landowner of the date, time and place for signing, providing transport if required. When a cheque was delivered, the land negotiator was to make sure that the proprietor signed the receipt of payment (Annexe No. 6) and the corresponding clearance certificate (Annexe No. 7). The “Final Phase” is phase VI, and the manual provided:

“In this phase the Land Negotiator will verify the payment of the damages caused by the Ocesa contractors out of the area negotiated by the Company and delivered formally by the Legal Department to the contractor or to the Management of the project. Likewise, the proprietor’s Clearance Certificate

with respect to the contractor must be located in the Ocenca archives. If the contractor does not present the proprietor's clearance certificate, the last payment must be withheld."

This provision is not entirely clear but appears to contemplate that the final payment *to the contractor* (i.e. payment for carrying out the works) is to be withheld unless the contractor demonstrates by presentation of the proprietor's clearance certificate that the verified damages caused by the contractors off the ROW have been paid by the contractor to the proprietor.

365. Table V was a "Table of Prices for the Right of Way" expressed in Colombian Pesos. Although not expressly stated in the document, the prices were per hectare. The highest prices were for the stretches from San Antonio-Puente Boyacá (15,000,000) and from Puente Boyacá to Santa Sofia (10,000,000). For the relevant stretch the prices were:

Area or Stretch	Proprietors
7. Vasconia – Río San Bartolomé	6,000,000
8. Río San Bartolomé - Remedios	4,000,000
9. Remedios - Caceri	5,000,000
10. Caceri - Pueblo Nuevo	6,000,000
11. Pueblo Nuevo	4,500,000

366. The notes to the table stated that these prices "include the easement price (30%) and the damages (70%), which are the cost of the harvest, in other words, the consequential damages and the profits lost over three months"; that they were based on studies carried out by the governmental authorities in charge of promoting the agricultural and livestock sector and were collated by Ecopetrol; and that they are "the highest rates on which the negotiator can agree. The negotiator cannot agree on higher prices without prior approval from David Arce or Phil Allison, according to the case."
367. The Annexes to the Manual are not available; but the sequence of events indicated in the Manual can be traced quite closely through the documents that are available relating to the Lead Claimants. Before going to them, it should be borne in mind that there was evidence from the Lead Claimants and the witnesses called on their behalf to the effect that the system anodynely outlined in the Manual did not reflect the reality of what happened on the ground, to such an extent that the Court should find that the Claimants did not receive suitable explanations and did not have freedom of choice when executing various documents and that the Defendant acted in bad faith when conducting and concluding its various negotiations. I shall consider this submission further in Section 7 and the evidence relating to each Lead Claimant in the

context of reviewing their claims. For present purposes I trace the documentary trail, treating the documents in LC74 as being broadly typical.

368. Typically the first document to come into existence would be what the Claimants call the preliminary contract and the Defendant calls the authorisation letter. I shall call it, for now, the First Letter. There is limited evidence about how the document came to be signed but, in general, it appears that a land negotiator would visit the farm and request the signature (or other mark) of the landowner on the document. In form it was a letter from the Defendant to the land owner and was dated 11 August 1994, being countersigned by different landowners on different dates. The First Letter was in standard form with adjustments to identify the property and landowner concerned. The one for LC74 {M/171T/593.1} stated as follows:

“Mr: Rogelio Velez Montoya
Plot: La Nieve (109)
Municipality: Remedios

Dear Sir,

BP EXPLORATION COMPANY (COLOMBIA) LTD, in carrying out its programmes of exploration, exploitation and transport of hydrocarbons set out in the Tauramena and Santiago de las Atalayas contracts of association entered into with ECOPETROL, will, in the coming days, begin the necessary works for the construction of a pipeline between the towns of Tauramena (Casanare) and Coveñas (Sucre).

Bearing in mind that these works may affect your property, we respectfully request authorisation for these works to be performed on your land.

BP guarantees you fair and equitable compensation for the damage that the studies, analysis and construction works may cause to your land, crops and other property that may be affected.

In fulfilment of the legal provisions, BP formally requests the appropriate permission for which, as a sign of your acceptance, it requests that you sign this communication.

Yours sincerely,

For BP Exploration Company (Colombia) Ltd

GUSTAVO SUAREZ CAMACHO (Signature)

Deputy Legal Representative

Upon receiving this communication on 19th August 1994, I declare my consent to the performance of studies, analysis and construction works on my property mentioned above and I expressly declare that I will not oppose either directly or

indirectly the execution of the studies, analysis and construction works. In addition, I expressly authorise BP to assign to whomever necessary the rights and authorisations conferred in this document.

Signature..... [Finger print]..... Address...In the property..... “

369. Later, the Defendant would enter into a “Promissory Agreement for Creation of Oil Pipeline Easement and Right of Way”, which the parties have called the ROW Agreement. Once again, these were in standard form with adjustments as appropriate to the landowner and property concerned. The one for LC74 {M/172T/602.1} provided as follows:

“BP EXPLORATION COMPANY (COLOMBIA) LIMITED

PROMISSORY AGREEMENT FOR CREATION OF OIL PIPELINE EASEMENT AND RIGHT OF WAY

...

PROPERTY: LA NIEVE
VEREDA: LA COOPERATIVA
MUNICIPALITY: REMEDIOS
DEPARTMENT: ANTIOQUIA
OWNER: ROGELIO VELEZ MONTOYA

ADDRESS: AT THE FARM

The undersigned ROGELIO VELEZ MONTOYA, ..., hereinafter called THE OWNER, for one party, and ALEXANDER ROJAS J., ... who in his capacity as UNIVERSAL AGENT acts in the name and on behalf of BP EXPLORATION COMPANY(COLOMBIA LIMITED, ..., acting in its capacity as operator of the Association Contracts SANTIAGO DE LAS ATALAYAS and TAURAMENA, entered into with ... ECOPETROL, hereinafter THE COMPANY, for the other party, have entered into the PROMISSORY AGREEMENT FOR CREATION OF OIL PIPELINE EASEMENT AND RIGHT OF WAY which shall be governed by the following clauses:

FIRST: THE OWNER states that he is the sole owner and possessor of the rural property called LA NIEVE, ... with a surface area of 47.6 Ha., ...

SECOND: ...

THIRD: THE COMPANY declares that it has executed Association Contracts with ... ECOPETROL, called SANTIAGO DE LAS ATALAYAS and TAURAMENA, the purpose of which is the exploration and production of hydrocarbons that might be found in the respective areas, ...

FOURTH: In furtherance of the above-mentioned Association Contracts, THE COMPANY must transport crude oils and gases found in the area of the contracts and, for such purpose, THE COMPANY must build the Cusiana-Coveñas pipeline, ...

PARAGRAPH.- By virtue of the Petroleum Code, THE COMPANY avails itself of the public utility and easement benefits established for the petroleum industry.

FIFTH: The Pipeline and complementary works will pass through the property described in the first clause of this agreement, in the SOUTH - NORTH direction, in a 25-meter wide by 488-meter long strip of land, for a total of 12,200 square meters, an area comprised within the following special boundaries: ...

PARAGRAPH.- The property referred to shall be affected by an oil pipeline easement and right of way in the terms Of Civil Law, the Petroleum Code and the laws and decrees supplementing it.

SIXTH: In said property and in particular in the area of land described in clause FIFTH, THE OWNER promises to constitute in favor of THE COMPANY, its agents and assigns, the rights of easement, use, occupation and way established by law in favor of the petroleum industry, by virtue of which THE COMPANY or the individual or legal entity to which it may assign its rights will be able to execute the necessary works (cuts and slopes), as required by the appropriate technique, for the construction and operation of pipelines, and execute works required for the preservation, replacement and handling of pipe, installation, use, maintenance and repair of telephone, telegraph and power lines; use the right of way for its workers, equipment and machinery as required for construction and maintenance of the pipeline and all types of works related or connected to exploration, production and transport of hydrocarbons, either used directly or by its contractors.

SEVENTH: THE OWNER promises to authorize THE COMPANY to occupy a larger area than that described in the FIFTH clause and to change its route, whenever technical circumstances so require; the larger area that may be occupied for this reason shall be paid to THE OWNER at a price per square meter equal to that provided in the NINTH clause and after the final cleanup stage. During the period comprised

between the date of execution of this document and the date of termination of the pipeline construction works, THE OWNER shall abstain from cultivating in the affected and additional areas, from subletting them for such purpose, as well as from putting up improvements or buildings, which will not be compensated by THE COMPANY. ...

EIGHTH: If THE COMPANY, in the future, needs to acquire other lands within the same property identified in the FIRST clause, THE OWNER promises to enter into the respective agreements for compensation of damages and to create an easement for transit, aqueduct or pipeline and a right of way, at the same prices and with the same terms agreed in the NINTH clause, ...

NINTH: The price of the easement rights promised hereunder and the damages caused by the construction of the pipeline is THREE HUNDRED PESOS (\$300) per square meter, for a total of FOUR MILLION TWO HUNDRED EIGHTY-FIVE THOUSAND PESOS (\$4,285,000), which THE COMPANY will pay in two instalments, as follows: 70%, that is, the amount of TWO MILLION NINE HUNDRED NINETY-NINE THOUSAND FIVE HUNDRED PESOS (\$2,999,500) within twenty (20) days following execution of this document and 30%, that is, the amount of ONE MILLION TWO HUNDRED EIGHTY-FIVE THOUSAND PESOS (\$1,285,000) within the next twenty (20) days, counted as of the date of delivery of the promised public deed and the land ownership certificate attesting that THE COMPANY is the holder of the easement right, issued by the corresponding Public Instrument Registry Office.

PARAGRAPH: The total price of this negotiation, from which the withholding tax will be deducted as provided by law, comprises in the terms of Article 5 of Decree 1886 of 1954 not only the rights of use, occupation and transit in the area described in the FIFTH clause, but also damages caused during construction on the property and in particular those listed in the attached inventory, as well as damages that may have been caused by the alteration in the normal economic exploitation of the property. For all other purposes, the price of the right of way is equal to 30% of the total price paid by THE COMPANY, as agreed by the parties.

TENTH: In any case and considering the needs of THE COMPANY, THE OWNER recognizes as of this moment the full pipeline easement rights and rights of way, use, and occupation of THE COMPANY on the strip of land described in the FIFTH clause and on additional land, if necessary. Furthermore, he expressly authorizes the immediate commencement of all works required for construction of the

pipeline and guarantees that he will not cause, by himself or through a third party, the suspension or disturbance of the works, the installation of elements or the handling of machinery, until full termination of the pipeline construction works, or during their subsequent use. ...

ELEVENTH: In those lands where, due to their geological makeup, it is indispensable to plant grass in order to guarantee the pipe stability, THE OWNER promises to authorize THE COMPANY to carry out such task, under the technical conditions required by THE COMPANY, as well as the other geotechnical protection works that may be necessary within or outside the strip of land identified in the FIFTH clause; in the other lands, the value of the grass seed and the day salaries for planting it are deemed included and paid within the price established for damages in the NINTH clause, as agreed by the parties.

...

THIRTEENTH: THE COMPANY may at any time freely assign or convey, totally or partially, to any individual or legal entity, the rights promised hereunder, for which THE OWNER promises to grant his authorization in the promised deed.

...

FIFTEENTH: This agreement and the promised deed shall be subject to the provisions of the Civil Code, the Petroleum Code, Decree 1886 of 1954 and the relevant sections of the Mining Code.

...

SEVENTEENTH: This agreement has settling effects and, thus, prevents any pending or future litigation between the same parties for the constitution of the right of way and rights of easement of the pipeline and the use, occupation and compensation of damages.

EIGHTEENTH: The parties undertake and agree to execute the public deed of creation of the oil pipeline easement and right of way in order to fulfil this promise and in the terms established herein, on the TWENTY-THIRD (23) day of MAY, 1995 at 2.PM, at the SOLE notarial office of REMEDIOS, ...

...

In witness whereof, this document is signed on the 23rd day of March 1995

BP EXPLORATION COMPANY (COLOMBIA) LTD.

THE OWNER

...

ANNEX

DESCRIPTION OF DAMAGES RECOGNIZED IN THIS
NEGOTIATION AND OBSERVATIONS

488 m x 25m.= 12,200 m ² , x \$300 /m	3,660,000
200 meters fencing at \$2.500 TOTAL	625,000
TOTAL	4,285,000"

370. It is convenient to note various points at this stage. First, the basic price in LC74's case per square metre was COP 300, or COP 3,000,000 per hectare. This rate does not match any of the rates set out in the Manual's Table of Prices: see [365] above. The rate of COP 300 per square metre was applied to the area of the ROW as it passed through LC74's property (i.e. 488 metres x 25 metres width: 12,200 square metres or 1.2 hectares): Clause 5. Second, the landowner promised to constitute over the property and, in particular, the area of the ROW the rights of easement, use, occupation and way established by law in favour of the petroleum industry to enable the works to be carried out: Clause 6. Third, the landowner promised to enter into a supplemental agreement if the Defendant discovered it needed to occupy more land or a different route, provided that the Defendant made a supplementary payment at the same rate: Clauses 7 and 8. Fourth, the agreement said that it had "settling effects and, thus, prevents any pending or future litigation between the same parties for the constitution of the right of way and rights of easement of the pipeline and the use, occupation and compensation of damages": Clause 17. I shall resolve later whether the settling effects were effective and, if so, whether they were intended to refer only to the area of the ROW itself. Fifth, the parties agreed to enter into a public deed of creation of the oil pipeline easement and right of way: Clause 18.
371. As foreshadowed by the ROW Agreement, the parties would then enter into a Public Deed of creation of the oil pipeline easement, which the parties have called the ROW Easement {M/178T/681.1}. The ROW Easements were also in standard form with necessary adjustments and were executed by the Defendant and the landowner. One of the standard features was that the document declared that it was made before a named Notary. Apart from being in the form of a public deed, the ROW Easements were in similar form to the ROW Agreements, including the Defendant availing itself of the public utility and easement benefits established for the petroleum industry (Clause 4), multiple references to the Petroleum Code and Article 5 of the 1954 Regulations, and reference to the settling effects of the agreement (Clause 17). In Clauses 6 and 7 of the ROW Easement, the landowner constituted the easement (Clause 6) and authorised the occupation of a larger area (Clause 7) where in the ROW Agreement he had merely promised to do so. Clause 9 differed from the equivalent clause in the ROW Agreement in referring (in the case of LC74) only to

the 30% second tranche of payment (in that case \$1,285,000) which the owner was to receive after execution of the deed, though that sum was described as “the price of the easement rights established hereunder and the damages caused by the construction of the pipeline...”. The last sentence of the Paragraph to Clause 9 of the ROW Agreement was omitted from the ROW Easement. The changes are obvious consequences of the different purposes and status of the two documents.

372. On 9 October 1995 the Defendant entered into an agreement with Ocesa by which it purported to assign both its rights and its obligations under the various ROW agreements it had entered into with the Claimants by Public Deed 4317 {J13/51T/1}. Its terms included the following:

“In the city of Santafe de Bogota, D.C., Republic of Colombia on [9 October 1995] ... was granted the public deed for ASSIGNMENT OF EASEMENTS CONSTITUTED BY BP EXPLORATION COMPANY – COLOMBIA – LIMITED, ASSIGNMENT AGREEMENT BETWEEN [the Defendant] AND [Ocesa]

...

FIRST CLAUSE: ... [the Defendant], in exercise of the rights arising from the assignment clauses of the different public deeds for pipeline and transit easements, ..., hereby assigns the permanent pipeline and transit easement rights constituted over 597 private and/or public properties for the construction of a public pipeline.

SECOND CLAUSE: ... [the Defendant], through this deed, assigns to [Ocesa], all the rights and obligations arising from the constitution of the legal pipeline and transit easement right with permanent oil occupation established by the owners of the properties assigned in favour of [the Defendant].

...

THIRD CLAUSE: This assignment is made as stipulated in the Law and in the capacity reserved for [the Defendant] in the aforementioned easement deeds to assign the pipeline and transit easement rights with no need for authorization from the Owners of the properties where the easement rights have been constituted.

...

NINTH CLAUSE: [the Defendant] ... [is] responsible for all claims brought in relation to the agreements assigned and which are based on events or acts occurred before the date of signature of this agreement.”

373. The deed was registered in the real property registry on and from 21 November 1996. It is not alleged that notice of the assignment was given to the assigned parties unless it was effected by registration in the real property register, which I have held to be ineffective: see [132]ff above.

General Consideration of Legal Concepts in Light of the Regulatory Process and Relative Bargaining Power of the Parties

374. Some general points may be noted at this stage, looking both forwards and back in this judgment:
- i) The disparity of bargaining power between the landowners and the Defendant is clear and great;
 - ii) Colombia has established a detailed regulatory and supervisory system which is designed to protect the interests of affected individuals. That scheme was effective in causing there to be supervision, intervention in the conduct of the works where necessary and the imposition of sanctions for failures on the part of Ocesa and Saipem to comply with their obligations where appropriate;
 - iii) The overall scheme under Colombian law contemplated and operated on the basis of agreements being reached with landowners, albeit against the backdrop of potential expropriation. The possibility of enforced access or expropriation is not regarded in Colombian law as removing freedom of contract from affected landowners and occupiers;
 - iv) The evidence suggests that the approach and documentation used by the Defendant (and subsequently Ocesa) was similar and in some places based closely on what ODC had done before. It appears that the schedule of rates operated by the Defendant was more generous than that operated by ODC. There is no evidence that the schedule of values was itself abusive. There is evidence of actual negotiation taking place on rates in some cases.
 - v) There is no evidence that would have justified a generic finding that ROW Agreements were vitiated by error or dolo such that they could have been set aside if application had been made;
 - vi) There is no evidence that would justify a generic finding of abuse of rights either in the contracting process or implementation. The involvement of notaries is significant and there is evidence of some claimants making use of other advisers. That said, each case is fact sensitive in this and other respects;
 - vii) The establishment of a scheme of compensation was an integral part of the regulatory system, being required by Clause 7(9) of the Environmental Licence;
 - viii) It is clear that complaints of damage were routinely made, addressed and settled after construction. There was a clear division between claims for damage on the ROW, which were dealt with by Ocesa, and claims for damage off the ROW, which were dealt with by Saipem. In this way all claims were addressed. The frequency of post-construction settlement

arrangements suggests that landowners generally knew of the availability of compensation and where to go to get it, though states of knowledge differed: see [395].

The Construction of the Ocesa Pipeline in General

375. The construction of the Pipeline North was divided into two sectors or spreads, called spread A and spread B. As originally planned, Spread A was to be between Coveñas and Rio Nechi while Spread B was to be from Rio Nechi to Vasconia. Spread A was to be constructed by “Construction Team A” and Spread B by “Construction Team B”, with Construction Team A starting at Coveñas and working southwards while Construction Team B started half way up Spread B at the Rio San Bartolomé and worked northwards, leaving until later the southern part of Spread B.
376. In the event Construction Team B made slower than anticipated progress and so the two-spread-plan was revised into three. Running from North to South they were called Spread A1, Spread B and Spread A2. LCs 9, 10, 38, 39, 54 and 93 are in Spread A1, which ran from Coveñas to Rio Nechi. LCs 50, 61, 74, and 82 are in Spread B, which was shortened so as to run from Rio Nechi to Rio San Bartolomé. There are no LCs in Spread A2, which ran from Rio San Bartolomé to Vasconia. Spread A1 was constructed from North to South; Spreads B and A2 were constructed from South to North. The Spreads and the position of the four trial case properties are shown on {C4/3/370} and {E1/1/17}: see generally {E1/1/13} at [7.1-7.8].
377. Saipem was the main contractor on all three spreads. The geotechnical works on Spreads A1 and A2 were sub-contracted to a company called Dinosaurios; the geotechnical works on Spread B was subcontracted to companies called Bronco and Progeocon. The identity of the sub-contractors has not been shown to be material. One feature of the construction works was the use of local labour. This was identified in the public meetings as being a social benefit to the communities through which the pipeline passed. It was a priority identified in the Environmental Licence at Article 21; and it was included as an obligatory requirement in the EMP {K9/35T/12}. Saipem’s tender identified the use of local resources as being “the only way to actually promote the well-fare (sic) of the inhabitants and the progress of the Country”; it anticipated that Colombian content would represent approximately 50% of the total contract value and included ROW clearing and grading and final restoration and environmental protection amongst the activities to be carried out by local labour {J14/54.1/124}. In October 1996, Ocesa’s project update recorded that over 78% of the total employment for the project had been with “local workers from the communities affected by the construction” {K38/378/3}.
378. As the pipeline progressed so new groups drawn from local labour sources had to be trained to appropriate standards. It is not clear precisely what activities would or would not be allocated to local workers or whether some may already have had some training and I make no finding on those points. Snr Loeber accepted that some workers, depending on the precise area, were better and more reliable than others. He explained this as meaning that productivity was affected so that it might mean that the time to install temporary geotechnical work might go slower than anticipated, not that it would be forgotten altogether. His solution was that additional local workers would be hired to try to increase the rate of progress {Day18/31:22} ff. I accept his evidence on this point. Although Dr Savigny recognised the possibility that people may have

been inadequately trained for the work they were initially being expected to do, there is no evidence that would justify a finding that the work force was not, in general, suitably trained for the works that are relevant to this litigation, namely the management of the soils disturbed by the works and the carrying out of protective works.

379. What matters more is the evidence of Dr Card and Dr Savigny who both observed differences in the apparent quality of the works at different places along the ROW, which were consistent with there being discrepancies in the quality of the workmanship along the ROW with some areas of work being less well performed than others: see {Day27/130:4} ff and {Day37/169:10} ff. In acknowledging the fact of variations, Dr Savigny made the qualification that there was no reason on the four trial case properties to believe that there was “any glaring exception to the standards”. Dr Savigny said in evidence that the variations were particularly apparent from LC74 south to the Rio San Bartolomé (i.e. the area of the early progress on Spread B). Dr Card had not noticed any particular pattern to the variations and had not attempted to analyse them formally any more than had Dr Savigny. On all of the evidence I find that the quality of workmanship along the ROW was not constant. That finding, and the absence of any cogent case of consistent or constant design defects together provide a sufficient explanation for my view that each claim in this litigation is very largely fact specific.
380. Work started on Spreads A1 and B in or about December 1995, and on Spread A2 in or about August 1996. It therefore started after the execution of the purported assignment of the Defendant’s rights and obligations on 9 October 1995 but before its public registration on 21 November 1996: see [372] above. The work spanned both the dry and the wet seasons: see {E1/2/110} at [5.26]. The violence of the climate was such that there was a risk of protection works such as retaining walls, trinchos or protection barriers being washed away, and this happened on occasions. This was not necessarily or even probably due to design or construction defects. It was not a common occurrence and, when it happened, Saipem were instructed to reinstate the damage: see {E1/1/38} at [12.29], {E2/7/337} at [14.1(d)]. I do not exclude the possibility that there were some delays in effecting reinstatement, whether because of a failure to notice damage or to instruct repairs or otherwise, but this too would be fact specific in every case and the evidence has not been examined in sufficient detail in this trial to make specific findings except in the four trial cases.
381. There is an ever present danger after spending months in the quiet of an English courtroom to lose touch with the reality of the project that was being undertaken. I have referred to video footage of the ODC and Ocesa works being carried out. The available video relating to the ODC works is a promotional film produced on behalf of ODC {L1/134}. Those showing the carrying out of the Ocesa works include some promotional films produced on behalf of Ocesa, typically recording progress and showing short clips of works being carried out ({L1/209} {L1/210} {L1/210.1} {L1/225} {L1/226} {L1/228} {L1/229}); but they also include ones where the film has been taken, without apparent editing, in the normal course of the works (e.g. {L1/208} {L2/787} -{L2/797} {L2/799} – {L2/801}). No film of works being carried out on a trial claimant’s property has been identified. The evidence from the films is therefore of prime relevance in showing generally what was involved in the project.

382. The available films and photographs provided material for the technical experts in forming their opinions. They also provide evidence in themselves which needs no expert interpretation. Without usurping the proper function of the experts, the films provide evidence of the following:
- i) Both the ODC and the Ocesa pipelines were major civil engineering projects by any standards, requiring the use of heavy machinery of many types throughout the length of the ROW;
 - ii) Much of the terrain was mountainous and exceptionally demanding. A good insight into the challenges that were faced is provided by {L2/802} at 30.55-31.16, which shows (amongst other things) the need to winch caterpillar-tracked heavy vehicles up hills because of the steepness of terrain, the inevitable churning of the soils on the ROW, and the arduous demands made on those working on site;
 - iii) The film of the ODC works shows many of the same techniques being used by ODC (who on the Claimants' case caused no damage) as were subsequently used on the Ocesa pipeline;
 - iv) It is frankly absurd to suggest that the stripping, excavation, stacking and subsequent replacement of soils can be achieved without some mixing of horizons or to suggest that the re-constituted ROW will be exactly as it was before. It is, I find, an inevitable consequence of the soil moving operations that the unmixed topsoil available to be re-spread on reconstituting the ROW would be less than had originally been there. This applies as much to the ODC works as to the works on the Ocesa pipeline;
 - v) The consequences of laying the pipeline on the area of the ROW would be obvious to any landowner. If and to the extent that there was a substantial escape of soil as a result of slump, erosion or dumping, that too would have been obvious to any landowner who was taking an interest in his or her land;
 - vi) There is clear evidence on the films of the Ocesa pipeline that the vegetation on the ODC ROW had not fully recovered before the soils were stripped again for the Ocesa pipeline: see, for example, {L2/793} at and around 37.46. The extent to which the vegetation on the ODC ROW had not fully recovered was variable;
 - vii) Viewing the films shows that snapshots taken from them as single images may be misleading. For example, on {Day1/185:6} it was suggested in opening that a protective barrier shown at {H2.1/1/126} had been overtopped. When the snapshot is seen in the context of its original film ({L2/790} at 5.37 and at 6.48) it becomes clear that (for whatever reason) the nearer section of the protective barrier had been progressively reduced in height with a gap between it and the further section. Although there is soil in the area of the gap, I am not satisfied that what appears to have been a conscious design decision would have led to any adversely significant escape of material in the area of the gap;
 - viii) Both the land-based and fly-over films show the extensive use of geotechnical protective works, particularly on steeper slopes. They also show clear

examples of recent deforestation, erosion with no obvious proximity or relevance to the ROW and a variation in the apparent tidiness of the carrying out of the works, which the experts noted but were not able to explain: see [379] above.

Roles and Responsibilities of Equion and Ocesa during Construction

383. Ocesa contracted with Saipem for it to carry out the construction works on the terms of the Saipem Contract {J14/54.1}. In briefest outline, the Defendant agreed to provide the management of the contract for Ocesa through the PCMT, with technical, financial, administrative and directive autonomy subject to the terms of the PCMA. In that role it managed, supervised and controlled Ocesa's contracts for the construction of the pipeline on a day-to-day basis. Mr Allison and Mr Spence were at all times employees of the Defendant, as were most of the senior management team on the PCMT. Mr Gasca's employment by Tecniavance was a notable exception but, as a member of the PCMT he came in direct line of management below Mr Allison, Mr Spence and others. Mr Allison was also appointed the Company's Representative under the terms of the Saipem Contract, which invested him with power to issue contractual instructions with the authority of Ocesa.
384. The role of the PCMT covered the management, supervision and control of Saipem to ensure that it carried out its work in accordance with its contract obligations, specifications and procedures. By way of example, below its construction managers, the Civil Engineers were responsible for deciding what short term measures would be implemented by the contractor {Day14/44:24} {Day17/82:19} and for signing off, on behalf of the PCMT, those measures that were installed {Day14/67:16}. The Civil Engineers decided what long term measures would be taken in conjunction with Saipem, with the Civil Engineers, such as Snr Gasca, playing the leadership role and others in practice following their view {Day14/71:24} {Day17/83:13}. If serious issues had arisen, they could and would have been referred up to the PCMT, to Mr Allison as Project Manager and Company's Representative if necessary.
385. The Defendant's role was variously described at the time and later. I shall return to the contractual obligation assumed under the PCMA in Section 7. An audit report produced by Total in about September 1997 stated that "the construction is operated by BP under a [PCMA]" {K49/517/2}, which Snr Gasca accepted was a correct description because "BP was the one that had done the contracts, carried out the studies and the construction contracts, and they were the ones that had sent some of those supervisors on the field, and if that means they built the pipeline, well, yes, then" {Day17/47:12}. In a joint review document with Ocesa produced in December 1998, the Defendant said that "the PCMA ... was formed in February 1995 in order for [the Defendant] to undertake the total Project Management for the Transportation part of Phase II ..." {J26/87/3}. I accept these as reasonably accurate descriptions of the reality of what happened. The day-to-day management was still subject to the residual power to exercise supervisory control and direction of the Ocesa Board although, as was to be expected, the Board was generally concerned with major budgetary, contractual and financial decisions. Thus it was Mr Spence's evidence that, although the Defendant required approval under the terms of the PCMA to enter into the contract with Saipem because (at US\$211 million) it exceeded its financial authority, in terms of the day-to-day management, supervision and control of the contracts, it was up to the Defendant to get on and manage,

supervise and control that contract, and the PCMT had total autonomy {Day13/89:24}.

386. There is no evidence that any of the Defendant's employees who worked on the PCMT were formally seconded to Ocesa, and Mr Allison accepted that he was not "legally" seconded {Day15/69:24}. Although a number of witnesses asserted that either they or others had been "seconded" to Ocesa, that evidence was either withdrawn or represented no more than that the person was working on behalf of Ocesa {Day13/42:18} {Day17/44:3}. The decision not to second BP employees to Ocesa was evidently a deliberate decision, foreshadowed by a meeting in Houston in May 1995 on the subject of the PCMA which recorded that "The PCMT will continue to reside within [the Defendant] except for [Brown & Root] members. Secondment will not be used. [The Defendant] will employ all non B&R members of the IPMT, will be responsible for their security and will pay their salaries and living allowances" {J10/36/14}. The same document made clear that this was a strategic decision: "For image and operative reasons IPMT members should be able to represent Ocesa and/or act as agents of such. The PCMA should include wording ... that allows for this. Although IPMT will not be seconded to Ocesa in a strict legal sense, the wording of the PCMA should allow for the IPMT to acts [sic] as if seconded." It appears that tax efficiency may have played a part in the decision. The decision was consistent with an earlier Communications Strategy which said that the Defendant, when acting as leader of the project management team, would project itself as the instruments of [Ocesa] and will seek to project the image of [Ocesa] and not its own image. It is not [the Defendant] that is building the line, it is [Ocesa] ... Given that the desired image can be said to be in conflict with the reality of who owns, is building and will operate the line, further explanation may be needed...." {K15.1/107.1/1}. The whole thrust of Ocesa's communications was for Ocesa to distance itself from the Defendant {K28/274/1}. This appears to be the reason why letters were not to be sent out on the Defendant's own headed paper and why the Defendants' employees working on the project carried Ocesa business cards.

Dealings with Landowners after Construction

387. After Saipem had carried out the works, there were further dealings with landowners. The end result of these dealings were typically that a settlement agreement would be entered into by the landowner with Ocesa. I treat a LC74 document {M/181T/686.1} as typical of a settlement agreement with Ocesa alone:

"DAMAGE APPRAISAL, RECOGNITION AND SETTLEMENT AGREEMENT

In the city of REMEDIOS, department of ANTIOQUIA, on the 15th day of JUNE, 1996, Messrs. ROGELIO VELEZ MESA, ..., hereinafter called THE BENEFICIARY, for one party, and for the other ALEXANDER ROJAS, ..., acting in his capacity as universal agent for OLEODUCTO CENTRAL S.A., ..., hereinafter THE COMPANY, met in order to enter into the appraisal, recognition of damages and settlement agreement which is governed by the clauses set out below, based on the following considerations:

FIRST: THE BENEFICIARY is the OWNER of a rural property called LA NIEVE, ...

SECOND: In furtherance of the construction works of the CUSIANA-COVENAS Pipeline, THE COMPANY caused damages to the property described in the preceding clause, consisting of: The pipeline construction caused permanent damage to 1 1/2 hectares of a plot used for cattle farming.

THIRD: THE BENEFICIARY has claimed from THE CONTRACTOR the amount of \$8,000,000 as payment for the damages caused to the property identified in the preceding clause, considering that they have caused him losses such as:

The land has become permanently unfit for cattle breeding and raising activities

FOURTH: THE COMPANY believes that the real value of the damages caused, considering the area of land affected, the economic exploitation for which it is intended and the commercial price of land in this area is \$4,000,000 for which reason it considers the financial claims of THE BENEFICIARY to be excessive.

FIFTH: Considering that there is no agreement between THE COMPANY and THE BENEFICIARY regarding the actual value of the damages caused and in order to avoid any conflict between them, the parties have reached the following:

SETTLEMENT

CLAUSE FIRST: THE COMPANY shall pay THE BENEFICIARY, within twenty (20) days following the date of execution of this document, the amount of Five million one hundred fifty thousand pesos (\$ 5,150,000), as sole and total value of the damages caused in the property identified in the FIRST item of the recitals, and including not only physical damages but also any other damages that the alteration in the normal economic exploitation of the property may have caused.

CLAUSE SECOND: THE BENEFICIARY expressly waives his right to file any judicial or extrajudicial claim against THE COMPANY for damages caused during the works described in the SECOND item of the recitals.

CLAUSE THIRD: THE BENEFICIARY has no claim against THE COMPANY, which fulfilled the obligations acquired, and accepts all terms of this settlement.

CLAUSE FOURTH: THE COMPANY has no claim against THE BENEFICIARY.

CLAUSE FIFTH: Upon compliance with the terms of this settlement, the parties declare one another mutually and reciprocally cleared and released from any claim arising from the damages described in FIRST item of the recitals.

CLAUSE SIXTH: For all purposes, this settlement has *res judicata* effects, and in witness whereof is signed on the 3rd day of July in the city of Remedios.

THE COMPANY

THE BENEFICIARY

(Signed)

(Sgd.) Rogelio Velez

WITNESS

WITNESS”

388. A second standard form of settlement agreement was in common use which was materially different because Saipem was joined as a party. The reason for Saipem’s inclusion was a contractual arrangement between Ocesa and Saipem that damages outside the ROW were the sole responsibility of Saipem although it was agreed that Ocesa and Saipem would negotiate them together. This appears from Clauses 1 to 3 of the typical agreement of this type set out below, which covered payment (again relating to LC74) for sobreanchos and a dump and gabions outside the 25 metre ROW {M/182T/689b}:

“RECOGNITION VALUATION OF DAMAGE AND SETTLEMENT CONTRACT

In the city of Remedios, ... on the 16th day of August, Messrs. ROGELIO VELEZ, ... acting in his own name, hereinafter called THE BENEFICIARY, for one party, and for the other ALEXANDER ROJAS, ... acting in his capacity as universal agent for [Ocesa], [...] hereinafter THE COMPANY, and LEONARDO GRAVINA [...] who, in his capacity as _____, acts in the name and on behalf of the company [SAIPEM] ..., hereinafter THE CONTRACTOR; have decided to enter into this appraisal, recognition of damages and settlement contract, which is governed by the following clauses, based on the following considerations:

FIRST – That [Ocesa] carried out the construction of an oil pipeline, from the village of Tauramena [...] to Tolú [...].

SECOND – For that purpose, [Ocesa] entered into a construction contract with the company known as [SAIPEM], which constructed the oil-pipeline between Vasconia and Coveñas.

THIRD – In the contract entered into it is stated that the damages caused outside of the right of way (“*sobreanchos*”) are the sole responsibility of THE CONTRACTOR, however, both THE CONTRACTOR and THE COMPANY will

negotiate the same together, in order to agree on the criteria, without prejudice to THE CONTRACTOR's obligation to bear the cost of the damages.

FOURTH – that THE BENEFICIARY is the Owner of a rural plot known as LA NIEVE, [...]

FIFTH – That in the performance of the construction works of the pipeline CUSIANA COVEÑAS, THE CONTRACTOR caused damage on the property described in the previous clause, consisting of

Sobreanchos, 488 meters long by 10 meters wide for a total of 4,880 m² on the right of way and a dump of 2,500 m² at \$280 per square meter, and gabions.

Total m² 7,380 m² x 280 m²

=2,066,410.

SIXTH - That THE BENEFICIARY has claimed the sum of ___ from THE CONTRACTOR as payment for the damages caused on the plot identified in the previous clause, because he considers that the same has produced losses such as:

SEVENTH – That THE CONTRACTOR believes that the real value of the damages caused, taking into account the area of land affected, the economic use of the land and ... assessed at \$..., which is why the financial claim of THE BENEFICIARY is too high.

EIGHTH – That since THE CONTRACTOR and THE BENEFICIARY were not able to reach an agreement regarding the real value of the damages caused, and in order to avoid whatever conflict between them, the two parties have decided the following:

SETTLEMENT

FIRST CLAUSE: THE CONTRACTOR will pay THE BENEFICIARY, within Thirty (30) days following the signing of this document, the amount of two million sixty-six thousand four hundred pesos (\$2,066,400), as the full and sole value of the damages caused to the plot identified in the FIRST point of the recitals, which includes not only physical damage but also the losses which may be caused by the alteration of the normal economic exploitation of the plot.

SECOND CLAUSE: THE BENEFICIARY expressly renounces to file against THE CONTRACTOR any type of

judicial or non-judicial complaint for the damages caused during the works described in the second point of the recitals.

THIRD CLAUSE: THE BENEFICIARY has no further claim in regard to THE CONTRACTOR, which complied with the acquired obligations, and accepts all the terms of the present settlement.

FOURTH CLAUSE: That THE CONTRACTOR has no outstanding claim with THE BENEFICIARY.

FIFTH CLAUSE: That, subject to the fulfilment of this settlement provisions, the parties hereby mutually declare to be FULLY AND RECIPROCALLY DISCHARGED FOR EVERY CONCEPT ORIGINATED IN THE DAMAGES DESCRIBED IN THE FIRST POINT OF THE RECITALS.

SIXTH CLAUSE: That for all its effect, the present settlement produces the effect of a final judgment, and for the record it is signed on the 16th day of August in the city of Remedios.

FOR OCENSA

THE BENEFICIARY

(Sgd.) Rogelio Velez

FOR SAIPEM S.P.A.

389. Either at the same time as the settlement or later, receipts would be obtained and Paz y Salvos would be entered into with the landowner. The receipts were not all in identical form but those signed by Snr Velez (LC74) are typical. A receipt signed by Snr Velez for a cheque for COP 5,150,000 dated 16 August 1996 {M/189/765} stated “I [Snr Velez] hereby state that I have received from [Ocensa] the amount of \$5,150,000 as payment of 100% of the accidental damage over [La Nieve], and that I have been fully paid in all respects”. Two later receipts relating to other settlements also contained the statement that he had been fully paid in respect of the agreement that had been reached {M/189/758} {M/189/755}. Some but not all declared that the payment related to an agreement or contract.
390. Common to these receipts is the phrase (in Spanish) “Ocensa se halla a Paz y Salvo”, which has here been translated as “I have been fully paid by Ocensa”. This same translation of the words (or very similar) has been adopted for other similar forms of receipt (e.g. {M/179T/682.1}, Snr Velez’ receipt for a payment under his ROW Agreement with Ocensa; {M/127T/458.1}, Snr Mesa’s receipt for the second payment under his ROW Agreement for LC54, which is translated as “I have been fully paid in all respects”). Paz y Salvos were in some respects more formal and, on their terms, went further than the mere receipt of full payment. In addition to recording the fact of payment for damage, they included express reference to formal renunciation or waiver of future claims.

391. There were two forms of Paz y Salvo in common use, just as there were two forms of settlement agreement. One form of Paz y Salvo would be entered into by the landowner with Saipem. It would state that it had been seen and approved by Ocesa. The Defendant would not be a party to the Paz y Salvo. It specifically referred to and was a clearance certificate against damage caused *outside* the ROW, reflecting the reference in the second form of settlement agreement to the responsibility of Saipem for all damages caused outside the ROW: see Clause 3 at [388] above. A typical Saipem Paz y Salvo (again from LC74) would be in the following form {M/184T/727.1}:

“SAIPEM S.P.A.

CLEARANCE CERTIFICATE FOR THE PERFORMANCE
OF THE CONSTRUCTION WORKS OF THE OCENSA
PIPELINE CUSIANA-COVENAS

OWNER	ROGELIO VELEZ MONTOYA
PLOT	La Nieve
DISTRICT	La Cooperativa
MUNICIPALITY	Remedios
DEPARTMENT	Antioquia

The undersigned Rogelio Velez M., ..., acting in his capacity as owner of the rural plot known as La Nieve ...

HEREBY DECLARES

That the company **SAIPEM S.P.A.**, in its capacity as contractor of **OLEODUCTO CENTRAL S.A. “OCENSA”** for the construction of a 30-inch wide pipeline known as **CUSIANA-COVENAS**, affected the above mentioned property over an area of 25 metres long by 488 metres wide, a total of 12,200 square meters.

That the company **SAIPEM S.P.A** is fully paid up to me in all respects and in relation to the property of which I am the OWNER and all the agricultural, cattle rearing and any other activities, carried out by me on the above mentioned property affected by the construction works of the pipeline, for all damage caused outside of the corridor of the Rights of Way (25 meters), or which were caused as a result of any legal, contractual or non-contractual relationship in the course of the permanent occupation contract of Pipeline and Transit legally constituted in order to carry out the construction works of Oleoducto Central S.A. I consequently **RENOUNCE (WAIVE)** the right to bring any reclamation, action or judicial or extrajudicial claim against SAIPEM S.P.A or OLEODUCTO CENTRAL S.A., regarding their obligations, agreements, loss

and damage to pastures, crops or property *outside the corridor of the right of way* [“por fuera del corredor de la línea”]¹³, or the alteration in the normal economic exploitation of the plot during the construction of the Central Pipeline.

Likewise, I hereby declare that I have received from **SAIPEM S.P.A** the payment to my full satisfaction of all the loss and damage caused on the above mentioned plot of which I am the OWNER (✓) and/or possessor (x). As a result, the present **CLEARANCE CERTIFICATE** frees SAIPEM S.P.A. and OLEODUCTO CENTRAL S.A. from their obligations of reparation (repair), payment or indemnity for the damage, repairs, compensations or any other aspect generated from the construction works of the pipeline and its complementary works. I authorize SAIPEM S.P.A to carry out on the above mentioned plot the maintenance, protection and cleaning works necessary for the stability of the Pipeline.

OWNER SAIPEM S.P.A.
[Signature –] [Signature –]

...

Seen and approved by OCENSA [Signature]

Date and place: Puerto Berrio April 4/98”

392. Ocesa also had a form of Paz y Salvo, which was in materially different terms. The two main points of distinction for present purposes are that Saipem was not a party to the Ocesa Paz y Salvo and that it expressly gave clearance for damage *inside* the ROW. In these respects it complimented the Ocesa settlement agreement to which I have referred at [387] above. There is no Ocesa Paz y Salvo in the court documentation for LC74. I therefore take an example from LC54 {M/136T/480.1} as typical:

“OLEODUCTO CENTRAL S.A

FINAL AND DEFINITIVE PAZ Y SALVO SIGNED BY THE OWNERS, POSSESSORS () OF THE PROPERTIES AFFECTED BY THE RIGHT OF WAY IN THE DEVELOPMENT OF THE CONSTRUCTION OF THE PIPELINE CUSIANA COVEÑAS

OWNER Rodrigo Mesa León
PLOT La Fe
DISTRICT El 18

¹³ Emphasis added: cf [392]

MUNICIPALITY Caucasia

DEPARTMENT Antioquia

The undersigned, Rodrigo Mesa Leon, ..., acting in his capacity as **OWNER (x) Possessor ()** of the rural plot known as La Fe ...

HEREBY DECLARES

That the company **OLEODUCTO CENTRAL S.A.**, affected my property over an area of 402 metres long by 3.4 metres wide, a total of 1367 square meters, for the construction of the 30-inch Cusiana Coveñas pipeline. That the mentioned Company is fully paid up to me and the property identified above, for all damage, losses or compensation caused or resulting from any legal, contractual or non-contractual relationship in the course of the contract of Easement of pipeline and Transit legally constituted for the purposes of carrying out the construction works of the pipeline in performance of the project or any other place of access to the works. As a consequence and in conformity with the above, I **RENOUNCE** the right to present any type of reclamation, action or judicial or extrajudicial claim against the company, regarding their obligations, agreements, loss and damage to the pastures, crops or movable [property] *inside the corridor of the line* [“por dentro del corredor de la línea”]¹⁴, or the alteration in the economic exploitation of the plot during the construction of the pipeline.

Likewise, I authorize The Company to undertake on the property La Fe the maintenance, protection and cleaning works necessary for the stability of the Pipeline on the property. In this regard, I renounce to present any type of reclamation against The Company. In acceptance of the aforementioned, I sign the present clearance certificate.

[Signature]

OWNER () POSSESSOR ()

PLACE Caucasia

DATE August 11/97

[Signature]

[Signature]

CENTRAL PIPELINE S.A.

WITNESS”

¹⁴ Emphasis added: cf [389]

393. The available evidence strongly suggests that Ocesa and Saipem entered into (or attempted to enter into) agreements and Paz y Salvos with all landowners. The trial bundle includes at least one settlement agreement with each of the Lead Claimants except LC82 and at least one Paz y Salvo with each Lead Claimant including LC82 (which indicates that there would have been a prior settlement agreement or agreements in that case too) but excluding LC93. The settlement agreements and Paz y Salvos for the Trial Claimants are considered in detail in Sections 11-14. In summary, the numbers of settlement agreements and Paz y Salvos entered into by each of the other lead claimants were as follows:

LC	Settlement Agreements	Paz y Salvos
LC9	3: {M/12T/29.1} O/S, {M/13T/32.1} O/S, {M/17T/46.1} O/S	2: {M/19T/48.1} S, {M/21T/50.1} O
LC10	1: {M/48T/123.1} O/S	1: {M/43T/113.1} S
LC38	1: {M/62T/190.1} O/S	2: {M/64T/192.1} S, {M/65/193} O
LC61	2: {M/165T/574.1} O/S, {M/166T/578.1} O/S	1: {M/162T/567.1} S
LC82	None	1: {M/229T/999.1} S
LC93	4: {M/240T/1084.1} O, {M/242T/1096.1} O, {M/263T/1298.1} O, {M/277T/1460.1} O	None

Key: Agreements: O = Ocesa as [387], O/S = Ocesa/Saipem as [388]; Paz y Salvos: S = Saipem as [389], O = Ocesa as [392].

There is a considerable range in the subject matter of the settlement agreements, ranging from quite considerable (e.g. {M/277T} – destruction of 1696m of 4-strand barbed wire fence and a bridge causing flooding to adjacent land) to the much more modest (e.g. {M/12T} one heifer that was lost because of a failure to close fences; {M/165T} – one cow).

394. I have not had any submissions about the various settlements and Paz y Salvos reached by non-trial Claimants, but it appears from the documents listed above, that the descriptions of the damages settled by Ocesa/Saipem forms of settlement agreement are of damages outside the original 25 metre ROW while the damages settled by the Ocesa form of settlement agreement are consistent with damages occurring within the original width of the ROW. Furthermore, analysis of the cases where there are settlement agreements and Paz y Salvos is also informative. The following points emerge:

- i) It is sometimes, but not always, possible to match a Paz y Salvo to a settlement agreement. Thus:

- a) For LC9, settlement agreement {M/17T/46.1} (O/S) refers to sobranchos of 10,755 m² leading to a payment of COP 3,011k. Its terms match those of the Paz y Salvos {M/19T/48.1} (S) and {M/21T/50.1} (O), each of which refers to the sobranchos. There is no Paz y Salvo in the trial bundle that matches {M/12T/29.1} (O/S – the claim for the loss of a heifer caused by failure to close fences) or {M/13T/32.1} (O/S – a claim for destruction of 3,700 m² of crops);
 - b) For LC10, settlement agreement {M/48T/123.1} (O/S) refers to sobranchos, a water problem and payment of access, which matches the terms of Paz y Salvo {M/43T/113.1} (S);
 - c) For LC38, settlement agreement {M/62T/190.1} (O/S) refers to sobranchos of 7,659 m² leading to a payment of COP 1,530k, which matches the terms of Paz y Salvos {M/64T/192.1} (S) and {M/65/193} (O), each of which refers to the sobranchos;
 - d) For LC61, settlement agreements {M/165T/574.1} (O/S) and {M/166T/578.1} (O/S) settled claims for a cow and for sobranchos respectively. The Paz y Salvo that is available ({M/162T/567.1} (S)) leaves blank the space for identifying particular losses that have been settled.
- ii) Where there are available Paz y Salvos between a claimant and Saipem and between a claimant and Ocesa (as in the case of LC9 and LC38) they are concluded on the same day – a pattern that is repeated with LC39 and LC54;
 - iii) The renunciation of rights regarding claims *inside* the corridor (in the Ocesa form of Paz y Salvo) and *outside* the corridor (in the Saipem Paz y Salvo) cannot be and clearly is not accidental. The two forms of Paz y Salvo are evidently intended to protect against the subsequent enforcement of different rights and claims;
 - iv) The execution of Paz y Salvos of both forms on the same day, allied with the fact that both of the Paz y Salvos for each of LC9, LC38, LC39 and LC54 referred to off-ROW damage strongly suggests a system whereby Ocesa and Saipem were attempting to wrap up all outstanding liabilities on the same day, using the two different forms of Paz y Salvo (each of which would refer to the off-ROW damage which they regarded as the primary responsibility of Saipem) to ensure finality. The fact that there is no available Ocesa form of Paz y Salvo for LC61 or LC82 and no Paz y Salvo for LC93 is consistent with (a) Paz y Salvos not having been executed or (b) Paz y Salvos having been executed but not being available to the Court. I am not able to make certain findings as to which of these alternatives may be correct in each case, but there is no basis for an assumption that all Paz y Salvos that were executed have remained and been available for the court.
395. The prevalence of settlement agreements for the Lead Claimants supports the inference that landowners generally were aware of the ability to make claims in respect of damage to land, crops and chattels and that they did so, even in respect of relatively minor losses. The settlement agreements in the trial bundles cover what

appear to be sobreanchos, damage to land (other than sobreanchos), damage to crops, damage to structures (such as the bridge) and damage to chattels (such as the heifer and the cow). By way of illustration, LC9's claim for the loss of the heifer was settled for the claimed sum of COP400,000 (roughly £100); the claim for destruction of crops was settled for COP156,000 (roughly £39); and the claim for sobreanchos was settled for COP3,011,400 (roughly £750). LC61's claim for the loss of his cow was settled for the claimed sum of COP350,000 (roughly £85). I do not underestimate the significance of such sums to the Claimants, but they pale into insignificance when compared with some of the losses that are now claimed and which were not claimed at the time.

396. The prevalence of settlement agreements also supports the inference that no impediment was placed in the way of those who wished to bring claims – though it is clear that some claims were not accepted in full and were reduced before settlement was achieved. The possibility that some of the 74 claimants did not know of the ability to make claims exists and cannot be determined on the evidence at trial; but, given the extent of the public involvement with the project, the likelihood that Ocesa and Saipem would have wanted to close off their potential liabilities where they could, and the prevalence of the settlement agreements for the 10 Lead Claimants, that possibility does not seem likely and would need explanation.

6. Procedural History

397. Section Index:

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Introduction

398. In 2004 Messrs Leigh Day were instructed by a group of Colombian Farmers to bring a claim against the Defendant alleging that the Ocesa Pipeline had damaged their land. Those claims were settled without proceedings being issued, following a mediation that took place in Bogota in June 2006. The terms of that settlement are not known to the Court. Leigh Day were subsequently instructed to bring similar claims by a further group of farmers, which forms the effective starting date for the present claims.
399. The Claimants' Letter of Claim in these proceedings was sent on behalf of 53 claimants to the Defendant on 22 May 2007 {N/0.1/1}. Leigh Day expressed the hope that the claims could be settled without litigation and said that was the reason why they were "providing [the Defendant] with far more information and evidence than would normally be the case prior to the commencement of proceedings." The letter said that the pipeline had caused "very significant damage to the lands surrounding the right of way" and included schedules of loss for five of the named Claimants.
400. The Defendant replied on 28 January 2008 rejecting the claims. The Claimants issued the first Claim Form in these proceedings the next day, 29 January 2008 {B5/1/1}. In June 2008 the Claimants applied for a GLO, which was granted on 24 September 2008 {C1/3/4}. Amongst the directions that were given by the GLO were that Particulars of Claim should be served for one Claimant and that all Claimants should complete and serve a Schedule of Core Information ("SOCI") by 26 November 2008. The SOCI was to include details of the damage alleged to have been caused to the Claimant's property as a result of the construction of the Ocesa Pipeline. It was also to provide details of the use of the property before and since the construction of the Ocesa Pipeline, details of any consequential losses claimed by the Claimant and details of the current state of the property. Leigh Day and the Defendant's solicitors (Messrs Freshfields) were to liaise with a view to affording the Defendant and its expert advisors reasonable and proportionate access to the properties and with a view to agreeing an appropriate categorisation or grouping or sub-grouping of the claims and identification of appropriate lead cases for trial.
401. The SOCIs were produced in late 2008. Attached to each SOCI was a Schedule of Loss which set out in considerable detail the sums being claimed by the Claimant. These were, self-evidently, the sums that the Claimant asserted that the Defendant was liable to pay him. Even without a Statement of Truth, they were formal documents produced pursuant to the GLO. There can be no doubt that the intention of

the GLO in requiring the production of these documents was to enable the Defendant to understand the claim being brought against it and to decide what resources it should devote before deciding whether or not to contest, compromise or capitulate. In other words, as the Senior Master aptly put it:

“The purpose of those documents was to allow the court and the Defendant to know; (a) what damage the pipeline was alleged to have caused and; (b) the value of the claims and (c) to enable the court and the parties to craft appropriate directions including the selection of lead cases.”

402. There followed a protracted sequence of events as the Defendant attempted to pin down the Claimants on the precise nature, scope and extent of damage alleged to have been suffered and the formulation of their claims for relief. That sequence is largely covered in the judgments given by the Senior Master {C2/2/39}, refusing the Claimants’ late applications to bring claims for remediation costs, and by me {C2/4/82} refusing permission to the Claimants to bring a claim described as a claim for general damages, which had been formulated even later than the attempted claim for remediation costs.
403. In its closing submissions the Defendant documented a number of interim skirmishes which it characterises as attempts to obtain proper clarity to enable it to understand and prepare to defend the claims brought against it {C4/4.6/145}ff. Since I am satisfied that, in the end, the Defendant was able to marshal sufficient resources to enable a fair trial to be held, it is not necessary at this stage in the proceedings to review all the matters of which they complained, and I do not do so. However, two issues relating to the formulation of the claims are of real significance for the Court when trying to establish where the truth may lie. It is therefore necessary to refer to them in some detail.

The Original Schedules of Loss

404. The Original Schedules of Loss were produced in late 2008. This was over a year after the Letter of Claim, which was sent by a team of lawyers and experts who had the advantage of having acted for claimants with similar claims since 2004. They provided considerable detail, sufficient to suggest that they were the product of careful and competent preparation upon which at least some reliance might be placed. When the individual claims were formally pleaded, each Particulars of Claim alleged that:

“By reason of the facts and matters set out above the Claimants have suffered loss and damage and claim accordingly. In this regard, a Schedule of Loss was served on 2 September 2008. Further particulars will be provided in due course. The Claimants claim compensation pursuant to Colombian Law, quantified pursuant to English law or damages.”

405. The Lead Claimants’ Pleadings were all supported by Statements of Truth in or about March 2010. The reference to “further particulars” being provided meant that further details would be provided of the claim formulated in the Schedules that were now being verified by the Statement of Truth; it did not mean, and would not be

understood as meaning, that the current claim was fundamentally unreliable. If anything, it supported the reliability of the Schedules rather than undermining them.

406. I have indicated what was and is the Court's view of the purpose of the Original Schedules of Loss. That view was shared by Leigh Day: "the intention was to enable the Defendant to gain an understanding of the potential value of each claim based on best estimates at the time so that the Defendant could consider the possibility of an early resolution of the claims as set out in the Claimants' Letter Before Action dated 22 May 2007" {C6/33/11}. The importance of the documents for the parties and Court should be apparent to anyone conducting litigation of this sort. For the parties, even in adversarial negotiations, some trust has to be placed in documents that are presented by reputable opponents seeking an early settlement. For the Court, trying to establish where the truth lies, consistency and demonstrable reliability are key features to which the Court will look when assessing a party's case.
407. In the event, the Original Schedules of Loss were shown to be quite unreliable and, in many respects, bore little or no relation what had happened or the evidence of the Claimants. The Claimants produced a schedule in the course of oral closing submissions which showed the percentage change (either up or down) between the Original Schedules of Loss and the Schedules that were provided in and after 2010 {C6/43.1/1}. Eight of the ten Lead Claimant Original Schedules of Loss were reduced when Revised Schedules were later produced. The divergence (on the Claimants' approach) in 7 of the 10 cases was 25% or more (of which 5 required reductions). The most extreme case was LC54, where the Original Schedule of Loss exceeded the Revised Schedule by a factor of 22. In LC39 it exceeded the Revised Schedule by a factor of 1.5; in LC50 it was a factor of 2.3; in LC74 it was a factor of 1.3. The most extreme divergence in the other direction was LC61 where the Revised Schedule exceeded the Original Schedule by a factor of 3.8.
408. When Snr Mesa (LC54) was asked if he had known that, by his Original Schedule of Loss, he had claimed COP 3.9 billion (roughly equivalent to £1-1.3 million) the look of astonishment on his face was real and unforgettable. His immediate reaction was that perhaps the COP 3.9 billion was "a group loss" and not his loss alone {Day7/25:3}. He was clear in his evidence that he had not known that such sums were being claimed in his name. I accept that evidence. It raises the wider question how the Original Schedules of Loss came to be prepared.
409. Leigh Day provided an account of how the Original Schedules came to be produced by a letter dated 14 January 2015 {C6/33/11}. I accept that account. In briefest outline, information was gathered during three relatively short trips (April/May 2007, March 2008, February 2009), on each of which a number of potential Claimants were interviewed at locations away from their properties. The information included "some initial information relating to issues of productivity and quantum." The time with each Claimant was limited to 2-3 hours, which covered liability and quantum issues and took place without the assistance of technical experts. The Schedules were prepared on the basis of that information. Although not expressly stated it is implicit (and I find) that Leigh Day did not go through the Original Schedules with any Claimant before serving them on the Defendant or before incorporating them in the pleaded case. Leigh Day's letter says that, when incorporating them in the pleadings, it had been the intention to provide further particulars in respect of the losses alleged in the group action. As before, there is a well understood difference between

providing further particulars of a pleaded claim and changing the basis of the claim substantially. Leigh Day's letter says that the information obtained on their visits to Colombia did not change with time.

410. In the light of the extent to which the case on quantum as set out in the Original Schedules of Loss has been shown to be inaccurate and the ready explanation for such inaccuracies which Leigh Day's letter provides, I am unable to place any weight upon the Original Schedules of Loss as being an accurate reflection of any losses that the Claimants may have suffered or the causation of those losses, despite the fact of their having been incorporated as part of the Claimants' pleaded case, backed by a statement of truth. It does not reflect adversely upon the Claimants themselves, since they were not involved in and were not personally responsible for the construct that was placed upon the information they provided or for the fact that the Schedules were put forward as real statements of the Claimants' factual case and losses.

The Revised Schedules of Loss

411. Each Lead Claimant in the trial cases gave evidence in their witness statement in the following terms (or very similar): "My schedule of losses has been read to me and I confirm that it is an accurate/precise description of my losses." {D4/71/809} – Snr Sequeda; {D5/88/954} – Snr Manco; {D5/91/1035} Snr Buitrago; {D6/100/1199} – Snr Mesa; {D6/105/1250} – Snra Arango; {D8/125/1518} – Snr Velez. However, in oral evidence, Snr Sequeda said that he had no idea and that his lawyers had not told him what he was claiming {Day11/85:21}. Snr Mesa gave highly equivocal evidence in a way which left me quite unconvinced that he had seen or had read to him his revised schedule of losses {Day6/126:1} ff. Snra Arango had no idea how much she and her husband were claiming {Day7/119:2}. Snr Velez said that someone had read him his Revised Schedule of Loss but that he didn't really understand it because he cannot read {Day4/37:1} ff.
412. In the light of this evidence I am not satisfied that the statement in the witness statement is reliable and am not satisfied that any of the Trial Claimants either read (or had read to them so that they understood it) their Revised Schedules of Losses. I am driven to the conclusion that, no doubt with the best intentions, the Revised Schedules of Losses were lawyers' documents by which they set out what they believed might be the most advantageous formulation of a claim for their clients, rather than rigorously checking with their clients whether what was being put in the schedule was supportable. That process continued even until after the hearing, when the Claimants put in further revisions which are said to reflect the evidence. That may or may not prove to be true, but I cannot rely upon the Schedules themselves to provide support to the Claimants' cases.

Reformulation of the Claimants' Claims

413. In June 2012 the Claimants served new Schedules of Loss. These raised, for the first time in the proceedings, claims for the cost of reinstating their lands. The potential impact on the litigation is illustrated by the effect that the reinstatement claim would have had upon the claim of Snr Sequeda (LC39). The headline figure for the claim for reinstatement was COP 730,633,559 (c. £271,114). The aggregate total of all other quantified heads of claim was COP 130,649,270 (c.£48,478). The Defendant objected to the late introduction of the reinstatement claim and the Claimants'

application to add them was refused by the Senior Master by his order of 15 February 2013, having provided his judgment to the parties in draft on 11 January 2013.

414. In January 2013 the Claimants informed the Defendant for the first time that they wished to add a claim for general damages for “damage to land”. On 18 October 2013 I refused permission to the Claimants to bring their proposed new claim in general damages for damage to their land adopting as the measure of loss either general damages at large or damages in accordance with the principles outlined in *Wrotham Park Estate Company v Parkside Homes Ltd* [1974] 2 All ER 321 and subsequent cases.
415. The net result of the decisions to refuse the late introduction of these heads of claim means that, in a case which is essentially about alleged damage to land, the Claimants’ cases are not framed by reference to what English law would regard as one of the conventional measures of loss, namely diminution in the value of the Claimants’ land. It has therefore been neither necessary nor possible to investigate whether such a reduction has occurred or whether, viewed objectively, there is any apparent relationship between the value of the land and the claims that are made about the economic losses that the Claimants allege that they have suffered as a result of living and working on their damaged lands.

The Trial

416. The trial process was conducted efficiently and combatively on both sides. It demonstrated once again the enormous benefits in speed, efficiency and cost that can be achieved with the use of electronic document management systems in court. All parties recognised and fully appreciated the contribution of those who transcribed evidence, provided simultaneous interpretation in circumstances of considerable difficulty and presented the documentation to the Court with cheerful courtesy. They and the Court staff of the Rolls Building were the unsung heroes and heroines of the trial process.

7. Legal Responsibility

417. Section Index

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418. The Claimants frame their claims in contract and in tort. I have reviewed the applicable principles in Section 3 and the basic facts in Section 5. In this section I apply the relevant principles to the facts to provide findings for application to the four Lead Cases that follow and for the parties' use in relation to the cases of other Claimants that are not before the Court in this trial.

The First Letter

419. The text of the Defendant's First Letter is at [368] and the similar text of the ODC First Letter at [255]. The similarities between the two documents strongly suggest that the Defendant's First Letter was drafted with the ODC First Letter as its model. This sets a pattern which is repeated later in the contractual sequence and which is unsurprising given the fact that the ODC pipeline had been laid recently along the same corridor and that Ecopetrol, which had a substantial interest in both pipelines, would have had access to the ODC documents even if the other joint venturers had not. The most obvious difference between the documents is that the reference to assignment is moved from the main text of the letter in the ODC document to the landowner's declaration in the Defendant's document. That change is not material for present purposes.

420. Although I accept the Claimants' submission that the Defendant or Ocesa would have relied upon the signing of the declaration by a landowner who subsequently tried to oppose the studies or construction works, I reject the submission that the Defendant's First Letter gave rise to a contractual right to compensation or damages. Applying the principles that I have set out at [62] ff above, the First Letter lacked a lawful object which was determined or determinable within the meaning of Colombian Law. It therefore lacked an essential element for the formation of the contract for which the Claimants contend.

421. The Defendant also submits that it has not been shown that the parties intended to enter into a binding contract when sending or signing the First Letter. The letter was capable of performing and did perform the function of being formal notice under Article 179 of the Mining Code as applicable to the oil industry {H23.2/7/468}. That does not mean that it cannot also be a contract. It is also true that no Lead Claimant in this case gave evidence that he regarded the First Letter as a binding contract, and that Snr Sequeda gave evidence in which he said of the First Letter that he "signed a

document [that the visitor to his farm] had stated [meant] that I would let them build the pipeline” {D4/71/795}. It would, in my view, have been surprising if the Claimants had given evidence that they *did* regard the First Letter as a binding contract, as I would find it hard to accept that any of the four from whom I heard evidence had applied their mind to that question at all at the time. In the light of the expert evidence as a whole, I would be more inclined to look at the form of the document as a whole to see whether it conveys an externalised intention to enter into a binding contract: see [141] above. Adopting that approach, the document has the look of something formal that is intended to be relied upon; and the reference to assignment of rights and authorisations “conferred in this document” suggests that it has at least some legal effect in giving rise to assignable rights and authorisations. Thus, though I accept Professor Vallejo’s evidence that there can be an assignment of rights that *do not* arise out of a contract {H15/1/141}, that seems to me to miss the point that the First Letter is contemplating the assignment of rights and authorisations that *do* arise out of it. I would therefore not find against the Claimants separately on this second ground.

422. Of much greater substance is the Defendant’s subsidiary argument that, if the First Letter did give rise to a binding contract to pay fair and equitable compensation, it was superseded by the ROW Agreement that each Lead Claimant entered into later. I refer to the principles of Colombian Law that I have set out at [113]-[114]. In each case that the Court has seen, the First Letter was followed by one or more ROW Agreements. The ROW Agreements made detailed provision for what the Defendant would pay to the landowner (or occupier) for the disruption caused by the works. For the reasons that I set out below, I do not consider that the ROW Agreements made provision for every eventuality. It could therefore be argued that, if the First Letter had the contractual effect for which the Claimants contend, there was a residual area of the First Letter’s contractual obligation to compensate, not covered by the ROW Agreement, which could have survived the execution of the ROW Agreement. The argument would be that, although the ROW Agreement covered damage on the ROW, any other damage would be subject to the First Letter’s contractual obligation to provide fair and equitable compensation for damage to land, crops and other property outside the ROW that might be damaged.
423. The question is whether it appears undoubtedly that the intention of the parties was to replace the (hypothetical) existing obligation to provide fair and equitable compensation under the First Letter with the obligation to compensate provided by the ROW Agreement. Taking the question in stages, the obligation to compensate provided by the ROW Agreement differs from and is inconsistent with an obligation to provide fair and equitable compensation. Leaving aside the Claimants’ submission that the compensation under the ROW Agreement was abusively inadequate, the provisions of the ROW Agreement are expressed in different terms, have different meaning and specify a rate and aggregate amount of recovery that has no place in the First Letter.
424. On the Defendant’s wide interpretation of the provisions for compensation under the ROW Agreement, it provided a contractual agreement that regulated and limited the recovery of damages whether in contract or in tort. On a more narrow interpretation of the ROW Agreement, however, the distinction between the specific provision in the ROW Agreement for damage on the ROW and the provision in the First Letter for

“fair and equitable compensation” is so clear as to call into question whether the parties intended anything of the prior arrangement to survive. It is material that the First Letter is not mentioned in the ROW Agreement, which is a more extensive and more formal arrangement and the precursor to the yet more formal ROW Easement. If on its proper construction the provisions for compensation provisions in the ROW Agreement are limited in scope to damage to the ROW itself, there is no need for separate agreement about damage elsewhere. Rather than continuing an imprecise contractual concept of “fair and equitable compensation”, it seems much more likely that the intention of the ROW Agreement was that compensation for damage off the ROW should be subject to the Colombian law of tort, subject to any contractual impact that the ROW Agreement might have.

425. If, therefore, I was wrong in my conclusion that the First Letter did not give rise to a contractual right to “fair and equitable compensation” I would find myself driven to the conclusion that the inconsistencies between the First Letter and the ROW Agreement, though not complete, were so great that the second contract superseded the first as a whole.
426. In reaching this conclusion I have left out of account the evidence of Snr Sequeda (LC39) that he was told when he signed the First Letter that “other people would come to negotiate the crossing of the pipeline” {D4/71/795}. That evidence is at least consistent with the vagueness of the reference to compensation in the First Letter when compared with the subsequent ROW Agreements. The fact that other Lead Claimants did not give the same evidence does not mean that similar conversations did not happen: it is equally consistent with loss of memory or not being asked the question in the course of preparation of witness statements or trial. I would expect that such conversations happened frequently, since it would be known to all concerned on the Defendant’s side at the time when the First Letters were signed that there were procedures and prices as set out in the Manual, that the First Letter did not represent the last word on the subject, and that the Defendant would be intending to enter into a ROW Agreement with the landowner, if possible. I am not in a position to make a finding about whether, or in what terms, such conversations happened in the case of Claimants whose cases have not been tried.
427. Neither Professor Castro nor Professor Vallejo gave as their opinion that the First Letter was a framework agreement. It did not set out general parameters to which future contracts would be subject, nor did it provide rules that must be taken into consideration in future agreements between the same parties. It was not a framework agreement as understood by lawyers in Colombia: see [115] above.

The ROW Agreement

428. I have set out the terms of a standard form ROW Agreement at [369] above. It provided for the payment of a sum of compensation calculated as set out in the Ninth Clause and the Annex and for the possibility of further payment if the Defendant subsequently required additional land as set out in the Seventh Clause.
429. Subject to the possibility of a further payment for sobrecanchos, the Defendant submits that the compensation specified in the ROW Agreement was the only compensation to which the landowner would ever be entitled as a private law remedy, because of the settling effects of Article 5 of the 1954 Regulations.

430. The Claimants' pleaded case on the ROW Agreement includes the following, taking LC74 as typical:
- i) Error/misrepresentation: the Claimant is entitled to set aside Clause 17 (the settling clause) and any other separable part of the ROW Agreement on which the Defendant relies as excluding, limiting, waiving or precluding his liability on the basis that there was error or misrepresentation because the Claimant believed there would be no damage to his property or that he would be fully compensated for all damage caused as a result of the construction process {B1.4/8/723};
 - ii) Failure to exercise due care: the Defendant was obliged to exercise all due care in relation to the activities envisaged by the ROW agreement, which included the construction, operation and maintenance of the pipeline. In breach of that obligation the Defendant failed to exercise due care, causing the loss and damage alleged by the Claimant {B1.4/8/724};
 - iii) Abuse of rights: the Defendant abused any rights that it may have had under the ROW Agreement, causing the loss and damage alleged by the Claimant {B1.4/8/724};
 - iv) Breach of the duty of good faith: the Defendant was under a duty of good faith, both during the pre-contractual stage and subsequently. The Defendant was in breach of its duty of good faith both at the pre-contractual stage and thereafter {B1.4/8/725};
 - v) Dolo: the Defendant's breaches were characterised by dolo. In particular it was clear to the Defendant, from the EIS, that the construction and operation of the pipeline posed a serious environmental risk to the Property, particularly to the water sources and the Defendant continued with the pipeline project with reckless disregard to those consequences and acted as a person of "little prudence" handling the affairs of another {B1.4/8/731}.
431. Underpinning the Claimants' approach to these issues is a submission that goes to the root of the contracting process. It is submitted that the imbalance of bargaining power between the parties meant that (a) the Claimants did not have freedom of contract, and (b) the Defendant abused its position by imposing unfairly low rates of compensation upon them coupled with unfair invoking of Article 5. For the reasons that I set out below, I have come to the conclusion that these arguments need to be borne in mind at all times, including when construing the terms of the ROW Agreements to see whether the Defendant's construction is correct.
432. I have previously referred to the imbalance of bargaining power at [297]. The protections provided by Colombian law included the establishment of the regulatory system. That regulatory system was, as stated earlier, intended to strike the balance that was considered right for the State of Colombia between private and public interests: see [24] ff. The 1954 Regulations, including Article 5, are an integral part of the balance that has been struck but there are substantial counterbalances, including the Environmental Licensing system and the close involvement of the state in monitoring and supervising the oil industry in order to protect both the public interest and private interests: see [43] and [240] above. Beyond the ambit of the

Environmental Licence there is also the involvement of public officials and the Courts in regulating the conduct of oil entrepreneurs (e.g. in relation to the giving of notice, ordering the provision of bonds, and assessing the proper level of compensation), as described in Section 3 above.

433. Further regulatory context for both the Defendant and the Claimants' submissions is provided by the requirement under Article 7(9) of the Environmental Licence that Ocesa should establish a system for the evaluation of damage caused during the construction works and the adoption of compensation measures: see [341] above. The implementation of that requirement may well have been susceptible to the same monitoring and intervention by the regulating Ministry or authorities as other requirements of the Licence, but there is no evidence of Ocesa's compliance with Article 7(9) being formally submitted, considered or approved. In fact, there is no evidence of a separate system of compensation being established in response to Article 7(9) equivalent to the system of prescribed rates of payment for the ROW Agreement as set out in the Land Acquisition Manual or otherwise.
434. It is evident that the Supreme Court of Colombia does not regard the balance established by the regulatory and legal regime as being intrinsically unfair to affected landowners, as appears from the citation from *El Cebu* that I have set out at [237]. Rather, the Supreme Court regards it as noteworthy ("peculiar") that (a) although of public interest the hydrocarbon fuel operator is "forced" to pay compensation for his use of the corresponding areas and (b) this is part of a balance between the ultimate sanction of expropriation on the one hand and the guaranteeing of private property on the other.
435. Given this context, the bald submission that either the disparity in bargaining power or the ultimate possibility of expropriation deprived the landowners of freedom of contract is unsustainable: see [112] above. The question remains whether the manner in which the Defendant conducted its dealings with the Claimants or the terms which were concluded should entitle the Claimants to relief.
436. The Land Acquisition Manual set out how negotiators were to carry out the negotiations: see [362] above. It set out both principles and specifics. Among the principles were the need to maintain "equilibrium" between landowners and the imposition of easements while maintaining good relations with them. A separate document, described as "ROW/ Land Negotiation/ Manuel/ Procedures/ Budget" {K66/606/1} appears to pre-date the Land Acquisition Manual {K66/606/15}. It runs along similar lines to the Land Acquisition Manual, including in it a statement of the Defendant's philosophy "to maintain equity between owners within a specified are [sic] paid to compensate damages caused to easements acquired" and "to maintain good relations with the owners or tenants of lands affected by the activities which BP is carrying out" {K66/606/8}. Its description of the negotiation phase states that "within the philosophy of the Land and Legal Department is the idea of paying for damages caused with equity, in such a way that the owners or tenants feel they have been duly compensated for damages caused to the lands, without this [in] any way meaning that excessive payments will be made..." {K66/606/8}.
437. The Claimants rely upon the statement that "in case that there is a land holder that refuse[s] to negotiate" there were four options, namely (a) changing the routing, if possible, (b) imposing the easement in accordance with the 1954 Regulations, (c)

expropriation according to the Petroleum Code, and (d) asking Ecopetrol to use a special procedure for Public Entities {K66/606/7}. The mention of these options is accurate and is not sinister. More concerning is an interview with Snr Rojas, one of the land negotiators, in late 1997 in which he said:

“We used various parallel measures alongside direct negotiation which were: first, fear. What was the fear?: “you don’t want to negotiate?” We would visit to negotiate 3 or 4 times and if they still didn’t want to negotiate, we would send them a letter telling them that we were going to start legal proceedings relating to an expropriation process according to article 84 of the oil code, “please can you sign for receipt of this letter.” We sent many, many letters and I’m telling you, 99% of them worked. The people think about it, after we told them that it was a public utility and that even if they didn’t want to negotiate we couldn’t lay the pipeline anywhere else. That was one; it was the start. And for the really stubborn people we started expropriation requests through the Ministry” {L1/230T/4}.

Mr Allison said that “fear” was not the right word but that expropriation was a part of the negotiation {Day15/35:9}.

438. Since it is part of the structure put in place by the law of Colombia, there is nothing inherently wrong or improper in pointing out to a landowner the rights and routes available to the oil company, including the ability to obtain an easement and to gain lawful entry onto land or to pursue the route of expropriation. Mr Allison was therefore right and entitled to describe the possibility of expropriation as a negotiating tool. I accept that being reminded in negotiations of the prospect of legally enforceable entry onto or expropriation of land could be both worrying and distressing to land owners or occupiers. Bearing in mind the likely disparity in education and bargaining power, I also accept that it would be possible for a land negotiator to apply pressure to the land owner or occupier ranging from the reasonable and perfectly legitimate to the unconscionable. On the evidence at trial, I find that none of the Claimants who gave evidence at trial was subjected to improper practices by negotiators.
439. A second limb of the Claimants’ case that the landowners did not have any real freedom of choice is the submission that the Defendant sought to impose standard form terms on them at price levels which were unrealistically narrowly based and unilaterally determined by the Defendant {C4/3.4/212}. This submission needs to be considered with an eye to the Colombian law test for abuse of rights in contract, which defines an abusive contractual stipulation as “a provision which significantly departs from the standard permissible terms governing the respective contract or activity, and in a manner contrary to the normal practices of the trade”: see [105] above.
440. There is no evidence that the adoption of a pricing structure such as that in the Land Acquisition Manual either departed significantly from the standard permissible terms governing such contracts or was contrary to the normal practices of the oil industry in Colombia. The only evidence of what was either standard, normal or permissible

comes from a comparison with the ODC ROW Agreement. Clause 6 of the ODC ROW Agreement is similar in wording and substance to the Ninth Clause of the Defendant's ROW Agreement: see [256] and [369].

441. Although the Claimants have frequently asserted that the payments made under the ROW Agreements were inadequate, that seems to me to depend upon what they were meant to represent. Before turning to that question, a comparison with the rates actually paid by ODC per square metre of the ROW (for occupation and damages) is potentially relevant to an assertion that the Defendant paid an unreasonably low amount. For the four trial claimants the comparison is as follows:
- i) LC39: Snr Sequeda's ODC ROW Agreement provided for him to be paid COP 1,660,000 for a ROW of 15,040 m², equivalent to approximately COP 110 per m²: see [1444] below. By contrast, the Defendant's ROW Agreement provided for him to be paid COP 7,270,000 for a ROW of 18,175 m², equivalent to approximately COP 400 per m²: see [1485] below;
 - ii) LC50: Snr Buitrago entered into two ODC ROW Agreements because his title had not been confirmed by the time of the first. The net effect of the two agreements was that he was paid COP 1,450,000 for a ROW of 14,500 m², equivalent to COP 100 per m²: see [1673] ff below. By contrast, the Defendant's ROW Agreement provided for him to be paid COP 7,400,000 for a ROW of 18,500 m², equivalent to COP 400 per m²: see [1695] below;
 - iii) LC74: Snr Velez' ODC ROW Agreement provided for him to be paid COP 798,000 for a ROW of 8,480 m², equivalent to approximately COP 94 per m²: see [1166] ff below. By contrast, the Defendant's ROW Agreement provided for him to be paid COP 3,660,000 for a ROW of 12,200 m², equivalent to COP 300 per m²: see [1196] below;
 - iv) LC54: Snr Mesa's position is not so readily identifiable. There is a ROW Easement {M/118.1/411.18} but no ROW Agreement in the trial bundle. The ROW Easement refers to payment of COP 1,223,200 for a ROW of 5,560 m², equivalent to approximately COP 220 per m². However, this may not reflect the terms of the original ROW Agreement. First, the rate seems out of line with those paid to the other three Claimants under their ROW Agreements. Second, both Snr Sequeda (LC39) and Snr Velez (LC74) entered into settlements with ODC after ODC's works were held up in and from January 1991: see [1445] and [1167]. In each case the effect of the *force majeure* settlement was to bring the overall compensation payable under the ROW Agreement plus the *force majeure* settlement to a rate equivalent to COP 200, which is much closer to the COP 220 per m² recorded in Snr Mesa's ROW Easement. Third, there is no evidence of a *force majeure* settlement between Snr Buitrago (LC50) and ODC. It therefore cannot be assumed that ODC entered into a *force majeure* settlement with every landowner: and there is no evidence of such a settlement with Snr Mesa. Fourth, it is evident that not all documents relevant to the ODC Works have been disclosed and this evidence was not investigated at trial.
442. On this evidence, all that can be said is that, where comparisons can be made, the Defendant's rates per square metre were significantly higher than those of ODC. It

provides no comparative support for the Claimants' case that unreasonably low levels of payment were being imposed upon them by the Defendant. For present purposes I attach no weight to the statement in the pricing table in the Land Acquisition Manual that the prices were based on studies carried out by the governmental authorities in charge of promoting the agricultural and livestock sector since, so far as I am aware, no substantiation of that statement or reference to particular studies is in evidence: see [366].

443. For completeness I add that I do not rely upon a comparison with the prices paid for land in the cases of LC39 and LC50. In the case of LC39 it was not an arm's length transaction as Snr Sequeda sold Villa Rosa to his son. In LC50 La Alborada was already affected, as I find, by the effects of pipeline works when Snr Buitrago and Snr Manco agreed their price. There is no independent evidence about actual land values that enables a valid assessment to be made of the relationship between the sums payable under the ROW Agreements and the underlying value of the land through which the pipelines were laid.
444. It was a feature of both the ODC and the Defendant's ROW Agreements that the rates for occupation and damages were assessed by reference to damage that would be suffered on the area of the ROW. I find that this approach deliberately reflected the intention of the Defendant, which was to agree the compensation payable pursuant to the ROW Agreements by reference to damage to the ROW and not elsewhere. The Defendant contemplated that damage may happen outside the ROW and intended to compensate that damage separately and in addition to the sums payable under the ROW Agreements. That intention was evidenced by the Land Acquisition Manual, the Contract with Saipem and the evidence of Mr Allison: see [243] above. It was also made explicit by the EIS, which provided that "any damages caused outside of the strip of land required for the construction of the pipeline will be subject to a future agreement": see [359] above. In context this meant that landowners would be compensated separately for damage to their land outside the ROW. The EIS was submitted to the Ministry as part of the application for the Environmental Licence: see [337] above. It therefore formed part of the basis upon which the Environmental Licence was issued. Additional and retrospective compensation of damage caused by the works may be said to be contemplated and endorsed by Article 7(9) of the Environmental Licence: see [341] above.
445. The intention that damage outside the ROW should be dealt with separately was built into the pricing structure for the ROW Agreements. The damages element of the payment was expressed to be the cost of the harvest, in other words, the consequential damages and the profits lost over three months: see [366] above. There is no evidence that land negotiators ever said to Claimants that the payment under the ROW Agreement would be the only payment that they would ever receive or that they suggested that the pricing structure was other than it was. If they ever discussed what the payment was for, I would assume (and would infer in the absence of evidence to the contrary) that they would have told the landowners the truth viz. that the payment was calculated by reference to the consequential damage to the ROW and three months' loss of profit.
446. One further piece of evidence may be introduced at this stage about how negotiations were conducted. Snr Medina was described by Snr Velez (LC74) as being a person who was very correct in his dealings; and at a later stage he was described as one of

Ocensa's Land Negotiation Engineers. At [1199] ff below, I refer to evidence from an interview he gave and to the strand of consistency in the Claimants' evidence that they were reassured that damage would be made good. I accept that such generally reassuring conversations would have taken place, though I have not accepted a number of the more specific allegations made by the Trial Lead Claimants about what they were told.

447. The Claimants' allegation that prices were imposed on them does not permit an easy generic answer. The rates paid to different Claimants varied both from the Table of Prices in the Manual and between Claimants. The reasons for these variations are not known but suggest that in some cases real negotiation may have taken place, including negotiation upwards from the prices set out in the Manual. I accept as genuine the provision in the notes to the Table of Prices that "the negotiator cannot agree on higher prices without prior approval from David Arce or Phil Allison, according to the case" {K66/618T/17}. The implication, which I accept, is that there was scope for negotiation both upwards and downwards from the figures appearing in the Table. Whether and to what extent any negotiation actually happened is fact sensitive to each case. But, viewed overall, the headline allegation that the Defendant imposed (or sought to impose) on the Claimants, "by the exercise of superior bargaining power, a disproportionately low price for the use and occupation of their land and for the normal disruption which would occur in the careful and orderly conduct of the works" is not made out so as to justify a generalised finding to that effect {C4/3.4/215}.
448. Finally, before turning to the terms of the ROW Agreement itself, it is clear from the General Narrative in Section 5 and the evidence from the four Trial Lead Cases that both ODC and Ocensa entertained and paid additional sums by way of damages when it was shown that damage had occurred off the ROW and when additional damage had occurred on the ROW: see [257] and [387] above and the detailed review of the four Trial Lead Cases.
449. Turning to the terms of the ROW Agreement, the Defendant's Article 5 case depends upon the proper construction of the Ninth and Seventeenth Clauses: see [369]. The Annex identifies that the damages are calculated by reference to damage to the area of the ROW. I have not encountered any ROW Agreement which calculates the compensation by reference to damage off the ROW: later sobreanchos agreements adopting the same rate as originally used in the ROW Agreement are not an exception to the general rule because they are provided for by the Eighth Clause and are effectively an extension of the ROW Agreement itself.
450. There are two possible arguments that could make the Article 5 exclusion act as a complete blanket. The first would be if Article 5 required that to be the case as a matter of law. I have rejected that argument at [206] ff. My rejection of the blanket argument entails the need to look at a contractual agreement such as the ROW Agreement on its terms, to see what is covered and what is not. The Defendant's second argument is that the terms of the ROW Agreements themselves provide for a blanket exclusion of all future claims, subject only to proof of dolo. Looking at the text of the ROW Agreement, the following points arise:
- i) The Ninth Clause states expressly that "the price of the easement rights *and the damages caused by the construction of the pipeline is [COP] 300 per*

square metre...” On its face, this appears to be a statement that the area of the damage determines the amount of compensation that will be paid under the ROW Agreement. That is comprehensible when considering the known size of the ROW, which will inevitably be disrupted. It is not obvious how it can be true when it is not known whether (or, if so, to what extent and seriousness) there will be any damage off the ROW or, for example, what area off the ROW would be capable of being affected by damage caused by the works on the ROW;

- ii) The Paragraph to the Ninth Clause invokes Article 5 and brings into its ambit (a) “the rights of use, occupation and transit for the area of the ROW”, and (b) “damages caused during construction on the property and in particular those listed in the attached inventory”, and (c) “damages that may have been caused by the alteration in the normal economic exploitation of the property.” Taking (b) and (c) together, they appear to be referring to different facets of the impact of the pipeline works, with (b) referring to direct damage and (c) referring to consequential economic losses such as loss of the ability to grow crops. As such they reflect the provision in the Manual that the damages include the consequential damages and the profits lost over three months;
 - iii) Neither (b) nor (c) necessarily means that damage off the ROW is covered. The distinction between (a) on the one hand and (b) and (c) on the other is a distinction in the nature of what is being paid for, not its geographical location: (a) is the easement rights, (b) and (c) are the damages. To my mind, the reference in (a) to “in the area described in the Fifth Clause” is merely part of the description of the rights and is not setting up “the area described in the Fifth Clause” as a point of geographical distinction against what comes next. That being so, the reference to “damages caused during construction on the property” (b) does not necessarily mean damages caused on the property whether on the ROW or off it. Similarly in (c), the reference “to alteration in the normal economic exploitation of the property” is not necessarily a reference to the economic exploitation of the property whether on or off the ROW. Nor do the words “and in particular those listed in the attached inventory” in (b) necessitate looking beyond the ROW: they can sensibly mean that the terms of Article 5 will not merely refer to the damages listed in the inventory but will cover any other damages on the ROW as well. That would be sensible because it would give the Defendant substantial protection against repeated claims in respect of damages caused to the ROW itself during construction;
 - iv) Seen in this light, the Seventeenth Clause is consistent with the Paragraph to the Ninth Clause and does not have a more expansive effect. It makes clear that the agreement has settling effects in relation to those matters that are within its ambit, namely (a) the constitution of the right of way and rights of easement of the pipeline, (b) the use and occupation of the land, and (c) the compensation of damages falling within its scope as set out in the Ninth Clause.
451. These points indicate that the Ninth and Seventeenth Clauses are concerned with what happens on the ROW and not elsewhere. The linking of the compensation payable under the ROW Agreement to the area of the ROW only, and the absence of any

necessary expansion of the reference to Article 5 to cover any wider area lead me to conclude, simply on the words of the ROW Agreement itself, that the reference to Article 5 invokes it to the extent of contemplated damage on the ROW and no further. I should make clear that “contemplated damage” is not limited to the damage typically specified in the Annex, which provides non-exhaustive particulars of the damage that will naturally occur as a result of the stripping of the ROW and the execution of the pipeline works.

452. I have adopted the approach and reached my conclusion as set out in the preceding paragraph simply by reference to the terms of the ROW Agreement (as translated) and without specific reference to the principles of contractual construction laid down by the Civil Code. Applying those principles confirms me in the view that the ROW Agreements did not purport to deal with or to exclude future liability for damage off the ROW. The most relevant Articles are:
- i) 1618: The clear known intention of the contracting parties prevails over the literal words used but the parties;
 - ii) 1621: In those cases where no intention to the contrary appears, the interpretation that best fits the nature of the contract should prevail;
 - iii) 1622: The clauses of the contract shall be interpreted by reference to each other, giving to each of them the sense that best suits the contract as a whole;
 - iv) 1624: If the previous interpretation rules cannot be applied, the ambiguous clauses shall be interpreted in favour of the debtor/obligor. However, ambiguous clauses drafted or dictated by one of the parties, either the creditor/obligee or the debtor/obligor, will be interpreted against the drafting party, provided that the ambiguity results from a lack of explanation which said party should have provided.
453. My starting point is that the literal words of the ROW Agreement have the meaning I have described above. If I am wrong in that analysis, I consider that the words are at least ambiguous and should therefore be interpreted against the Defendant because, on the evidence that I have heard, it did not ever explain to the landowners or occupiers that the wording they were being offered had the draconian effect for which the Defendant now contends: see Article 1624.
454. I would go further and hold that the intention of the contracting parties was clear and known within the meaning of Article 1618. It was that the ROW Agreements were concerned with damage on the ROW and no other damage. And, viewed overall, that was the nature of the contract which the Court’s interpretation should follow pursuant to Article 1621. I bear fully in mind the policy considerations underlying Article 5, which I have considered in detail in Section 3 above; but I also bear in mind the following factors:
- i) Limiting the ambit of the Article 5 exclusion to the area of the ROW was a course that was open to the Defendant and one which would provide significant protection;

- ii) The Defendant sent its negotiators out to negotiate on the basis that the compensation being paid was for damage on the ROW and three months' loss of profits;
 - iii) A blanket ban would be flatly contrary to "the idea of paying for damages caused with equity, in such a way that the owners or tenants feel they have been duly compensated for damages caused to the lands";
 - iv) The general reassurance given by the Defendant's negotiators would also be flatly contrary to the notion that the landowners would receive the compensation under the ROW Agreement assessed by reference to damage to the ROW but, in everyday language, would be left to whistle for anything else.
455. I have summarised the clear evidence that the Defendant appreciated the need to provide additional compensation to landowners if damage was caused outside the ROW, and the Environmental Licence's endorsement of that appreciation. In the light of that evidence it would to my mind have been regarded as both disreputable and scandalous if the Defendant had turned round immediately after concluding the ROW Agreement and explained to the landowners (which it certainly did not do in advance) that they were now limited to their payment under the ROW Agreement whatever and wherever damage was caused by the pipeline works. There is also no evidence to suggest that ODC (or any other person operating in this area in Colombia at the time) would have adopted such an approach, and the existence of multiple settlements by ODC when damage was caused is evidence that it did not do so. There is no evidence that the Defendant, Ocesa or Saipem made such a suggestion to the landowners at any time before the involvement of the lawyers, much later on. I do not accept that such conduct would have been in accordance "with the normal practices of the trade". Put differently, the submission now being made on behalf of the Defendant implies that the Defendant would deliberately and as a matter of general policy and conduct have engaged in behaviour that was abusive under Colombian Law.
456. The Claimants have to a greater or lesser extent attempted to portray the Defendant and Ocesa as people and organisations who were prepared to ride roughshod over the interests of the landowners and set out to do so. On the basis of the evidence I have heard, that is a portrayal that I reject. Just as there were variations in the quality of the works that were carried out, so I can accept that not every negotiator was as correct in his dealings as Snr Medina; and I have no doubt that the senior employees from whom I heard were just as capable of being tough and canny in their walk of life as some of the Claimants are in theirs. What I reject outright is any suggestion that the Defendant set out to conduct its negotiations with the landowners or its treatment of their lands with abusive contempt. Such a finding would be contrary to the documentary records of how the Defendant proposed to set about its work and the testimony of those who gave evidence at trial about their general approach to the operation, which evidence I accept.
457. The Defendant submits that there would be no unfairness in limiting the landowners to the recovery provided by the ROW Agreements in all circumstances. I disagree. To my mind the potential unfairness of an agreement which, in the circumstances I have outlined, addressed the question of damage by reference to what happens on the ROW but gives the same compensation to a landowner whether or not the damage suffered is confined to the ROW and whatever the severity of the damage he may

suffer off the ROW is so clear as not to need further explanation. Arguments based on unfairness can be advanced even if the effects of Article 5 are confined to damage on the ROW; but in that case the effects are necessarily more limited and may reasonably be said to be within the ambit of the policy considerations justifying the disadvantageous effects of Article 5: see [206] ff.

458. For these reasons, and not least because I do not accept that the Defendant set out to con the landowners by persuading them to sign up to a ROW Agreement that was essentially a trap, I reject the interpretation of the ROW Agreements advanced on the Defendant's behalf at trial. I find that the ROW Agreements had the effect of invoking the Article 5 protection for the damage on the ROW that was within their contemplation. I accept the possibility that in an individual case it would be possible to identify damage that had occurred on the ROW that was not within the contemplation of the ROW Agreement but, for the reasons explained in Section 3, mere underassessment of the financial loss caused by damage that was in contemplation would not be sufficient to escape the impact of Article 5.
459. In their closing submissions the Claimants allege breach of the duty of good faith on the part of the Defendant in the negotiation and execution of its contracts in:
- i) Failing to provide the Claimants with accurate or materially complete information concerning the risks involved in the pipeline construction works, including the risks that those works might not be done correctly;
 - ii) Causing the Claimants to believe that their evidence would be restored to its pre-construction condition; and
 - iii) Failing to give the Claimants a fair presentation of the terms which the Defendant proposed should be included, in particular as regards Clauses 9 and 17 of the ROW Easements {C4/3.4/213}.
460. I refer to Section 3 at [74] ff above and, in particular, at [96] and [103] where I have reached conclusions about the law of Colombia on the issue of good faith. In each case before the Court the Claimants and the Defendant entered into the ROW Agreements (and subsequently the ROW Easements). There is therefore no free-standing action for damages even if the Claimants were to show that there had been a breach of the obligation of good faith in the pre-contractual stage: see [103] above. If the Claimants had been in a position to show bad faith at the stage the contract was being formed, the relevance of the bad faith would have been that it might have given a right to avoid the contracts if the bad faith amounted to dolo: see [76] above. However, a claim to set aside the contracts would have had to be brought within two years of the execution of the contract and would now be statute barred. In any event, the claim to set aside is no longer pursued: see [54] above.
461. Since no claim is admissible, I shall deal with the factual allegations shortly:
- i) I reviewed and rejected Professor Castro's opinion on the obligation to provide complete and timely information to the other party at [80] ff, reaching conclusions on the issue at [96] above. Applying the principles as I have found them to be, I reject the allegation that there was a generalised failure to provide sufficient explanation to the landowners in advance of contracting

with them. Not least because of their previous experience of or knowledge about the ODC pipeline, most if not all of the landowners would have understood both the immediate consequences of driving the ROW through their land and, at least in general terms, the risks of damage off the ROW if things went wrong: see [97] above;

- ii) I would subject evidence from any landowner with direct experience of the ODC ROW who said that he believed his land would be restored absolutely to its pre-construction condition to considerable scrutiny. Of the four Trial Lead Claimants, three (LC39, LC50 and LC74) had suffered significant damage from the ODC ROW as I detail later. The ODC ROW on LC54 recovered better, but was still clearly visible from the air in 1995 {L1/143/143}. I have referred elsewhere to the generally reassuring conversations that would have taken place. In the light of my interpretation of the ROW Agreement, it would not have been misleading to give the impression that damage would be made good and, as subsequent experience showed, Ocesa both (a) attempted to reinstate the ROW and (b) entertained and settled claims for damage over and above the damage covered by the invoking of Article 5 in the ROW Agreements. Although Lead Claimants gave evidence that they thought their settlement figures were too low, there is no example of which I am aware amongst the four Trial Lead Claimants of a claim being made to Ocesa or Saipem and being rejected completely;
- iii) On my interpretation of the ROW Agreements, there was in general no material misrepresentation of the terms of the Agreement or failure to make a fair presentation that would amount to bad faith.

462. In their closing submissions the Claimants allege that the Defendant broke its duty to respect the Claimants' rights and not to abuse its own right:

- i) In imposing on the Claimants, by the exercise of superior bargaining power, a disproportionately low price for the use and occupation of their land and for the normal disruption which would occur in the careful and orderly conduct of the works;
- ii) In seeking to impose on the Claimant, a contractual stipulation of the level of compensation which was not a genuine pre-estimate of the loss which they would suffer;
- iii) In seeking to impose on the Claimants, by the exercise of superior bargaining power, a term which purported to preclude them from asserting rights to compensation which they did not know, and could not then have known, that they had;
- iv) In carrying out the works without sufficient or any regard for the damage which they would or might cause to the Claimants and their property;
- v) The failings in the planning, design and execution of the construction works, detailed elsewhere in these submissions, constituted abuses of the Defendant's rights to build a pipeline through the Claimants' properties {C4/3.4/216}.

463. I have reviewed and made findings on the law relating to abuse of rights in Section 3 at [105] ff.
464. I can state my general findings shortly:
- i) I have already rejected the allegation that the Defendant imposed a disproportionately low price on the Claimants by the exercise of superior bargaining power: see [442] and [447] above;
 - ii) For the same reasons as set out above, the Claimants have not shown that the level of compensation was abusive because it was not a genuine pre-estimate of loss. Such an allegation cannot succeed in the absence of proof that the compensation was disproportionately low;
 - iii) On my interpretation of the ROW Agreement, there was nothing abusive about the extent to which Article 5 was invoked;
 - iv) The standard of the works on each of the four Trial Lead Claimant properties is examined in detail later. In general terms, I have accepted that there were variations in quality of workmanship and that, in some cases, attributable damage has been proved. Again in general terms, the Claimants have not come close to proving that the works were conducted in a way that constituted an abuse of either the Defendant or Ocesa's rights. The test to be applied is whether those carrying out the works exercised their rights to do so "in an improper way and which distorted its genuine purpose". On the evidence led at trial and summarised or referred to in this judgment, errors were made but material impropriety has not been shown; and the works were carried out so as to fulfil the purpose of bringing the project to a successful conclusion in the face of very demanding challenges;
 - v) The design case has largely if not completely fallen away. The last allegation of abuse of rights fails for the same reasons as set out at (iv) above. For the avoidance of doubt, I substantially reject the submission that "the Defendant knew that its short-term and long-term measures were not capable of preventing the kind of damage which occurred if known risks materialised" {C4/3.4/217}. Even in the best regulated circumstances, there was always a risk of damage because of the challenges of terrain and climate. In general terms, the measures that were planned and implemented were those that were appropriate to minimise the risk of damage and it has not been shown that the programming of the works or their design or execution was negligent, let alone abusive.
465. For similar reasons, and applying the principles summarised at [147] above, I reject the generalised allegation that either the Defendant's contracting process or the execution of the works was characterised by dolo. There is no evidence that the Defendant breached any term of the ROW Agreement with the intention to cause harm to any Claimant or entered into the ROW Agreements knowing in advance that it could not perform its contractual obligations towards the landowners. The Claimants' case on contractual dolo is extremely vague, and does not identify what contractual obligation arising under the ROW Agreement is alleged to have been broken with dolo. A generalised assertion that something was likely to go wrong, or

that damage may be caused, is in my judgment an inadequate justification for a finding of dolo. No sustainable case on contractual dolo was put to the Defendant's witnesses as it should have been if the allegation was to be pursued.

The ROW Easement

466. The ROW Easement did not materially add to or detract from the terms of the ROW Agreement: see [371] above. It was necessary for the constitution of the oil easement and carried with it the involvement of the Notary: see [118] above. I have explained the role of the Notary at [117] ff above. The main relevance for present purposes is that visiting the Notary was an opportunity for landowners who wanted explanations about the content of the proposed agreement so far as they concerned establishing that the proposed agreement complied with the purposes and will of the parties as declared to him. If the need arose he would afford the needful party an opportunity for further discussion or refer him elsewhere for partial legal advice. If asked, the Notary might give an illiterate (or otherwise needy) campesino farmer some legal advice on the substance of the proposed agreement. Visiting the Notary therefore gave the landowner the opportunity to find out more about the agreement if he was uncertain about it. To that extent it reduced the imbalance between the parties.

Assignment

467. When considering questions of assignment I shall refer to the ROW Agreement and the ROW Easement collectively as the ROW Agreement. For the reasons set out at [132] ff above, registration of the contract of assignment of the ROW Agreements did not act as notice to the landowners who were the assigned: see [372] above.

468. As set out at [139] above, tacit acceptance of an assignment requires unequivocal behaviour of the assigned party amounting to performance or continued performance towards the assignee. There is consistent evidence that, so far as the Claimants were concerned, by the time that the works were carried out and the time for claiming came, they looked to Ocesa and Saipem and not to the Defendant to make good the losses for which they claimed. Thus:

- i) So far as I am aware, none of the Trial Lead Claimants made a claim against the Defendant either during or in the aftermath of the Ocesa pipeline works;
- ii) On LC54, where long-term geotechnical works were carried out during the week of 15-21 December 1996 and revegetation works were carried out in March 1997, Snr Mesa entered into his first settlement agreement with Ocesa (for the destruction of a bridge) on 6 March 1997 and sent a complaint to Saipem on 30 April about the death of a cow. He then entered into his second settlement agreement, this time with Ocesa acting on behalf of Saipem on 5 July 1997. He entered into two Paz y Salvos, one with Saipem for damage outside the ROW corridor and one with Ocesa for damage inside the ROW corridor. He went to Saipem's offices on numerous occasions to complain. He was at the time negotiating on behalf of others as well as on his own behalf and clearly knew and intended that he was directing his claims to Ocesa and Saipem;

- iii) On LC74, where the ROW was stripped on 15 June 1996, long-term geotechnical works were carried out in early December 1996 and revegetation works were carried out at the end of February 1997, Snr Velez entered into his first settlement with Ocesa on 3 July 1996, his second settlement with Ocesa and Saipem on 16 August 1996, his third settlement with Ocesa and Saipem on 4 April 1998, his fourth settlement with Ocesa on 30 October 1998, and his fifth settlement with Ocesa on 19 December 2003. The only available Paz y Salvo relating to the Ocesa works was one that he entered into with Saipem, relating to damage off the ROW, but he gave evidence that he had also signed one in respect of damage inside the ROW. By the time the Ocesa works started he was already an experienced claimant as a result of the damage caused to his property by the ODC ROW. It is apparent that he was looking to Ocesa and Saipem to make good the damage on and off the Ocesa ROW and that he was aware of what he was doing;
 - iv) On LC39, where the long-term geotechnical works were carried out between 9-13 April 1997 and revegetation took place in the period to mid-May 1997, Snr Sequeda entered into a settlement agreement with Saipem on 29 June 1997. He entered into separate Paz y Salvos with Ocesa and Saipem on 7 August 1997 which released them from further claims inside and outside the ROW respectively. He knew that the signing of the Paz y Salvo was his final opportunity to claim for damage. Although he said he didn't know where to go and who to complain to, there was no suggestion in his evidence that he contemplated a claim against the Defendant instead of or in addition to his claims against Ocesa and Saipem;
 - v) On LC50, where the ROW was opened on about 6 November 1996, long-term geotechnical works were carried out by about 12-14 December 1996 and revegetation works were completed by about 21 March 1997, Snr Buitrago entered into his first settlement agreement with Ocesa and Saipem on 6 November 1996. He went to Remedios to complain and entered into a settlement with Saipem as a party on 31 August 1997. He entered into a Paz y Salvo with Saipem which was duly authenticated before a Notary on 23 October 1997. The settlement was for damage to watercourses sedimented off the ROW, destruction of unidentified parapets and sobrecanchos. There is no suggestion that he went to Remedios or elsewhere in search of the Defendant. He had by then, of course, already entered into one settlement with Ocesa and Saipem.
469. The combination of (a) the consistency with which claims were made to and settled by Ocesa and Saipem, with the clear distinction between Ocesa taking responsibility for damage on the ROW and Saipem being responsible for damage off the ROW and (b) the complete absence of any evidence that the Claimants either contemplated or looked to the Defendant is compelling. On the evidence at trial there is a consistent pattern of Claimants contracting with Ocesa, with specific provision for damage on the ROW, and then going back to obtain further payments not from the person with whom (as they all would have known) they had contracted but from Ocesa and Saipem. The division of roles is also significant. It demonstrated that Ocesa was taking responsibility for the matters that had been directly addressed in the ROW Agreements and that it looked to its contractor, Saipem, to deal with matters

elsewhere. There was no room for the Defendant in this arrangement because Ocesa, not the Defendant, was the party taking responsibility for and entering into settlement agreements with and on behalf of Saipem; and Saipem was specified to be Ocesa's contractor, not the Defendant's. A settlement with Ocesa and Saipem was therefore distinctly and unequivocally different from a settlement with the Defendant.

470. For these reasons I make the general finding that if the conduct of the four Trial Lead Claimants is typical, there was a pattern of tacit acceptance of the assignments of the ROW Agreements from the Defendant to Ocesa. If, therefore, there was any valid claim for non-performance in contract to be brought under the ROW Agreements, they should have been brought against Ocesa and not against the Defendant. Equally, however, the Defendant would not be able to rely upon the terms of the ROW Agreements to which it is no longer a party to form the contractual basis of a defence against the assigned landowners.

Liability in Tort – General

471. Because of my conclusions on the interpretation of the ROW Agreements and their assignment, the potential problems under Colombian law of pursuing claims in tort and contract concurrently fall away. I have reviewed and made findings about the relevant principles of Colombian Law at [148] above. If it were to be held in a particular case that there had not been an assignment that was effective as against the assigned landowner, the Defendant would remain entitled to rely upon the contractual invocation of the limited Article 5 exclusion as explained at [449] ff above.

The Dangerous Activities Doctrine

472. The relevant principles governing a claim under the dangerous activities doctrine are set out at [161] above. The question whether the Defendant was liable as guardian depends upon whether it satisfies the test identified at [163]. I therefore look to see whether the Defendant exercised an independent power to manage, direct or control the laying of the pipeline. I bear in mind and also apply the restated test agreed by the experts that the guardian to be held liable is the person which at the time of the occurrence (in this case the pipeline works from stripping the ROW through to its revegetation) exercised an effective and independent power of direction, governance or control over the instrument or the activity which generates the harm; and that relevance is given to the de facto power over the thing or activity.
473. The factual background is summarised at [262] ff, [346] ff and [383] ff above. Ocesa was the party that entered into the construction contract with Saipem. That was a large and complex contract which allocated responsibilities to both parties. Fortunately, it is not necessary to examine the terms of the Saipem contract in further detail here. What matters is that Ocesa had no management or technical infrastructure that would enable it to run a major construction contract such as the Saipem contract. It therefore entered into the PCMA with the Defendant. Proper interpretation of the PCMA is the first step in identifying the Defendant's responsibilities; but it is not necessarily the last, since it will be necessary to look at de facto control and its exercise in the course of the contract as well.
474. The relevant terms of the PCMA are set out at [280] above. The dispute between the parties on its interpretation was whether the words "through the Project Construction

Management Team (hereinafter PCMT)” has the effect that the Defendant itself was not managing the contract. Two things emerge when these words are seen in context. First, the primary thrust of the Clause 1 is that the Manager (i.e. the Defendant) is required to provide the management of the contracts executed by Ocesa and that its services will include those set out at (i) to (v). Second, the words that are in issue describe how the Defendant will manage the contracts executed by Ocesa; they do not say that it is the PCMT *and not the Defendant* who will manage the contracts. Both of these considerations point to the conclusion that the PCMA imposed upon the Defendant itself the obligation to manage the contracts “with total technical financial, administrative and directive authority.” The Defendant was to use the PCMT as the vehicle by which it was to provide the management of the contracts, but that does not detract from the fact that it was the Defendant’s contractual obligation to manage them. Had the contracts been inadequately managed, Ocesa’s contractual remedies would have been directly against the Defendant.

475. As well as imposing that contractual obligation, it was the source of the Defendant’s contractual power to manage the contracts as it did. The Defendant set about managing them through the PCMT as summarised earlier. Most of those assigned to work on the PCMT were employees of the Defendant or another BP company, including the senior members such as Mr Spence and Mr Allison: see [282] and the summary of assigned employees at {C4/3.4/229} [615-618]. As a deliberate policy, the Defendant did not second its employees to Ocesa in any other sense than that they were working on the Ocesa project and were at pains to give the impression that the project was Colombian and Ocesa’s: see [386] above. In the absence of any formal secondment it retained the power to hire, fire and determine the work of those of its employees who were working on the Ocesa project. The PCMT did not have any status which, of itself, had the effect of taking the management of the Saipem contract out of the hands of the Defendant rather than being the vehicle established as the vehicle through which the Defendant would manage the project in accordance with the PCMA. There were people on the PCMT who were not BP employees, as with the inclusion of employees of Brown & Root who brought their design expertise. This case, however, is not substantially about design responsibility: it is about the management of the construction project and how the works were done. Even if design were still substantially in issue and included in an assessment of where control lay and by whom it was exercised, the overwhelming preponderance of control was vested in and exercised by employees of the Defendant. While I accept that the work of the PCMT was subject to the overall supervisory control of the Ocesa Board, that did not affect the reality of who was exercising autonomous control in managing the Saipem contract on a day-to-day basis at every level from site up to senior management. If there had been any residual doubt on the basis of evidence about what actually happened on site (which, in my judgment, there is not), it is dispelled by the Defendant’s own assessment of the realities of life: see [385].
476. On this evidence and the evidence I have summarised elsewhere in this judgment, I conclude and find that the Defendant exercised an independent power to manage, direct or control the laying of the pipeline. Adopting the restated formulation agreed by the experts, the Defendant exercised an effective and independent power of direction, governance or control over the carrying out of the Ocesa pipeline works by Saipem at all times material to these claims. It therefore satisfies the requirement of guardianship for the purposes of the dangerous activities doctrine. In making this

generic finding, I do not exclude the possibility that there could be circumstances connected with the laying of the Ocesa pipeline works where the Defendant could show that it did not have responsibility. As explained at [168], this possibility might exist, but the burden of demonstrating that it did would rest on the Defendant in the light of further submissions on the point.

477. The dangerous activities doctrine carries with it the presumption of fault. The Claimants have independently alleged that the works were carried out negligently. I have considered those allegations in the context of the individual lead claims. At this stage it is sufficient to say (as I repeat elsewhere) that no analysis of the programming of the Ocesa works was undertaken. While I have referred in the course of the judgment to the march chart that formed part of the EIS and have accepted general propositions such as, for example, that revegetation should take place at or about the same time as long-term geotechnical works, I do not accept that the mere fact that it can be shown that works took longer than indicated in a preliminary and high level document such as the march chart, or that there was a gap between various stages in the course of the works is a sufficient basis to found findings of negligence. As should be well known, and as should be recognised by anyone who has contemplated the challenges that the Ocesa works presented, there may be almost any number of possible reasons for an eventual sequence and timing of works. It is possible that some delays may of themselves call for an explanation, but the Court will not readily be persuaded that programming was negligent in the absence of proper analysis of its causes.

Protection from Liability – The ROW Agreement

478. For the reasons I have set out above, the ROW Agreements themselves only operated to provide protection pursuant to Article 5 in respect of damage within the ROW and to the extent contemplated. That provides a rational (and, in my view, correct) explanation for why Ocesa was prepared (by way of example) to compensate Snr Mesa (LC54) for the destruction of a bridge on the ROW on the basis that it had not been covered by the ROW Agreement (“paid in the original negotiation”). It also explains why Ocesa and Saipem agreed between themselves that Saipem would compensate landowners for damage off the ROW and subsequently implemented their agreement by the settlements involving Saipem. Snr Mesa again provides an illustration: he entered into a settlement with Saipem because they had affected additional land; but his Paz y Salvo with Saipem recorded that the death of a cow was excluded from its effect. It was alleged to have been killed because of the lack of the bridge, and was therefore referred back to Ocesa as damage suffered on the ROW and not covered by the ROW Agreement. This pattern is repeated many times. The pattern is clear, though I do not suggest that it was necessarily always applied with complete precision.

Extinction of Liability – Settlement and Novation

479. The applicable principles governing the extinguishment of liabilities are set out at [175]-[190] above. The standard forms of settlement for damage within and outside the ROW and the standard forms of Paz y Salvo for Ocesa and Saipem are set out at [387]-[392]. Typically, but not always, Paz y Salvos were signed on the same day as settlements were concluded. Most if not all of the Trial Lead Claimants knew at least in general terms at the time of settling that the meaning and purpose of “Paz y Salvo”

was that it would be their last opportunity to make a claim. No Trial Lead Claimant made an application to set aside their various settlement agreements.

480. There are differences in translation of the two forms of settlement agreement but the Spanish originals use materially the same terms for equivalent clauses. In particular, the second clause under the heading Settlement (Transaccion in Spanish) is materially identical in each document:

“CLAUSULA SEGUNDA: EL BENEFICIARIO renuncia expresamente a presentar contra [LA CONTRATISTA/LA COMPAÑIA] cualquier tipo de reclamación judicial o extrajudicial por concepto de los daños ocasionados durante los trabajos descritos en el punto SEGUNDO de las consideraciones”

This has been translated in the Ocesa form of settlement as:

“CLAUSE SECOND: THE BENEFICIARY expressly waives his right to file any judicial or extrajudicial claim against THE COMPANY for damages caused during the works described in the SECOND item of the recitals.”

And in the Saipem form of settlement as:

“SECOND CLAUSE: THE BENEFICIARY expressly renounces to file against THE CONTRACTOR any type of judicial or non-judicial complaint for the damages caused during the works described in the second point of the recitals”¹⁵.

The two translations of the clause must carry the same meaning despite the differences in translation. Thus (a) the words “waives” and “renounces” in the two translations have the same meaning; and (b) there is no difference between the words “for damages” and “for the damages” in the two translations.

481. Similarly, the fifth clause under the heading Settlement (Transaccion in Spanish) is materially identical in each document:

“CLAUSULA QUINTA; Que cumplidos los términos de la presente transacción las partes se declaran mutua y reciprocamente a paz y salvo por todo concepto originado en los daños descritos en el punto PRIMERO de los considerandos.”

This has been translated in the Ocesa form of settlement as:

¹⁵ The Claimants submit the following translation: “THE BENEFICIARY expressly waives his right to file any judicial or extrajudicial claim against THE CONTRACTOR for damages caused during the works described in the SECOND item of the recitals” {C4/3.6/785}.

“CLAUSE FIFTH: Upon compliance with the terms of this settlement, the parties declare one another mutually and reciprocally cleared and released from any claim arising from the damages described in FIRST item of the recitals.”

And in the Saipem form of settlement as:

“FIFTH CLAUSE: That, subject to the fulfilment of this settlement provisions, the parties hereby mutually declare to be FULLY AND RECIPROCALLY DISCHARGED FOR EVERY CONCEPT ORIGINATED IN THE DAMAGES DESCRIBED IN THE FIRST POINT OF THE RECITALS.”¹⁶

482. The reference to “el punto Primero” is puzzling, because the first point of the recitals does not describe the damages in either document.
483. In each settlement the recitals (second and third in the Ocesa settlement, fifth and sixth in the Saipem settlement) set out that the Claimant has claimed in respect of particular damage to which the Claimant attaches a particular value, though in some settlements the sum being claimed by the Claimant is not specified. Two further recitals then record the contractor’s evaluation of the claim (sometimes left blank) and that the parties have not reached agreement on the actual value of the damages caused. The Clauses of the Settlement, however, go wider. The First Clause records the settlement figure. The Second Clause records the Claimant’s express waiver/renunciation of his right to bring any further judicial or extrajudicial claim against Ocesa or Saipem (as the case may be) for damages caused during the Ocesa works. The Third and Fourth Clauses record that neither party has a claim against the other. The Fifth Clause read on its own has the puzzling reference to the first recital; but read in the context that includes the Second Clause is a general statement of mutual and reciprocal release from further liabilities.
484. The forms of Paz y Salvo for Ocesa and Saipem reflected their different roles, but the wording of the Spanish original in each document is materially identical for the renunciation of the right to bring any future claim; and in each case it is entirely general and comprehensive.
485. Viewed on their own, the second and fifth clauses of each of the settlement agreements are entirely general in their meaning: the Claimant waives/renounces his right to bring any future claim for damages caused during the Ocesa works and, upon compliance with the terms of the settlement, each party releases the other from any future claim. It is also legitimate to look at the Paz y Salvos when interpreting the settlement agreements as they are related documents which may assist in ascertaining the intention of the parties {Day21/187:12}. Looking at the Paz y Salvos relating to these transactions confirms the view that I have reached, namely that the intention of the settlement agreements was to settle all future claims as well as those presently being dealt with.

¹⁶ The Claimants submit the following translation: “Having complied with the terms of this settlement, the parties declare one another mutually and reciprocally FULLY PAID UP IN RESPECT OF ANY ITEM ARISING FROM THE DAMAGES DESCRIBED IN FIRST POINT OF THE RECITALS” {C4/3.6/785}.

486. At [176] above I discussed the difference between Professors Castro and Vallejo on what is meant by an eventual lawsuit and what future contingencies could validly be settled. Applying the principles as I have found them and as set out at [180], the wording of the forms of settlement agreement either alone or in the light of the Paz y Salvos shows a clear intention to prevent any future claims arising out of the Ocesa works and is technically competent to achieve that aim. There is no suggestion that the settlement agreements may now be set aside. I therefore treat them as remaining in force and valid. On that basis, the effect of a settlement agreement in the standard form for Ocesa alone settles all future claims for damage on the ROW and the effect of the settlement agreement in the standard form involving Saipem settles all future claims for damage off the ROW. Integral to that decision is the fact that each involves an express renunciation of any right to file either a judicial or extra-judicial claim, which is clear, unequivocal and precise. I see no policy reason to strain against this construction or outcome, which is consistent with the balance struck by Colombian law between private interests and public benefit, including the policy decision to provide substantial protection to the oil industry as set out elsewhere in this judgment.
487. My decision on the wide-ranging effect of the settlement agreements hinges on the terms of the Second and Fifth Clauses, with the Sixth Clause emphasising the final effects of the settlement. If the settlements had been limited to the First Clause with the Second, Fifth and Sixth Clause omitted, it would have been necessary to look at precisely what came within the ambit of the claim that had been made. Although it is not necessary to the decision I have reached, merely settling the claim that had been advanced would not, without more, have had the wide-ranging effect of the settlements that were in fact concluded.
488. The Defendant was not a party to any of the settlement agreements or Paz y Salvos. It submits that it is entitled to rely upon them as evidence of extinguishment of any liabilities it might have to the Claimant concerned by virtue of novation. The applicable principles are set out at [184] above. It follows from my conclusion that the Ocesa and Saipem settlement agreements settled all existing and future claims inside and outside the ROW respectively that they effected a novation as between the contracting parties by substituting the new contractual rights and obligations under the settlement in place of any existing or future obligation in tort. Complete novation of all tortious obligations is the combined effect of the two forms of settlement agreement. If it were to be shown that a Claimant had entered into one form of settlement agreement but not the other, there would be partial novation of the tortious obligations relating to either inside the ROW or outside the ROW as the case may be.
489. Any liability that the Defendant might have had towards one or more Claimants would have been joint and several with the liability of Ocesa and Saipem because of their concurrent responsibility for the performance of the Ocesa works. Professor Castro's acceptance that a novation will operate to affect those having joint or several liability with Ocesa or Saipem means that, where the Claimants have entered into settlement agreements in the standard forms to which I have referred, the Claimants' rights in tort against the Defendant as a legal person who would have been jointly and severally liable will be affected to the same extent. It follows that, where and to the extent that settlement agreements took place between the Claimants and Ocesa or

Saipem, any liability that the Defendant might otherwise have had to the Claimant in respect of the Ocesa works is extinguished by novation.

8. The Four Trial Claims

490. The underlying allegation is that the Ocesa works caused damage to the Claimants' land. The Claimants chose not to claim damages by reference to diminution in the value of their land. The late attempt to introduce claims for the costs of reinstatement and the even later attempt to introduce claims for general damages related to the damage to the land were rejected. As a result, the claims focus on allegations that the economic capacity of the farms concerned has been reduced and that specific losses have been suffered, such as loss of animals caught in the mire.
491. The details of each claim are set out in the Sections dealing with the Trial Lead Claims. No further issues need to be dealt with here.

9. The Lay Witnesses

492. See Section 4.

10. The Expert Evidence

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Introduction

494. The Parties appeared at one point to be agreed that generalised allegations of failures of design or workmanship were of less concern than specific allegations in relation to individual properties. Despite that, very substantial resources were devoted to dealing with generalities rather than specific properties. In the event, my emphasis in this judgment is on the four trial properties; but, not least because it is intended that it should have implications for other claims, it is necessary to deal with some of the generalised allegations as well. It is also necessary to look at some of the broad principles and matters of opinion that divided the experts before coming to address their potential application to the individual claims. I shall not, however, try to match the detail or length of the many reports that were served: to the contrary, I shall try to give my conclusions as briefly as is consistent with explaining the basis for them.
495. Each side made trenchant criticisms of the other party's experts. Some of those criticisms were well founded, and I shall refer to those I consider to have been most important. With the exception of Mr Willis (called by the Claimants on the subject of Pipeline Project Management), each expert had something to contribute and I reject the various submissions that I should discount the evidence of the expert entirely.
496. When considering the criticisms that have been made on either side I have constantly had in mind the obligations of experts providing reports for use in contested litigation and also the extreme pressures that litigation can impose on both experts and lawyers. I have made as much allowance as possible on the basis of the information that has been made available to me about the circumstances in which the various reports were prepared. I accept without hesitation that the experts have had to confront highly unusual, if not unique, difficulties because of the remoteness, climate and security situation affecting the areas where the Claimants live. The climate has meant that visits have had to be scheduled to cover the wet and dry seasons; while the security situation has meant that visits to properties have been delayed and, when they have happened, have had to be shorter than would otherwise have been undertaken.
497. It is also clear that the conduct of the litigation has been highly combative, with the added pressures inherent in that state of affairs. However, while making all due

allowances, it is essential that proper standards of independence and expertise be maintained in combative litigation just as in any other litigation if the integrity of the court process is to be maintained.

The Claimants' Inter-disciplinary Approach

498. On first reading the Claimants' experts reports, it appeared that there had been considerable co-operation between them, extending to the mutual provision of reports with the intention and effect that one expert's expression of opinion was either supported or based upon work carried out by another. There were numerous occasions where one expert would refer to specified passages in the reports of another, apparently adopting them as an integral part of their own reasoning and opinion. Thus, for example:

- i) Dr Card said in his first report at [1.10] {H1.1/1/7} "where appropriate I will refer to the expert reports prepared by the following Colombian Experts acting for the Claimants" and listed six colleagues (Drs Obando, Tobon, Penuela, Velez, Snr Atencio and Snr Delgado). In the course of the report he made frequent cross references, of which [10.2.15] {H1.1/1/112} is typical. There he said "The increase in sediment of the water in the natural watercourses at the property has increased the turbidity of the water and the iron content (see Expert Reports of Dr Tobon and Dr Obando) which may have an adverse effect on water quality." Even more specific are references such as [15.3.3] at {H1.1/1/192} where, in the course of giving his opinion on the process of sedimentation on LC74 he said "Dr Tobon describes in his Expert Report that the waterlogging on the property is due to a high rate of deposition of sediment and that the most likely cause was intense soil erosion from stockpiled soil during ROW and pipeline construction. I note that Dr Tobon's opinion appears to be consistent with witness statements given by the Claimants as well as construction workers who also describe soil erosion from stockpiled soil during ROW and pipeline construction." This last quotation is in relation to an issue that is right at the heart of the dispute on LC74;
- ii) Dr Tobon also said that he would refer to the expert reports of his other expert colleagues ({H7.3/3/594} at [1.6]); and he frequently did so. At [4.3] {H7.3/3/618} he summarised what he said was the evidence from videos and witness statements by saying that "the soil that was removed during the process of excavating this trench or strip of land was deposited on either side of the route, without adequate protection and without any consideration for the natural arrangements of the soil horizons... . This soil was left there, exposed, for however long the works took on each farm, in places with steep slopes (see reports by Franco Obando and Geoff Card for their observations and conclusions on the construction process) and high rainfall This significantly contributed to this sediment being carried towards the streams beds either by the water during rainfall events or down the slope by gravity .." This illustrates the mutual dependency and support given by the reports of (in this instance) Dr Card, Dr Tobon and Dr Obando. Most specifically, when writing about LC50 at [1.6.1.6] {H7.4/4/896} Dr Tobon wrote "The amount of soil accumulated in the swampy area greatly exceeds the amount of soil that could have eroded from this grassy area. This is established in paragraph 12.10 of Geoff Card's report: "the volume of sediment in the LC50

comparative farm has a relationship 70/30 greater in LC50. But the initial sedimentation from the ROW could have adversely affected the sediment now present”. Consequently, it can be said that the damage caused to the streams, and the formation of the swampy area (SW1), are related to the construction of the pipeline.”

- iii) Dr Velez was equally specific. In his first report at [7.1] {H5.3/4/566} he said “The specific characteristics of the soils in the region are explained in detail in the reports of Dr Card and Dr Obando, and I will refer to their conclusions in my report.” Various references of increasing specificity culminated in [9.3.9.12] at {H5.3/4/615} where, in setting out his opinion on the measures that ought to have been implemented to restore vegetation, the immediate environment and the ecology he identifies that he refers to numerous examples “given by Dr Franco Obando in his report regarding the (lack of) implementation of adequate measures of soil management. By way of example, photographs G15 and G16 in section IV of the general section of Dr Obando’s report clearly show the phenomenon of the inversion of soil layers on one of the LC properties, and paragraph VII.2.7.3.2 details the superficiality of the soil study carried out for the construction of the pipeline. ...”;
 - iv) In his first report, when dealing with LC39, Dr Atencio purported to quote directly from Dr Card’s report, writing “In his report, Dr Geoff Card commented “ ... in general the whole extent of the ROW has been harmed by soil erosion” So the sediments arrived mainly from the ROW during construction of the pipeline during construction of the pipeline” {H11/2/210} at [17.10.5.11].
499. Each of these passages (which are only a very small proportion of the many examples in multiple reports) was misleading:
- i) Before trial, the Defendant questioned the passage at [1.10] of Dr Card’s first report, asking under CPR r.35.6(3) “Please clarify whether, from the above experts, you only read the final, served version of the above reports. If you read earlier versions of the reports, please identify, by the date of the draft, the version of the reports that you read.” {H1.3/21/704}. Dr Card’s answer (which he confirmed he had read before it was sent out in his name {Day24/104:13}) was “References in my report to other expert reports are to the same final versions as were served.” Yet when he came to give evidence, Dr Card said (and I accept) that he had seen no draft reports and no final reports from the other experts when he completed his first report. All that he had was verbal discussions in the field and in the hotel (which were in Spanish, so that he had little opportunity to take notes) and possibly a few skype calls and verbal discussions with Dr Tobon before the finalisation of Dr Tobon’s report and with other experts {Day24/20:13} ff, {Day24/100:3} ff, {Day25/166:6};
 - ii) Dr Tobon said in evidence that he had seen neither a draft nor a final version of Dr Card’s report before completing his report. That evidence is all the more surprising because the purported quote from “paragraph 12.10 of Geoff Card’s report” that I have set out above does not exist in Dr Card’s first report as disclosed or in any other of Dr Card’s reports that are before the Court.

Initially he said that if he was writing about something related to Dr Card or another expert's field of expertise, he asked Leigh Day to tell him what the relevant report was so that he could refer to it, and that although the references were in his report, he did not look at any draft of any other experts' reports before drafting his first report {Day28/19:8}. Subsequently he said that the particular quote that had been read from his report referred to field notes and what Dr Card had been saying in the field {Day28/21:22}. Later still he reaffirmed that Leigh Day had not let him see the reports of other experts {Day29/51:16}. The only possible conclusions are that (a) contrary to his evidence, Dr Tobon saw the purported quote in a draft of Dr Card's report or (b) he was fed the passage in his own report by the legal team (out of context but with attribution) and adopted it without having seen a draft from Dr Card. I reject as incredible his explanation that the passage was based upon field notes and what Dr Card had said in the field {Day28/21:22}, since that cannot explain how he came to attribute the purported quote to a particular paragraph of a report from Dr Card. In the absence of contrary information the most likely explanation appears to be that he was fed passages but not full reports by Leigh Day and that he included them in his report without independently verifying them or their context;

- iii) The nadir came during the cross-examination of Dr Velez. He became agitated to the point of appearing angry when he denied repeatedly that he had discussed the case with the other experts {Day32/174:10}, or seen a report or draft report from any of the other experts instructed by the Claimants before drafting his report {Day32/187:11} {Day32/189:2}. When asked how he came to identify photographs G15 and G16 in Dr Obando's report he replied "I had not seen it. I would like to reply emphatically along those lines. This is something provided by Leigh Day" and that Leigh Day had written those sentences of his report {Day32/189:21} ff. He later modified his acceptance that Leigh Day had written the sentences, explaining that Leigh Day had given him the information, that it had backed up his findings and he accepted the information he was given {Day32/190:9} ff. He was then asked to provide a schedule to identify other parts of his report which had been compiled in the same way, which he did the following day;
 - iv) Dr Atencio's report was signed off on 27 June 2013. Dr Card's first report was signed off on 1 July 2013. Dr Atencio's purported quote from Dr Card's report does not appear in Dr Card's first report. Dr Atencio said that it came from a draft report that was provided to him and the Claimants' counsel confirmed that a draft of Dr Card's report was sent to him at some stage. The quote does not appear in any report from Dr Card that has been disclosed.
500. This evidence is startling in three quite different respects. First, I am driven to the conclusion that the experts stated in their reports things that were wrong and seriously misleading. I accept the evidence of the experts to whom I have referred above that they had no more than discussions in the field and in some cases by Skype but did not have the reports (or drafts of the reports) to which they referred. If that was true of them, it is probable that it applied to others of the Claimants' technical field experts, though I accept that Dr Atencio drew on a draft report, which puts him in a different category. Second, I accept that in some cases (of which the examples I have cited

from Dr Tobon and Dr Velez are two) the Claimants' experts included in their reports statements and information which had been provided to them by the lawyers and which they did not independently verify. Third, I am unable to understand how Dr Card could have given the answer he did to the Defendant's question under CPR r.35.6 consistently with his duty to the Court as an independent expert.

501. The first effect of this is to cast doubt upon the integrity of the affected reports, since it is not possible to identify what is and is not properly brought into account and relied upon by the receiving expert. More broadly, it casts doubt on the integrity of the expert evidence process as a whole, since it must (on the information I have before me) have involved the Claimants' legal team at some level as well as the experts. These are very serious drawbacks for a court that is trying to reach a just answer in heavy litigation. It is only because I have had the opportunity to watch each of the experts over many days that I feel confident in drawing the conclusion that it would be wrong simply to jettison the entirety of any expert's evidence because of this episode. I am convinced that, although there are other criticisms to be made of individual experts to which I will refer later, all of the experts who came to court did so with the intention of expressing opinions of which they were rightly or wrongly convinced.
502. The involvement of solicitors in the drafting of experts reports is not the sole preserve of the Claimants. The involvement of solicitors may, of course, be a necessary and proper part of organising expert evidence and it is (to my mind) inevitable that Freshfields and Counsel will have been closely involved in the preparation of the expert evidence that was served on behalf of the Defendant. However, the Claimants identified one example, which they say illustrates exactly the same problem as has arisen with their own expert evidence. Professor Montenegro and Dr Avila produced supplementary reports that were dated 21 May 2014 {H4.9/10/1704} and {H21.9/13/1827}. They are presented in identical formats and adopted near-identical structures. The language is so similar that it is quite inconceivable that the two reports have been entirely independently written. The overwhelming probability that the production of the reports involved a process of cutting and pasting is confirmed by the fact that, although Dr Avila's report is responding to Mr Delgado's for the Claimant and Professor Montenegro's report is responding to Dr Obando's, the terms of [2.4] of each report are identical: "On the individual Lead Claimants, my conclusions remain substantively unchanged by Dr Obando's report." {H4.9/10/1710} and {H21.9/13/1834}. To any observer with any experience of contested litigation it is apparent that the lawyers have been co-ordinating the responses (and their physical production) which is why the format and structure is the same for each report. What is not so obvious is whether either expert saw or relied upon the substance of what became the other expert's report, since the reasons and references in each report are different. So, while I conclude that Dr Avila must have had at least the framework which is common to his and Professor Montenegro's May 2014 reports, and that framework must have included the reference to Dr Obando in [2.4] (since there is no other reason why Dr Avila would suddenly have referred to him), I am not in a position to conclude that either Dr Avila or Professor Montenegro adopted substantive material that was fed to him by Freshfields without independently verifying and adopting it. I return to this issue at [828] when reviewing Dr Avila's evidence later in this section {H7.4/4/978}.

Geotechnology and photo-interpretation

The experts

503. Dr Card is an experienced geotechnical engineer. He has had no experience of working on oil pipelines since he was a post-graduate student in 1980, but that does not affect his ability to opine about matters of general geotechnical practice. It emerged that the statement in his CV that he was “currently involved in designing oil pipelines in Colombia and assessment of geo-hazards from land instability” {H1.3/3/622} was in fact a reference to his involvement in the present litigation, which has not involved him designing oil pipelines in Colombia or elsewhere. On issues that were either specific to oil pipelines or specific to what constituted good practice in Colombia in the mid-1990s, he was unable to rely upon his own experience, as he had none.
504. The Defendant submits that Dr Card lacked objectivity and candour. They are able to point to a number of points in support of their submission, of which the most important are as follows:
- i) In his first report at [14.2.1] to [14.2.6] Dr Card had described soil erosion that he said he had observed at various points along the ROW on LC50 {H1.1/1/171}ff. He included what he called “notable features” and “significant areas of erosion” in his Table 14.2. Dr Card estimated that the 7 areas included in Table 14.2 would have suffered 3035 cubic metres of soil loss, of which one area (Image/2) contributed 2000 cubic metres (66%). He said (at [14.2.7]) that this estimate was based upon “measurements of surface area and depth of erosion.” Image/2 was marked on the Claimants’ annotated aerial image [“CAI”] {B2.3/45/544} as being to the east of the ROW from where erosion could drain into the areas of LC50 said to have been damaged by erosion from the ROW. At [14.2.10] {H1.1/1/171} Dr Card said that “any sediment originating from the ROW is likely to have entered Streams 1-4. ... Based on the soil erosion recorded on the ROW and the lack of functional erosion control measures it is my opinion that soil erosion is on-going due to lack of repair and maintenance to the erosion control measures and lack of vegetation cover on the ROW as I have described in paragraphs 14.2.1 to 14.2.6.” The clear implication of this evidence was that Image/2 had contributed 2000 cubic metres or 66% of the totality of the sediment from the notable features listed in Table 14.2 and that the sediment from Image/2 had fallen to the east of the ROW and onto the parts of LC50 that were said to have been adversely affected. A number of problems emerged from this evidence:
 - a) Dr Card accepted that the placing of Image/2 on the east side of the ROW on the Claimants’ annotated aerial image [“CAI”] would have been on his advice {Day27/9:3}. That would explain why he had included it in Table 14.2. It was in fact further to the west and was wrongly placed on the CAI;
 - b) It is now common ground that any erosion from Image/2 would have flowed to the *west* and does not affect LC50 {Day26/156:18};

- c) By the time he was cross-examined, Dr Card had appreciated that sediment from Image/2 would have drained to the west. Instead of accepting that he had made an error in his placement of Image/2 and its inclusion in Table 14.2 he said that he had simply recorded what he saw on the ROW and that he made no “further comment on it because it was not relevant to the matter” {Day26/156:23}.
 - d) If that evidence had been correct, Image/2 would have been shown to the west of the ROW and Dr Card would have made the position clear at some stage in the course of [14.2.1]-[14.2.10] or subsequently in accordance with his duty to the court;
- ii) A similar situation arose with Image/3. Dr Card described it at [14.2.4] and provided a photograph of a steep sided bank near to it {H1.1/1/172}. It was included in Table 14.2 as a measured area of 200 sq. metres from which an estimated 100 cubic metres of soil was lost. As with Image/2 the clear implication was that Image/3 was a significant source of erosion on to LC50. However:
- a) Image/3 is to the *west* of the ROW {H1.3/21/731};
 - b) In his oral evidence Dr Card accepted that Image/3 was irrelevant to LC50 but asserted that he was being “fair and balanced to show there is possible sedimentation flow away from the claimant’s property on to another property”; and that he had included Image/2 and Image/3 in Table 14.2 “just to show ... a balanced opinion, of what erosion is on and off the ROW and whether it is draining to the east or draining to the west”; and he concluded by saying “... this is a feature on the side of the ROW, so – I felt I have a duty to the court to report a feature and truthfully show that it is flowing away from the ROW” {Day26/161:18} ff;
 - c) The difficulty with this evidence is that he did not at any stage show that sedimentation from Image/3 was flowing *away* from LC50;
 - d) The difficulty is compounded by the fact that, in his fourth report he produced a drawing which purported to be a typical cross section of the ROW and to show erosion from the west side of the ROW travelling along an access trail back to the ROW and thence onto LC50 via Stream W1 {H1.6/24/1357}. This effect, if it happened at all, was minimal {H2.3/3/714}, as his answers in cross-examination recognised;
- iii) When producing his first report, Dr Card did not refer in any detail to historical photographs or DVD footage of the OcenSA construction works. That deprived him of useful evidence but is not otherwise (at least in the present context) a criticism since it may have been attributable to a lack of time or resources or for other understandable reasons. In his third report, he made increasing use of extracts from DVDs. I deal later with other criticisms made of his use of DVD evidence, but one example informs the present assessment of Dr Card as an expert witness. At [3.4.1] of his third report

{H1.5/23/1096} he introduced three screen shots, Figures 3.5 to 3.7, saying “I am unable to identify the specific location where these images are on the Ocesa pipeline works but they represent typical earthwork operations from the DVDs I have reviewed.” The first two images showed bulldozers working line abreast pushing tumbling and rolling bucket loads of earth that is evidently being shifted on the ROW. The captions for those two stated “Soil fill is disturbed and compacted only by machine passes. The soil is not being compacted to an engineering specification Soil will be more susceptible to erosion as a result” (Figure 3.5); and “There is no control on layer thickness which are [sic] too thick Machine compaction at insitu moisture content is likely to result in high voids ratio in soil that will be erodible when wet due to weakened soil strength” (Figure 3.6). The third image shows a flat area with a scraper to regulate soil fill thickness and a vibrating smooth cylinder roller. The caption stated “A good example of Ocesa earthwork operations using vibrating roller compacting equipment and scrapers to regulate placed layer thickness.” The conjunction of the text and images amounted to clear representations that (a) all three images showed typical earthwork operations on the Ocesa pipeline works, (b) Dr Card was unable to identify their location, (c) images 3.5 and 3.6 represented poor practice while 3.7 represented good practice that could and should have been implemented at the site of images 3.5 and 3.6, and (d) he had reviewed the relevant DVDs. In fact:

- a) Images 3.5 and 3.6 were taken on the ROW, but Image 3.7 was not. Image 3.7 was of a stretch of runway and taxiway at an airstrip which was constructed to enable the largest serially-manufactured transport aircraft in the world to land. It is obvious, and should have been obvious to an expert engineer, that the specification and requirements for compacting a runway will be quite different from those for stripping, grading or re-forming a ROW;
- b) Though Dr Card may not have been able to identify the location of the first two images, he should have been able to identify the fact that the third image was of a runway as it came from a separate DVD which makes clear that its subject was the airstrip and that it was a special undertaking to enable the huge aircraft to land;
- c) It was, as Dr Savigny correctly pointed out, “inappropriate and misleading to suggest that the practices demonstrated adjacent to an airport landing area would be representative of pipeline construction practices along a ROW, or suggest that such practices should be considered “good” practice for a pipeline ROW” {H2.10/13/2586}¹⁷. Dr Card accepted with the benefit of hindsight that he should have

¹⁷ I accept Dr Savigny’s evidence that in forty years of Professional Geotechnical Engineering experience with pipeline construction projects he has never specified nor encountered compaction specifications for line-pipe sections of on-land pipeline projects {H2.10/13/2547}. I find that there was no basis for Dr Card’s implicit suggestion that such a specification would be expected for on-ROW compaction, as Dr Card would have known if he had relevant experience of pipeline laying projects of this nature.

drawn attention to the fact that image 3.7 showed a runway {Day25/133:21}. He should not have needed hindsight;

- d) If Dr Card had reviewed the DVDs himself and had selected the images {Day25/132:6} then his statement that he was unable to identify the location of the images (at least for image 3.7) and his clear representation that the practices shown in image 3.7 could and should have been replicated in the operations being carried out on the ROW in images 3.5 and 3.6 are inexplicable {Day 25/132:15}.
- iv) In March 2014 the Court gave permission for further experts' reports to be served that were responsive to specified other reports and information. Dr Card's fourth report, served on 29 August 2014, some five weeks before trial, made no attempt to comply with the Court's requirement that it should be responsive to specific and specified evidence. In particular, it introduced a new and much more detailed series of calculations, purporting to show that enormous quantities of soil "could have been generated during the various construction and post-construction phases ..." {H1.6/24/1347}. These calculations were then used to support Dr Card's opinion that the soil loss from the ROW would have been orders of magnitude greater than soil loss generated from background losses from the farm in question over the same period (e.g. {H1.6/24/1355} at [4.3.3]). Dr Card was fully aware of the limitation that the Court had imposed {Day24/7:19}, as were the Claimants' legal team. It is not an adequate response to say that, after negotiations between the parties, the Defendant agreed to the admission of the report on terms that Dr Savigny would be allowed to respond to it {Day25/34:3}.
- v) The workings lying behind Dr Card's new calculations were not disclosed until 1 October 2014. When they were, the figures and the calculations in the fourth report had been revised. At some stage after service of the fourth report, Dr Card had realised that his new calculations contained serious errors. Hence the revised figures that were served on 1 October 2014. After those revised calculations were served, he must have realised that even the revised calculations were wrong. He therefore wrote a report revising them, which was served on the Defendant on Day 22 of the trial, 14 November 2014. He introduced the latest calculations with the following explanation:

"Since service of my final report, I have undertaken a more detailed assessment of the actual phases and recorded periods of works. The following amended tables, and the calculations in the revised Appendix F, set out my understanding of the magnitude of soil loss that would have taken place on each of the trial cases lead properties. Due to incomplete or insufficiently detailed construction records, the dates of work are estimated and I have set out the other assumptions made in the notes to the revised Appendix F." {H1.6/25/1512}

While it was true that he had made some revisions to the dates incorporated in his calculations, the major changes were the result of his correction of

recognised errors. The divergence between the partial explanation and what would have been a full and fair explanation is so great as to render the partial explanation very seriously misleading. Worse still, the report was served with a letter from Leigh Day {N/1/1} which represented that the fifth report had come about because Dr Card had carried out a further review of the disclosed documents, especially construction weekly reports. “This analysis informs the soil loss calculations that he prepared for the 4 TCs. As a result, he has made some amendments to the soil loss calculations [in the fourth report]. We enclose a copy of this clarifying report.” When first asked about it, Dr Card maintained that the explanation in the letter was a fair summary of the position when he served his fifth report. It was nothing of the kind. Ultimately he accepted that the letter and, by implication, his report should have highlighted the errors he had made {Day25/101:24}. That concession, rightly made, was a long time coming.

- vi) Dr Card failed to have any regard to the consequences of the revisions he had made. In particular, having thought that what he had seen in the field was consistent with the results of his initial calculations, he did not address the question whether what he had seen in the field was consistent with his calculations as revised in the fifth report. The magnitude of the revisions was as set out in the table below. The units are tonnes per hectare of soil calculated to have been lost from the ROW and construction works:

	LC39	LC50	LC54	LC74
Fourth Report	9,358	2,884	8,244	17,919
Fifth Report	551	296	326	560
5 th as proportion of 4 th	6%	10%	4%	3%

When converted to absolute figures, the quantities in the fourth report that Dr Card was proposing to have come off the ROW were quite unrealistic, as he agreed {Day25/96:24}. For example, his figure of 8,244 tonnes per hectare for LC54 in the table above was his calculation of the amount that would have come off the ROW (per hectare) in a period of 13.8 weeks. When scaled up for the area of the relevant stretch of the ROW, it implied a loss in the order of 11,350 tonnes during that period, or 825 tonnes per week or over 100 tonnes per day regularly throughout the period. Dr Card accepted that this was an utterly ridiculous suggestion {Day25/40:12}. A moment’s thought should have made him realise that such an estimate bore no relation to what was otherwise evidenced in that case, to the extent that his calculation had to be wrong by many orders of magnitude. This error goes right to the heart of his expert evidence about the quantity and source of sedimentation attributable to the carrying out of the Ocesa works. Similar considerations apply to all four trial cases, as is clear from the amended figures in his fifth report;

- vii) In the event, even the figures in his fifth report were shown to be wrong and based upon unjustifiable assumptions. Taking LC54 as the exemplar once again, Dr Card’s calculations in the fifth report assumed stockpiles 8.06 m high with slope angles of 79.46° on each side of the ROW for its entire length on the property {Day25/47:14}. It is of more than passing interest that Dr Card included in his assumptions that 50% of the soil loss would remain on the

ROW: {H1.6/25/1518} at Note 6. Thus Dr Card was subscribing to a set of assumptions that assumed something of the order of 22,000 tonnes (of which 50% remained on the ROW) being eroded in a 13 week period on LC54. The Defendants were entirely justified in describing these assumptions and this evidence as utterly preposterous. The reasons for this conclusion may be shortly stated:

- a) There is no factual evidence to suggest the existence of stockpiles conforming to Dr Card's assumptions on the trial properties. Had such stockpiles (or anything like them) been there, they must have been noticed and remarked upon;
 - b) The DVD evidence does not support the assumptions, for the reasons set out in Dr Savigny's Supplemental Report 18 {H2.12/15/2671} ff. In particular, the stockpile slope angles Dr Card assumed (73.72° to 79.46°) were, with one exception, approximately double the slope angles he had measured from the DVD evidence (29.2° to 38.7° apart from one modest windrow assessed at 51.5°) {H1.5/23/1303}. There was no basis for his assertion that the measurements were taken when the stockpiles had reached "somewhere near their angle of repose" (i.e. had already lost the soil that his calculations were intended to measure) {Day25/137:21} ff;
 - c) It would not have been possible to construct stockpiles as suggested by Dr Card without employing extraordinary construction techniques. The size and shapes suggested would be unheard of in international pipeline construction practice {H2.12/15/2669};
 - d) The assumption that all stockpiles would have been built with (i) a base width of 3 metres and (ii) Dr Card's assumed slope angle and height determines the outcome of Dr Card's calculation because his theory was that soil would be lost as the stockpile slumped to achieve a lesser slope angle. There is no evidence that all stockpiles were built with a base width of 3 metres or with such acute slope angles, and where DVD evidence shows substantial stockpiles the base either always or virtually always has a width of more than 3 metres. It follows that the soil loss must, on Dr Card's theory, be less than he calculated and I reject his evidence to the contrary {Day28/82:2};
- viii) The calculations in Dr Card's fourth report went hand in hand with a new sequence of drawings and, in combination, were intended to "set out linkages between Ocesa construction and reinstatement works and the locations of damages for selected Lead Claimant properties based on: (a) topography of the ROW in relation to the location(s) of damages ..." {H1.6/24/1347}. For the reasons outlined in the Defendant's closing submissions at [187] of Section 10 {C4/4.7/315} I accept the submission that the drawings were non-expert and impressionistic; and that they should not have been included without that being made clear. As it is, Dr Card was forced into a gradual retreat from saying that the drawings were "a diagram. So I am just trying to illustrate the mechanism and the sediment transport process" {Day25/70:16} to accepting that they were a possible mechanism, rather than a mechanism based on investigations

that he had made which led him to the conclusion that it was operative {Day26/114:20} ff. Two particular features identified by the Defendants require specific mention here:

- a) Some of the representations appear to bear little or no resemblance to reality (for example the gradient of the slope depicted for LC54 at {H1.6/24/1368}) which, even for an attempt to illustrate a possible mechanism, is unhelpful;
- b) Dr Card used the opportunity provided by the drawings to cover areas which his reports had never covered before, and to do so in a way that did not highlight what he was doing: for example, his introduction of field AF1(b) on LC39 by Figure 4.1 at {H1.6/24/1351}, which he had not addressed previously {Day25/74:19}.

505. As with the other experts, I have reviewed all of Dr Card's evidence since the conclusion of the trial. That review has reinforced the provisional impression that I had formed during the trial, namely that at some stage in the proceedings, doubtless influenced by the remorseless pressure imposed by the Defendant's emerging expert evidence and by the demands of participating in large-scale litigation, Dr Card realised that his initial observations and report were inadequate to sustain the conclusions he had reached and that, being convinced that his conclusions had been just, he set about attempting to justify them. In the course of doing so, he made mistakes that are only explicable by reference to falling from the high standards that are expected of expert witnesses in major litigation. These mistakes were of four kinds. First, he became inadequately rigorous in attributing relevance or significance to evidence that he found in the mass of contemporaneous material. This led him to attempt to bolster the Claimants' case with evidence that was, as he should have realised, not appropriate for the task e.g. his treatment of Images 3.5-3.7 in his third report. Second, he advanced quantitative evidence based upon assumptions which he was later forced to accept were ridiculous and qualitative evidence that was essentially non-expert and at times misleading e.g. in his fourth report. Third, when concessions were required of him they were either slow in coming or not forthcoming at all e.g. his clinging onto the suggestion that the inclusion of Image/2 and Image/3 in the table of notable erosion events on LC50 was simply to provide a fair and balanced record of what he had seen on the ROW. Fourth, and to my mind most serious, he gave an explanation for the production of his fifth report which was so inadequate as to be substantially untrue. I do not go so far as to say that he consciously set out to mislead the Court, since that is not an allegation that was expressly put to him or that he dealt with in the course of his evidence; but I have reached the clear conclusion on the basis of the documents and having seen him giving evidence for days that he had by then, if not before, lost those qualities of objectivity and independence of mind which are essential for an expert in contested litigation and that he had become caught up in the siege-mentality which was painfully obvious on a number of occasions (on both sides) during the trial.
506. These findings have two consequences, each of which is serious in the context of a case where the central issue for the technical experts is the relative and absolute contributions of the ROW works and other potential sources of erosion and sedimentation on the Claimants' properties. First, I find it impossible to place any reliance upon Dr Card's attempted quantifications of soil loss from the ROW

consequential upon the Ocesa pipeline works. The destruction of Dr Card's fourth and fifth reports in cross-examination on this area was complete. The Claimants evidently recognised the damage that had been done as they placed little or no reliance on Dr Card's figures in closing submissions, being driven instead to advance calculations prepared by counsel, typically on the basis of a draft report by Professor Morgan who, though he has in the past been consulted by the Defendant, was not an expert in the case. Even before then, figures were put to the Defendant's experts on a number of occasions which differed from and effectively abandoned those in Dr Card's reports and evidence. Second, I cannot approach Dr Card's evidence on other matters with the implicit trust that is the privilege of experts whose objectivity and independence have not been successfully impugned.

507. Dr Card's geotechnical opposite number was Dr Savigny. The main criticism of him by the Claimants was that he was "implausibly absolutist". Put in other words, it is said that he had a tendency to blame everything *except* the Ocesa pipeline for the damage which the Claimants allege that their land has suffered. The second major criticism the Claimants make of Dr Savigny is that he did not attempt any quantitative analysis of the relative contributions of the ROW and other potential sources of erosion. There is substance in each of these criticisms, but they can be overstated; and, in my judgment, there was a pervasive though variable tendency of the experts on both sides to concentrate on the features that they thought of particular significance to the relative exclusion of others. Dr Savigny has long experience in geotechnical works in association with oil pipelines and brought his very considerable expertise and experience to bear in forming his opinions. He carried out invaluable analysis of historical photographs to identify changing patterns of land use and land quality (i.e. levels of soil exposure) which provide an essential context for any assessment of the impact of the Ocesa pipeline. His reports addressed the Claimants' allegations fairly and squarely and at very considerable length. These same qualities were evident when he gave his oral evidence.
508. Amongst the main sources for Dr Savigny's work were the DVD materials. The Claimants emphasise that none of the Lead Claimant properties have been identified on the construction DVDs and that "an illustration showing good practice in one place does not show that bad practice was not followed in another." I agree; and the opposite is equally true. However, the DVDs are useful in giving a general understanding of the challenges faced in various different terrains and the measures that were (at least on occasions) put in place to meet them. Overall, Dr Savigny's analysis of the DVDs was thorough and his opinions on what they showed were reliable.
509. Dr Gundlach was instructed late on to respond to Dr Savigny's photo-interpretation evidence; he did not criticise Dr Uribe's reports. He identified weaknesses and points of disagreement, which were maximised when being deployed in the cross-examination of Dr Savigny. However, by the end of his evidence, some of the aspects of dispute appeared somewhat synthetic. I have taken into account the Claimants' criticisms of Dr Savigny's methodology and results at {C4/3.5/354}ff. It is not necessary to engage in a detailed examination of those points because neither Dr Gundlach nor the Claimants say that there is no value in the photo-interpretation exercise that Dr Savigny carried out. They caution against attributing spurious accuracy or precision to the resulting land use and land quality maps. That is

reasonable, as Dr Savigny accepted. I bear in mind at all times that Dr Savigny had limited photographic evidence with which to work, and that attempting to draw long-term trends from a small number of photographic snap-shots will lack precision. Subject to those qualifications, the photo-interpretation work carried out by Dr Savigny and those working with him was thorough, generally reliable (with a few identified exceptions), and helpful.

510. Snr de los Rios provided annotated images which purported to show the area of influence (or impact) of the Ocesa works. Cross examination showed that the work that he had produced was the result of various discussions with and instructions from Dr Velez and Dr Tobon and that Snr de los Rios himself had not carried out a topographical study to validate his work. As a result of the manner in which his work had been produced and his limited involvement in the case, it was established that (at least in the case of LC54 and LC74) his mapping exercise was deficient because it had no regard to local topography, included areas uphill from the ROW and excluded areas which, on any view, should have been included. The Claimants described his photo-interpretation evidence on vegetation as “limited” {C4/3.5/266}. I agree.

The Use of Contemporaneous Documents and DVDs

511. During the course of the trial very few references were found in the contemporaneous documents that could be related specifically to a Lead Claimant property. Both in their pleaded case, however, and in the evidence that was served in support, the Claimants referred to contemporaneous documents identifying concerns or problems and relied upon them in support of a broad case which asserted generalised failures in the design and construction of the works. The breadth of the allegations can be illustrated by reference to [5]-[18] of the Claimants’ Further Information served in February 2012 {B2.2/32/232} ff. The Further Information alleged that “there were no or no proper measures to prevent and control erosion and/or any measures were not properly designed and/or installed” [5]; “measures to store protect and preserve topsoil, trench spoil and other excavated material were not property designed. ... Further or alternatively, proper measures to store, protect and preserve topsoil, trench spoil and other excavated material were not taken and/or installed or properly installed on the Lead Properties” [10]; and “all excavated material should have been (but was not) stored within silt fences or other secure retaining structures, which should have been covered;...” [11]. These allegations were said to be “generic matters which apply to all Lead Properties unless otherwise stated: {B2.2/32/240} at [1]. It was thus the Claimants’ case not merely that there were individual deficiencies on Lead Claimant properties but that the deficiencies on Lead Claimant properties were themselves examples of generalised deficiencies as were alleged in the Further Information. In support of these generalised allegations, the Claimants relied upon extracts from the contemporaneous documents to which they referred at [14]. If the Court could be persuaded of generalised deficiencies as alleged, it could provide support for a finding of lack of good faith, abuse of rights or dolo on the part of the Defendant in its dealings with the Claimants, though a failure to persuade the Court of generalised deficiencies would not necessarily be fatal to such a finding.
512. In his first report and his Joint Statement with Dr Savigny, Dr Card identified a selection of documents which he used to support generalised allegations of failure on the part of the Defendant, and gave as his opinion that the documents to which he referred “provide evidence of inadequate or poor management of the geotechnical

measures to prevent soil erosion and sediment transport during the ROW construction. These incidents during ROW construction of poor geotechnical management will certainly have contributed to large volumes of soil erosion and sediment being transported into natural water courses causing siltation and adverse flow conditions” {H23.3/8/582} at [2.3.4]. His selection was comprehensively reviewed and responded to by Dr Savigny in his Supplemental Report No 6 {H2.6/8/1708} at [3.2.1]ff¹⁸. Substantially for the reasons given by Dr Savigny in his review, I agree with his conclusion that the documents selected by Dr Card do not justify drawing any conclusion to the effect that the carrying out of the project was subject to generalised deficiencies. In accepting Dr Savigny’s evidence, I agree that the documents are typical of those that are generated in the course of any typical large-scale civil engineering project. While it is common ground that, *if* geotechnical protective measures were not taken or were inadequate, erosion and sedimentation could follow, the documents do not justify the conclusion that there was in general poor geotechnical management or that large volumes of soil erosion and sediment were routinely or even commonly transported into the natural water courses. Whether large volumes of soil erosion and sediment were transported into water courses (or elsewhere) is a question of fact which must be decided on the evidence relating to individual properties and places, taking into account all relevant evidence both generic and specific.

513. After the Joint Statement, and in one of the sections of his fourth report which cannot reasonably be described as being responsive in accordance with the Court’s order, Dr Card carried out a more extensive review of documentation for the first time and identified other documents. All of the documents related to Spread B {H1.6/24/1382}. He subdivided them and allocated them to what he called “the most important issues that repeatedly occur during the Ocesa construction and reinstatement operations”, namely (1) problems with geotechnical works including reinstatement works, (2) problems with transport and deposition of sediments, (3) problems with revegetation works, including impacts by cattle activities, and (4) delays in the progress of works due to rainfall, lack of coordination between work fronts and other factors.
514. The Defendant made detailed closing submissions on the first two of Dr Card’s four issues at {C4/4.7/273}. In the light of those submissions I can state my conclusions shortly. Some of the documents predate the carrying out of works on any of the Trial Claimant properties (May 1996 for LC74 being the earliest); there is other evidence in the case (of which some is identified by the Defendant in its closing submissions on this point) that identified problems were taken seriously where identified, and were rectified where possible; and the selection taken at its highest does not evidence widespread problems such as would justify Dr Card’s conclusion that there was a failure of management or supervision on a pervasive scale. Turning to the last two of Dr Card’s issues, my conclusions are the same for essentially the same reasons.
515. I have given my conclusions briefly because it appears that the Claimant had retreated significantly on the issue of pervasive failure by the end of the trial. In Closing

¹⁸ Dr Savigny reviewed Dr Tobon’s selection of documents with equal thoroughness and I accept the broad thrust of his conclusions for the reasons he gave in his Supplementary Report No 6, which are similar to those given in respect of Dr Card’s selection.

Submissions the Claimants submit that they “do not say, and have never said, that the Defendant’s construction practices were always deficient; rather that they varied and on the Claimants’ farms were deficient.” On the evidence of Dr Card and Dr Savigny to which I have already referred, I accept that there is evidence of variability in the quality of work along the ROW. It is necessary therefore to examine specific allegations by reference to specific evidence in the knowledge that things can and often do go wrong on large-scale civil engineering projects but without any predisposition to find either that they have gone wrong or that they have not.

516. Turning to the experts’ use of DVDs. I have already referred to the available materials and their usefulness and to Dr Savigny’s thorough analysis of them. Both Dr Card and, to a greater extent, Dr Tobon had reviewed the DVD footage for the purposes of their earlier reports, and Dr Savigny had reviewed their evidence on the DVD footage in his Supplemental Reports. Although it is possible to identify Lead Claimant properties on the post-works flypast DVDs, no footage of works being carried out on a Lead Claimant property has been identified.
517. It was in response to Dr Savigny’s critique of Dr Card’s use of documents and DVDs in the period up to and including their Joint Statement that Dr Card embarked on a new analysis of the DVD footage in his fourth report, specifically to support the Claimants case on the height of and failure to protect stockpiles. I deal with the results of that work when considering stockpiles below at [540]. Though not as serious as the failure to provide a fair presentation of specific images (which I have criticised at [504.iii]) above) Dr Card’s selection of the images of stockpiles without identifying that they were taken in January 1996 on a stretch of the ROW which is not generally representative was in my view an example of lack of rigour on his part in selecting and presenting evidence which appeared to assist the Claimants’ case but which on close inspection provided limited assistance to the Court.
518. In conclusion, where the evidence of Dr Savigny concerning the significance of contemporaneous documents or the interpretation of DVD evidence conflicts with that of either Dr Card or Dr Tobon, I prefer the evidence of Dr Savigny unless I indicate to the contrary.

Geotechnology issues – soil characteristics

519. I have provided a summary of the soils at [288] above. It is common ground that the soils on the Lead Claimant properties (and, by inference elsewhere along the pipeline) were broadly the same both on and off the ROW. Variations might be found in places on a particular property, but the general similarity of the original soils is what rendered useful the comparative analyses of soil samples taken on and off the ROW after the works had been carried out.
520. Considerable time was taken at trial on various technical issues, such as whether it was appropriate to refer to a Corrected or Uncorrected Plasticity Index, the nature of clay activity, the applicability of direct shear tests presented by Dr Card, and whether the USDA soil classification charts presented by Dr Savigny were of assistance to the Court. It is not necessary to lengthen this judgement yet further by a detailed review of the counter-arguments (which are fully set out in the closing submissions) because, ultimately, they are of little assistance in determining the relative contributions of erosion from the ROW and from other sources; and because findings on those issues

would not affect my overall view of the Claimants' attempts to provide absolute measurements of erosion from the ROW. I will therefore make limited findings indicating whose evidence I preferred on the disputed topics and the reasons for those findings by reference to the relevant passages in the closing submissions:

- i) Plasticity indexes: I prefer the evidence of Dr Savigny, for the reasons identified in the Defendant's closing submissions at {C4/4.7/262} [78] -[83]. However, the resolution of this dispute seems to me to make no difference to the question of the relative contributions of the ROW and other sources;
- ii) Clay activity: I make no finding because I am not satisfied that a finding one way or the other has any determinative or significant influence on the outcome of these claims;
- iii) Direct Shear Tests: both sides tried to prove too much. Dr Card's repeated shear tests did not determine final residual strength and did not show that disturbed soils would be "cohesionless". On the other hand, they showed that submitting soils to repeated shear forces tended to reduce shear strength. The tests are not capable of being extrapolated to provide quantitative assessment of the effect of disturbing the soils on the ROW, but it is common ground that soil that has been disturbed is more susceptible to erosion than soil that has not. The inability to extrapolate is compounded by the fact that the ROW was not treated to a regulated compaction regime like that afforded to a runway. The outcome of this litigation does not depend upon whether soils are described as "erosive" or "highly erosive".
- iv) Soil Classification: I do not make any finding on the appropriateness or otherwise of various soil classification systems because to do so would not materially advance the case beyond the description of the soils that I have set out at [288]ff above.

521. After Mr Lewis had, by immaculate and persistent cross-examination, destroyed Dr Card's attempts to quantify soil loss from the ROW Ms Thornton, equally immaculately and with considerable sangfroid, set about attempting to reconstruct a case on soil loss. She did so by reference to the work of Professor Morgan (seldom forgetting the mantra that he had once advised the Defendant) and a calculation known as the Universal Soil Loss Calculation ("the USLE"). Professor Morgan's work and calculations based upon the USLE and developed by the Claimants' advisers became an important feature of their case.

522. Professor Morgan produced a draft paper in September 1997 {K49/520/1}, which was much discussed during the trial and in the Claimants' closing submissions: see {C4/3.5/388}ff and {C4/3.5/577}ff. Another version of most of the draft paper appears at {H1.6/41/1697}. Both versions were referred to during the trial without any apparent acknowledgement that they were different. Comparison of the two versions suggests that {H1.6/41/1697} preceded {K49/520/1}, though it is not necessary to make a firm finding to that effect. For present purposes I will refer generally to {K49/520/1}; but where it is necessary to differentiate between them, I shall call {H1.6/41/1697} version 1 and {K49/520/1} version 2. I do not know whether there were other versions or how closely version 2 relates to any final version that was produced since no other version is in the trial bundle.

523. The first stated objective of the draft paper was to demonstrate a procedure which could be used world-wide to assess the rate of erosion under a range of conditions and to evaluate the effects of different control measures. Another was to propose a “target” for an acceptable erosion rate (after construction). A third was to develop design procedures for various erosion control measures and assessing their performance over two and five year periods {K49/520/2} at [1.2]. He identified the USLE as being “an appropriate method [for predicting erosion rates] combining acceptable accuracy with relative simplicity and the ability to use quite basic data”: at [2.2]. He stressed, however, that the USLE “predicts only erosion on hillslopes by raindrop impact, shallow overland flow and rills. It does not predict the effects of gullies, subsurface processes or mass soil failures. Nor can it be used to predict soil loss from catchments¹⁹”: *ibid.*
524. Professor Morgan’s qualifications were endorsed by Dr Card who explained that the USLE was a “grey-box model” meaning that “there is some understanding of the relationship between the input and output but the model is operated by equations based on statistical relationships” {H1.4/22/837}. Other limitations have been recognised since 1997. In particular, a *Handbook of Erosion Modelling* (edited by Morgan and Nearing, 2011) identified key limitations of the USLE including that (a) it was not able to compute erosion losses from areas larger than single fields; (b) it was not able to compute erosion losses for specific time periods; and (c) it could not be used to predict sediment movement across the landscape: see {H1.4/22/833}. I accept and bear in mind those qualifications.
525. The USLE takes the form:
- $A = R \times K \times S \times L \times C \times P$ where
- A = mean annual soil loss (t/ha)
 - R = rainfall erosivity factor (MJ.mm/ha.h)
 - K = soil erodibility factor (mean annual soil loss per unit of R (t.ha.h/ha/MJ.mm) for a standard condition of a 9% slope, 22.1 m long, recently tilled downslope with no erosion-control practice)
 - S = slope steepness factor
 - L = slope length factor
 - C = crop management factor
 - P = erosion-control practice factor.
- S, L, C and P are dimensionless coefficients which allow correction of the value of A for the standard condition to that for the actual condition.
526. The variables in the equation may combine to provide a very wide range of outturns for the value of A. In the introduction to the draft paper, Professor Morgan wrote of “natural conditions” where the landscape comes into a state of dynamic equilibrium over hundreds of years. “In many parts of the world this balance is achieved beneath a vegetation cover which helps to protect the surface from erosion and, through decaying vegetative material, contributes to soil formation. Under these conditions, mean annual erosion rates typically range from virtually zero to 5 t/ha, depending on

¹⁹ This last sentence about catchments appears in version 2 but not in version 1.

local soil, climate and slope. Where the land surface is disturbed, particularly where the vegetation cover is removed, erosion rates increase. Under agricultural production, mean annual soil loss typically ranges from 0.1 to 100 t/ha, again depending on local conditions and whether any erosion control measures are practised. Where land is cleared for construction work, typical annual rates are 1,000 to 10,000 t/ha.” Although these ranges are very wide, the trend is not in doubt and is confirmed by ample evidence including a PowerPoint presentation by Snr Gasca which indicates a background rate of 5 t/ha for original land use prior to construction and a rate in excess of 1000 t/ha after construction without doing any restoration work {K57/548/10}.

527. The draft paper includes various tables of variable guide values for factors K, C and P, each of which covers a wide range. For example, the suggested K-value for Sand with 4% organic content is 0.002, while that for Silt with >0.5% organic content is 0.060, a relative increase by a factor of 30. Similarly, the average suggested annual C-factor value for bare soil (recently tilled downslope) is 1 whereas that for dense forest with good litter layer is 0.001-0.01. Table 6 in version 1 {H1.6/41/1707} offers C-factor values for ground conditions at construction sites ranging from 1.3 (“compact, smooth, scraped with bulldozer or scraper up and down hill”) to 0.9 (“loose with smooth surface greater than 0.3m depth”)²⁰. These guide values are neither universally accepted nor of universal application. Different suggested values are suggested by different authors: see {H1.4/22/841}; and each of the variables requires a more or less scientifically precise judgment to be formed. Although when comparing prospective rates of erosion on the ROW and on the land adjacent to it, R, K and S are likely to be similar, if not identical, that cannot be assumed as the ROW was frequently laid so as to minimise the slope across it when compared with the surrounding terrain - this is illustrated by photographs (not all of the Ocesa pipeline) at {K66/615/28}ff. Conversely, Dr Tobon’s measurements of slope downstream, upstream and on the ROW (fiercely criticised by Professor Monsalve) suggest that the gradient will alter in those three areas.
528. The draft paper recognises another problem with the S-factor, stating that “with present knowledge it is not possible to define mathematically the relationship between erosion and slope steepness on steep slopes.” It is apparent that the normally adopted equation gives unrealistic results for steep slopes because the paper goes on to say that “A somewhat conservative approach is proposed here which will prevent unrealistic assessments of erosion on steep slopes but not simulate the relationship shown in figure 3 [which is not shown but is said to show a relationship between soil loss and steepness after the work of Odemarh]. It is recommended that a maximum value of 8.0 be set for the S-factor” {K49/520/10}. The following page sets out the extreme difficulty in measuring slope length (Factor L).
529. The fine judgments that may have to be made when applying the USLE are apparent from comparison of the guide K-values tabulated in Professor Morgan’s draft paper at {K49/520/10} and the estimated K-values for the Cusiana-Coveñas area tabulated at {K49/520/33}.

²⁰ Table 6 of Version 1 does not appear in Version 2, but it seems probable that it would have been on page 14 of Version 2 if that were not missing (apparently because of a problem in sending faxes).

Soil Description	Guide Value {K49/520/10}	Suggested value {K49/520/33}
Sandy Loam	0.027-0.019	0.0199
Loamy Sand	0.012-0.008	0.0172*
Clay	0.005-0.002	0.0343*

* = outside the guide value range

The need for expert judgment in the assessment of values for different factors is also shown by the one worked example in Version 1 that relates directly to the Ocesa pipeline. At {H1.6/41/1712} the USLE is used to provide estimations of the rate of soil loss for natural conditions and after construction but before installation of erosion control measures. The estimate for conditions after construction (2113 t/ha/yr) is 433 times greater than that for natural conditions (4.88 t/ha/yr), which is entirely attributable to the choice of C factor (1.3 “compact, smooth, scraped with bulldozer or scraper up and down hill” vs 0.003 “good dense cover”). This calculation is relied upon by the Claimants in their closing submissions {C4/3.5/390}. Had it been assumed that the land was being cultivated with cassava (0.20-0.80) or had been (at least for part of the year) bare soil recently tilled downslope (1.0) the differential would have been greatly reduced.

530. It is apparent that modest differences in the assessment of different factors can lead to dramatic differences in the value of A. This is well illustrated by the differences in the figures calculated by Dr Card for off-ROW erosion for equivalent soils in his second and third reports {H1.4/22/845}, {H1.5/23/1126}. By adjusting the C and P factors he reduced his calculated estimates of off-ROW erosion by a factor of nearly 5, as shown below:

Soil type/ K value	Cover %	C	P	SER = K*C*P	A (ton/ha/yr)	3 rd /2 nd
Silty Loam (2 nd) (K = 0.55)	60-80	0.07	1.0	0.025	24.5	
Unspecified (3 rd) (K= 0.55)	100	0.02	0.5	(0.0055)	5.5	22.4%

531. Thus, despite the apparent numerical clarity of the exercise, the USLE is on one level, as the Claimants accept, “magnificently imprecise” ({C4/3.5/388} at [1046]) because, in a site of any size and complexity, it will not be possible to assess and adjust the variables with any degree of precision. The imprecision is compounded if an additional variable, namely a sediment transport factor is applied to reflect the fact that not all eroded soil will be transported over given distances. The extreme variability of the transport factor is shown by the fact that Professor Morgan has expressed the view that it can vary from about 3 to 90 per cent, decreasing with greater basin area and lower average slope {H1.6/40/1692}.
532. I will consider Professor Monsalve’s use of the USLE when reviewing his evidence later. Remaining with Dr Card, I have already rejected the calculations in his fourth and fifth reports, which were offered as superseding those in his earlier reports. Those in his earlier reports are not useful indicators of erosion or sedimentation, essentially for the reasons set out in Dr Savigny’s Supplemental Report 17 at lines 764-817 {H2.10/13/2562}. Without addressing each of those reasons seriatim, I

accept the thrust of that evidence and the reasons which, cumulatively, show that Dr Card's earlier figures are not reliable indicators for the Lead Claimant properties.

533. The collapse of Dr Card's evidence on this area left the Claimants without substantive expert evidence on which to rely: hence the reconstruction effort by their advisers. While applauding (and having due regard to) the attempts to reconstitute this area of their case, I must bear in mind at all times that Professor Morgan was not called, the wide range of available values for each factor in the equation is highly fact sensitive, and judgment about what numeric values to adopt for each factor is a matter of high expertise. The skilful extracting of concessions and other points from the Defendant's experts cannot adequately compensate for the absence of a coherent and reliable body of expert evidence from those called on behalf of the Claimants. The Claimants' lack of direct expert evidence is therefore a substantial disadvantage when attempting to reconstruct a case on the basis of the USLE.
534. There is a further aspect to the Claimants' reconstruction efforts, which arises out of their reference to and reliance upon the worked example in Version 1 to which I have referred in [529] above. It is that the worked example does not appear in Version 2. It had been one of two illustrative examples and had adopted mean annual estimations for the Cusiana-Coveñas section of the pipeline in the eastern piedmont of the Cordillera Oriental using data for the Yopal recording station for which only mean monthly and mean annual information existed {H1.6/41/1708} and was made for the section of the pipeline described as being between K17+00 and K17+240 where the land was steeply sloping (25-50%), the soil was a loamy sand and the land cover was natural grassland {H1.6/41/1712}; and it appeared in the main body of the draft text. In the second version, no equivalent or similar worked example appeared in the main body of the text. Instead, Appendix 1 of the second version included a more detailed exercise for the section of pipeline between K+800 and K10+600 where different slopes and different soils were subject to natural pasture, woody shrub, managed pasture and abandoned cultivation {K49/520/30}. Despite these differences in soil and land use, C-factors for natural pasture (0.003) and after construction (1.3) were retained throughout - thus maintaining as differential factor of 433 as had existed in the version 1 worked example. Other factors were subject to more modest variations so that application of the USLE led to many different results.
535. The result of the application of these variables was that mean annual erosion rate (t/ha) for original land use varied between 3.5 and (?)38.5, for natural pasture between 2.6 and 10.7, and after construction between 1023 and 4120. The text recorded that "for the section between K2+750 and K2+750 where the slope is 43°, the rate is 4,013 t/ha for the bare compacted soil, which is not unreasonable for a steeply-sloping construction site in tropical rainfall conditions. The estimated rate under natural pasture, which was also the original land cover, is 9.3t/ha. This value is rather high and indicates that achieving a target mean annual soil loss of 2 t/ha will be difficult. The value of 9 t/ha should therefore be used as the "final" erosion target" {K49/520/34}.
536. The following points emerge:
- i) It is not known why version 2 dropped the version 1 worked example. All that can be said with any confidence is that, although there are similarities, the exercise in version 2 related to a different stretch of the pipeline, adopted more

and different parameters and assumptions, and gave a wide range of outcomes;

- ii) Both the example in version 1 and the example in version 2 assume that no erosion control measures have been taken since construction;
- iii) As is plain from the text that I have set out above, the calculation in version 2 was undertaken with a view to identifying a “target” rate for erosion after construction. Table 9 in version 2 gives a range of P-factors attributable to various treatments including 0.80 for “straw bale barriers” through 0.50 for “grade stabilisation structures: normal use (up to 120 m/ha)”, 0.20 for “contour grass barriers” to 0.14 for “level benches”, which are not further described. The headline figures provided by both the version 1 and version 2 exercises would need to be adjusted if and to the extent that these or other measures were taken;
- iv) Professor Morgan could doubtless have explained these and many other interesting points arising out of the two versions of his paper, but he was not called;
- v) Simple extrapolation from or adoption of figures from either version 1 or version 2 by those who lack the expertise of Professor Morgan (or that of some of the experts in the case) is dangerous and likely to be misleading.

537. However, I accept that the widespread use of the USLE over time evidences its ability to provide qualitative, if not precise quantitative, evidence about the relative rates of soil erosion to be expected in different circumstances. To that extent it is a useful tool for the purpose of showing trends and providing a measure of confirmation for other evidence. It needs to be treated with extreme caution when seeking to extrapolate to estimate actual quantities of soil lost in the past, not least because the predicted soil lost is (as USLE recognises) dependent upon assumptions about rainfall which may not be replicated in a particular place at a particular time. This is so even if a given area has on average greater or lesser rainfall than assumed for a USLE calculation. To similar effect, I accept Dr Card’s evidence that “using the USLE to simulate what will happen over a short time period or during a single event will lead to poor results for a system that is characterised by high temporal variability” {H1.4/22/838}. (I note in passing that Professor Morgan’s paper makes plain that to assume that erosivity increases linearly with rain intensity would be wrong: see [2.3.1] at {K49/520/4}.)

538. The Claimants limit their reliance upon their work based upon the Morgan papers and the USLE as follows:

“The Claimants do not rely on the work to establish numerical accuracy about the position. The Claimants rely on the work to demonstrate a pattern of the ROW causing sediment to enter the streams at a greater rate during/post construction than the rate of sediment from agricultural production and deforestation.” {C4/3.5/390} at [1054]

For the reasons set out above and elsewhere in this judgment, I have come to the conclusion that even this may be an optimistic ambition. While I accept (and it is

common ground) that the USLE is likely to show that the ROW soil was likely to be lost at a greater rate per hectare per year for the period of construction and some time thereafter than was likely to be lost per hectare per year from land under agricultural production or subject to deforestation) extrapolating from those rates of soil loss to identifying the rate at which sediment will enter streams on a given property is likely to be very unreliable. This is because of the uncertainties surrounding the course to be taken by any sediment that leaves the ROW or areas of agricultural production or deforestation. Further expert judgment is required to form any valid assessment of what, if any, proportion of the sediment that is lost from the various sources will make its way to streams, either directly or indirectly. It cannot be assumed that all or a large part of sedimentation from the ROW will end up in streams: to the contrary, it is part of the Claimants' case that large quantities were found on fields in the course of the inspections and investigations for this litigation.

539. For these reasons, I approach the Claimants' use of the USLE calculation with caution, recognising that neither the Claimants' advisers nor the Court has the necessary expertise to make reliable judgments on the variables that feed the calculation without assistance from others who are suitably qualified.

Geotechnology issues – Short term works

(i) Stockpiles

540. The nature of protection that could or should be applied near or round stockpiles depends upon site-specific factors including the size and configuration of the stockpile, its position on or off the ROW, and any slope affecting the ground on which the stockpile is placed or adjacent ground. I accept that there were occasions when large stockpiles were created and retention structures adequate to retain all the soil were not installed. Examples are shown in Dr Card's Third Report at Figures 4.2 - 4.7 {H1.5/23/1113}. These images were taken in early 1996 on a particularly challenging stretch of the ROW on Spread B near the San Bartolomé River, which is not representative of the ROW as a whole {H2.12/15/2671}. A number of points arise:
- i) The most extreme examples are Figures 4.2 and 4.4 which show severe gradients both longitudinally and to the sides of the ROW. The surrounding land as shown in the Figures is forest and not pasture;
 - ii) With the exception of the furthest stockpile in Figure 4.4, the large stockpiles tend to have been placed uphill of the ROW;
 - iii) In Figure 4.5, there is no obvious cross-gradient, so that soil from the stockpiles would appear likely to follow the ROW downhill. It is not clear what significance this would have lower down the hill. Nor, for obvious reasons, do the photographs show what long-term works were installed, or how long the stockpiles would have been in place as shown;
 - iv) The images were taken in the dry season. That said, there are no signs to the non-expert eye of thousands of tonnes of eroded soil having left the ROW for the surrounding land, and no expert evidence that such a phenomenon is shown. It would be wrong to be greatly influenced by this absence of

evidence, but if the picture painted by the Claimants were generally applicable, some sign of sedimentation on adjacent fields caused by erosion from the ROW would have been likely to be apparent to the experts even if not to lay observers;

- v) Figure 4.6 shows flat terrain. Dr Card's estimate of the height of the windrows to the right of the photograph (2-3 metres) is to my mind unconvincing. There are no silt retention fences. Nor is it apparent that there are any watercourses that might be affected or (if there are) whether any measures to protect them were taken. Although there is an area of apparent sobreamchos to the left of the image, there is no cross gradient and no sign of soil being randomly deposited across fields.
541. It is self evident that the greater the height or the exposed surface area of a stockpile, the greater the prospect of slump, escape or erosion. Snr Gasca gave evidence which suggested that anything over about 4 metres would be "too high" for a stockpile {Day 14/118:14} ff and that he didn't remember seeing stockpiles higher than that. There are films and photographs showing stockpiles which, though not formally measured, are clearly more than four metres high. There is a clear general relationship between the topography of the terrain through which the ROW passed and the absence, presence and size of stockpiles: the steeper and more difficult the terrain, the greater the likely need to strip and stockpile larger amounts of soil. {L2/794} at c. 8.21-10.00 gives a good representation of the ROW which bears passing resemblance to the Brown & Root ideal ROW drawing: despite undulating terrain and some significant cuts to the side of the ROW, there are no significant stockpiles after opening of the trench: and see {L1/229} at 7.28, {L2/788} and {L2/806.1}²¹. Having reviewed all of the video evidence I find that {L2/794} and {L2/788} provide a representative picture of the general state of piling of soil on the ROW that could be achieved in the absence of particular difficulties, steep gradients or the need to strip greater than normal quantities of soil. The relationship between the complexity of the terrain and the size of stockpiles as shown on the video footage and photographs is not exact: for example, {L2/790} at about 2.00 and 27.05 shows significant stockpiles that appear to have been created at the edge of one or more camps or storage depots in relatively flat terrain. More typical of the topographical need to accumulate stockpiles, however is {L2/790} at about 38.28-42.52, which shows substantial stockpiling of sub-surface soil at the side of a hilly stretch of the ROW.
542. While I accept that, as a general principle, the height of stockpiles should be kept at a reasonable level, what will be reasonable in any given circumstance will primarily be determined by the topography, which will determine whether soil requires to be stockpiled in any substantial quantities and, if so, where and how it can best be stockpiled. Accordingly, I would not accept that a stockpile over about 4 metres high was automatically "too high" and contrary to good practice; equally, it would not necessarily follow that a stockpile under 4 metres high was, for that reason alone, not "too high".
543. Dr Savigny analysed the historical and contemporaneous photographic and DVD evidence from the outset {H2.1/1/102}ff. In the course of his work, he identified a

²¹ D0001830(1): the timing mechanism seems faulty. The relevant passage is about 10% in (said to be 00.15).

section of overflight video covering a stretch of 15.66 kms from north to south, starting at the south shore of Rio Cauca and ending approximately 3.46 km north of LC54. I accept his evidence that this is the best overall platform to evaluate the Ocesa ROW grading and earthworks practices in spread A and to assess the frequency, location and size of windrows and stockpiles. Dr Savigny's evidence (which I accept) was that there were four stockpiles evident in the approximately 16km of the Ocesa ROW south of the Rio Cauca crossing. All extend off the ROW and all except the smallest have appropriate erosion management fences (retention structures) at their toes. In the 20-25 km of the Ocesa ROW shown in the DVD, he counted 6 small stockpiles. Windrows are generally evident over the entire length of the Ocesa ROW covered by the overflight. One or two are present at one or both sides of the graded ROW. Windrow height estimates are possible near strung pipe sections, and none seems higher than approximately 1 metre {H2.12/15/2679}. Reasonably representative images from the video are at {H2.12/15/2674-2675}. They and the video evidence show good management practices for stockpiles {H2.12/15/2673}.

544. I accept that the question whether the management of stockpiles conformed to good practice is a site-specific question that cannot be answered solely by reference to generalities. But the video evidence and Dr Savigny's analysis of it lends no support to a suggestion that there was wanton or generalised failure to adopt good management practices for stockpiles and windrows.

(ii) *Silt fences, retention structures and covering exposed soil*

545. It is common ground that silt fences and retention structures were known short-term measures and that the need for them depended upon a number of variables, including the quantity of soil being placed in any particular location or pile, the steepness of the slopes in that location, and the proximity of watercourses.

546. There is no general criticism of the design of silt fences or retention structures. Rather, the criticism that is levied is that they were not provided where they should have been or, in the case of retention structures, they were not of adequate size or strength for the particular location. Review of the photographic and DVD evidence shows examples of silt fences and retention structures, and other areas where the experts disputed whether they were necessary or, where present, whether they were adequate. What was clear was that the factual evidence called on behalf of the Claimants about practice along the ROW, to the effect that there was no protection of soils or watercourses along the ROW, was unreliable {Day9/10:5} ff. Similarly, the factual evidence of Snr Nelson Clavijo to the effect that great quantities of earth were scattered across fields {D11.2/177/2114} is not borne out by the contemporaneous evidence of DVDs and photographs. His statement describes landslides and "mountains of mud" in times of heavy rain. Even allowing for (what I find to be) an element of hyperbole, this evidence does not go directly to the presence or adequacy of silt fences and retention structures, and is not specific to the Trial Cases or (so far as I am aware) the Lead Claimants' cases. I do not exclude the possibility of landslides having occurred, but the evidence at trial does not support the conclusion that landslides were a constant or consistent feature along the ROW.

547. Where there were stockpiles of topsoil or stockpiles of trench (or other) soils, temporary retention structures could be used to retain the soils within a designated

area and to prevent either slippage or erosion escaping from the stockpiles and the ROW. There is ample evidence of retention structures being used, with the size and complexity of the structures reflecting the size of the stockpile and the topography in which it was placed.

548. On this evidence, I conclude that it would be wrong to make any generic factual finding about whether or not silt-fences and retention structures were used. The evidence does not justify a finding that, as a matter of general practice, silt fences and retention structures were not provided where required or were inadequately constructed when provided. Conversely the DVD evidence does not establish that there were *never* occasions when things went wrong.
549. In 1994 the Defendant had commissioned a report on revegetation from Bateman Ingenieria, which had recommended that “during the period in which the soil removed will remain in place along the trench under construction and while it is used to cover the lowered pipe, it shall be protected from the effects of rain and wind, by covering it with plastic sheeting or [tarpaulins]” {K14/102T/52}. Snr Gasca accepted that the reason for the recommendation was that otherwise the trench spoil could easily be eroded by the effects of the rain and the wind: {Day14/120:22} ff. There is no evidence of soil being covered by sheeting or tarpaulins, and I accept Snr Gasca’s evidence that neither trench spoil nor topsoil was ever covered as recommended by Bateman {Day14/121:1} ff. Although he was being asked specifically about trench soil and topsoil, I infer and find that it was not the practice to cover stockpiles of any size or kind to protect them from the wind or rain.
550. Despite the contractual requirements that excavated material should be segregated and preserved, and that short term erosion measures should be taken as necessary to ensure the stability of graded and excavated material (see [305] and [306] above), I reject any suggestion that all exposed and disturbed soil should as a matter of general good practice have been covered. Some stockpiles were necessarily very large and it would not have been feasible to have covered such large mounds of earth with tarpaulins, with the implication that the tarpaulins would not merely have to be placed and secured but removed whenever the stockpile was to be added to or soil removed from it. Equally, there is no evidence that justifies the conclusion that, as a matter of general good practice, modest windrows should always be covered. While I do not exclude the possibility that there may have been occasions when some stored piles of soil should have been covered in particular circumstances dictated by topography, climate or particular susceptibility to erosion, I reject as entirely unrealistic any formulaic assertion that stockpiles and other exposed earth should always or usually be covered as a matter of routine good practice.
551. I have referred to the contractual requirements to keep soils segregated, and also to the impossibility of avoiding some mixing when stripping and grading the ROW. I do not accept that such inevitable mixing would be indicative of poor practice. All of the DVD and photographic evidence confirms that soil stripped from the ROW before trench excavation was kept separate from the trench excavation, which was placed adjacent to the trench for ease of replacement. Where this was done, the stripped topsoil and the excavated trench soil would be kept separate and I have seen no evidence of generalised failure to follow this practice. The question of poor practice in relation to soil segregation is therefore fact sensitive and to be decided on site-specific evidence.

(iii) Stream crossings

552. Dr Card did not criticise the contractual design methodology for stream crossings, with the exception of revetments, or its implementation {Day24/48:20} ff. I have summarised the contractual provisions at [314] above. Snr Loeber and Snr Gasca gave evidence about the approach to stream crossings which, if followed, would have amounted to good practice. There is ample evidence on the DVDs of crossings being protected by flumes, sediment traps and channels, which appears satisfactory. I also accept Snr Gasca's evidence that there were special crossing teams dedicated to the crossing of streams that were not dry and that, in general, the waterbed would be reformed to its original state {Day18/50:7}. However, there is also evidence on the DVDs which points the other way with the ROW apparently running immediately on both sides of the stream without any apparent protection {H7.5/48/1448}; and Snr Gasca's evidence was clear that sediment traps were not installed on crossings other than those listed in the EMP {Day16/90:5}, which would exclude the streams on the Trial Case properties. Snr Loeber's evidence was also that flume pipes were not installed across the entire width of the ROW but only across the part that served as a transit road {Day18/84:10}. Whether for that reason or otherwise, there is evidence on the DVDs of sedimentation of the stream bed adjacent to a culvert where there is no obvious protection where the ROW meets the flow of the stream {H7.5/48/1450}; and during the course of 1996 concerns were periodically raised about run-off into watercourses {K31/305/20}, {K34/339T/2}, {K38/379.1.1T/2}, {H1.6/24/1384}, {K38/392T/1}.
553. In the light of this evidence, I find that there were occasions when either steps to minimise the escape of sediment from the ROW into watercourses were not taken or the steps that were taken were not effective. The evidence does not justify a finding that there was always a failing in this regard. Accordingly, it is necessary to look at site-specific evidence in each case.

(iv) Maintenance of Short Term Measures

554. Saipem had maintenance crews responsible for maintaining short term measures. On occasion, Ocesa had cause to complain to Saipem about a failure to repair works that had been damaged by the weather. On 15 May 1996 Saipem was given 10 days notice to comply with its responsibilities on Spread B {J25/86/241}; and on 6 December 1996 Ocesa's environmental supervisor on Spread A wrote to Saipem saying that Saipem "has worked little" over a 16 km stretch and was short staffed {K40/411T/1}.
555. This evidence falls far short of showing a systemic failure throughout the period and for all of the pipeline. It shows a recognised need for maintenance where short term works were damaged; and it shows that those supervising the works were taking their responsibilities seriously: see [380] above.

(v) Failure of short term measures

556. The Claimants seek a generalised finding that "in relation to short term measures, soil on the soil piles and the stripped ROW (and over-widths) will not have been [...] contained and, during construction and in the ensuing months, will have fallen or been washed onto adjoining land and into neighbouring water courses, in materially larger

quantities than would otherwise have occurred and more than could be accommodated by the environment” {C4/3.5/310}.

557. I do not make such a finding. While the Claimants can point to evidence that there were failings of short term measures, the evidence falls far short of showing systematic or wanton failure on a large scale. In reaching this conclusion I take into account the evidence cited in Section 10 of the Claimants’ closing submissions, some of which I have mentioned specifically above; and also the detailed evidence about the four Trial Cases, to which I refer in greater detail later. This generalised case on short term erosion measures is largely advanced on the basis of a presentation of contemporaneous documents which, both singly and cumulatively, are unremarkable in the context of a major and complex civil engineering project such as this. With the sole exception of not covering stockpiles (as to which see [549]-[550] above) the contemporaneous documents are, both in content and number, consistent with a project where the systemic intention on all sides was to do a good job. That is also true of the DVD and photographic evidence which (making due allowance for the fact that some of it is promotional material) is also consistent with a project being carried out generally to acceptable standards in conditions that are often extremely challenging.
558. It appears that the Claimants may have recognised the probability that their generalised case would (or even should) fail since their Closing Submissions included that “it is unclear whether these problems amounted to systemic failures, but there are multiple references to repeated problems with timely completion of geotechnical works in the contemporaneous records. At the least, this shows that the standard of work was variable. Given the emphasis on pressing ahead quickly with the construction of the pipeline, this is no surprise and it can safely be said that that variation meant that the standard sometimes fell below acceptable levels. Dr Savigny’s comment at {H2.7/9/1724} is telling: “... my past experience indicates that a contractor will take steps that enable the fastest possible advance of the construction spread. This approach acknowledges that some problems may develop but they will be dealt with quickly, as required to avoid adverse environmental or safety impacts; or, relegated to reinstatement where short term impacts are not foreseeable.”” {C4/3.5/313}.
559. With two modest additional comments, I accept this more limited submission and Dr Savigny’s evidence on the point. The first is that attempting to make fast progress was desirable from all points of view. Quite apart from the commercial benefits of a promptly executed contract to those undertaking it, prompt carrying out of the works was to the benefit of the landowners, it being an integral part of the Claimants’ case that the works should be carried out quickly so as to minimise the time that the soils on and from the ROW were exposed to the elements between initial stripping and final reconfirming and revegetation: see [561] below. The second is that the contemporaneous documents, DVDs and photographs bear out Dr Savigny’s experience and support his expression of opinion.
560. It is clear that things sometimes did go wrong and that, when they did, the potential for increased erosion, sedimentation and adverse effects on land and watercourses alike was very real. But that is to be considered on a case by case basis without any predisposition to finding that things went wrong in that particular case or that they did not.

(vi) Delays

561. In their general submissions on the expert evidence, the Claimants point to the contractual requirements that the excavated trench must be open for as short a time as possible and that excavated soils must be backfilled as soon as possible. Having done so they reserve their further submissions on delay to those they make in relation to the four Trial Cases individually [C4/3.5/310].
562. It is common ground that undertaking the long-term geotechnical works and the revegetation works more promptly will usually reduce the period during which the ROW is bare soil, thereby reducing the risk of erosion. It is (or should be) also common ground that the risk of erosion is dependent upon many factors including topography and rainfall {C4/4.7/318} at [190]. That said, while the risk or happening of increased erosion may be consequences of the fact of the delay, the fact of delay does not of itself prove fault on the part of those responsible for the project.
563. In normal circumstances, if a Claimant wished to prove that a major civil engineering contractor on a huge project was guilty of *culpable* delay, it would be necessary to provide a detailed factual analysis of the circumstances in which the delay occurred followed by the provision of cogent expert evidence on how the project was planned and programmed and an expert analysis and opinion on the operative causes of delay. This is necessary because it cannot be assumed that any one of a number of potential causes was critical or coincidental. Finally, expert evidence would be required on whether the operative causes of delay were the consequence of a lack of reasonable care. The Claimants have not attempted to obtain any of these sorts of evidence. Although Dr Card, as one of the new strands introduced in his fourth report, purported to identify “a systemic failure to ensure the final geotechnical and revegetation works were conducted simultaneously such that the “new design” could properly function to effectively control soil erosion” {H1.6/24/1395} at [4.7.10] he did not carry out a delay analysis and was unable to assist the Court with any reasons for the delay, because there was insufficient information to enable him to form an opinion {Day27/55:24}.
564. I am no more able than Dr Card to express a generic view on the reasons for delays, which must be addressed on a case by case basis, bearing in mind the deficiencies in the expert evidence to which I have referred.

Geotechnology issues – Long term works

(i) Ditch diverters, waterbars and erosion matting

565. The Claimants’ pleaded case was that the design in the RECS for ditch diverters and erosion control matting was inadequate, primarily because the spacing of the diverters in the RECS was to be approximately double that originally provided in the EIS/EMP; and that the ditch diverters were less robust in design than those in the EIS/EMP {B2.2/32/244}. What this allegation failed to take into account was that the EMP design did not include erosion control matting whereas the RECS did. This was a fundamental design shift {Day24/65:9} which Dr Card had not taken into account in his support for the pleaded allegation. In their Joint Statement Dr Card and Dr Savigny agreed that the greater spacing of ditch diverters in the RECS design when compared with the EMP design was justified by the introduction of erosion matting,

which also allowed for a less robust ditch diverter configuration {H23.3/8/618}; and that the approach of the RECS design philosophy was acceptable {H23.3/8/622}. On this evidence, I reject the allegation that the original RECS design was defective.

566. As will be seen in more detail later, the Claimants' evidence on the spacing of ditch diverters varied from Trial property to property, ranging from LC50 where the experts agreed that the spacing was closer than stipulated in the RECS to LC39 where the identified ditch spacings were further apart than stipulated in the RECS. As Dr Card rightly stated, what was found might or might not have been the spacing as laid, since some rows of diverters may have completely eroded and may therefore been missed on inspection. The experts offered possible reasons that may have contributed to such erosion. Dr Card concentrated on the potential contribution of a lack of erosion matting while Dr Savigny drew attention to the potentially destructive effect of cattle. Both are possible contributors, but they may not provide a full explanation for all of the cases where ditch diverters are no longer visible. I am not satisfied that either is a necessary pre-requisite for the total erosion of some ditch diverters over the period between possible installation and litigation inspections: some may have failed over time for other reasons, including the destructive effect of climate, or simply with the passage of time.
567. Bearing in mind the possibility that ditch diverters may have completely eroded before the inspections for this litigation, the evidence from the Trial Properties does not support the conclusion that ditch diverters were routinely omitted or placed at intervals inconsistent with the RECS. I accept the Claimants' submission that the diverters installed as part of the original works are likely to have been on the basis of the spacing requirements in the RECS and diverter composition as set out in TQ49 {C4/3.5/322} at [854] and {K34/336/1}. And I conclude that the inability to find a particular ditch diverter on a property where it is evident that other ditch diverters were put in place does not without more justify the conclusion that the "missing" ditch diverter was not installed or (assuming it was installed in the first place) was defectively installed or protected. That will need to be determined in the light of all site-specific evidence.
568. As outlined at [330] above, the effect of TQ61 was that from October 1996 erosion control matting was omitted on Spread B slopes between 10 and 20%. Where TQ61 was implemented, this departure from the original contract design would have increased the rate and amount of erosion from the ROW when it rained. The contemporaneous correspondence records concerns about the deleterious effect of implementing TQ61 {K66/611/6}, and Snr Gasca in evidence agreed with the concerns expressed at the time that omitting the matting in accordance with TQ61 was "not the most suitable response" {Day16/71:16}.
569. The expert evidence on the topic was more nuanced. Dr Card's view, as expressed in the joint statement was that "the wider spacing and type of ditch diverter adopted in the RECS relied upon the placement of erosion mat between the diverters over the whole ROW to effectively reduce the susceptibility of the exposed soil on the ROW to erosion. Without adequate erosion mat the ditch diverters were vulnerable to excessive overloading with surface water and erosion sediment causing choking of the diverter channels and overtopping of the ditch diverter berms leading to failure" {H23.3/8/630}. As a general statement, this is correct; but it does not specifically address the question whether it was negligent to allow the implementation of TQ61 as

was done. Equally, the fact that any derogation from the RECS design would at least potentially have increased the rate and amount of erosion from the ROW is not of itself sufficient to prove that any such derogation would automatically be negligent.

570. This is shown by Dr Card's first report where, having rehearsed the facts surrounding TQ61, including the limited references to a positive trial on Spread B and a negative trial on Spread A he recognised that "I have not seen any documents that provide details of the periods when the trials were conducted, where they were conducted on the pipeline ..., the parameters of the trials, how and who monitored them and the results, and how Ocesa and others evaluated the results of the trial. Without such information I am unable to assess the significance of the trial results and the reasonableness of Ocesa's decisions issued in relation to Saipem's TQ or indeed whether the trials affected works on the Lead Claimants' affected properties" {H1.1/1/87}. That was his opinion on reasonableness although his view was that "removal of the matting on slopes with gradients less than 20% would have increased the vulnerability of the wider spaced ditch diverters to erosion and sediment accumulation leading to their failure": see [8.3.22].
571. Dr Savigny's view was that matting was not called for on slopes less than 10% and was called for on slopes over 20%. For slopes in between, his opinion was that "this could have been a discretionary call on the part of those responsible for ROW reinstatement design layout based on some combination of the following considerations: the extent of ROW disturbance during construction; actual slope gradient (i.e. closer to 10% or closer to 20%); length of ROW slope in one direction along the pipeline centreline (i.e. longitudinal); uniformity of the ROW gradient both longitudinally and cross slope; off ROW terrain and vegetation conditions; spacing, cross sectional configuration, and standard of water bar construction on Ocesa ROW and the ODC ROW, if adjacent; optimization opportunities through custom fitting; schedule for revegetation; and prevailing season/climate as regards suitability for revegetation" {H2.5/7/1378}.
572. It can be seen from these extracts that neither expert laid down a hard and fast rule that any failure to apply erosion control matting on a slope exceeding 10% was automatically negligent, though for different reasons. The results of the trials are still not known in any detail; and I accept that each of the factors identified by Dr Savigny could reasonably inform a decision being made on the ground on whether or not to lay erosion control matting in a given location. It follows that I do not find it to have been automatically negligent to have omitted matting on slopes between 10% and 20%; but, given that the RECS design (a) involved an increase in the spacing of ditch diverters and a reduction in the robustness of their construction and (b) was adopted precisely because it was thought to be (and was) appropriate as a general design for a composite approach involving both ditch diverters and erosion control matting, the various criteria identified by Dr Savigny need to be considered with care on a case by case basis to see whether the omission of erosion control matting in a given location was justifiable.
573. Questions of workmanship are not susceptible to an overall ruling. There is evidence of ditch diverters failing in the face of stormy conditions soon after being installed, and of their being in a state of disrepair when the experts made their inspections. Where such observations were made on Trial Claimant properties, I will hope to deal with them in the relevant section of this judgment. It is not possible to extrapolate

from the Trial Cases to other cases because of the expert evidence that there was evidence of varying qualities of workmanship. One point to be borne in mind when reviewing the factual evidence of what was found on site is that “the erosion matting was designed to break down naturally with a period of time commensurate with the establishment of vegetation cover (i.e. measured in months). For this reason [Dr Card and Dr Savigny] did not expect to find any significant erosion mat laid at the time of reinstatement works, if at all” {H23.3/8/634}. Therefore, although some small remnants of fique matting were found during inspections, the fact that matting was not found in a particular place more than 10 years after the works were completed does not prove that it was not laid there in the first place.

574. There is limited contemporaneous evidence about where erosion control matting was placed either on the Trial Properties or generally. The position is not helped by the Defendant’s confusion about how erosion control matting would be shown on the GDS, Snr Gasca gave evidence that erosion control matting was used on Spread B during his time. His evidence ultimately was that the positioning of erosion control matting would have been marked on the ground and was not marked on the GDS {Day17/27:17} ff. The Claimants describe this evidence as implausible {C4/3.5/334} and point to the fact that he was not on site for the duration of the contract. The latter point is justified, but I do not regard his evidence as implausible. I accept that erosion control matting was not marked on the GDS on Spread B; but the overall level of competence and supervision that is evident when the evidence is viewed overall makes it highly unlikely that no thought was given and no decision made about where erosion control matting should be placed. Since it does not appear to have been recorded on the GDS or any other document that is now available to the parties, it seems highly likely (and I find) that decisions were made on site and would have been taken in the knowledge of the RECS design and (where applicable) TQ61. It does not follow that the RECS design or TQ61 were always followed and, if they were not (so that erosion control matting was omitted) the risk of erosion was increased. The evidence does not justify the conclusion that the contractual design was routinely ignored or that erosion control matting was routinely omitted. Snr Gasca said that the project’s erosion control measures were good and that erosion levels were well within acceptable limits ({E1/1/87} at [19.7]). That evidence was consistent with his 2001 Paper {K57/548/21} as explained in his witness statement at [19.8]. I accept that it was the genuine view of those involved in the project that the approach to erosion control measures had been “conservative” and in some respects went beyond what was strictly necessary.
575. Turning to Spread A, Snr Loeber’s evidence (which I accept) was that erosion control matting was denoted by zig zag lines. No Spread-wide analysis has been carried out that would justify overarching conclusions about whether or to what extent markings on the GDS represented a pattern of compliance or non-compliance with the contractual design. In any event, I would not be prepared to make a general finding that erosion control matting was always laid in accordance with markings on the GDS. It seems equally possible that on occasions decisions were taken on the ground either to increase or to decrease the amount of erosion control matting relative to what was shown on the GDS.
576. The experts’ analysis and the Courts’ viewing of the contemporaneous DVD and photographic evidence do not justify a conclusion that the use of erosion control

matting on either Spread always was or always was not in accordance with the contractual design. I bear in mind the contemporaneous documents that refer to erosion occurring during and after the works. However, to the extent that the Claimants continue to seek generic findings about the extent of the application of erosion control matting other than that it would have been generally in accordance with the RECS and (where appropriate) TQ61, the only generic finding that is appropriate to be made in the light of the expert evidence of Dr Savigny and Dr Card is that failure to comply with those contractual requirements would increase the risk of erosion and would require justification on a case by case basis.

577. While it is accepted at a general level that it is desirable for final revegetation and long-term geotechnical works to be carried out at the same time, there may be a range of reasons why final revegetation may be delayed beyond the date of long-term erosion works, ranging from the sensible to the culpable. Dr Card's review recognised that contractors were reluctant to plant in the dry season, and expressed no opinion that this was unacceptable, merely pointing to the recommendations in a paper prepared in 2001 where contractors raise this difficulty {H1.6/24/1396}. Further rational support for the desirability of not planting in the dry season comes from Dr Velez who, when arguing for dense application of seeds on sloping ground said that "to support this high population [of seeds], the soil requires correct management ... and an appropriate moisture level, which is possible if planting takes place at the beginning of the rainy season" {H5.7/10/1518}. It would be wrong to make a generic finding that any gap over and above a certain period between stages of the works (including between final geotechnical works and revegetation) either was or was not negligent, and I make no such finding. Having regard to the general desirability of revegetation happening at the same time as long-term erosion works, where there is a substantial gap and there is evidence that the length of the gap has contributed to a significant increase in erosion over and above what would have happened in any event, it may be a proportionate use of resources to look at the reasons underlying the gap in detail.

(ii) Longitudinal drains, energy dissipation structures and sediment traps

578. The Claimants submit that longitudinal drains are required wherever ditch diverters are called for; and that such drains should have embedded in them some form of energy dissipation structure ("EDS") {C4/3.5/337} at [885]. I reject each limb of that submission.
579. Dr Card maintained that longitudinal drains were required whenever there were ditch diverters across the ROW. Dr Savigny's opinion was that "longitudinal drains and off ROW measures are rarely required in terrain such as is present on and adjacent to the Lead Claimant properties. Rather, these structures are used in high relief settings involving steep terrain where runoff flow velocities and volumes are much greater" {H2.1/1/169}; and he expressed the opinion that widespread use of longitudinal drains and energy dissipation structures as Dr Card advocated was contrary to the design and construction practice standards in South America at the time of the Ocesa design and construction {H2.7/9/1755}. The difference of opinion between Dr Card and Dr Savigny was virtually complete.
580. It is convenient to start by considering whether there was a contractual requirement to place longitudinal drains along the entirety of the ROW:

- i) The RECS at [3.7.3] {K21/189/9} provided under the rubric “Off Right-of-Way” that “drainage ditches, energy dissipation, and other erosion control measures required by the specification shall continue beyond the limits of the right of way as may be required to return the runoff flow from the disturbed areas to natural drainage courses.”
- ii) The Claimants accept that the RECS does not expressly refer to longitudinal drains but refer to a drawing at {K27/262/1} in support of their submission. The drawing includes a plan of a ROW perpendicular to the natural slope, which shows an intercepting swale to the upper side and has the annotation to the lower side (with an arrow pointing to the lower end of the diverter) “Diverter to continue to natural drainage. Install energy dissipating structures as required to maintain ditch flow slope at 5% maximum”.²² The drawing also includes a plan and section of a ROW parallel to the slope.

581. Neither of these documents supports the Claimant’s position:

- i) [3.7.3] of the RECS does not require longitudinal drains at any point and stipulates that erosion measures shall continue beyond the limits of the ROW “as may be required”, which begs the question;
- ii) The words “diverter to continue to natural drainage” on the drawing of the ROW perpendicular to the slope do not mean that all diverters shall continue to a longitudinal drain. This is apparent from the sectional detail (D-D) immediately below which shows that the diverter does not continue to a longitudinal drain as there is no longitudinal drain there;
- iii) The drawing of the ROW parallel to the natural slope shows no longitudinal drains;
- iv) Dr Card in cross-examination ultimately accepted that the drawing does not require longitudinal drains either when the ROW is parallel or when it is perpendicular to the slope {Day25/7:}. He interpreted the annotation on the drawing where the ROW is perpendicular to the slope to mean that the ditch diverter was to discharge into a natural stream and that at the point of discharge it must have a flow “equivalent to an energy of less than 5% gradient” i.e. not into a longitudinal drain.

582. I reject the submission and Dr Card’s original evidence that there was a contractual requirement derived from the RECS that Saipem should insert longitudinal drains wherever there were ditch diverters. I also reject Dr Card’s opinion that the drawing of the ROW perpendicular to the slope meant that the ditch diverters were to discharge into natural streams. The effect of that interpretation would be that the spacing of ditch diverters would be determined by proximity to streams, which would immediately subvert the spacing principles established by the RECS.

²² Though not directly in point at present, I note in passing that Dr Card’s measurements did not disclose any gradient of a ditch slope greater than 5% {Day25/4:11}

583. Dr Card in cross-examination also referred to the EMP as he had done in the Joint Statement {H23.3/8/644}. The pages to which he referred were at {K9/35T/182}ff and do not require longitudinal drains as a matter of course wherever there are diverters.
584. I therefore turn to consider whether good practice required the insertion of longitudinal drains wherever there were ditch diverters or, given Dr Card's interpretation that the RECS required ditch diverters to discharge directly into streams, whether that was a requirement of good practice.
585. The Claimants rely {C4/3.5/339} upon:
- i) An extract from the Defendant's post-construction "BPXC Environmental Procedures for the Construction of Lines for Piping Hydrocarbons" {K41/437T/12};
 - ii) A photograph in the BP Amoco paper co-authored by Snr Gasca and Mr Mike Sweeney entitled "Novel Erosion Control Practices on Pipeline Rights of Way" {K57/548/6};
 - iii) "The Ocesa Civil Maintenance Records {K60/591T/2} identify a common failure of the erosion control measures as being the lack of geotechnical protection works to channel and transport water run off outside of the ROW as a cause of erosion by water, again demonstrating that the lack of [Longitudinal Drains] and [Energy Dissipation Structures] had exacerbated soil erosion and sediment transport to off-ROW drainage courses";
 - iv) The fact that a longitudinal drain was installed by ODC on LC74 and that Dr Card said that he identified a longitudinal drain on La Fe 2 where the ODC ROW had passed;
 - v) Dr Card's evidence that the function of Longitudinal Drains is to "trap sediment and allow the filtered water to go to the natural drainage channel. It is a very efficient system of collecting a number of discharge points of the ditch diverter system and just having one silt fence or silt trap to collect the silt before- to stop it discharging into the natural channel" {Day24/149:5}.
586. The Claimants' citation from the BPXC Environmental Procedures manual states that "[t]he lateral channel drains into the natural drainage systems at least every 10 cortacorrientes when on a ridge, or every 5 cortacorrientes when on sidehill terrain with a gentle gradient. Where it is not possible to deliver the caught waters directly into a natural drainage point defined in the above recommendation, due to the fact that the length of the required spillways would be too long, the cross-section of the channel must be increased gradually to increase its capacity and thus lower the number of drains needed, until a favourable point is found for the delivery where problems of erosion or gulying are not generated." This is not altogether easy to follow (at least in translation) but, taken in conjunction with the associated drawings 13.8-13.13 {K41/437/122}ff supports the proposition that where there are ditch diverters there should be longitudinal drains and that, where possible, the drain should discharge into a stream which is draining the relevant area: that this is the meaning of "natural water channels" in this context appears from [13.2] at {K41/437T/10}.

However, as the topography of the various Trial Cases shows, there are areas where streams are not readily available, as was the case with the ridge on LC50 or on the gentle slopes of LC54, so that the waters would have to be carried long distances before a discharge point can be found. [13.2] of the manual recognises that “good water management, especially of runoff waters, leads to a drop in the supply of sediments to the natural water channels which drain the intervened area.” It follows from this that there may be a balance to be struck between channelling all runoff waters directly into a small number of streams and dissipating some or all of the waters more widely along the land adjacent to the ROW.

587. The photograph at {K57/548/6} illustrates techniques that can be used, including the linking of ditch diverters to longitudinal channels. It does not suggest that channels must be used whenever ditch diverters are present any more than it suggests that wooden retention fences (which are also shown) must always be used.
588. The following points emerge from the 2002 Survey:
- i) The cited page {K60/591T/2} does not mention longitudinal drains. It states as the first of six “Factors” that “the principal factor causing deterioration of the ROW is runoff water, which in areas where there is a lack of vegetation and geotechnical works to channel the water outside of the ROW is causing the erosion ditches ... that can be seen in the land.” It does not say or imply that longitudinal drains should have been installed wherever there are diverter ditches;
 - ii) Other factors include the removal of fences by local inhabitants and cattle trampling the slopes;
 - iii) The worksheets from the 2002 Review {K60/591/5}-{K60/591/340} (originally D0002524) show that an extensive survey of the ROW was carried out and found numerous areas where repairs were needed. Dr Card referred to this general fact in his first Report at {H1.1/1/56} and elsewhere, and in his Second Report at {H1.4/22/801} and elsewhere. However, his references in his Second and Fourth Reports (where he carried out his more extensive review of contemporaneous documents) to the documents he identified as D0002524 do not identify the lack of longitudinal drains as a cause of problems: see {H1.6/24} at pages 1386, 1388 and 1440;
 - iv) It appears that a small selection of the survey reports have been translated and are at {K60/590T/1}. That selection includes as general descriptions of the problems encountered (not in this order): gullies forming due to run off water, gully formation caused by damage to ditch diverters due to the passage of heavy machinery to work on the valve, damage due to body of water neighbouring the ROW, ditch diverters in a poor state, ditch diverters in a poor state but working normally, fairly heavy runoff zones, medium-heavy runoff both on L and R, lack of vegetation, zone unprotected by vegetal layer, overgrazing, gully formation towards the bottom [of medium-steep gradient], zone of medium-heavy gullying, longitudinal gully ..., gradient somewhat steep, site of medium runoff, cattle and human path. References to runoff may imply that the situation would have been ameliorated by the presence of

longitudinal drains, but in none of the translated examples was the provision of longitudinal drains suggested as remedial works.

589. I find no support in the 2002 Survey for the proposition that longitudinal drains should be provided whenever there were ditch diverters.
590. Dr Savigny agreed with Dr Card that the topography on LC74 required the use of longitudinal drains and that there is photographic evidence from 1995 that ODC had installed one {L1/181}. Neither that fact nor the fact that ODC had installed a longitudinal drain on La Fe 2 demonstrates either that longitudinal drains were routinely inserted wherever there were ditch diverters or that good practice required them to be inserted.
591. The Claimants submitted that “the nuanced nature of [Dr Card’s] evidence was not fully appreciated” {C4/3.5/339}. That may be so, but his evidence before cross-examination was clear and neither qualified nor nuanced:
- i) “The ditch diverter ... intercepts the flow of water running downhill on the ROW and discharges the flow to the side where the flow discharges into natural watercourses via longitudinal drains ... “ {H1.1/1/48};
 - ii) “Longitudinal drains, also termed collector drains, are constructed at the side of the ROW, which then connect into natural water courses” {H1.1/1/55};
 - iii) “... my view [is] that longitudinal channels and energy dissipation structures along the ROW to control the discharge of water run-off to areas outside the ROW were necessary. The absence of such measures on LC38 will have exacerbated soil erosion and sediment transport to off ROW natural drainage features” {H1.4/22/942};
 - iv) “The combination of ditch diverters, erosion control matting, longitudinal drains and energy dissipation structures is to divert surface water from the ROW to natural drainage channels and water courses without excessive soil erosion and sediment transport over and above the baseline volume rate prior to ROW construction. It is the combination of the long-term geotechnical measures that provides the optimal resistance to soil erosion. Each component of the long-term measures needs to be functional and maintained until the revegetation on the ROW has become established. Failure of any component can cause failure of other components with consequent uncontrolled soil erosion and sediment transport” {H23.3/8/667}.
592. In their Joint Statement both Dr Card and Dr Savigny identified a 1990 Manual of Geotechnical Protection {K2/2T/1} as an appropriate reference for geotechnical construction practices in Colombia prior to the mid-1990s {H23.3/8/644}. That document recommended building “water breakers or transversal drainages” on ridges or mountain tops or on smooth slopes as illustrated in photographs 4.19-4.21 and Figures 4.26-4.29 {K2/2T/50}. It is noticeable that each of photographs 4.19-4.21 show what appear to be longitudinal drains on at least one side of the ROW; and each of figures 4.26-4.29 ({K2/3/54}ff) also show longitudinal drains on at least one side of the ROW. Figure 4.26 (which is an indicative design for a ridge or mountain top) states that the longitudinal drain should channel water to natural watercourses at up to

every 10 ditch diverters; Figure 4.28 (which is an indicative design for a smooth slope) states that it should channel water to natural watercourses at up to every 5 ditch diverters. This supports the proposition that in the period from 1990 to the mid-1990s, if the slope justified the placing of ditch diverters, longitudinal drains would usually, if not always, be placed too.

593. Dr Savigny's opinion was that longitudinal drains were required in "high relief settings" and that they were used more widely "in settings where subgrade soils are highly erodible." In contrast, his opinion was that they were rarely required in terrain such as is present on and adjacent to the Lead Claimant properties {H2.1/1/169}. In the Joint Statement he made the point that installing longitudinal drains may take additional land from the landowner. I accept that could be correct in some circumstances, though that is not obviously the case in the images to which I have referred from the 1990 Manual or the illustrative image at {K57/548/6}.
594. To my mind, Dr Savigny's most compelling argument in support of his opinion was that there will be areas off the ROW which are well vegetated, whether they be forest or farmland, and where the vegetation will of itself attenuate and disperse the flow of water off the ROW {Day37/11:3}. In such situations he described the intent of the ditch diverters as "to control water to an undisturbed area adjacent to the [ROW], and at that point it is discharging into terrain that is comparable to the other terrain on either – generally on either side of the [ROW]" {Day37/12:19}.
595. In the light of all of the evidence relied upon by either party, I am not satisfied that there is or was a hard and fast rule of good practice that required longitudinal drains wherever there are a series of ditch diverters and I reject Dr Card's evidence to that effect. While I accept that there may be circumstances in which dispersal to the land adjacent to the ROW may be unacceptable because of the longitudinal or cross-slope gradients, the anticipated volume of erosion and sediment that will be carried by the runoff water, or because of the erodibility of the surrounding soil or lack of vegetation (or a combination of all these things) I am persuaded by Dr Savigny's reasoning that there may be times when it is better to let the water discharged from a ditch diverter dissipate directly onto the surrounding land. I accept that this may have a concentrating effect at the point of discharge from the individual ditch diverter but it is clear from the evidence about the USLE and the need to introduce a sediment transport factor that further movement of the sediment will occur: see [531] above. So the question will be whether it is better to allow runoff across a broad front from a number of ditch diverters or to concentrate the runoff yet further and to discharge it in fewer places. I place no limitation on the list of possibly relevant considerations and accept Snr Loeber's evidence that the timing of the works and the prevailing weather conditions could be factors to take into account {Day19/73:21}.
596. I turn to the question of energy dissipation structures and silt fences or traps next, but remain sceptical (for reasons I will develop in greater detail when considering LC50) about the wisdom of channelling water over long distances and steep hills before debouching it into watercourses that, on the Claimants' case, have only a limited ability to deal with additional sediment.
597. Equally, I do not accept Dr Savigny's opinion as expressed in his original report unless it is recognised that, for these purposes, the steepness of gradients and the relative erodibility of the soil (both on and off the ROW) are variables which are

likely to interrelate, and that they are not the only variables to be taken into consideration. Beyond that, I find no assistance for these purposes in the attribution of labels such as “erodible” and “highly erodible”, particularly in litigation where it is accepted on all sides that the soils throughout the length of the ROW were generally fragile.

598. Although Mr Loeber gave an answer in cross-examination {Day18/89:9} ff that suggested that there should be longitudinal drains on both sides of a ROW throughout its length, the general thrust of his evidence was to the contrary {Day18/78:11} ff, {Day18/110:5} ff, {Day19/85:3} ff. There was confusion and contradiction in the Defendant’s factual evidence about how and when longitudinal drains were marked on the GDSs. Despite that confusion and contradiction, I reject the submission that the GDSs indicated a need for longitudinal drains wherever there was a continuous unbroken dual or triple line parallel to the direction of the pipeline installation; and the answer to that effect given by the Defendant in November 2011 was wrong {B3/4/70}. Had it been right it would have meant that for all or virtually all of the length of the ROW for which the GDS is available, Saipem agreed with those on the ground that longitudinal drains were required and then failed to install them; and yet (on the evidence) the omission would have gone without comment either from Saipem or the supervisory staff. On all of the evidence about the manner in which the project was executed, I am not remotely persuaded that could have happened.
599. The provision of EDSs within longitudinal drains (where they were installed) would equally be a matter of judgment, dependent upon the gradient of the longitudinal drain, the volume of water anticipated and the point where the water was intended to be discharged from the drain. If the intention was to discharge into a stream, sediment traps or silt retention fences may have been called for (because of the limited ability of most of the small watercourses to clear sediment) but I do not feel able to reach any prescriptive design formula. No submissions were made about how, when or by whom sediment traps or silt retention fences were to be maintained in the long term.

(iii) Fencing

600. The Claimants seek findings that:
- i) Adequate fencing should have been provided along the ROW (and overwidths) to isolate them from the presence of cattle until such time as vegetation coverage was substantially achieved;
 - ii) Such fencing was not, or not consistently or adequately provided. {C4/3.5/345}
601. It is common ground that cattle can cause damage if they get onto the ROW, particularly in the early stages of revegetation. The weekly report on Northern Section Spread B for 30 June 1996 referred to problems emerging with the adherence of the mulch to the soil, due to the transit of livestock shortly after it had been laid and when grass had begun to germinate. The erection of a temporary fence had been proposed but there had been no concrete proposal from Saipem to solve this “serious inconvenience” {K35/345T/9}. In August 1997 Ocesa’s Environmental Affairs Office recorded that “livestock-raising activities in 90% of the land through which the

North sector of the [Ocesa ROW] passes has made the development of the *Brachiaria decumbens* and *Brachiaria humidicola* improved grass types and other regional grasses more difficult. We have had to resort to enclosing the area with electric fences at the most critical points to protect them from cattle” {K48/516T/5}. In 2002 one of the factors leading to damage was identified as being that “in some cases the inhabitants of the area remove protective fencing so that cattle enter into the area and destroy the works” {K60/591T/2}.

602. The EMP stated that “the revegetated areas must be fenced off in common agreement with the property owner, in such a way that the access of cattle or people is restricted, using fences with three lines of barbed wire” {K40/417T/4}, a passage that was repeated in the Defendant’s post-construction Manual on Environmental Management Procedures at {K41/437T/18}.
603. It is clear from various photographs that the ROW was not routinely fenced off, though it sometimes was. The reasons for this lack of consistency are not clear but are likely to be site-specific in many cases. The August 1997 report leaves open the prospect that in some cases it may have been assessed that there was no appreciable risk against which fencing was required. There are obvious considerations both in favour and against fencing off the line of the ROW, even where there is a potential risk of damage. In favour is that, if there is a risk from people or cattle, fencing it off protects the ROW, which may be particularly necessary in its early stages of revegetation. Against would be that, as in LC54, fencing off the ROW would bisect fields, restrict access to water in some parts of the fields and restrict access across the farm. So an alternative solution is to remove livestock from the affected fields altogether for a time, or to fence them temporarily on one side of the ROW and then move them to the other, if that is practicable from the point of view of stock husbandry, milking and general farm management. Evidence was also given during the trial of fencing off the ROW (not on LC54) but creating a passage across it at a selected point or points. That evidence is consistent with implementation of the EMP statement that the ROW should be fenced off “in agreement with the owner”: the statement allows for no fencing to be provided if there is no or no appreciable risk or if the owner didn’t want it.
604. In comparison with other issues, the generic evidence and submissions on fencing are short. The risk of damage from cattle or humans will be most obvious to the landowner who will know how he would wish to use his fields. If he wished to keep cattle in fields which spanned the ROW, the terms of the EMP suggest that Ocesa would agree to provide fencing to enable him to keep his cattle off the ROW itself. I do not consider that this gives rise to an unlimited obligation to fence the ROW, for a number of reasons which interlink. First, the land is and remains the property of the landowner subject to the grant of the rights by the ROW Agreement and the easement as set out in the Public Deed. Neither Saipem nor Ocesa nor the Defendant were given the right to fence off the ROW by those documents: see [369] (particularly clauses 6 and 7) and [371]; nor has it been suggested that the provisions of the Mining or Petroleum Codes give the right to fence off the ROW without the agreement of the landowner. As against that, the pipeline works carry a risk of damage, with the result that good practice requires the carrying out of erosion control works as part of the pipeline works. But what else? It seems to me that fencing off the pipeline works raises different and additional questions because (a) the standard ROW Agreement

provides limited compensation for the effects of the works on productivity and (b) while it is the landowners' right to have access to his land at all times provided he does not obstruct the entrepreneurs' exploitation of their easement, even the entrepreneur's best efforts to restore and return the land after taking advantage of his easement may be nullified if the landowner takes immediate or premature access for his cattle.

605. These conflicting considerations are given real substance by the citations I have recorded at [601] above. The transit of livestock on new mulch on Spread B was regarded as "a serious inconvenience" by Ocesa in June 1996. It does not appear whether the decision in August 1997 to enclose the area of Spread B with electric fences at the most critical points was taken with the agreement of the relevant landowners, or whether the matter had been discussed with them, or precisely what nature of economic and farming imperative made the landowners put their cattle in the fields with the recently sown ROW. And the 2002 report that "in some cases the inhabitants of the area remove protective fencing so that cattle enter into the area and destroy the works" suggests that the absence of fences may not always be attributable to lack of willingness on the part of Saipem and others responsible for the works.
606. With these limited materials a generic finding that the absence of fencing involves negligence on the part of those responsible for carrying out the works is not justified.
607. Where fences were agreed to be inserted, the question of adequacy is also not entirely straightforward. On the assumption that the intention of the fencing was to protect vegetation on the ROW until it was established, the period during which it would be required might vary considerably from place to place. The EMP specification was for 3 strands of barbed wire, which to European eyes suggests a degree of permanence that would be positively disadvantageous if access to the ROW was going to be required within a period measured in months. There is no material that would justify the generic finding that a fence should last a particular length of time, or even that it should be barbed rather than electric. There is evidence (for example, in the case of LC54) of fences being damaged after installation. I do not accept that the fact that a fence gets damaged means that it was negligently constructed: damage to fences is a fact of farming life the world over and, if it happens, repairs are readily carried out. If a farmer finds that one of the fences on his land is damaged and chooses not to repair it, damage caused thereafter by animal incursion would (to an English tort lawyer) appear to be caused by his decision not to repair the damage to the fence of which he knew.
608. For these reasons I make no generic findings about responsibility for the maintenance of fences or the consequences of fences failing. But the facts of any individual case must be reviewed in the light of all relevant evidence to see where responsibility lies.

(iv) Long term protection of watercourses

609. The Claimants seek findings that:
- i) Long term protection works (such as revetment, earth filled sacks, concrete headwalls and erosion mats on the banks) should have been, but were not provided at water crossing points so as to prevent eroded soils from the ROW (and overwidths) from entering water sources and to prevent soil erosion from

the action of water flow in the channel removing soil from the channel base and sides;

- ii) Following ROW composition, soils which escaped into water sources during construction should have been, but were not removed and flow conditions in those streams should have been but were not reinstated to their pre-construction condition {C4/3.5/348}.

610. I have referred to the contractual requirements of the RECS and the PCS and Snr Gasca's evidence about how works were carried out at [315]-[317] above. I do not understand it to be seriously disputed that those requirements and the steps described by Snr Gasca, if adhered to, were consistent with and represented good practice. If it is disputed, I reject the grounds of dispute. What is certainly common ground is that "water crossings pose one of the more significant environmental impact risks associated with pipeline construction" {H23.3/8/650} at line 2429. Dr Savigny identified that specific attention was given to reducing the impact of traditional techniques for watercourse crossing in Canada in and from 1992 and that practice in Colombia probably lagged behind that in the United States and Canada {H23.3/8/650} at lines 2436ff. As in other respects, it is clear from his evidence that erosion control techniques were developing throughout the 1990s; but it is pertinent to remember that those constructing the Ocesa pipeline had access to the most modern expertise available through the joint venturers. And, given the extreme importance of watercourses to the agricultural communities through which the Ocesa pipeline passed, until less invasive techniques were developed, the need to use existing techniques to protect watercourse crossings and to minimise the adverse effects of sedimentation that may have occurred was paramount. Precisely what techniques should be used to protect a given watercourse crossing as and after the works were carried out, and whether it was thereafter necessary to remove sediment from river beds in order to restore them so far as possible to their pre-works condition would be a matter for judgement in each case. But I accept the generic proposition that the available techniques could and should have been used as necessary to prevent the sedimentation of watercourses so far as reasonably practicable.
611. The acceptance by Snr Gasca and Dr Savigny that disruptive techniques for stream crossings will inevitably have caused some sediment to get into watercourses was both correct and significant. Small quantities might not matter, because of the ability of the water flow to clear them with time; but if significantly detrimental sedimentation of a stream took place (whether or not reasonable precautions had taken place), steps could and should have been taken to remove it so as to prevent lasting damage to the watercourse. Snr Loeber effectively recognised this when giving evidence about post-works walkthroughs. The walkthrough would generally be limited to the ROW and adjacent to it, but it was made with the intention of picking up and remedying deficiencies in the works and problems caused by the construction {Day19/43:17} ff, which should have included deficiencies in and near to watercourses that were caused by the works. Damage to watercourses was evidently part of the remit, as evidenced by his recollection of one case where the inspectors were stopped by a farmer who said that his watercourse had been contaminated {Day19/44:7}.
612. The expert inspections revealed very limited evidence of permanent watercourse protection works {H23.3/8/654} at [14.4.3]. Only one record of walkthroughs

identifies removal of sediment from streams as a work to be done {J24/74T/39} and there is no record of removal of sedimentation in the available weekly construction records, though I am not convinced they would necessarily have merited being mentioned there. Factual evidence, apart from evidence of system from Snr Loeber and Snr Gasca, is either entirely or almost entirely absent. Absence of evidence is not necessarily evidence of absence, but in this area there is an almost deafening silence. It remains to be determined on a site by site basis whether there was or would have been sedimentation of particular watercourses that required or justified cleaning out while the initial works were being conducted or later, and whether sedimentation attributable to the ROW works has caused damage. That said, I have the clear impression from the evidence that clearing of sediment from watercourses as a distinct operation (as opposed to being part of or incidental to the works on a crossing as the main works were being carried out) happened rarely.

613. I consider the need for revetments and other works on a site-specific basis later.

(v) Failure of maintenance and its consequences

614. The Claimants' case on maintenance is very lightly sketched and is barely a matter of expert opinion. There is ample evidence of walkthroughs, punchlists and later surveys of the condition of the ROW. There is also evidence that problems, when encountered, were addressed: see [514]. There is no evidence, either factual or geotechnical, that would justify a finding of a systemic failure to carry out appropriate maintenance of the long term erosion works that were installed. Where appropriate it must be dealt with on a case by case basis. I have already rejected the Claimant's generalised case that there was a systematic failure of the long term erosion works that were installed: see [512] above.

615. For similar reasons, I make no findings of a generic nature about the consequences of any failures that did in fact occur. Given that the purpose of geotechnical erosion control works was to prevent damaging erosion and sedimentation, it is obvious that a failure to install appropriate geotechnical works either adequately or at all had the potential to cause or permit increased erosion and sedimentation of land and watercourses. Whether it did so and did so to an extent that caused significant adverse consequences for a Claimant can only be decided by reference to site-specific relevant evidence.

Cattle and comparator farms

616. I use "cattle" in this heading as a compendious term for the alternative causes of erosion advanced by the Defendant on the basis of Dr Savigny's evidence. The following short points may be noted:

- i) Background erosion is an acknowledged fact. The rate of background erosion is dependent upon a number of variables and will itself vary: see, for example, [289] and [526] above;
- ii) Cattle can cause erosion on and off the ROW, as Dr Card accepted. {Day25/180:11}. The dispute about the amount of erosion attributable to cattle on the Claimant's farms is not susceptible to generic findings;

- iii) Farm management and overgrazing can cause disturbance of the soil and affect vegetation cover both on and off the ROW and can therefore contribute to rates of erosion. Whether and to what extent it does so in a given case is not susceptible to generic findings;
- iv) The ODC pipeline will have disrupted the land as described elsewhere in this judgment. Only two generic points are certain. First, the ODC works will inevitably have reduced the layer of unmixed topsoil available for reformation because some mixing of layers was inevitable, just as it was with the subsequent Ocesa works. Second, where the two pipelines followed the same route, the potential for erosion from the ODC ROW would have been similar to the potential for erosion from the Ocesa Row, subject to the fact that the Ocesa ROW had already been disturbed by the ODC works and will therefore already have been in a more fragile condition than when those constructing the ODC ROW started their works on land that had not previously been subject to such disruption. The extent to which the ODC ROW caused erosion or sedimentation is not susceptible to generic findings;
- v) Deforestation increases rates of erosion by reducing the protective cover and leading to a reduction in organic content. The effects of deforestation may be ameliorated by leaving cut materials on the ground. Dr Card tended to dismiss the effects of deforestation and asserted that the background levels of erosion on the deforested lands around the ROW were insignificant when compared with the erosion he considered to have happened on the ROW. His evidence is tempered by Dr Tobon's frank acceptance that "in general terms, surface erosion and sedimentation normally increase dramatically in a catchment area when the forest is removed" {H7.3/3/614}. I accept Dr Tobon's qualitative evidence on this point. The relative impacts of deforestation and the ROW are not susceptible to generic findings that can be extrapolated to individual cases.

617. There are factual disputes about what was found on comparator farms, which require individual resolution. In the most general of terms, I find that the evidence from and around the ROW on the farms alleged to be affected by the Ocesa pipeline is more compelling than comparison with the conditions on comparator farms, though the comparative exercise is in some cases informative, as appears below.

Hydrology and Water Quality

The experts

618. Hydrology and water quality were important elements of the Claimants' case that they had suffered substantial damage to their streams as a result of sedimentation from the ROW. The case was set out in detail in Appendices 1 and 1A to the 2012 Further Information {B2.3/34/467}, {B2.3/34/467}. In briefest outline, the case being advanced was that sedimentation had led to increases in levels of iron which in turn led to increased colouration and turbidity and made the water offensive to taste and smell. The increase in iron was alleged to give rise to risks to the health of humans and animals. Increased concentrations in other elements were also relied on in the pleaded case.

Dr Tobon

619. Dr Tobon and Dr Penuela were the experts who were intended to support this area of the case. Dr Tobon's academic career shows him to be fully qualified to act as an expert though, in common with most of the other experts in the case, he had not previously acted as such in contested litigation in this jurisdiction. The basic division of responsibilities was that:
- i) Dr Tobon carried out field inspections and took water samples and, on the basis of those inspections and the laboratory analysis of the samples, expressed clear views on the significance of the samples as supporting evidence for his views (and the Claimants' case) on the causation of sedimentation in the streams. His sampling, reporting of sample analysis and expressions of opinion were not merely based upon iron, colour and turbidity: he also, from time to time, sampled and reported on the sample analysis for *E. coli*, total coliforms, aluminium, total solids, and other parameters. He expressed opinions based on the analysis results both by reference to WHO criteria and also by reference to findings on Comparator Farms;
 - ii) Dr Penuela reported as an expert in environmental chemistry. His instructions were to focus "on analysing the iron levels, manganese levels, turbidity and pH of the water sources in the affected farms. This focus was chosen as a result of initial observations and analysis by Dr Conrado Tobon and Dr Franco Obando showing that these four parameters had altered and were outside normal levels for water sources" {H9.1/2/67}.
620. The importance to the Claimants' case both on causation and on damage of the evidence of both experts about water quality was clear and appears from their written opening {C4/3/34}, particularly at [420, 422, 469.3, 470]; and it was underpinned by Dr Tobon's sampling results. Reflecting the interlinking nature of the two experts' evidence, Dr Penuela was scheduled to give evidence immediately after Dr Tobon. However, after the end of Dr Tobon's evidence on Day 29 of the trial (25 November 2014) the Claimants announced that Dr Penuela was not going to be called because, as they put it, they had "considered ... whether [they] need[ed] still to rely on the evidence of Dr Penuela" and had concluded that they did not.
621. A fuller explanation of the decision was given on 2 December 2014 by letter from Leigh Day to Freshfields {N/2/1}. It appears from the letter that Dr Tobon had at some stage informed Leigh Day that, in relation to the Trial Case properties, he did not wish to rely on his water quality sample results. "Professor Penuela relied principally on the sample results of Dr Tobon for the Trial Case properties. During meetings in London immediately prior to his giving evidence, it became apparent that he had limited familiarity with sample locations and conditions on the Trial Case properties such that his evidence was of little assistance in resolving the disputed issues on water quality sampling." The letter went on to say that "in light of the above, the Claimants do not consider the water quality sample results sufficiently reliable to support allegations of an impact on water quality in relation to the Trial Case farms or to support arguments on causation. For the above reasons, the Claimants do not pursue a case in relation to water quality on the Trial Case farms in reliance of [sic] experts' water quality sampling results, comprising both laboratory sample results for all parameters tested (including but not limited to iron, manganese,

solids and turbidity) and water quality field samples for turbidity, pH, temperature and dissolved oxygen. For the avoidance of doubt the Claimants continue to rely on Dr Tobon's field measurements relating to sediment depth, channel width, discharge rate, and water sheet depth. Further, the Claimants do not allege physical harm to human or animal health caused by a decline in water quality. The Claimants continue to allege by way of factual witness evidence (to the extent this is applicable to each Trial Case property) that during and post construction of the pipeline, the water became coloured, sedimented, full of earth, tasted different, "muddy" and/or "like iron" and/or smelled bad, and this affected the Claimants' use of the water."

622. In the light of these concessions, I am not required to make findings about the water sampling exercise or what it might have shown. But in closing submissions the Defendant has submitted that Dr Tobon's evidence about his water sampling (though now withdrawn) shows that he lacked objectivity and scientific rigour, that he did not understand his duties to the Court, and that he presented himself as an advocate for the Claimants' case. They go further, submitting that his analysis of water samples reveals bias and that the Court can have no confidence in Dr Tobon's reported observations relating to the condition of streams. That, taken in conjunction with his evidence to the Court about whether or not he had Dr Card's draft report and findings, and his citation from an academic text that is criticised by the Defendant, leads the Defendant to invite the Court to place no reliance whatsoever on Dr Tobon's evidence. These are very serious allegations to make against a witness of undoubted distinction in his field, and I must address them fully.
623. The Defendant's attack on Dr Tobon identifies 11 separate areas of criticism {C4/4.7/336}ff, of which the first six are put at the forefront of the submission. They can be briefly summarised as follows:
- i) Claiming expertise which he did not have: see [624] below;
 - ii) Selection of water sampling locations: see [627] below;
 - iii) Treatment of water sampling variables: see [630] below;
 - iv) Misplaced reliance on WHO guidelines: see [635] below;
 - v) Analysis and interpretation of sample results: see [636] below;
 - vi) Evidence about whether or not he had Dr Card's reports: see [650] below;
 - vii) Reliance on DVD evidence: see [651] below;
 - viii) Citation from an academic text: see [656] below;
 - ix) Treatment of comparator farms: see [660] below;
 - x) Evidence about the ODC ROW: see [662] below;
 - xi) Miscellaneous points on his evidence about LC50, LC54 and LC74: see [663] below.

624. *Claiming Expertise:* In his first report Dr Tobon tabulated the analyses of his water samples and expressed opinions about their implications for water quality and causation. {H7.3/3/683} provides a typical example: against the total iron reading for one sample Dr Tobon gives as his interpretation of the water analysis result that “This value exceeds the values accepted by the WHO. These high concentrations of total iron in this caño are associated with sediments that were deposited on the caño’s bed and that caused the bed’s narrowing.” It is now entirely clear that Dr Tobon is not an expert on issues such as the quality of water for human and animal consumption and that he would not be able to provide an objective interpretation such as I have just set out (which, for shorthand became known as “the third column”) {Day28/10:10}, {Day28/63:6} {Day28/166:1}.
625. Three criticisms are made, which are interlinked. First, Dr Tobon should not have included the third column and other interpretations of water quality and fitness for human or animal consumption as it was outside his area of expertise. Second, Dr Tobon should not have signed the expert’s statement of truth asserting that all matters in his first report were within his field of expertise. Third, when coming to give evidence to the Court, Dr Tobon should have made clear his absence of expertise in this area rather than leaving it to be established in cross-examination. Applying the high standards applicable to experts in contested English litigation, I accept all of these criticisms as justified. However, there are very substantial mitigating circumstances. First, Dr Tobon said in evidence that he told Leigh Day he was not an expert in this area {Day28/10:16}. Even if he did not, the obligation on the legal team to ensure that an expert does not give evidence which he is not qualified to give is always present and is particularly important when dealing with experts who are not experienced in the demands and technicalities of contested English litigation. Second, Dr Tobon had referred to his lack of expertise about water quality for animal consumption and about the levels of Manganese that generates toxicity or health problems in answering Part 35 Questions, which will have been done with the assistance of the legal team {H7.5/44.2/1289.29}; and in his joint meeting with the Defendant’s water quality expert he is recorded as having said that he was “not an expert on issues such as quality of water for human or animal consumption” {H23.5/15/1230}. As for the question of clarifying the position when he came to give evidence, I consider that any criticism is more fairly directed at the legal team who by then knew Dr Tobon well. My instinctive reaction (not having heard argument specifically on the point) is that it is a responsibility of those having conduct of the trial to decide (after reviewing all of their evidence) what matters are going to be brought to the attention of the Court by way of correction or otherwise at the start of a witness’ evidence, whether that is done in answer to specific questions in chief or the expert “volunteers” matters. This will involve prior dialogue with the witness, and it may be that the witness’ (privileged) answers will deflect the lawyers. Whether I am right or wrong in my instinctive reaction, I would be slow to criticise someone such as Dr Tobon who is unfamiliar with English procedure and the Court’s expectations and who would hope and expect to be guided by others about how he should assist the Court. I do not think that the fact that he has been provided with the normal information about an experts’ duties alters the position; my attitude would be different if he were an experienced English litigation expert. Finally, when tackled on his lack of expertise in cross-examination, he readily acknowledged it.

626. For these reasons, while I accept that the criticisms are accurate, they would not on their own justify the wholesale discounting of Dr Tobon's evidence.
627. *Water sampling locations:* The Defendant submits that Dr Tobon's water sampling locations were chosen irrationally. Specifically, the Defendant criticises the fact that on his first visit Dr Tobon took samples where the ROW intersected streams while on his second visit he set out to take samples 50m above and 50m below the point of intersection {C4/4.7/339} at [51] & [52]. In addition it is said that his first sampling exercise assumed that, if the Ocesa pipeline construction impacted water quality, it would be evident at the ROW crossing and that his explanation of his second sampling method, namely that he was testing the null hypothesis that there are no differences between the concentration of any element upstream or downstream of the ROW if there is no impact from the ROW, is not to be accepted.
628. I reject both of these criticisms and do not consider that they support the submission that Dr Tobon's sampling was to try to collect evidence in support of the Claimants' case rather than to try to test the case objectively:
- i) I accept the explanation he gave in his report at {H7.3/3/653} that he initially visited and photographed "particularly where the pipeline crosses the stream or spring. ... Therefore, initial observations were made during this visit regarding the type and magnitude of impact on the sources of water at the crossing point of the [ROW]." In those circumstances it was not irrational, nor was it based on mere assumption of impact, that he then carried out the first water sampling "at the crossing point of the pipeline and right of way with the stream i.e. at the point of impact on the water." He sampled at the crossing point because he thought he had seen evidence suggesting that there had been an impact at that point;
 - ii) I do not consider it irrational for the second sampling to have been based on a methodology that assumed that the upstream sample would represent the natural condition of the stream and that the downstream sample would reflect water altered by the construction of the pipeline {H7.3/3/654} at [2.3.1.11]. To my mind, it is then correct to describe the hypothesis being tested as being that if there is no impact from the ROW there will be no differences between the concentration of any element upstream or downstream of the ROW. Other criticisms might be made, such as whether it is reasonable to hypothesise that the actual point of crossing the ROW may still be a "point of impact" many years later; but that is another matter.
629. The second criticism under this head ({C4/4.7/340} at [54]-[58]) relates to the fact that, although he set out to take samples in pre-defined places, in fact he did not do so; and his evidence (to which I have already referred) about taking (or not taking) samples from stagnant water. While it is legitimate to question where and why he took his samples, I reject the suggestion that he set out to obtain samples that would provide results intended to be biased in favour of the Claimants. Similarly, I am not persuaded that his taking of individual "spot samples" on comparator farms without having any a priori method for defining where such samples should be taken as evidence of deliberate bias. It raises questions about whether the samples are representative, but that is another question, to be assessed elsewhere.

630. *Water sampling variables:* There are two matters relating to Dr Tobon's choice of what he sampled for that the Defendant submits show a lack of objectivity on his part:
- i) On his first visit to the Lead Claimant properties Dr Tobon tested for total coliforms and *E. coli* in water sources used for human consumption. He did not test for these variables on subsequent visits;
 - ii) On his first visit to the Lead Claimant properties and comparator properties, Dr Tobon tested for colour. He did not test for this variable on subsequent visits.
631. Dr Tobon was cross-examined on both of these changes. He undoubtedly knew it to be the Claimants' case that stream water had been rendered unfit for human consumption by the Ocesa pipeline works. He must also have known that *E. coli* and total coliforms (if found) would (at least as a working assumption) have their origins in faeces and not in the pipeline works; and he knew that their presence would independently render stream water unfit for human consumption in accordance with the WHO guidelines to which he referred {H7.3/3/875}. It is also correct (and he recognised) that the samples tested provided consistent evidence of the widespread presence of each. His evidence was that the decision not to continue testing for *E. coli* and total coliforms was his and that he had communicated that decision to Leigh Day. His reason for doing so was that he is a hydrologist and he decided to focus on the hydrological factors and everything that was related to hydrology; in other words he decided to analyse the aspects that he thought were relevant in order to be able to identify any level of damage that might have been caused (by the pipeline works) to the streams in the farms {Day29/75:6} ff. He later described his objective as being "to find variables that would ... help to show the court as variables that were related to what I was observing in the field. So I went eliminating variables that might give the wrong impression and I focussed on the variables that, at that time, and that I still believe are relevant to the case that I have been asked to analyse" {Day29/77:4}.
632. This answer is understandable in relation to eliminating testing for *E. coli* and total coliforms, which are not affected by the mechanism of damage that Dr Tobon thought he had seen. It is less understandable in relation to the elimination of colour, which was asserted as a marker of damage attributable to the pipeline by the Claimants' pleadings to which I have already referred. However, I had no sense at the time that Dr Tobon's reference to eliminating variables "that might give the wrong impression" meant or implied that he was eliminating variables that he thought might be adverse to the Claimants' case; and I am not now persuaded that was his meaning. Review of this section of his evidence (including listening to some of it again as well as reading it) leaves me convinced that his reference to "giving the wrong impression" was an example (not unique in the course of this trial on either side) of intended sense being lost in translation.
633. I am also conscious of the fact that decisions about testing in litigation such as this, even if initially made by an expert, would be taken in conjunction with and endorsed by the legal team. Any legal team competent to conduct litigation such as this (as the Claimants' team certainly is) would have appreciated the potential significance of *E. coli*, total coliforms and colour. Furthermore, there are considerations in litigation such as this of which the Court has either partial or no information or understanding, including funding constraints. While the omission of colour is surprising, the Claimants were not under any obligation to continue testing for the omitted variables:

if the Defendant had wanted to conduct further tests on the omitted variables, it was open to it to do so.

634. On the material advanced by the Defendant in support of this criticism, I am not persuaded that the later omissions of *E. coli*, total coliforms and colour cast doubt on Dr Tobon's integrity as an expert.
635. *Reliance on WHO Guidelines:* The Defendant established to my satisfaction that Dr Tobon had misunderstood and misapplied the WHO guidelines upon which he relied on iron, colour and turbidity and I accept its submissions to that effect {C4/4.7/345} at [66]-[69]. That goes to his (now acknowledged) lack of expertise in the area of water quality. It is a factor to be taken into account in the assessment of Dr Tobon as a witness. It does not of itself demonstrate bias (intentional or unintentional). There is also substance in the criticism that he was not prepared to accept that he was wrong even when it should have been clear to him that he was (e.g in relation to iron at {Day28/91:25} - {Day28/95:23}). This was not an isolated example (see below) and informs my overall view of Dr Tobon as a witness.
636. *Interpretation of Sample Results:* The Defendant submits that Dr Tobon "tried to analyse the results in a way that supported the Claimants' case, and in doing so revealed his inherent bias in the Claimant's favour" {C4/4.7/346} at [71].
637. The Defendant first highlights Dr Tobon's treatment of the results for iron, colour and turbidity on two locations on LC54 and one on CF54, the samples being taken two days apart in November 2011. The material is set in convenient form at {C6/16.2/1}. I summarise the essential material which founds the complaint below:
- i) For iron:
 - a) The two results from stream W2 on LC54 were 1800 mg/l, of which Dr Tobon said "This level far exceeds, by a factor of 6, WHO safe levels, which indicates that the water of this stream is not appropriate for consumption", and 1788 mg/l, which Dr Tobon described as being slightly below levels in samples from another stream on LC54;
 - b) The result from stream W1 on CF54 was 2,328 mg/l, which was 30% higher (i.e. worse) than the highest result from LC54. Dr Tobon's column 3 comment was that "the total iron content was found to be similar to the values found in some affected streams on LC54 farm. This result appears to be related to the fact that there was a rainfall the night before". He made no reference to the fact that it exceeded by many times what were (in his view) the WHO safe levels or the fact that it was significantly worse than the results from LC54;
 - c) Conversely, when analysing the results from LC54 he had not referred to the fact that they were significantly less than his result from CF54.
 - ii) For colour:
 - a) The two results from stream W2 on LC54 were 303 UPC, which Dr Tobon interpreted as "... apparent colour exceeds safe levels by a

factor of 27. ...”, and 231 UPC, which Dr Tobon described as “...exceeds the acceptable WHO level by (15 UPC), indicating that this parameter is showing the effect of water pollution at this point in the streams”;

- b) The result from stream W1 on CF54 was 274 PCU which falls between the two results from LC54. Dr Tobon made no reference to WHO levels or to pollution as he had done for those results. His interpretation was “According to the test results, the value of 274 UPC is between the values found in the streams affected, which seems to indicate the existence of an excess of some element in this stream, which affects the colour on the date the sample was taken.”
- c) When analysing the results for colour from LC54 he had not mentioned that the reading of 231 UPC was lower than the result from CF54. Nor had he made any qualifying remark to suggest that the LC54 results were transient as he did on CF54 by referring to the colour being affected “on the date the sample was taken”.

iii) For turbidity:

- a) The two results from stream W2 on LC54 were 25.1 NTU, which Dr Tobon interpreted as “... this indicates the presence of elements in the water generating a turbidity level, which exceeds by a factor of 5 WHO safe levels”, and 20.7 NTU, which Dr Tobon described as “... exceeds the acceptable level; indicating that this parameter is also showing the effect of water pollution, at this point in the stream”;
- b) The result from stream W1 on CF54 was 24.1 NTU, which falls between the two results from LC54 and is just below the higher LC54 level which he had described as exceeding by a factor of 5 WHO safe levels. Dr Tobon described the CF54 result as “low, which indicates that there is a lower quantity of elements in the water, that affects the turbidity and colour than that of the streams that were affected by Ocenca.” He made no reference to WHO safe levels, though consistent interpretation would have meant that the CF54 result also exceeded them by a factor of about 5;
- c) When analysing the turbidity results from LC54 he had not mentioned that the reading of 20.7 NTU was lower than the result from CF54.

638. Dr Tobon had no satisfactory explanation for these differences in his treatment of sample results from LC54 and CF54. He said that he had looked at each figure and analysed each figure individually and made the corresponding comment {Day28/165:4}. I accept he looked at each figure individually; but he also cross-referred, as when pointing out that the figure for colour on CF54 was between the values for the streams on LC54 which he considered to be affected by the pipeline. And even if he had only looked at the CF54 results alone, there is no reason why he should have ignored the WHO criteria that he considered so important when interpreting the LC54 results. Nor is there any rational explanation for describing the CF54 turbidity result as “low”.

639. A further substantial submission is made about Dr Tobon's interpretation of the results he obtained from his water sampling within the same stream. Where he obtained results which showed (or which he thought showed) an increase in iron, manganese or turbidity downstream of the ROW, he would attribute that to the construction of the pipeline. However, where his results showed a *decrease* he engaged in unconvincing explanations to avoid the corollary, namely that the ROW had *not* had an impact. To the contrary, he still maintained that his results showed that the pipeline had affected the stream. One example (there are others) illustrates his approach. He took two sets of upstream and downstream samples on stream W2 on LC54. His first set showed *higher* turbidity but *lower* iron and manganese downstream than upstream. Instead of acknowledging that the iron and manganese results were contrary to the Claimant's case (to which he was lending his expert support on this point) that the impact of the pipeline would have been to lead to *higher* iron and manganese downstream he gave the following explanations:
- i) The sample was taken from a pool of water displaying stagnation so that the decrease in its iron content may be explained by a possible decantation or settling of the iron. Alternatively it might be due to a greater discharge rate than seen on some other streams {H7.4/4/916} column 3;
 - ii) The downstream manganese result "decreases slightly" (0.218 mg Mn/l upstream: 0.122 mg Mn/l downstream) away from the ROW "which also appears to be related to the effect of the stillness of the water in the pools downstream of the ROW": {H7.4/4/917} column 3.
640. When he took his second set of samples, total iron and turbidity were *lower* downstream than upstream and manganese was the same for both. Dr Tobon's explanations were:
- i) "The concentrations of iron and manganese up and downstream from the [ROW] are similar, which is related to the high discharge of the stream during the sampling day, since it was raining the night before. However, likewise, this stream also has a constant discharge rate and a well-formed channel, which shows no major effects from the right of way, the water discharge is therefore high and constant, even during the dry season." {H7.4/4/918} column 3;
 - ii) "Turbidity levels in this stream, like element concentration levels, are constant, both up and downstream from the right of way, which is related to the normal washing of sediment that occurs when there is a storm runoff" *ibid*.
641. When he reviewed these sets of results he wrote: "Despite the small amount of accumulated sediment, water quality in this stream more likely than not was affected by the pipeline's construction more than by anything else. This is evident from the results of the analysis of the water showing a significant increase in turbidity and iron and manganese concentration down stream of the ROW as compared to values upstream of it." {H7.4/4/919} at [2.5.3].
642. The following points emerge:

- i) The only result for turbidity, iron or manganese that showed an increase downstream was the turbidity result from the first set. Dr Tobon agreed that the increase in turbidity was insignificant {Day29/9:14};
 - ii) Dr Tobon’s explanation of the first set of iron and manganese results (that they came from a stagnant pool) is not consistent with (a) his statement that the stream had a well formed channel and a high and constant discharge rate even in the dry season and (b) his evidence that he had not sampled from stagnant water {Day29/75:12};
 - iii) Nowhere in his reports did he acknowledge the fact that, in the absence of the special explanations he was offering, the results did not support the thesis he was supporting and advancing.
643. When confronted in cross-examination with the obvious fact that *none* of the results supported his conclusion in [2.5.3] Dr Tobon had no reasonable explanation for what he had said {Day29/9:14} ff. I do not interpret his reference to the results being “a headache” as meaning that he had knowingly set about misrepresenting the effect of his results in a manner that was designed to support the Claimants’ allegations. But his absence of any reasonable explanation was surprising and a reason for concern both when this example is viewed on its own and in the light of the other evidence relied upon by the Defendant under this head of criticism.
644. As further material in support of this area of criticism, the Defendant refers to Dr Tobon’s treatment of the water quality results from samples taken from the water source for the old house and the source for the new house on LC74. As will appear later, it is a feature of LC74’s claim that he moved house because his water supply at the old house was unacceptable. Both sources were on stream W1. Dr Tobon’s results²³ were:

	Old House {H7.4/4/984}	New House {H7.4/4/986}
Iron	1.791 mg/l	1.830 mg/l
Colour	409 UPC	480 UPC
Turbidity	48.1 NTU	53.8 NTU

645. It should immediately be recorded that Dr Tobon’s column 3 comment on the result for turbidity at the old house source recognised that it was lower than the value seen at the new location. But instead of recognising that all three of the relevant results at the new house were worse than those for the old, Dr Tobon added a note at the end of the old house results stating that “According to the results of evaluation of concentration of elements and bacteriological analysis of waters at the new location where the water is drawn ... and the location in the stream where it was previously usual for water to be taken for household consumption ..., it is evident that the change of location brought about an improvement in water quality, given that the new location for drawing water is well above the area affected by the construction of the Ocesa pipeline” {H7.4/4/985}.

²³ There were other results obtained, but it was and is not suggested that there were material differences between those for the old source and the new. Both sources were analysed as showing substantial levels of total coliforms.

646. Dr Tobon's general observation in a note at the end of the new house source results was "It should be noted that a rainfall event occurred in the area for the entire night prior to the sampling visit. This had a marked effect on the concentration of elements in the water. In general terms, the concentration of the variables analysed demonstrates the effect of rainfall events on the quality of the water, given that these three small watercourses respond differentially to the rainfall events, transporting part of the sediment load and matter which accumulate on the stream beds" {H7.4/4/988}. According to his report, the samples for the old and new house sources were both taken on 29 November 2011 so that any rainfall event would have been of equal materiality to both sets of results {H7.4/4/983}, {H7.4/4/986}. In his itemised comments on the results for iron for each watersource, Dr Tobon referred to the stream waters having been contaminated by iron and that "this is related to a rainfall event the night before the visit" {H7.4/4/984}, {H7.4/4/987}; but he included no note suggesting that the old house results had generally been affected by the rainfall event as he did with the new house note that I have quoted.
647. Dr Tobon was cross-examined about the note at the end of the old house results. He said that he would have to go through the information data by data in order to clarify why he had worded the note as he had {Day29/130:2}. The points had, however, been clearly flagged in the Defendant's written opening with the clear assertion that his willingness to make the statement he did in the note to the old house results "betrays the obvious bias" {C4/4/748}. Making all possible allowances for the pressures of litigation, his statement that he could not provide an explanation for that note without going back through the information data by data was and remains profoundly unsatisfactory, as it leaves the Court with no explanation for what, in the absence of an explanation, is an unjustifiable state of affairs.
648. Dr Tobon was not asked about his note at the end of the new house results. But the discrepancy in his treatment of the two sets of results is closely similar in kind to the discrepancies in his treatment of the results from LC54 and CF54, and to his note at the end of the LC74 old house results about which he was cross-examined as I have identified above. In those circumstances, I do not consider that there is any unfairness to Dr Tobon in considering his treatment of the LC74 results, not least because (as I have said before) time constraints during the trial made it quite impossible to cross-examine on all points of material dispute.
649. I have reviewed this aspect of the evidence in detail because it may have serious implications. It fully justified the Claimants' suggestion before he had finished giving evidence that his column 3 evidence should simply be stripped out; but it goes further than that. I have gone through all of the relevant parts of Dr Tobon's written and oral evidence again before forming a view on this particular criticism, making every allowance that I can for the fact that Dr Tobon is not an experienced litigation expert and for what he says about the involvement of the Claimants' legal team. Having watched Dr Tobon give his evidence courteously and (usually) clearly in the face of considerable (though proper) pressure and having reviewed all of the materials that I have been asked to consider in closing, I am not satisfied that Dr Tobon was guilty of knowing bias in his approach to these results; but I find that either he started with the conclusion that he intuitively thought he should reach and failed to recognise that the data contradicted that conclusion or, although he started with the data, he was subject to unconscious bias that led him to form conclusions that his scientific training should

not have permitted. Whatever the precise thought processes that led to the outcome, the result was bias manifested by a willingness to express conclusions for which there was no reasonable or scientific justification.

650. *Cross-referring to other experts:* I have already dealt with Dr Tobon's referring to reports of other experts that he had not independently verified: see [498.ii)], [499.ii)], [500]-[501] above. As I have made clear, it is unacceptable for an expert to accept material in this way. Making all due allowance for Dr Tobon's inexperience of English litigation and what appears on the available information to have been the involvement of the Claimants' solicitors in this process, it would be wrong to conclude that Dr Tobon's acting in this way of itself demonstrates bias. That said, the willingness to accept material which is said to come from another expert without verifying the source or the context is a worrying indication of a lack of independence and objectivity, quite apart from the fact that its prevalence makes the Court's task much more difficult when trying to decide what is Dr Tobon's independent view and what is not.
651. *Reliance on DVD evidence:* The Defendant submits that Dr Tobon's reference to construction DVDs is another example of his willingness to act outside his proper field of expertise {C4/4.7/355}. It cites one clear error where Dr Tobon asserted that a still taken from a DVD showed "deposition in a stream bed of soil excavated from the ROW strip during the construction of the Ocesa pipeline. The soil was deposited directly into the beds of the streams, canos and spring sources" {H7.3/3/619}. In fact the still showed a substantial sediment trap behind a gabion wall which separated it from the main course of the stream at a significant crossing, the purpose of which was to catch soil and to prevent it getting into the main stream.
652. The most troubling point about this error is that *if* Dr Tobon had looked at the video from which the still was taken, it should have been obvious to him without the need for any particular expertise that the still did not show the stream bed but an area to its side. The reason why this is troubling lies in the previous head of the Defendant's criticism, that of accepting information from others without verifying it. I am left with the choice that *either* Dr Tobon had not looked at the video *or* his interpretation of what he saw on the video demonstrates a complete lack of understanding of what he saw. If this were the only example of citations from videos, it might be insignificant in the overall scale of things; but in his supplemental report at [10.16] he cited 28 extracts from the disclosed videos as support for his expression of opinion that "from the evidence seen in the videos examined, we can conclude that much of the sediment that built up in the streams, both on the strip traversed by the right of way, and in the water downstream of it, was deposited there during the construction of the Ocesa pipeline, or eroded from the unprotected mounds of soil deposited on each side of the ROW" {H7.5/48/1447}. I have looked at all of the videos; that exercise alone would leave me in a state of complete uncertainty about whether Dr Tobon looked at some, all or none of them. My uncertainty is increased by Dr Tobon's evidence, when referred expressly to the passage I have just set out, that the "role of the videos here was minimal" {Day28/36:22}. That is not the sense of the passage in the supplementary report, even though its context shows that the videos were only one part of his process of considering the available evidence; and his answers in cross-examination on this point involved a downplaying of the importance of the videos that

is hard to credit unless it happened to be that his reliance on them was truly minimal because he had not himself watched them.

653. When I take into account the apparently inexplicable nature of the error in relation to {H7.3/3/619}, and Dr Tobon's demonstrated willingness to accept information about other experts' views and reports without verifying them, I come to the conclusion that Dr Tobon did not himself independently review and select all of the DVD evidence to which he referred and upon which he relied in his reports. It is possible that he looked at some of it, but I do not know how much; and it is possible that he himself selected some of the extracts from DVDs to which he referred; but again I do not know to what extent.
654. This point has significant consequences for the Court's approach to Dr Tobon's evidence about causation of individual cases because he relied upon video evidence in support of his views on causation on each individual stream on each property {Day28/39:17}. The relevant passage on damage to La Enix (Stream W1) on LC39 is typical, where he referred to reduction in channel width where the stream intersects the ROW and then continued "Additionally, the evidence shown in the videos available from the Defendant ... [citing extracts from the videos by reference to specific points and specific durations] ... show that the streams received large quantities of sediment during the construction of the pipeline, which made the channels of these streams suffer damage, like the narrowing of the channel" {H7.3/3/840} at [1.6.1.1].
655. I have reviewed all of the references to videos in Dr Tobon's original report. They are too numerous to list individually here; but collectively they assert significant reliance on videos as a source of information on mechanisms and causation of damage at both a generic and individual level. In conclusion, uncertainty about whether or to what extent Dr Tobon either could or did actually rely upon the videos he cited, combined with my finding that he did not independently review and select all of the DVD evidence to which he referred and on which he relied casts a significant shadow over his evidence on causation and over his reliability as an expert.
656. *Citation from an academic text:* The Defendant's submission is that, in quoting an academic article, Dr Tobon deliberately omitted words that were unhelpful to the Claimants' case. The academic article itself would be of passing interest only in this litigation but for the criticism that is made of Dr Tobon in relation to it. It is *Hydrological functions of tropical forests: not seeing the soil for the trees?* by L A Bruijnzeel (Agriculture, Ecosystems and Environment 104 (2004) 185-228) {H7.7/57/2000}. In the course of the article, Bruijnzeel writes:

"Normally, peaks (and to a lesser extent stormflow volumes) produced by some form of overland flow are more pronounced than those generated by subsurface types of flow (Dunne, 1978). Therefore, the dramatic increases in peakflows/stormflows that are often reported *after logging or land clearing operations* using heavy machinery (Fritsch, 1992; Malmer, 1993) primarily reflect a shift from subsurface flow to overland flow dominated by stormflow patterns as a result of increased soil compaction (Kamaruzaman, 1991; Van der Plas and Bruijnzeel, 1993)." (Emphasis added) {H7.7/57/2019}

657. In his original report at [3.2] Dr Tobon wrote

“[Storm flows caused by surface water run-off] are [normally] more pronounced than those generated by subsurface types of flow (Dunne, 1978). [In line with the above], the dramatic increases in [] stormflows that are [frequently] reported [following work] using heavy machinery (Fritsch, 1992; Malmer, 1993) primarily reflect a shift from sub[-]surface flow to [surface] [] as a result of increased [] compaction [of the soil] (Kamaruzaman, 1991; Van der Plas and Bruijnzeel, 1993).”

658. The words or blanks in square brackets in [657] represent differences where words are changed, omitted or added in the Tobon version. The similarities between the two versions are clear, even down to using precisely the same punctuation when citing other articles. The similarities lead inevitably to the finding that the passage in the Tobon version is lifted directly from the Bruijnzeel article. That would not matter in the slightest but for three things:

- i) The only alteration that materially affects the sense of the Bruijnzeel original is the omission of the words “*after logging or land clearing operations*” which are omitted without any equivalent words being inserted in the Tobon version;
- ii) The omitted words are detrimental to the Claimants’ case as would have been known by anyone with a knowledge of the litigation: they support the Defendant’s case that deforestation and land clearing lead to increased rates of erosion, which is at the very centre of the dispute about relative contributions from the land generally and from the ROW;
- iii) Dr Tobon did not attribute his passage to Bruijnzeel;
- iv) When challenged with the similarities and the significance of the omitted words, Dr Tobon denied that he had quoted from the Bruijnzeel article saying he would have put the passage in italics if he had done so. Instead, he asserted that he had constructed the passage in his report by looking at the articles that he had mentioned (i.e. the articles cited identically by Bruijnzeel and Dr Tobon). He said that “what I am summarising here is what these different authors mentioned here have said, so I have taken that information from there, relating to heavy machinery and others I do the same when I am referring to deforestation. They are not direct quotes.” And when it was pointed out that the two versions were “verbatim the same, ... apart from the missing words”, he replied that “in translation it might be the same, but in Spanish what it is really a summary of my readings and my knowledge in this matter.” Later still he accepted that he had not read the underlying references and that the passage in his report was “part of the knowledge I have gained.” {Day29/139:21} ff.

659. This episode gives rise to two criticisms of Dr Tobon, which I find to be justified and serious. The first is that excluding the omitted words was deliberate and was done in the knowledge that they were material to the Claimants’ case. I reach this conclusion because their exclusion cannot have been accidental when it is plain that Dr Tobon started with the entire quote from the article; and because Dr Tobon knew enough

about the Claimants' case to understand their materiality. This criticism is serious; but the second criticism is much more severe.

660. I formed the provisional view when hearing and watching Dr Tobon give his evidence that the explanation he gave at {Day29/139:21} ff was not merely absurd but that Dr Tobon knew that it was. The only point in its favour is that he did not italicise the passage, which he says he would do if quoting directly. But the evidence in support of my finding that he did quote directly is overwhelming and, even when subject to the pressures of being cross-examined, he must have been able to see that the passage was a direct quote even if he had forgotten about the existence that particular paragraph altogether since including it in his report. He asserted positively that what appeared in his report was his own work and represented his summary of the underlying papers. Having reviewed his evidence again, I find myself driven to the conclusion that he knew that evidence to be untrue for two main reasons: first, the evidence is so palpably wrong as to be absurd; and second, there can have been no reason either for him to have reconstructed events to such an absurd conclusion or (which is what he appeared to be asserting) to have a recollection (albeit mistaken) of what he was saying. Before finally reaching this conclusion I have compared my reaction to this passage of Dr Tobon's evidence with my reaction to Dr. Avila's in apparently similar circumstances see [777] below. The witnesses were different and the facts not identical; and in the end, after trying to weigh all of the features of each witness and their evidence, my conclusions are and remain different.
661. *Evidence about comparator farms:* The Defendant submits that Dr Tobon's evidence about comparator farms shows a lack of objectivity because his assertion that there is no evidence of sedimentation in the streams of the comparator farms is wrong {C4/4.7/357}. As will appear later, I will find that his evidence that there is *no evidence* of sedimentation is wrong. Viewed alone I would not regard that as being more than an error. Viewed in the context of the Defendant's other complaints I am not persuaded that it is indicative of either intentional or unintentional bias.
662. *Evidence about the ODC ROW:* Dr Tobon gave evidence in his second report about the contribution of the ODC ROW that was outside his expertise and lacking in merit {H7.5/48/1422-1424} at [4.57]-[4.64]. It was outside his expertise because he purported to deduce from a video about the ODC construction and from an ODC construction manual whether appropriate geotechnical protective steps were carried out, which could only ever be for someone with considerable geotechnical expertise. It was lacking in merit because one video and a construction manual are no basis for a conclusion about whether proper geotechnical protective steps were undertaken, either in particular areas or over the length of a pipeline that stretched for hundreds of kilometres. His willingness to express a conclusion on the relative contributions of the ODC and Ocesa lines was also inappropriate because he expressly acknowledged in the course of the offending passage that "based on the information that was made available to me, I cannot determine exactly to what extent the construction of the ODC pipeline contributed to the sedimentation of the streams of the LC farms and if said contribution was significant" {H7.5/48/1423} at [4.59]. This passage of his second report is a clear example of his giving evidence that he should not have done and for which, even on his own logic, was not justified. As such, in my judgment, it adds some weight to the Defendant's overarching submission that Dr Tobon was not

sufficiently rigorous or independent-minded about what he was prepared to assert as an expert or to put in his reports.

663. *Miscellaneous points:* The miscellaneous points can be shortly summarised:
- i) Dr Tobon was adamant that the photographs of flooding on LC54 were an extreme event despite Snr Mesa's evidence that they represented what happened "pretty well every day", at least in the wet season {Day6/143:21} {Day28/103:6}. This undoubtedly displayed a determination to maintain the position he had set out in his reports, but his justification for maintaining his position was not irrational and I neither had the sense at the time nor am persuaded now that this was a separate manifestation of bias. Separately, his refusal to accept that the culvert under the main highway was a cause of the sedimentation upstream of it was a view that a reputable expert could properly maintain and I am not persuaded that his doing so is separate evidence of bias;
 - ii) He wrongly stated in his first report at [1.3.5] that the strip used by Ocesa had until then been entirely covered by natural forest {H7.3/3/879}. That was wrong as the strip had been cleared of trees for the ODC works; and the mistake may have influenced his opinion when reviewing all the available evidence. There is no reasonable basis for finding that the mistake was a manifestation of bias. For a person afflicted by knowing bias, it would be a foolish misstatement to make as it was bound to be discovered; it is equally difficult to see how or why unconscious bias would lead to such a misstatement. I reject the submission that this mistake evidences bias. I do not know why the mistake was made. It does not add materially to my view of Dr Tobon as an expert or a witness;
 - iii) Dr Tobon saw a gabion wall on LC74 but did not refer to it in his report. Instead, his report said "according to the geotechnics expert (Dr Geoff Card in his report of Farm LC74) no barrier has been built to prevent this flow of eroded sediments" {H7.4/4/974} at [2.6.1.4]. Dr Card's report said that he had not observed gabions on LC74 but also that "I also note that Dr Conrado Tobon also identified during his inspection in January 2012 a gabion retaining wall on each Claimant Property 74. He describes this feature in his Expert Report" {H1.1/1/53} at [6.3.15]. This bizarre mis-cross-referencing seems most likely to have occurred (in both of the reports) because of the vice of accepting information without verifying it. This particular instance suffers from the additional vice that Dr Tobon had seen a gabion but did not mention it on the basis of his own inspection. It exemplifies the difficulties that arise from the Claimants "inter-disciplinary approach" where experts failed to verify the information on which they purport to rely. It shows lack of rigour on the part of the experts, which is detrimental. This example does not indicate bias as such.
664. I return to the Defendant's overarching submission. Dr Tobon's evidence included the record of his observations in the field and the scientific exercise of taking samples and interpreting their analyses. It is common ground that I can place no weight upon his water quality sample reports, so that there is no objective support for a case on water quality or on causation. The concession to this effect in Leigh Day's letter of 2 December 2014 was limited to water quality on Trial Case farms; but it leads

inevitably to the conclusion that I (and those wishing to settle other cases) cannot rely on his water sample results either on Trial Case farms or elsewhere. There is no basis for assuming or asserting scientific competence elsewhere when his methods were identical to those adopted in the Trial Case farms.

665. Taken individually the Defendant's criticisms of Dr Tobon that I have found to be justified are of varying seriousness. Some, such as being prepared to give evidence that was outside the sphere of his expertise, may individually be mitigated by reference to his lack of experience of the high standard expected of experts in English litigation. Even so, they are evidence of a lack of scientific rigour. Others, such as his evidence of reliance on DVD and cross-referencing evidence which he had not verified, impugn his independence of mind and lack of objectivity (each of which the Court sees as an essential safeguard to the integrity of its process). Finally, his inconsistent treatment of the results of his water sampling on their own show bias.
666. Taken together, the Defendant's criticisms of Dr. Tobon are very serious and require the court to be vigilant in its approach to his evidence. I make clear that I do not find that he was deliberately or knowingly biased when carrying out his field investigations; and I do not find that he set out with the conscious intention of procuring or recording evidence that was biased in favour of the Claimants. However, having found (i) bias in his interpretation of sample results and his selective reliance on WHO guidelines that he professed to be important, (ii) a willingness to express opinions that were outside his field of expertise, (iii) a readiness to assert reliance upon information he had not verified (including, to an extent that I am not able precisely to define, the DVD evidence), (iv) a willingness to express opinions for which there was no reasonable or scientific justification and (v) a willingness to deny that he had quoted directly from an academic article when he must have known that evidence to be untrue, means that any evidence about causation that he gives must be scrutinised with extreme care to ensure that both the source evidence upon which he relies and the logic underpinning his opinion are sound.
667. If I had concluded that Dr Tobon was guilty of deliberate bias in his recording of his field observations or in the giving of his opinions about causation, I would be prepared to discard his evidence altogether. On the findings I have made, however, that would be too extreme a course to take. Dr Tobon visited the farms on between 3 and 5 occasions between November 2011 and December 2013 spending, in all, just short of 200 hours on the four Lead Claimant farms and the five Comparator Farms. In the course of those visits he walked the hydrographic basins and the streams that are crossed by the ROW, though there are challenges to the extent of some of his inspections on some of the farms {H23.4/10/831}. I have not been persuaded that all of his recorded observations on the farms or, for example, his measurements of sediment depth are systematically (though unintentionally) biased so as to be skewed in the Claimants' favour. Those observations and measurements therefore remain as part of the overall body of evidence to be considered and tested on their merits (as to accuracy) and for their significance (as to causation) on a case by case basis. Finally, it is possible to interpret the passage of his oral evidence about the Bruijnzeel article as the knowing and unjustifiable response to the pressures of determined cross-examination without concluding that it infects all of his evidence in the case, and that is how I find it to be.
668. I summarise my conclusions as follows:

- i) I accept the Defendant's submission that Dr Tobon lacked the objectivity and scientific rigour that was required both by the task and standards he would set himself and by the Court, that he did not fully understand his duties to the Court and that he sometimes presented himself as an advocate for the Claimants' case;
- ii) I reject the submission that Dr Tobon's choice of sampling locations or which variables to analyse demonstrates bias, though his choice of sampling locations raises the question whether the samples from those locations are representative of the particular stream in general;
- iii) I accept the submission that Dr Tobon's treatment of his sample results shows bias, but reject the submission of knowing bias;
- iv) I accept that Dr Tobon was prepared to include information in support of his conclusions without verifying it, which weakens his evidence generally and requires the Court to be extremely vigilant in assessing those aspects of his opinion that fall properly within his expertise;
- v) I do not reject outright Dr Tobon's evidence about his field observations or the measurements (other than those based on water sampling) that he took. However, the major qualifications to the reliability of his evidence that I have considered above make the Court's job in finding where the truth may lie very much more difficult than would otherwise be the case.

Professor Monsalve

669. Professor Monsalve has a long and distinguished career as both an academic and practising engineer in the field of hydrology. In the course of that career he has previously advised BP on a number of occasions in different capacities. Although the Claimants drew attention to his previous work with and for BP, they did not suggest that had affected his approach to his work on this litigation. What they did, with reason, submit was that the scope of his evidence was carefully circumscribed and that there were a number of flaws in his approach, particularly in relation to his use of the USLE. It is right that his reports were written on the assumption that all proper and practicable steps had been taken to protect the ROW and prevent soil erosion from it. However, I formed the clear impression that, as the Claimants submitted, the scope of his evidence had been carefully controlled and circumscribed by others; and I formed the equally clear impression, which was reinforced as he gave his oral evidence and as I have reviewed his evidence as a whole, that the Claimants were right not to level any accusation of partiality against him. While quite prepared to hold a position when he thought it right to do so, he was also prepared to make concessions when properly called for, as happened during the course of his being skilfully cross-examined at length.
670. The Claimants' main attack upon Professor Monsalve focussed upon his use of the USLE calculation. He had calculated the volume of sediment that would have come from the basins feeding each of the streams in issue and the volume of sediment that would have come from the ROW in the period after construction and concluded that the total volume of soil coming from the ROW was a tiny proportion of that which had come from the basins over a period of decades. He did not attempt to carry out

any comparative analysis of the volumes that would have come from the ROW during any given period with the volumes that would have come from the basin during that same period. His USLE-based exercise did not address the Claimants' case that the "soil loss from the ROW was catastrophic because it arrived in the streams at a rate and volume that clogged the streams" {C4/3.5/395} at [1081].

671. The Claimants identified two methodological features of Professor Monsalve's USLE calculation which, singly and cumulatively, cast doubt upon its accuracy and usefulness.
672. First, Professor Monsalve defined his basin for each stream as being that part of the stream's overall basin that lay above the ROW. He therefore terminated his basins in each case where they intersected the ROW. His explanation for this was that "by limiting the drainage basins up to²⁴ the ROW and not up to the boundary of the property the intent was to demonstrate the effect of deforestation on a drainage basin in terms of erosion processes. If I had included the area up to the boundary of the property a possible effect of the ROW on the water courses would have been considered which was not the objective" {H23.4/10/827}.
673. At first sight this approach tends to understate the contribution of the land in the stream's basin (other than the ROW) because it excludes any contribution of land below the ROW. However, the real problem that emerged was that, when assessing the potential contribution of the ROW, he excluded those stretches of the ROW which were not between the points of intersection by the basins he had drawn. The effect of this was to exclude from consideration 57% of the ROW on LC39, 34% on LC50, 24% on LC54 and 33% on LC74. A partial answer to this omission was that not all of the ROW would have flowed *directly* (i.e. along the line of the ROW) towards a watercourse, though Dr Gundlach's evidence showed that even on this basis significant portions of the ROW had been wrongly excluded: see, for example, {H22/2/110}ff. More importantly, even if soil that was lost from the ROW did not flow directly into streams, it will have flowed downhill until arrested by the topography of the land or by being captured in a stream at a more distant point. In some cases, soil lost from an area of erosion may have flowed off the property from which it originated, as the Claimants allege to be the case with soil from point E1 beyond the boundaries of LC54; but in other cases, even if it does not make its way to a stream either directly or indirectly, soil lost from the ROW will end up below the ROW on the same property, as is alleged by the Claimants to have happened in field AF2 on LC39. This has two implications. First, to exclude the lengths of the ROW without consideration of where soil from them would go was arbitrary and tended to underestimate the amounts of soil making its way into the streams. Second, it cannot be assumed that all soil from the ROW either went into streams or stayed on the property on which the relevant section of the ROW was situated. An exercise which assumes that all soil lost from the ROW will end up in streams would therefore be as misguided as one which arbitrarily excludes substantial proportions of the ROW altogether. More subtle, because it is more difficult to define or quantify, is that it cannot be assumed that all soil lost from that portion of the ROW which falls within a particular stream's basin will end up either in the stream (because some may remain

²⁴ Throughout this passage it would, I think, have been more idiomatic and clearer if he had said "down to" rather than "up to".

on the land) or on the property on which the portion of the ROW is found (because some may flow off the property) or both.

674. The second major methodological criticism to be made of Professor Monsalve's USLE exercise is related to the first. He applied no sediment transport factor to the soil losses he had calculated, either from the ROW or from the basin as a whole. Although the basins in question are, in absolute terms, relatively small, this was a fundamental omission, as he recognised in his evidence {Day39/81:18} ff. Since much of the basin would be further than the ROW from those parts of streams alleged to have been affected, this error led to overestimation of the contribution of the basin and underestimation of that of the ROW. When cross-examined Professor Monsalve referred to transport factors in American literature varying between 0.5 and 0.7 {Day39/82:22}, and in a paper submitted after his cross-examination {H8.28/46/7318} he settled on 0.5 (or 50%) as appropriate, which is to be contrasted with the range of 3-90% referred to in the Morgan draft paper: see [531].
675. The Claimants made other criticisms of Professor Monsalve's USLE exercise, such as demonstrating that his original work showed streams on occasions flowing uphill. What this demonstrated was the imprecision of the contouring exercise he had undertaken, which in turn affected his assessment of the outline of the basins feeding particular streams. To my mind, these criticisms of lack of precision of the exercise are not fundamental unless an attempt is made to claim precision for the product of the resulting exercise, which Professor Monsalve did not do. They do, however, raise questions about the thoroughness of his original exercise, because of his failure to recognise or remedy the implausibility of water flowing uphill.
676. When Professor Monsalve took account of the criticisms of his work that had first been articulated by Dr Gundlach in his response to the Defendant's hydrology evidence, he recalculated the relative sizes of the drainage basins and the contributing lengths and area of the ROW and concluded that their impact was to increase the contribution of the ROW; but he remained of the view that the increase was not sufficient to alter his overall conclusion that the contribution of the ROW during and after construction was still greatly outweighed by the contribution of the basin over decades {H8.21/25/5355}ff. On his assumptions, that was correct and his revised analysis was not challenged. Dr Tobon described Professor Monsalve's revised evidence in his Supplemental Report as "a good piece of work" and confirmed that it was also his view that the ROW occupies a very low percentage of the basin {Day29/143:9} ff.
677. One important element of Professor Monsalve's continuing exercise was his assessment of the proper coverage factor to be applied to the basin (the C factor for the purposes of the USLE calculation). This gave rise to protracted argument and requires some analysis here. Professor Morgan's draft paper described the C factor as "Crop management factor" and provided two tables, for average C-factor values (Table 3) and for pasture and rangeland (Table 4) {H1.6/41/1704}ff. In the draft paper, he adopted 0.003 as the applicable C-factor where there is 100% ground coverage. Reference to his paper and tables shows that there was a range of values that he could have adopted depending upon how the land was categorised.
678. The experts who were called to give evidence gave different assessments of the appropriate C-factor to be applied to the generality of the various properties and

basins. In his application of the USLE calculation, Dr Card adopted a figure of 1 for land on the ROW and 0.07 for land off the ROW, which he said was based upon his field observations and was intended to reflect 60-80% coverage (though he later reduced his figure to 0.02) {H1.4/22/845}. Professor Monsalve settled on a figure of 0.16 for land off the ROW. The Claimants submit that, by a process of extrapolation, this meant that he was assuming 34% coverage overall, as shown at {C4/3.8.1/1366.17}. Professor Monsalve rejected such a simple approach and extrapolation, summarising his approach after cross-examination at {H8.28/46/7318}, where he rejected a purely mechanical application of figures from the Morgan paper and the figures that had been put to him in cross-examination. He concluded that summary by saying that “it is very difficult, if not impossible, to give an accurate assessment of the absolute amounts of erosion from the ROW or from the drainage basins on the information that is available.” I unhesitatingly agree with and accept that opinion, for the reasons he there gave, and it appears to be common ground: see [683] below. In particular, one reason for the reservations expressed about whether the USLE can be used to predict soil loss from catchments, to which I have referred at [523] above, would be the impossibility of assessing with any degree of accuracy the C-factor for an area of any significant size which will inevitably have varying types of vegetation and levels of coverage over time. Even when land coverage is assessed at a specific moment, the coverage on the Claimants’ properties was not homogeneous, as is illustrated by Dr Savigny’s assessment of LC39 in 1995 {H2.8/11/2192}: he assessed different areas as having a 0-10% exposed soil (43% of the whole), 10-50% (41%), 50-90% (10%) and 90-100% (1%). Identifying a C-factor with mechanical or mathematical precision is impossible and runs the risk of being spurious. Professor Monsalve’s reliance upon his experience and the aggregation of features applying to what he saw is, in principle at least, a preferable approach.

679. The other feature to be resolved at this stage is an inconsistency in the evidence about when erosion can be expected to happen, depending upon the extent of vegetation cover. In answer to the Court the Defendant’s expert agrologist, Professor Montenegro, said that he did not expect to get soil erosion unless the vegetation cover was less than 30% {Day42/74:7}. In doing so he agreed with a statement made by Dr Obando at {H3.8/16/1914} at [11.4.15.3]. I do not accept that evidence, either coming from Dr Obando or from Professor Montenegro. It is implicit in the USLE that erosion can and does occur with almost any level of vegetation cover, and that the rate of erosion will vary with the degree of vegetation cover: there is no particular point before which there will be no erosion and after which erosion will occur. Specifically, there is no magic or particular significance in 30% vegetation cover as suggested by Dr Obando and accepted by Professor Montenegro. I prefer and accept the evidence of Dr Uribe at {Day43/77:10} ff that wherever rain falls on the soil with energy there will be erosion and that 30% vegetation cover is not a point of particular significance in the overall range, even for land that has been cleared.
680. For these reasons, while I accept Professor Monsalve’s opinion that in many if not all cases the aggregate volume of soil coming off the basins over decades will have exceeded the volume of soil coming off the ROW in the short period after its construction (even bringing the full length of the ROW into account), I do not find his evidence helpful in trying to assess either where the soil from the ROW would have gone or whether or not it would have left the ROW in such quantities and at such a rate as to cause significant problems for the land and streams below. I make it clear

that I accept his opinion at a high level of generality based upon his evidence as a whole and not on the basis that the figures produced by his use of the USLE are accurate or reliable. However, as revised, they form part of his expert evidence and are reasonably to be relied on as tending to support his opinion that, over time, the aggregate volume of background sedimentation from the basins will have exceeded the volume of sedimentation from the ROW during its period of maximum vulnerability.

The Claimants' Reworking of the USLE

681. Having made inroads into the usefulness of Professor Monsalve's USLE exercise, the Claimants carried out one of their own for their closing submissions. The results are set out in full in their Appendix 5: Table 2 {C4/3.8/1366}ff. In putting forward the calculations as "conservative", the Claimants adopted the following assumptions:

- i) $R = 10183$, derived from Professor Morgan's draft paper at {H1.6/41/1712};
- ii) $K = 0.0172$, from the same source;
- iii) $L = 1.16$, from the same source;
- iv) $S = 3.6$, a reduction from the 8.0 adopted in Professor Morgan's draft paper because the Claimants assumed a slope of 20% rather than taking the maximum suggested by the draft paper: the figure 3.6 was then the product of an equation included in the draft paper;
- v) $C = 1.3$ on the ROW, derived from Table 6 of Professor Morgan's draft paper (ground conditions at construction sites described as "compact, smooth, scraped with bulldozer or scraper up and down hill") and either 0.003 (assuming 100% vegetative cover) or 0.013 (assuming 80% vegetative cover) derived from Table 4 of the draft paper (appropriate grass pasture with no canopy) and adopted by Professor Morgan for "good dense cover".
- vi) $P = 1$, assuming that no erosion control was practiced either on or off the ROW.

682. At the outset of the Claimants' submissions on the re-worked figures, Ms Thornton made clear that, despite the apparent numerical precision of the exercise, the Claimants were not asking the Court to make specific findings about numbers. What they were asking the Court to find is that soil loss from the ROW (and therefore sedimentation of streams and land) was orders of magnitude more than it would have been from the deforestation and agricultural use of the hydrological basins above and upstream of the ROW {Day55/85:19} ff. To that end they rely upon the calculations in support of the specific finding that "by developing the USLE analysis of the Defendant's advisers, the Claimants can demonstrate that soil loss from the ROW, once the pipe had been laid and the trench covered with soil, would have contributed more sediment on a daily rate to the streams on farms than the contribution from deforestation/agricultural practice" {C4/3.5/388}. Despite these stated limitations, it is certain that the re-worked calculations are intended to be taken by the Court as evidence in support of the Claimants' case that soil loss from the ROW happened at such a rate and in such volumes as to overwhelm streams and cause substantial

damage to the Claimants' land. They are intended to be important evidence lending credence to the evidence of lay witnesses about the impact of the Ocesa Pipeline and the findings recorded in fields and streams to which I will have to turn in due course.

683. In part the Claimants are pushing at an open door, since the Defendant accepts that the relative rate of soil loss per unit of area would have been greater from the newly-disturbed soil of the ROW than from the undisturbed pasture around it. However, that is only the start of the Claimants' case on causation derived from the theoretical behaviour of the soils, because the Claimants contend that the *rate* of loss of soil from the ROW (and hence sedimentation of land and streams that it caused) was so much greater than the rates that had been experienced over time that the streams were unable to cope with the actual *volumes* of soil that left the ROW with the result that streams became "clogged" (to use Dr Tobon's word) and large quantities of sediment were deposited on fields, reducing their productivity. The relative rate of difference between the historic rates of erosion and sedimentation and the rates from the ROW during its time of maximum vulnerability therefore matters and the orders of magnitude being suggested by the re-worked USLE calculations must be examined to see if the assumptions on which they are based are reliable, conservative or not. Only if it is possible to reach reliable conclusions about the *relative rate* of soil loss (even in terms of orders of magnitude) could the Court make inferential findings about the *volume* of soil loss at any given time and whether the USLE exercise provides real support for the Claimants' case that the volumes were sufficient to clog the Claimants' streams and cause damage to their land.
684. A second feature must be borne in mind at all times. Both Professor Monsalve's calculations and the Claimants' reworkings concentrated on the effect of soil loss (from the basins or the ROW) upon streams. Professor Monsalve's failure to apply a sediment transport factor was a material error, for the reasons I have summarised above. However, it is the Claimants' case that soil from the ROW did not merely affect streams, but also came to be deposited in large quantities on the Claimants' fields. I return to this when reviewing the Claimants' reworking of the USLE calculation; but it emphasises the need to scrutinise closely the assumptions made by the Claimants in order to determine the extent to which they reflect and support their factual case both as to streams and as to land.
685. The third feature to be borne in mind at all times is that this reworking is potentially a double-edged sword for the Claimants. If and to the extent that the Claimants establish that the creation of the Ocesa scar through the fragile ecosystem of central Colombia would predictably have the effect that soil would come off the ROW at high volumes, the same is true of the ODC pipeline. The main variable as between the pipelines for the purposes of the USLE calculation is the period before revegetation takes hold or other long-term erosion control measures are installed. There is no evidence before the Court of the time during which particular stretches of the ODC pipeline were exposed and lacking in revegetation or erosion control measures. There is, however, evidence that revegetation was inadequate or incomplete in places either at or shortly before the Ocesa pipeline was laid; and, even in the short term, the ODC pipeline scar would have been vulnerable to the effects of torrential rain just as the Ocesa pipeline was later. Even if all criticisms of the reinstatement and revegetation of the Ocesa pipeline were justified (which they were not) it strains credulity to assert that the effects of the Ocesa pipeline were as

catastrophic as now alleged and that no soil loss, sedimentation or damage occurred as a result of the ODC pipeline. That is not to be interpreted as a finding of fact; but it is a consideration that demands close attention to the factual (including observational) evidence of damage that is attributed to the Ocesa pipeline.

686. The fourth preliminary feature may in some respects act as a qualification of the third. Soil loss and sedimentation are a function of the impact of erosive rain. Therefore one of the critical factual questions is the amount of rain that fell on the Ocesa ROW (and, before it, the ODC ROW) while they were at their most vulnerable and as their vulnerability decreased with long-term measures and progressive revegetation. The USLE calculation assumes an annual level of erosive rain leading to an annual rate of soil loss by virtue of the impact of that erosive rain on land having the other assumed (or proved) characteristics. However, that annualised rate is not capable of being extrapolated with any confidence to shorter periods since actual rainfall is variable in intensity and duration both within particular seasons of the year and as between seasons. Thus, for example, to apply the annualised assumption about rainfall erosivity to a period falling within the dry season is likely to overestimate the rate and volume of soil loss while the opposite is likely to be true if the annualised assumption is applied to a period falling within the wet season. Neither the Claimants' reworking nor those in Professor Morgan's draft paper or Professor Monsalve's exercise take this feature into account.
687. The end result of the Claimants' reworking of the USLE on {C4/3.8/1366.4} is a series of daily soil loss volumes from the ROW (average annual soil loss per year [A] x area draining to the stream (ha)/365). For the reasons just explained, even assuming that the average annual soil loss per year is reliable, this both overstates and understates the case to the extent of losing touch with reality: the actual daily soil loss volumes will depend upon actual daily rainfall; and, as a separate point, it is necessary to take account of the duration of the ROW's exposure to rain in its assumed vulnerable condition (which includes the complete absence of long term erosion control measures). By way of example, for the purposes of the revised stockpile calculations put in for closing submissions {C4/3.8/1361.1} the Claimants allege that the ROW was opened on LC39 on 29 November 1996 and that recomposition occurred on 15 March 1997, 103 days later²⁵. That was during the dry season and there is actual evidence about rainfall during that period {C6/24.1/4} to the effect that adopting an annualised approach leads to an overestimate. As I have already said, no account is taken of season or actual rainfall in the Claimants' calculation of soil loss from the ROW at {C4/3.8/1366.4}. The evidential point is not met by the Claimants' submission that the actual annual rainfall exceeded what was assumed by Professor Morgan in his draft paper: what matters for present purposes is that adopting an annualised rate is an unreliable guide to what would actually have happened on site.
688. The table below summarises the exercise undertaken by the Claimants in relation to LC39 in tabular form. It is typical of the exercise undertaken for each Lead Claimant. Columns 2, 4 and 5 reflect the Claimants' USLE calculation of annual soil loss from the ROW (column 2), the drainage basin assuming 100% vegetative cover (column 4)

²⁵ The Claimants' reworked calculations related to the period after the pipeline trench had been backfilled until revegetation, which would be shorter {Day58/197:3}

and the drainage basin assuming 80% cover (column 5). The reason for columns 3, 6 and 7 will appear.

1	2 C On Row {C4/3.8/1366.4}	3 Card 2 nd On Row {H1.4/22/845}	4 C Off Row 100% cover {C4/3.8/1366.4}	5 C Off Row 80% cover {C4/3.8/1366.4}	6 Card 2 nd Off Row {H1.4/22/845}	7 Monsalve Off Row {H8.28/46/7317}
A	945	350/550	2	9	24/38	
R	10183	1000	10183	10183	1000	
K	0.0172	0.35/0.55	0.0172	0.0172	0.35/0.55	
L	1.16	1	1.16	1.16	1	
S	3.6	1	3.6	3.6	1	
C	1.3	1.0	0.003	0.013	0.07	0.16
P	1.0	1.0	1.0	1.0	1.0	

689. It can immediately be seen that the Claimants' starkly different outcomes for factor A on ROW and off ROW are determined by the C factor, because the Claimants have adopted the same numerical value for the other factors (R, K, L, S and P) both on and off ROW. A is expressed in tonnes per hectare per year and, on the Claimants' assumptions, the rate of soil loss on ROW is either 433 or 105 (945/2 or 945/9 allowing for rounding) times greater than off ROW because those are the ratios determined by 1.3/0.003 and 1.3/0.013 respectively.

690. Each of the C values adopted by the Claimants are open to objection:

- i) The figure of 1.3 is suspect:
 - a) It is not supported by expert evidence, being adopted by the Claimants from Professor Morgan's draft paper, on which he was not called to give evidence;
 - b) It is contradicted by Dr Card's expert opinion as shown by his adoption of 1 as the appropriate figure for his workings at {H1.4/22/845};
 - c) The justification for adopting the category "compact, smooth, scraped with bulldozer or scraper up and down hill" is not self-evident. While it may be a reasonable assumption where the ROW ran parallel with the line of the slope, it is not obviously reasonable where the ROW ran perpendicular to it, which happened in places. On the evidence of the DVDs, the bulldozers typically worked along the line of the ROW. Where that was perpendicular to the line of the slope, the scraping with the bulldozer or scraper would be *across* the slope, which (according to Table 6 of Professor Morgan's draft paper) would indicate a C-factor value of 1.2;

691. The adoption of the values for the C-factor for the basin assuming 100% cover (0.003) and 80% cover (0.013) are subject to similar objections:

- i) While being drawn from Professor Morgan's draft paper, they are not supported by expert evidence;
- ii) An overall assumption that the basins are to be treated as having 100% or even 80% vegetative cover by grass is not supported on the evidence;

- iii) The figures are contradicted by Dr Card's adoption of 0.07, or even his later substitution of the reduced figure of 0.02, which was explained as being for 100% coverage (and is therefore to be compared with the Claimants' figure of 0.003);
 - iv) The figures are contradicted by Professor Monsalve's opinion that an appropriate figure for off the ROW overall is 0.16.
692. The implications of the expert evidence that has been called about the C-factor upon the relative rate of soil loss and the other features to which I have referred above are dramatic. Thus:
- i) Adopting 1.2 instead of 1.3 for the on ROW value but retaining the Claimants' off ROW figures reduces the relative rates of soil loss per hectare from on and off the ROW from 433 (assuming 100% coverage off ROW) or 105 (assuming 80% coverage off-ROW) to 400 (1.2/0.003) or 92 (1.2/0.013);
 - ii) Adopting Dr Card's value of 1 for on ROW and the Claimants' values for off ROW gives relative rates of 333 (1/0.003) or 77 (1/0.013);
 - iii) Adopting Dr Card's values of 1 for on ROW and 0.07 for off ROW gives a relative rate of just 14. Adopting his later reduced value of 0.02 for off ROW increases the relative rate to 50. Adopting 1.3 for on ROW and Dr Card's successive figures of 0.07 and 0.02 off the ROW gives relative rates of 19 and 65 respectively;
 - iv) Adopting Dr Card's value of 1 for on ROW and Professor Monsalve's figure of 0.16 off ROW reduces the relative rate yet further to 6.25;
 - v) As against these figures provided by the experts who did give evidence, Professor Morgan's draft paper (in the version at {K49/520/1}) stated that "under agricultural production, mean annual soil loss typically ranges from 0.1 to 100 t/ha, again depending on local conditions and whether any erosion control measures are practised. Where land is cleared for construction work, typical annual rates are 1,000 to 10,000 t/ha". Dr Savigny said that he had no reason to doubt those rates for construction work, though he had not been able to find data that justified the range {Day37/174:5}. At the extremes, these figures would lead to relative rates from 10 (1,000/100) to 100,000 (10,000/0.1), which is not of itself informative in attempting to determine what the relative rate would be on-and off ROW in the Ocenca cases.
693. These considerations reinforce my conclusion that any attempt to use the USLE to provide relative rates for soil loss on and off the ROW in the manner urged by the Claimants in closing, even to the extent of attempting to reach orders of magnitude, is inherently so imprecise as to be positively dangerous. I reach that conclusion bearing well in mind that the USLE is an empirical equation that is widely used for planning and implementing erosion control measures and that its limitations are well documented. My conclusion is further reinforced on the state of the expert evidence in the present case, not least because Dr Savigny's mapping of land use and coverage and how it has changed with time convinces me that to adopt any overall figure for the condition of the basins is likely to be unreliable, even if reached on the basis of an

assessment that is reasonable in principle, as was Professor Monsalve's. Reviewing the product of the various values for the C-factor as I have done in [692] supports the proposition that the relative rate of soil loss per unit of area from on the ROW will be orders of magnitude greater than from off ROW in the period shortly after construction; but that is not in dispute: see [683].

694. While the choice of values for the C factor has determined the relative rate of soil loss on and off ROW in the Claimants' exercise, the other factors influence the actual rate (A), which the Claimants have carried forward into the second stage of their reworking. They are therefore relevant for consideration:
- i) For the *rainfall-runoff erosivity factor* (R) the Claimants adopted the figure found in Professor Morgan's paper (10183), which related to a different area of the pipeline. Their justification for doing so was that the annual rainfall in the area of the Lead Claimants' properties was greater than that assumed by Professor Morgan, so that using his figure was conservative. Volume of rainfall is obviously of high importance, though it is not the sole determinant of the R factor, as appears from the text of Professor Morgan's draft paper. Dr Card in his worked example took an R factor of 1000. It is not clear how he reached that figure, but it is not consistent with adopting 10183 without expert evidence in support. I have already noted that the true R factor will vary with the seasons, which is material where there is a short period between ROW opening and recomposition;
 - ii) The Claimants adopted 0.0172 as the *soil erodibility factor* (K), which was used in Professor Morgan's draft paper for sandy loam. The soils in the areas in question in the Trial Lead Cases are not sandy loams. There is variation but the main debate between Dr Card and Dr Savigny was whether they should best be described as clay or silty soils, both of which would attract a higher K factor than sandy loams. Dr Card adopted 0.35 and 0.55 as the K factors in his worked examples {H1.4/22/845}, which are approximately 20 and 31 times greater than the Claimants' chosen value;
 - iii) For the *slope erodibility factor* (L), the Claimants took a value of 1.16. Dr Card took a value of 1. Professor Monsalve had not attributed a value to L, simply treating it as a constant when considering relative contributions;
 - iv) For the *slope steepness factor* (S) the Claimants adopted the figure 3.6. This was a reduction from the use of 8 in Professor Morgan's draft paper and was based upon an assumed slope steepness of 20% {C4/3.8.1/1366.21}. Dr Card had taken 1 as his value for the S factor, though it is possible that this was intended simply to be an assumed neutral constant. The evidential foundation for the Claimants' assumption was not laid either in relative or absolute terms. In absolute terms, much of the terrain with which the present cases are concerned exceeded 20% steepness (see, in general, LC50 and LC74) while some cases involve gradients of less than that- see, for example, the position on LC54 where gradients on the property were generally 9-11%: see [933] and [986]. In relative terms the gradient on the ROW does not either necessarily or generally match the gradient elsewhere on the property or in the basin being considered: an example is the southern stretch of the pipeline on LC74 which

is itself quite flat though being close to steep hills down to the site of the old house;

- v) The Claimants' *support/erosion control practice factor (P)* was taken as 1 throughout, which assumes that no erosion control has taken place. This emphasises that the exercise is only intended to reflect the position up to recomposition and the construction of any long term erosion control measures that were then installed. It assumes that no short-term erosion control measures were taken, which may be a reasonable assumption off ROW but is not universally applicable on ROW.
695. Leaving aside the question whether, in a given case, it would be justifiable to treat L and S as constant on and off ROW, the Claimants' figures for R, K, L, S, C and P cannot be assumed to be applicable to the circumstances of any particular case with which the Court is now concerned. And, as has been seen, altering any one or more of these factors may lead to material changes in the value of A. These considerations drive me to the conclusion that there is even less validity in treating the Claimants' reworked USLE as giving any indication of actual rates of soil loss on or off the ROW in the cases I have to consider than there is in treating them as reliable indicators of the relative rates of soil loss.
696. That is, however, what is undertaken in the next stage of the Claimants' reworking exercise. {C4/3.8/1366.4} (which is typical) takes each stream on LC39 in turn and calculates the daily loss from the length of the ROW and from the basin (assuming 100% and 80% coverage separately) that may drain into the stream. It is founded on the assumptions and analysis that I have just considered and therefore suffers from all of the limitations that I have found. It is therefore not a reliable quantitative exercise.
697. Other points arise at this stage, which add to the limitations of the exercise. The Claimants submit that they have been conservative in taking Professor Monsalve's original assessment of the length of the ROW that may contribute to sedimentation of the streams. Thus the exercise states that the daily soil loss from the ROW area that drains into W1 on LC39 is 0.13 tonnes per day, that being 945 tonnes per annum (see the table at [688] above) divided by 365 to provide a daily rate x 0.05 (which is Professor Monsalve's estimate of the contributing area of the ROW {H8.22/26/5752}). I agree that the adoption of Professor Monsalve's area is a conservative approach, but am not able to form any view of the extent to which it is conservative, for the reasons set out at [673] above. The daily soil loss figures from the basin are said to be 1.28 tonnes (for 100% coverage) or 5.56 tonnes (for 80% coverage), which are unreliable for the reasons previously given.
698. The final stage in the exercise (again taking LC39 as the exemplar) is to apply sediment transport factors to soil coming from the ROW and the basins so as to arrive at a numerical value for the daily amount of soil arriving in the streams as sedimentation {C4/3.8/1366.5}. For most streams the Claimants assume that either 100% or 90% of soil loss from the relevant part of the ROW will make it to the stream and that 50% from the basin will do so (that being Professor Monsalve's figure). For stream W1 the Claimants also work their example on the basis that either 25% or 3% of the soil lost in the basin will make it to the stream. On these assumptions the Claimants arrive at a quantified figure (in tonnes per day) for daily sediment delivery from the ROW area and the basin that drains into each stream. In most cases the

resulting daily delivery from the ROW exceeds that from the basin. The table below summarises the results for LC39 (excluding the 25 and 3% sediment transport factors for W1).

	W1	W2	W3	W4
ROW (100/90%)	0.13/0.12	0.98/0.89	0.18/0.16	0.18/0.16
Basin 100% coverage	0.64	0.01	0.04	0.05
Basin 80% coverage	2.78	0.06	0.15	0.22

699. Stream W1 (La Enix) is unusual in that the product of the Claimants' reworking on their normal assumptions leads to the conclusion that the sedimentation of the stream by materials originating on the ROW would exceed that by materials originating in the basin. This no doubt motivated the Claimants to offer figures using sediment transport factors of 25% and 3%: applying the sediment transport factor of 3% to the basin assuming 100% coverage produced a daily rate of 0.04 tonnes, which would be below the quantity estimated for sediment delivery from the ROW. There is, so far as I am aware, no direct expert evidence supporting the use of either 25% or 3% for a basin of this size or characteristics.
700. For the reasons I have already given, these figures are not reliable either as indicators of relative or absolute rates of soil loss. The parties recognised the Court's wish to have reliable and quantifiable evidence about quantities of soil loss and sedimentation, but the Claimants' reworked figures in submissions, though beguiling, suffer from two insurmountable flaws. First, they do not have a sufficient grounding in reliable expert evidence; and, second, the multiple variables that would apply in a given case mean that the Claimants' reworked USLE, based as it is on constant assumptions, cannot be applied as quantitative evidence to individual cases – even to the extent of providing evidence of “orders of magnitude”. The same applies to the response from the Defendant {C4/4.24/1456}, which was based upon the same assumptions and variables and which purported to show (or, as Mr Lewis put it, to give the “feel”) that the contribution of the ROW to sedimentation of streams between the opening of the ROW and the installation of long term erosion control works was a very small proportion of the contribution from the basin over the preceding 40 years, as explained at {Day60/153:22} ff. Such a conclusion would be important for the Defendant's case because of Professor Monsalve's evidence that a continuous process of erosion in a drainage basin over time can have the same effect on a stream with a low transport capacity as the accumulation of sedimentation as a large deposit of sediment occurring over a short time {H8.21/25/5423}. I draw no quantitative conclusion from the Defendant's calculations and do not rely on them in reaching my acceptance of Professor Monsalve's opinion as set out below.
701. Drawing these strands together, I conclude that the relative rate of soil loss from a newly disturbed ROW will be significantly higher per unit of area than the rate from established agricultural land. The history of the land use will determine the precise level of soil loss from the land as a whole, and that has changed with time in all the cases examined in this trial. Whether over time and in aggregate a basin will contribute more erosive soil loss and deposit more sediment in streams and on land than will come from the ROW in the relatively short period of its maximum vulnerability and progressive improvement will depend upon the size of the basin, the land use over time, and the period adopted. However, I accept that, in principle, the

basin's contribution over time may be much greater than that of the ROW between opening and full recovery. To that extent I accept Professor Monsalve's opinion based upon the entirety of his evidence.

The Importance of the Hydrological Evidence

702. To put things in perspective, it is convenient to recapitulate what was the intended importance of the hydrological evidence. By the end of the trial it was common ground that, as a general proposition, soil from the ROW could have caused sedimentation of streams in times of heavy rain, though the location, volume and extent of such sedimentation was in dispute {Day39/47:21} ff {Day39/55:6} ff.
703. The Claimants' case as opened and pursued was (and is) that very large quantities of soil left the ROW as soon as rain fell on the stripped and stockpiled ROW. The Claimants rely on damage (in the form of sedimentation) to streams happening "at the point at which they intersect the ROW or downstream (but not upstream)" {C4/3/212}ff. Dr Tobon took samples to test the depth of sedimentation in the streams. Conscious that the presence of sedimentation of itself did not prove its source, the Claimants' hydrological evidence relied upon three lines of enquiry and analysis in particular to support the case that the sedimentation came from the ROW and not from background erosion. The first was analysis of where and to what depths sedimentation was found, to try to substantiate the claim that sedimentation and damage was found on and downstream of the ROW but not upstream. The second was to see whether there was a distortion of the width of the stream at the intersection with the ROW that would evidence damage during or shortly after construction. The third was to analyse the water in the streams, because it was (and apparently still is) the Claimants' case that sediment from the ROW had particular qualities that would reflect in the chemical analysis of the water.
704. This third strand of the hydrological case depended upon the water sampling results which were to be the subject of Dr Penuela's evidence. It has now gone. When amending and clarifying their pleading to take account of the absence of water quality evidence, the Claimants said that they "continue to allege that as a result of the mixing of soil horizons, soil from lower soil horizons with higher concentrations of iron would have been washed into the streams from the ROW" {B2.3/35.1/519.2} at [2(c)]. However, this misses the point and merely asserts what the water quality evidence was intended to prove, namely that there was a difference in the chemical qualities of the water upstream and downstream of the ROW. It cannot be and is not proved by observational evidence in the absence of supporting chemical analysis.
705. What remains of the Claimants' positive case based on hydrological evidence is therefore what can properly be deduced from Dr Tobon's observations and sampling of sediment above, on and below the ROW.
706. Dr Tobon did not himself make an analysis of the actual or relative contributions of the various potential contributors of sediment that he had observed. He regarded his main scientific contribution as taking water samples that were intended to be used in assessing whether or not there were material differences in the water quality above, at and below the ROW. As a result, he expressly disclaimed any ability to provide any scientifically based assessment of where the sediment that he observed came from {Day29/61:3} ff.

Patterns of Sedimentation

707. The Claimants seek a general finding that there is a pattern to the sedimentation in the farm streams from which it can be inferred that the ROW caused sedimentation over and above the background rate of sediment present in the streams prior to construction. Dr Tobon asserted “the magnitude of accumulated sediments that is observed in each water source that is crossed by the ... ROW in the LC farms, responds to a process of deposition over short periods of time and of a high magnitude and not to the erosive processes occurring in the farms and that are related to the deforestation and to their land use and management ...” {H7.5/48/1425}.
708. The first dispute is as to the theoretical basis of the claim. It is common ground that a factor which affects the quantity of sediment accumulating in the streams on the Lead Claimants’ Properties is the capacity of a stream to transport sediment {H8.21/25/5422} at [10.41]. It is also common ground that, even though the streams move little water in the summer, in high flow times they transport significant amounts of sediments {H23.4/10/816}.
709. Dr Tobon’s opinion was that the streams had the capacity to cope with the background erosion from the basin over time; but that the existence of clogging in the streams suggested the sudden depositing of large quantities of sediment in the watercourse in a very short space of time with which the stream could not cope {Day28/34:8}. As he put it “given these streams of the LC farms are small and they don’t have a lot of flow, when they receive a lot of sediments, the sediments stay there” {Day29/29:6}; and it was his view that, in the event of rain, the “impact of the pipeline was immediate in my view at the point when the ROW was first opened. But lower down the stream it will depend. ... It could take months or even years if the stream has a low flow rate” {Day29/21:1} ff.
710. In his reports Dr Tobon had appeared to contemplate a generally constant volume of flow when giving his opinion that “when a large amount of sediment reaches the stream/river bed within a very short amount of time, the source’s capacity to move or transport the sediment will be reduced falling to very low values when the amount of sediment is very high and the time frame is very short”; but he also said that “a fraction of the sediment that reached the stream beds during and immediately following the construction was removed by the water, when the flow rate of the stream has enough capacity to remove and transport sediment or during rainfall events, when the flow increases in these streams, and another fraction or part thereof remains in the beds of the affected streams.” In response to these passages, Professor Monsalve agreed that, “if flow remained the same, in the event that large amounts of sediment are deposited into a stream over a short period of time, the stream’s capacity to transport that sediment is reduced temporarily”; but he gave as his opinion that the flow velocity in the stream might increase because of the reduced cross-section caused by the deposition or because of increased volumes of water during and after rainfall {H8.21/25/5422}.
711. When asked the specific question: “if soil came from the ROW, do you accept that most of the streams on the Lead Claimant farms, because of their low flow and carrying capacity, would have been unable to cope with a large volume of soil from the ROW?” Professor Monsalve gave an equally specific reply: “... in general principles, yes. But you have to look at what point this deposit of sedimentation

happened. If it happened during a heavy rainfall episode, as happens in the area, of 250 or 300 millimetres in one hour, then the sediments could have been taken down, down the stream. It is not so clear. 250/300 millimetres of rainfall may happen several times a year. So that is a really heavy rainfall intensity, and in that way – that is a way in which the sediments could have left the Right of Way, gone down into the streams. But also, with such high levels of rainfall, these streams would have been able to take the sediments down, and it wouldn't necessarily have led to this major process of sedimentation.” {Day39/32:3} ff

712. On background erosion, Professor Monsalve's opinion was that most of the streams on the Lead Claimants' properties “have an inherently low flow and therefore a low transport capacity. This is particularly the case in the dry season, and in many cases also in the rainy season. As such material will accumulate when the stream's transport capacity is exceeded, which occurs frequently as a result of the stream's inherently low flow. A continuous process of erosion in a drainage basin over time can have the same effect on the accumulation of sedimentation in a naturally low longitudinal sloped area of a stream channel as a large deposit of sediment occurring over a short time period. Over a longer period of time, sediments accumulating as a result of the erosion in a drainage basin will form sedimentation which can be as significant as any sedimentation formed by a sudden deposit of sediment.” {H8.21/25/5423} at [10.45]-[10.46].
713. I am unable to accept as a general or universal proposition that the streams on Lead Claimant properties were able to cope with background erosion. Once it is accepted that the depositing of sediment is a function of the carrying capacity of a stream and that most of streams have low transport capacity (to the extent that some are virtually or completely dry for periods at a time), it follows that sediment will be deposited with time, and I accept Professor Monsalve's opinion to that effect. Equally, I accept that in times of high rainfall, the transport capacity of a stream is likely to increase with increased volume and velocity of flow. So the rainfall which strips soil from the ROW (and, for that matter, from the basin) and carries it towards the stream will at the same time increase the transportation capacity of the stream to remove it. As that capacity is dissipated, either because the rain stops or because of conditions lower down, so fractions of the sediment will be deposited either within the confines of the stream or (if it has burst its banks) beyond (as illustrated by the photographs of flooding on LC54).
714. The hypothesis that sedimentation downstream of the ROW will be greater than sedimentation above it is consistent with a mechanism of rainfall stripping soil from the ROW and transporting it downhill. The hypothesis that sedimentation at the point of intersection with the ROW will be greater than sedimentation above it requires more careful thought. The DVD and factual evidence shows that, on occasions, the ROW would slope down to the banks of a stream, with the trench for the pipeline being excavated on the approach, through the stream and up the other side. Where that happened, soil could flow along the ROW as it sloped down into the stream, but the relevant area of the ROW, and therefore the quantities entering the stream, would be relatively small though not negligible (as Dr Savigny accepted in answering questions relating to La Enix on LC39). In other cases the wider topography may have included an element of slope in the direction of the stream even though there may also be an element of slope downhill (and downstream), as illustrated by Dr

Gundlach in his criticism of Professor Monsalve's original work. There were some cases (of which the streams on LC54 may have been examples) where the potential impact on the streams was reduced or removed by boring under the stream bed so that the disturbed ROW stopped short of the stream. All of these features would affect the likelihood and extent of soil from the ROW entering the stream at the very point of intersection rather than downhill and downstream.

715. The evidence and closing submissions did not, so far as I am aware, address the impact of the variable nature of the state and slope of the ROW in the vicinity of the ROW and I am not able to reach any quantitative conclusions. However, I do not accept that the existence of sedimentation at the intersection of a stream with the ROW is necessarily evidence that the sedimentation has come from the ROW. It may, depending upon the specific circumstances of the stream in question, be attributable wholly or in part to deposition of sediment from further upstream caused by the particular lie of the land at that point – it being common ground that one of the features that may cause a stream to deposit sediment is when its downward slope reduces and a stream passes over a relatively flat area.
716. Although not made entirely clear, the hypothesis that sedimentation at the intersection with the ROW will be greater than above is also based (at least in some places) on the expectation that soil will be deposited directly in the course of the construction works. This appears from [4.5] of Dr Tobon's original report where he wrote that "... soil that is removed during civil works for roads and pipelines is carried by water to the drainage zone or stream channel. This sediment generally enters the stream channels rapidly and in large volumes, *particularly during rainfall events*. When such deposition of soil takes place, in large volumes over a short time, the accumulation of sediment in the stream channel is generally permanent, especially if the stream has a very low discharge, with no capacity to carry materials away. This means that very little of the sediment can be moved by the water flow or discharge of these streams. In these cases, it is common to observe an accumulation of sediment in the stream channel, with a thin sheet of water running over the top of the sediment" (emphasis added) {H7.3/3/620}. The use of the word "particularly during rainfall events" clearly contemplates that the process here being spoken about may happen without the influence of rain. In my view, this mechanism for sedimentation at the intersection with the ROW is both plausible and consistent with the evidence of Professor Monsalve because it may involve the rapid deposition of an amount of soil or sediment without a corresponding flow of water that would both carry it to and clear it downstream from the point of intersection with the ROW. I therefore accept that one of the reasons why there may be sedimentation at the point of intersection of the ROW could be that soil has been deposited in the stream at that point directly in the course of construction activities. It cannot be assumed that this happened at every stream crossing and the extent to which it happened would be a function of good or bad construction practices.
717. Turning from the theoretical basis for an evidentially significant pattern of sedimentation, the Claimants' factual case is summarised at {C6/37/1} which records the sediment findings of Dr Tobon and Professor Monsalve. That summary, and the detail that lies behind it, does not demonstrate a generally applicable pattern of sedimentation on and downstream of the ROW but not upstream of it. I will review the sedimentation findings in detail for each farm but, in briefest outline:

- i) Sedimentation was found upstream of the ROW in each of the four streams on LC39;
- ii) The streams that are alleged to have been damaged on LC50 did not intersect the ROW;
- iii) Of the three streams on LC54:
 - a) W1 was affected by sedimentation along virtually its entire length within LC54. On the Claimants' case it is all downstream of the ROW while on LC54. Professor Monsalve observed sedimentation upstream and downstream of the ROW {H8.11/11/2859};
 - b) Professor Monsalve saw sedimentation of W2 upstream of the ROW {H8.11/11/2859}. On Dr Tobon's first visit he was unable to measure sediment depth at the ROW intersection because the channel was deep and not filled with sediment: he assumed that any sediment depth was not significant {H7.4/4/911} at [2.2.4]. On his second visit he found W2 to have a deep and well formed channel with "some" sediment on its bed {H7.4/4/912} at [2.3.2]. Dr Tobon did not record measurements or observations upstream of the ROW intersection;
 - c) The experts agreed that the swampy strip on W3 starts approximately 100m upstream of the ROW;
- iv) On LC74 there is sedimentation upstream of the ROW on both W1 and W2.

718. I will consider the state of streams on comparator farms when considering the evidence for the specific Lead Claimant Properties. For present purposes it is sufficient to say that I do not find any features that would provide a "signature" showing that sedimentation on the Lead Claimant properties was caused by soil from the ROW and that sedimentation on comparator farms was not.

719. On this strand of the hydrological evidence I conclude for the reasons set out above that there is no pattern of sedimentation on the Lead Claimant Properties from which it can be inferred as a general proposition that the sedimentation observed in the stream on those properties was caused by soil from the ROW.

Distortion of Stream Widths

720. The second feature of Dr Tobon's measurements relied upon by the Claimants is that, according to his measurements, some of the stream channels on LC39 narrowed at the intersection of the stream with the ROW {C4/3.5/380} at [1017]. This can be dealt with more shortly:

- i) No stream crosses the ROW on LC50;
- ii) On LC54, there was no narrowing of the widths of Stream W2 at the intersection with the ROW {H7.4/4/912} at [2/3/4]. There is no evidence of any narrowing of stream W1 at the intersection with the ROW {H7.4/4/901} ff. Stream W3 was wider at the intersection than elsewhere {H7.4/4/924} at [3.3.4];

iii) On LC74 Dr Tobon recorded that at the crossing point with the ROW “the width of the canal [Stream W1] is 0.73m, which is smaller than the stream’s natural width above the [ROW] which is 1.63m, ..., due to the large build-up of sediment” {H7.4/4/978}. The position of the measurement above the ROW is not apparent: what is known is that the stream had been affected by sediment before the intersection with the ROW, where it flows into Stream W2 {H7.4/4/975}

721. While I accept that the narrowing of streams at the point of intersection with the ROW may yield evidence as to causation, the evidence from the four trial cases does not demonstrate any pattern that assists at a general level in determining the cause of any sedimentation in the streams.

Conclusion

722. The findings of Dr Tobon and Professor Monsalve require to be considered on a case by case basis. They do not demonstrate patterns of universal or general application that can be relied upon to create a presumption that sedimentation found in streams has come from the ROW rather than from another source. I am therefore not prepared to make the finding, requested by the Claimants on the basis of the hydrological evidence, that (as a matter of general application) sediment from the ROW clogged streams because of the volume and rate at which it entered the streams. At the same time, it cannot be said on the basis of the hydrological evidence that sediment from the ROW never clogged streams, and I make no such generalised finding on the basis of the hydrological evidence.

Agrology

The Experts

723. The agrology experts were Dr Obando for the Claimants and Professor Montenegro for the Defendant. Their evidence was central to the question whether pipeline works had caused soil-inversion, mixing or compaction and, if so, what changes had been caused to the chemical or morphological makeup of the soils on and off the ROW.

724. Dr Obando is extremely intelligent and suitably qualified to act as an expert; but he had a persistent tendency to state the evidence he wished the Court to receive, whether or not it was an answer to the question he had been asked. As a result his evidence took longer than it should, to the disadvantage both of those asking questions and hoping for answers and of the Court, because the progress of cross-examination was slowed and, as a consequence of time constraints, curtailed. His evidence was permeated by the assumption that all farms were managed well in all respects, which was no more justified as an assumption than Professor Monsalve’s assumption that all necessary protective measures had been taken by Ocesa during its pipeline-laying works: see [669]. I deal with other criticisms of his evidence below.

725. Professor Montenegro, by contrast, gave clear answers to questions and made concessions readily when appropriate. Although this was a refreshing difference, I bear in mind that the manner of giving evidence does not determine whether the evidence being given is right or wrong. The Claimants’ submitted that Professor

Montenegro was out of touch, having retired in 2010 and having not had experience of field work in the soils in the region of the Lead Claimants' farms. I accept the limitation in his field work in the area, and that on a few occasions he changed his evidence; but these criticisms do not undermine his overall expertise as an agrologist or the assistance he gave to the Court as an expert.

726. Having reviewed the evidence of both experts at length for the purposes of writing this judgment, I have come to the conclusion that both experts provided much evidence that is useful and important but that the evidence of neither expert justifies the more extravagant claims that were made for it in closing submissions. In particular, I have concluded that it is not safe to draw generalised conclusions from the agrological evidence that was considered at trial about what damage was or was not caused by the Ocesa or ODC ROWs or to apply such generalised conclusions to the whole length of the respective ROWs (or those stretches of the pipelines which have been considered in the trial). The agrological evidence (either taken alone or in conjunction with the other evidence in the case) contributes to the conclusion I have expressed elsewhere that there was variation in the quality and effects of the pipeline works along the length of the pipeline. Equally importantly, for the reasons that follow and unless otherwise stated, I do not consider that the agrological evidence on particular farms on its own justifies generalised findings about the state of the ROW over its entire length on that farm. It is, however, important evidence to be taken into account on each farm when trying to identify what, if any, damage occurred as a consequence of one or other or both of the pipelines.

Sample locations: the differing approaches

727. It is common ground that, because of the constraints upon the parties, the number of sample locations was not sufficient to give rise to statistically valid conclusions: Dr Obando said that 30 would be needed (without specifying the area that the 30 should cover) and Professor Montenegro said he would have liked more. Neither expert could or purported to carry out an analysis based on large numbers of samples, and each expert adopted a different approach to the selection of sample locations. Dr Obando deliberately searched out areas on the ROW that he considered showed observable damage “based on the severity of the process of degradation” {H3.4/4/723}. When he went off ROW he chose locations “oriented toward the natural profile” even if those locations were at some distance from his on ROW locations {H3.6/8/1336}. He did not attempt to pick his on ROW locations on the basis that they were representative of the state of the ROW as a whole; what he was trying to do was to find sample locations that would be most likely to show differences in soil profiles.
728. Professor Montenegro's approach was different. Having identified the position of the ROW with Dr Savigny, he set about trying to find sample locations that would be representative of the wider soil conditions on the ROW and identifying locations that were representative of off ROW conditions while being “relatively near the ROW in order to minimise the degree of natural variation in the soil characteristics” {H4.4/4/785}. By that means he intended to see whether soil conditions that were likely to have been similar initially were now different on and off the ROW.
729. Each party attacked the approach adopted by the other's expert and, in doing so, missed the point that the experts *were not* trying to achieve a statistically valid

assessment of the entirety of conditions on and off the ROW and *were* trying to find evidence that would inform the decision of the Court, albeit in different ways. The strength of Dr Obando's approach was that he maximised the possibility of finding a soil profile that had been disrupted by the pipeline works, based on his initial observations; its weakness was that he maximised the possibility of natural variation because of distance. The strength of Professor Montenegro's approach was to minimise the possibility of natural variation because of distance; what it did not do was to aim to identify the "worst" bits of the ROW and see what lay underneath. Whether that was a weakness depends upon whether one wants to form a view of the overall state of the ROW or to maximise the chance, given a limited number of samples, of finding clear evidence of soil disturbance on the ROW and differences between what is found on and off ROW. The Defendant accepts that Professor Montenegro's sampling sites are not representative of sub-surface conditions of the eroded parts of the ROW {C4/4.7/393} at [88]. It is clear that Dr Obando's sampling sites are also not representative of conditions on and off ROW as a whole.

730. Provided that the different approaches of the experts are borne in mind, each approach is capable of providing useful information. I do not accept that Dr Obando's approach pre-supposed that damage occurred and was caused by the pipeline works: his methodology involved identifying apparent damage on the surface of the ROW and seeing if sampling at that location revealed information about the cause of that damage. I accept that Professor Montenegro did his best to select sampling sites that were reasonably representative of the non-eroded conditions of the ROW, but also bear in mind his recognition that it would have been better to have had more sites in order to gain a reliable representative view overall {Day41/33:9}.
731. While I accept the evidence of Mrs Vargas and Professor Montenegro that "looking across all available data from the lead claimant properties collectively might provide valuable insight in identifying trends or patterns of current data" {Day41/35:18} it does not follow that the exercise that has been done in this case has in fact done so. Since Dr Obando did not even attempt to obtain samples that were representative of the condition of the ROW as a whole, there would have been no justification for extrapolating from his results to assert generalised conclusions about the state of the ROW as a whole even if he had taken more samples than he did. The small numbers of samples taken only serves to emphasise that it cannot be justifiable to extrapolate from any set of data including Dr Obando's results to support conclusions about "the whole length of the ROW" either along the stretch of the ROW with which Ocesa litigation is concerned or along the stretch of the ROW within a particular property.
732. For these reasons, I treat any attempt to draw conclusions based upon drawing together the inadequate numbers of samples from unrepresentative sites selected by the application of different (unrepresentative) criteria with very considerable caution. This applies to the purported identification of trends of individual results and to conclusions based upon taking the averages of individual results. The practice of averaging results itself needs considerable caution because different results were frequently taken at or between different depths which would be expected to lead to differences in results in any event.
733. Dr Obando criticised Professor Montenegro's choice of locations on two grounds. The first was an allegation of deliberate bias, which I unhesitatingly reject. Having read his written evidence and seen him give his oral evidence, I am certain (and find)

that Professor Montenegro went about the choice of his sample locations in the way he described and without any conscious or unconscious bias. The allegation was, quite rightly, not put to Professor Montenegro in cross-examination and was not maintained in closing submissions. It should not have been made by Dr Obando in the first place, should not have been persisted with and should have been withdrawn unequivocally by Dr Obando when given the opportunity. The second criticism was to assert the possibility of a “border effect” which may have given rise to cross contamination of his off ROW samples by being on the border of the ROW {H3.8/16/1853}. I accept that Professor Montenegro chose his off ROW sites in the way he described and with the assistance and guidance of Dr Savigny. I am not persuaded that there is substance in this criticism. There is however, substance in the Defendant’s observation that, having alleged in his First Supplemental Report that Professor Montenegro’s LC74 results were affected by border effect (at which time Dr Obando apparently thought that the results were adverse to the Claimants), in his Third Supplementary Report (by which time he had realised that Professor Montenegro’s results could be seen as supporting the Claimants’ case) he wrote of the same sample that “in this particular case, Professor Montenegro probably took samples from representative sites on/off ROW in such a way as to avoid the border effect, which is not surprising given the fact that this is one of the farms located next to farm LC61 which is one of the farms where Professor Montenegro agrees that there was a mixing/inversion of soil horizons” {H3.10/20/2333} cf {H3.8/16/1856}. I reject the suggestion that Professor Montenegro manipulated the selection of his sites as suggested.

The Defendant’s Criticisms of Dr Obando

734. The Defendant’s closing submissions were littered with allegations of bias against Dr Obando. I take them as being allegations of unknowing bias. If allegations of conscious and deliberate bias were made in the preparation of his reports, I reject them. I address the most serious criticisms below. For these purposes I ignore apparent discrepancies that may be attributable to simple error, such as the inconsistent information provided about whether the same photograph was taken on his first or second visit at {H3.5/5/1033} and {H3.5/5/1035}

Dr Obando’s Reliance upon Dr Card

735. I have referred to the generalised problem of stated reliance on other experts at [498] above. Two particular instances of the problem arose with Dr Obando. First, in his third report at [2.3.1.4] he said that “[i]n the ROW, sites affected by erosion that had been previously identified by Dr Geoff Card were evaluated” {H3.9/18/2120}. Yet when asked what reliance he placed on reports, draft reports or information supplied by Dr Card he first said that he had not relied on any such information and that Dr Card had not pointed out to him any areas of erosion on the ROW, following that with a further and unsatisfactory answer to the Court {Day30/10:1}. I was left with the clear impression that the sentence in his third report was simply wrong. Second, and more seriously, in his fourth report he made extensive references to Dr Card’s fourth report. Specifically, at [6.2.4.1]ff he recorded his observations of soil deposits on LC39 and stated (at [6.2.4.8]) that “the deposits of soil I saw on this property are consistent with the stockpile loss described in section 4.1 of the Additional Material Report of Dr Card ...” {H3.10/20/2324}. However, when cross-examined, he was unable to give any satisfactory evidence about whether he had or had not read Dr

Card's report, beyond asserting that he must have read it, or part of it {Day31/146:11} ff. Had he read Dr Card's report, with its grossly excessive estimates of soil loss, he should and would have realised that those estimates were inconsistent with his own observations, as recorded in his report. I am therefore left with the choice between finding that he referred to Dr Card's report in the terms set out above when he had not read it or that he had read it but failed to appreciate that Dr Card's estimates were inconsistent with his observations. In the light of his unsatisfactory evidence in cross-examination, I find that he had not read Dr Card's report.

Dr Obando's Presentation of his Results

736. Dr Obando refined his approach to the presentation and interpretation of his results between his original report and his second and subsequent reports. The general thrust of his evidence was consistent and was that the area of the ROW was less productive than the surrounding areas because of "compaction due to densification (increase in the soil bulk density), loss of total porosity, loss of organic matter and drop in cationic exchange capacity" {H3.5/5/1009}. Central to his evidence was that the structure of the soil on the ROW had been changed by mixing, inversion and compaction. A serious dispute arose over the manner in which Dr Obando presented his findings, both in his first and his subsequent reports.
737. I shall concentrate mainly upon Dr Obando's later presentations, but there were aspects of his initial presentation in his first report that gave cause for concern about his objectivity. At {H3.5/5/1119} he provided two tables setting out the physical properties of the soils found on LC74 on his first and second visits respectively. He had mis-recorded results in the table, which may have been simple error, as may have been some of the numbers recorded in the course of his averaging of data in Tables 5 and 6 at {H3.10/20/2329}. Of much more concern was that his results for soil density on the second visit were recorded as 1.23 g/cm³ off ROW and 1.38 g/cm³ on ROW. Dr Obando purported to apply the classification of Lal (1994) – of which more later – which, for bulk density can be represented as follows:

Limitation	Relative Weighting Factor	Soil Bulk Density (g/cm³)
None	1	<1.2
Slight	2	1.2-1.3
Moderate	3	1.3-1.4
Severe	4	1.4-1.5
Extreme	5	>1.5

738. Dr Obando chose to round the figures of 1.23 g/cm³ off ROW down to 1.2 g/cm³ and 1.38 g/cm³ on ROW to 1.4 g/cm³, enabling him to report that "these density values represent slight (off the ROW) and strong (on the ROW) limitations for the growth of roots." As will immediately be recognised, he had converted the off ROW figure from near the mid-point of "slight" to the borderline of "slight" and "none" and the on ROW figure from within "moderate" to "severe", which he reported as "strong". This was clearly inappropriate given the ranges proposed by Lal and supposedly adopted by Dr Obando; and it was evidently wrong to the detriment of the Defendant. In an unsatisfactory passage of his oral evidence {Day32/49:12} ff, Dr Obando singularly failed to answer the question whether he had realised that his rounding of the figures had placed the on ROW figure into a higher category of limitation; he gave an

inadequate and wrong explanation for why he had not rounded other numbers that appeared in the same paragraph of his report; and he gave a near incomprehensible series of answers about whether Lal either permitted or required rounding in such circumstances. I formed the clear impression at the time, which re-visiting the evidence has confirmed, that when giving evidence Dr Obando understood precisely what he had done and was not prepared to admit it. He should have appreciated the potential significance of what he was doing when he wrote the report; but I am not satisfied that he did, or that the bias in his presentation of the figures was knowing at that stage.

739. The approach of the experts to selecting their sample sites and the small number of samples taken by the experts meant that there was no scientific basis for concluding (as Dr Obando did) that there had been mixing or soil-inversion along the ROW as a whole. Similarly, where Dr Obando took two or three samples per farm, there was no statistically or scientifically sound basis upon which he could express views on the basis of his sampling and observations that there was mixing or inversion along “the entire area of the ROW” on that farm, which was the view that he consistently expressed.
740. Being fully conscious that he could not draw a decisive conclusion without at least 30 samples, Dr Obando instead asserted the existence of trends and anomalies to support his conclusions. This approach was flawed for a number of reasons. First, the number of samples was so low as to make the detection of any trends a dubious exercise. Second, if this approach was to be adopted, it was essential that all results be taken into account. Yet Dr Obando arbitrarily excluded some results as being anomalous when there was insufficient material on which to determine what was a trend and what was an anomaly. Where he did so, the excluded results tended to be those that would not support the Claimants’ case. On occasion he suggested that it was acceptable to exclude one result out of three if he felt that the excluded result fell outside “the general trend” {Day31/122:23}; but this ignored the fact that he did not have sufficient samples to establish satisfactorily a general trend for the ROW as a whole or for the ROW on the properties being considered. On other occasions he suggested that the omission of results may have been an oversight e.g. {Day31/122:16}. Neither of these explanations is satisfactory and no satisfactory explanation was provided.

Lal, Manichon, Compaction and Sustainability

741. It is common ground that compaction is an important consideration when considering loss of productivity of soil and that there are objective tests for measuring compaction. Tests of bulk density and porosity are standard and objective tests for compaction and are universally recognised as such {H6.3/10/698} {Day32/74:24}. In his first report, Dr Obando adopted bulk density as a prime marker of compaction and, where his bulk density results were favourable to the Claimants, relied upon them. However, in his second report he adopted a new approach, by reference to the work of Lal, by which he attempted to assess the “sustainability” of soils {H3.8/16/1892}ff. This work led him to conclude that the Ocesa pipeline affected the sustainability of the soil on the ROW by varying degrees of intensity. He concluded that off the ROW the soil “varies between highly sustainable and sustainable” while on the ROW is “varies between sustainable with high technological input and unsustainable” {H3.8/16/1896}.

742. Professor Lal has an authoritative reputation for his analysis of tropical soils, and Professor Montenegro correctly said that “Lal’s method is ideal to assess the sustainable use of soil, which means that this has to do more with agronomy than with agrology. This is based on a part of agrology: the properties. But to make sure that [the soil] is sustainable, the agronomy must be taken into account” {Day41/101:7}. Dr Obando cited a 1994 paper by Lal as the foundation for his approach. Throughout the paper, Lal makes clear that his objective is to “develop criteria and methods for quantitative assessment of sustainable use of soil and water resources” {H6.3/10/655}. He emphasises repeatedly the need for objective criteria. Thus, for example, “the concept of sustainability, useful and relevant as it is, needs to be made quantitative, objective and reliable” {H6.3/10/655}; and “it is important, therefore, that objective and science-based criteria are developed and standardised for quantitative assessment of sustainability” {H6.3/10/725}. He identified reproducible methods for assessing depth to root penetration {H6.3/10/699} and soil physical indicators e.g. {H6.3/10/691} {H6.3/10/693} {H6.3/10/697}; and he tabulated objective criteria for soil quality assessment (including bulk density) at, for example, Tables 18 {H6.3/10/695}, 29 {H6.3/10/711} and 37 {H6.3/10/717}. Table 37 provided “an example of summation of weighting factors for 10 relevant critical indicators” and Table 38 provided a cumulative rating index based upon the 10 soil indicators identified in Table 37.

743. What Dr Obando did was different in three highly material respects. First, he introduced three new criteria, none of which was susceptible to objective measurement. The three new criteria were (a) Appearance of Structure (“ES”), (b) Appearance of root depth (“PR”) and (c) Appearance of internal structure of aggregates (“EIA”). Second, he constructed a table with numeric values for 7 criteria (as opposed to the 10 in Lal’s Table 37) including his 3 new ones. Third, he adapted the sample rating index from Lal’s Table 38 which he then applied to the 7 criteria which he had selected. The numeric differences between the two rating index tables are summarised below. In general terms, Dr Obando has reduced Lal’s index figures by 30% which is in proportion to the reduction of criteria from 10 to 7:

Sustainability	Lal Cumulative Rating Index {H6.3/10/710}	Obando Cumulative Rating Index {H3.8/16/1895}
Highly Sustainable	<20	<14
Sustainable	20-25	14-18
Sustainable with high input	25-30	18-21
Sustainable with another land use	30-40	21-28
Unsustainable	>40	>28

744. Lal does not support the introduction of Dr Obando’s subjective criteria, and their inclusion is inconsistent with Lal’s goal of achieving reproducible objectivity. Furthermore, the weighting to be attributed to Dr Obando’s subjective criteria when compared with the other criteria that he retained or excluded from those identified from Lal is neither explained nor demonstrated. This matters because it is not self-evident that (for example) the subjective appearance of root depth should carry the same weighting as a contributing criterion as should rooting depth determined by the core break method (discussed and used by Lal) or as should bulk density. The same objection can be levelled at Dr Obando’s weighting (on a scale of 1-5) when assessing each of his subjective criteria. Lal’s paper, when introducing his Tables 37 and 38 counsels that “site-specific empirical relationships should be established between

cumulative rating indices and one or several indices of sustainability discussed in another section of this report” {H6.3/10/716}. That was not done. The result is therefore a subjective and unproven composite methodology and rating index based on criteria that depart markedly from those proposed by Lal.

745. Dr Obando’s justification for his work was that he had introduced criteria that were likely to change on disturbance of the soil. And he referred to a paper by Manichon and Gautronneau {H3.10/21T/2377.9} which provided a three-fold categorisation of the appearance of clods of earth (which Dr Obando adapted and applied for his criterion EIA). Professor Montenegro agreed that an analysis adopting Manichon’s methodology “is a useful analysis to make in the context of this case” {Day41/107:16}; but that agreement falls far short of being an endorsement of Dr Obando’s incorporation of the Manichon categorisation into his adaptation of Lal’s work or as determining the weighting to be applied and the internal score (1-5) when EIA was incorporated into the altered rating index table.
746. At a later stage, the Claimants provided a 2014 paper by Pulido Moncada and others entitled “Visual field assessment of soil structural quality in tropical soils” {H3.10/41/3045}. The stated reason for the production of the paper was that there is scant information about the applicability of visual field assessments to tropical soils. Three different but previously established methods for conducting visual field assessments were reviewed. The first (SQSP) is semi-quantitative in its approach {H3.10/41/3045}. The second (VWESS) involves checking against a visual key linked to criteria chosen to be as objective as possible {H3.10/41/3045}. The third (VSA) follows the visual assessment of key indicators presented on a scorecard suggested by the author {H3.10/41/3045}, with the indicators of the score card identified using the comparative photographs of the field guide manual {H3.10/41/3047}. So far as I am aware, none of these semi-quantitative methods was adopted by Dr Obando. Although I accept that visual observation is an integral part of an agronomist’s armoury, I do not accept that it justifies or validates the changes to the Lal methodology introduced by Dr Obando.
747. Some comfort and support for Dr Obando’s methodology might be derived if it were possible to see any correlation between the Lal criteria that he retained and the relatively subjective criteria he introduced. But the opposite is the case. Taking just the four trial cases the divergence between the on and off ROW numbers for the four non-Obando criteria (bulk density, total porosity, basic infiltration rate and saturated hydraulic conductivity) and for the three Obando criteria (ES, PR and EIA) respectively in Dr Obando’s table at {H3.8/16/1895} is remarkable:

A	B	C	D	E	F	G
	On ROW Lal Criteria	Off ROW Lal Criteria	B/C	On ROW Obando Criteria	Off ROW Obando Criteria	E/F
LC39	4	4	1.0	13	4	3.2
LC50	5	3	1.7	14	5	2.8
LC54	6	7	0.9	15	5	3.0
LC74	6	5	1.2	11	5	2.2

748. The pattern of divergence in results is repeated for the other LC properties. As can be seen from the summary above, adopting the Lal criteria which Dr Obando had retained shows relatively slight change, at least in 3 of the 4 trial properties. But adopting the new criteria which Dr Obando had grafted on shows change that is

orders of magnitude greater in each case. Dr Obando's visual observations cannot simply be dismissed out of hand for this reason; but I am not satisfied that his approach is scientifically sound, validated, or reproducible; or that it is a valid extension of the work of Lal and others on which the Court can rely as providing any form of objective or quantitative view as put forward in his reports.

Dr Obando's Attitude to the ODC ROW

749. Dr Obando was convinced that the ODC ROW caused no damage and that therefore any signs of damage must be attributable to the Ocesa ROW. There is a wealth of evidence to the contrary and I find that his unwavering conviction on this point was wrong. I do not imagine that all of the evidence that is available to the Court would have been available to him: for example, there is no reason to suppose that he knew of the concerns expressed at the public meetings held before the Ocesa pipeline was laid, or that he knew of the multiple settlement agreements that Lead Claimants had entered into on the basis that the ODC ROW had caused them to suffer damage. It may also be the case that Dr Obando would not have known and need not have realised that the processes used on the ODC ROW would have been highly likely to cause at least some disturbance to and deterioration of the soil. But the evidence on which he relied in support of his opinion was sparse, and there was objective evidence of which he should have been aware which should have caused him to qualify the absolute nature of his opinion on this topic.
750. Dr Obando relied very heavily, if not exclusively, on two test pits on the ODC ROW, one being on CF54 {H3.5/5/1036} and the other on LC93 {H3.5/5/1197}. The Defendant makes trenchant criticisms of his selection of the location of the CF54 trial pit and whether the LC93 trial pit results support his conclusions: see {C4/4.7/422}. But even if I were satisfied that there is nothing in those criticisms (which I am not), any consideration of the photographic record as a whole shows that the ODC ROW was clearly visible because it had not fully recovered by the time the Ocesa ROW was laid. The aerial photographs showing CF54 in 1995, 2002, and 2009 illustrate the point. The ODC pipeline is clearly visible for much of its length on CF54 in the 1995 photograph because of a relative lack of vegetation {L1/143/143}, including but not only towards the North-Western and South-Eastern boundaries. In 2002 {L1/258/258} the ODC pipeline remains visible, most clearly towards the North-Western Boundary. Some erosion and lack of vegetation remains visible on the 2009 photograph {L2/474/474}.
751. One other piece of evidence highlights why Dr Obando's determined conviction that the ODC Pipeline caused no damage is misplaced can be traced through Dr Card's report {H1.1/1/64}. At [7.2.10] Dr Card refers to a report on the actual condition of the ODC ROW prepared by Bateman Ingeneria Ltd, which he references as disclosure document D0001849. He summarises part of the report by saying that it "identified that geotechnical erosion control protection works on the ODC ROW were destroyed in the area of LC50, LC61, LC74 and LC82 by soil erosion causing large gulleys and rills to form which presumably undermined the ditch diverters and other geotechnical erosion control and drainage measures. From the documented photographs in the [Bateman] report large erosion gulleys can be seen in the ODC pipe trench itself where the backfilled material has been washed out of the trench." The relevance of this report, with its specific references to damage occurring on LC50 and LC74, is obvious. Disclosure document D0001849 is at {K6/22} and {K6/22T}. It is in fact

an executive summary of a Full Technical Report on the Geotechnical Study of the Vasconia-Coveñas Pipeline. Dr Obando had the full report and cited specific items of evidence from it in his first report: see {H3.4/4/652} at 749, 752, 766.3. As with his cross-references to Dr Card's report, I cannot be sure whether he read the Bateman report (though his citations suggest that he had). Whether he did or not, he certainly had in his hands the material that should have caused him to qualify his benign view of the construction of the ODC pipeline.

752. The consequence of Dr Obando's assumption that the ODC ROW caused no damage was that he attributed all signs of damage to the Ocesa ROW. Unfortunately, the Court's task is more difficult in almost every case and will involve assessing whether signs of damage are attributable to the ODC ROW, the Ocesa ROW or a mixture of the two. Viewed overall, the criticisms to which I have referred lead me to conclude that I do not share Dr Obando's apparent certainty in the correctness of his opinions or his readiness to dismiss evidence and opinions that did not coincide with his own. I am not, however, compelled to dismiss his opinions wholesale or to discount the primary evidence acquired in the course of his investigations.

Matters Agreed between the Agrologists

753. I have already provided an outline summary of the soils at [289]-[291], and of the construction methods adopted for the Ocesa pipeline at [301]ff. The soils summary is drawn from the Agrologist's evidence and is largely or entirely non-controversial. From the perspective of the Agrologists, the following points about the design and implementation of construction practices were not controversial:
- i) The documented method for transporting topsoil was adequate (though Dr Obando noted that inverted or mixed horizons on the ROW and buried soils inside and outside it would be and, in his opinion, were strong evidence that the documented method was not fulfilled) {H23.1/2/97};
 - ii) The documented measures for storing topsoil were adequate (though Dr Obando noted that, in his opinion, evidence showed that the proposed measures were not fulfilled) {H23.1/2/98};
 - iii) The documented measures for the replacement of topsoil and preservation of the different horizons {H3.8/16/1939} at [1.1.2.4.1] and for revegetation {H23.2/6/362} were adequate (though, in Dr Obando's opinion they were not properly implemented).

Matters in Dispute

754. The Claimants seek a finding (Finding 94) that "prior to the Ocesa construction, topsoil (horizon A) was present on the LC farms, and that it was thin but adequate for agricultural production" {C4/3.5/408}. I refer to my earlier outline summary at [289]-[291]. The thickness of Horizon A varied depending upon location and whether it had previously been disturbed or damaged either by human intervention or natural processes causing erosion. The organic content of undisturbed horizon A meant that agricultural production was possible in such soils. How "adequate" it was in any given place would again depend upon the impact of human interventions (both agricultural and engineering) and natural processes so that it is not possible to make a

finding that could be applicable to the whole length of the ROW in the terms sought by the Claimants.

755. By their proposed Finding 95 the Claimants seek detailed findings to be applied to the whole length of the ROW that “the Ocesa construction team were negligent in their management of soil during construction in that they (1) did not properly inform themselves about the local soil characteristics; (2) did not attempt to separate horizon A topsoil; (3) mixed soil horizons A, B and C during the course of soil management; and (4) did not conduct any soil studies before revegetation to establish/refine the revegetation measures proposed.” {C4/3.5/410}. Proposed Finding 96 is that “soil along the ROW on all four LC farms was mixed by Ocesa construction work {C4/3.5/413}.
756. While noting that the findings sought in Finding 95 relate specifically to the Ocesa construction team, I am not persuaded that it would be right to make generalised findings in the terms proposed by the Claimants. The risks inherent in laying pipelines were well known to all: see [319]ff. The methods that were to be adopted during construction were adequate and included separation of Horizon A and the avoidance of mixing or inversion: see [753]. They were not likely to be materially influenced by further or better soil surveys, particularly in the light of Dr Obando’s general acceptance recorded at [291] above and my finding that the summaries to which I there refer are accurate general descriptions of the soils on the Lead Claimants’ properties. The construction team at least attempted to implement those methods, as appears from the evidence of Snr Gasca and photographic and video evidence. This finding is not undermined by the confusion in some of the Defendant’s evidence about what constituted Horizons O or A: the construction process was intended to remove the topsoil and store it separately.
757. I have found (at [312], [328]) that some mixing of soils was inevitable given the machinery being used in the construction of both the ODC and the Ocesa pipelines. In support of their proposed Finding 95 the Claimants rely upon Professor Montenegro’s acceptance that the only reasonable conclusion to be drawn was that construction of a pipeline had caused the soil mixing he observed in LC74 {Day41/45:3}. Two points must, however, be borne in mind: first, that what matters is the extent to which mixing of soils was damaging for the Claimants; and, second, that Professor Montenegro’s acceptance does not relieve the Court of the need to determine whether damaging soil mixing occurred with the construction of the ODC pipeline, the Ocesa pipeline, or both. There was variability in the quality of workmanship such that questions of not attempting to separate Horizon A topsoil or mixing horizons must be considered case by case on the basis of specific evidence. It also appears (e.g. from the evidence relating to LC54) that specific consideration was given to when and how to revegetate. There is no evidence that soil studies were undertaken after construction but before revegetation to identify the condition of the soils, but the evidence does not justify a finding that the failure to undertake such soil studies was itself to be regarded as negligent. What matters is what was done to revegetate and whether the steps taken from place to place were adequate. That must again be the subject of specific consideration rather than simplified generalisations.
758. The Claimant’s proposed Finding 98 is that “soil along the ROW on all four farms became compacted by the Ocesa construction process”. It is common ground that pipeline construction has the potential to cause compaction of the soil {H4.7/8/1428}

and Professor Montenegro accepted that the impact of heavy machinery could be worse if the machinery was used in times of rain {Day41/97:8}. It need hardly be repeated that this applied both to the ODC and the Ocesa pipelines and, where they overlapped, the soil would have been subjected to mechanical influences twice over. The extent to which soil was compacted and the causes of compaction in any given case is a matter for specific evidence and findings.

759. The Claimants' proposed Finding 99 is that "in the light of the evidence on LC39 and 74, it can be inferred that construction soil would have spread onto other parts of the farms where topography allowed and where the erosion control measures were insufficient to prevent it" {C4/3.5/419}. This finding is circular in its reasoning; but it is common ground that, if construction soil leaves the ROW, where it comes to rest will be determined by local topography. There is evidence of soil from the ROW being found elsewhere on farms, which will have to be considered on a case by case basis.
760. The Claimants' proposed findings 100 and 101 can be taken together. Proposed Finding 100 is that "the quantity/quality of the vegetation cover on the ROW is now generally poor compared with the cover off the ROW or on the comparative farms" {C4/3.5/421}. Proposed Finding 101 is that "the damaged soil was less fertile and more erodible" {C4/3.5/422}. It is common ground that mixing and inversion result in the topmost layer of soil having reduced organic content. If the organic content is reduced below about 4% the soil becomes less fertile (with the drop-off in fertility occurring at a faster rate below 2% {Day44/44:8}, and see references at {C4/4.7/525} [97]). Reduction in organic content can therefore have two main adverse effects. First, the soil structure itself may degrade so that root penetration decreases and susceptibility to erosion increases {H3.10/22/2378}. Second, ground cover may be adversely affected by reduced fertility, which again may lead to increased susceptibility to erosion. While making the point that fertility of soil is dependent upon the availability of nutrients as well as upon organic content, Professor Montenegro agreed with these propositions at {Day41/64:25} ff. In general terms, it may be said that the results for organic material on the ROW have a tendency to be lower than those off the ROW. For the reasons already given, I am unwilling to extrapolate from the specific to the general; but I accept that, if samples were otherwise comparable and not subject to variation caused by distance or other intervention, reduced organic content on the ROW when compared with content off the ROW is evidence that may support a finding that the soil on the ROW has been damaged. To identify the cause of the damage requires further investigation on a case by case basis.
761. Three final areas of dispute require to be mentioned here: slash and burn agriculture, the impact of cattle as a cause of compaction and erosion, and the depth at which plinthite may be formed.
762. Professor Montenegro agreed in cross-examination that deforestation does not automatically lead to erosion, but he added the explanation that it will be the beginning of an erosive process, due to the fact that the soil is unprotected by vegetable cover. The process he described was that trees that were to be sold would be removed, then materials that are not for sale would be removed, and then the land is burnt. The extent of any erosion that follows will be dependent upon developments in floor cover after the trees have been cut down and the land has been burned

{Day41/130:1} ff. When used as part of cyclical rastrojo land management, the susceptibility to erosion will again depend upon the degree of exposure of the burned land to direct impact from rainfall.

763. There are many illustrative examples of slash and burn on lands of various slopes and degrees of coverage in the photographs. The Defendant cites two in its closing submissions at {C4/4.7/420} which are illustrative but not exhaustive of the conditions that may be observed. In each case land that has been subject to slash and burn is not fully covered and, subject to other variables such as gradient, would be susceptible to some erosion.
764. It is not possible to make generalised findings about the proportionate contribution of slash and burn agriculture to the erosion of soils on the lands along the whole length of the Ocesa pipeline because of the many variables involved.
765. In the end there was little between the experts on the effects of cattle crossing and re-crossing land. At the most superficial level, they may cause superficial erosion along cattle trails which may then lead to further erosion with the impact of rain on exposed soil. I accept Dr Obando's evidence that "in the long term, the driving of cattle leads to the formation of paths, characterised by the lack of vegetation, and areas that have been eroded generally into channels and gullies" {H3.8/16/1920}. There is a wide variety in the extent of cattle trails and any associated erosion that may be found: see {H3.4/4/761} and the illustrative photographs at {H3.4/4/762}. The area of a single cattle trail is much smaller than the area of the ROW, though on some farms extensive cattle trails give the impression of relatively widespread exposure of soil: see, for example, the area generally shown at {H2.3/3/782}. The impact of the hooves of cattle may also cause surface compaction, but not to the same depth as repeated passages by heavy machinery {Day41/98:10}. The thickness of compacted layers due to transit of tractors and tillage implements ranges between about 10 and 15 centimetres (though that is not clearly shown in the illustrative drawing at {H3.8/16/1910}) {Day41/9:13}. Photographs taken on LC9, LC39, LC61 and LC74, for example, illustrate a deeper compaction caused by the transit of machinery on the ROW during the stage of re-filling or soil restoration, which is manifested by the deformation of soil structure. Compaction such as that illustrated in those photographs has drastic implications for the water dynamics and the depths of roots {H3.8/16/1910} {Day41/99:20}.
766. The experts differed on the levels at which plinthite may be found, it being Professor Montenegro's evidence (as summarised in the Joint Statement) that it is generally located within 30cm from the soil surface and Dr Obando's that in the Claimants' properties it is "located at a greater depth than 30 cm (e.g. LC10 and LC38 are located at more than 60cm)" {H23.1/2/91}. The Claimants submit that Professor Montenegro's evidence on the topic of plinthite should be rejected because he had not previously done a soil investigation in the area of the Claimants' properties {C4/3.7/1016}. Given Professor Montenegro's overall experience and quality as an expert, I do not think this is a sufficient reason to discount his evidence on a matter of general agrological expertise; and the Joint Statement between the experts records agreement that plinthite "may be found at various depths depending on its origin and evolution" {H23.1/2/91}. Professor Montenegro's evidence that plinthite may be found in the upper layers of oxisols (which are prevalent among the Claimants' properties has academic backing {H4.9/10/1715} and I accept it.

Agronomy

The Experts

767. The agronomy experts were Dr Velez for the Claimants and Dr Uribe for the Defendant. For present purposes agronomy may be understood as being the science of soil management and its impact upon crop and vegetation production. As such, the agronomy evidence focussed on the land and agricultural management practices adopted by the Claimants and their impact with time on crop production; and on the potential impact of the Ocesa pipeline on the Claimants' farming activities, the management of their farms, and the productivity of their farms over time.
768. I have already referred to the difficulties that emerged from the Claimants' experts' "interdisciplinary approach" at [498] above. The Defendant provided a detailed critique of the application of those difficulties to Dr Velez' evidence in its closing submissions at {C4/4.7/502} at [1]-[10]. It is a serious indictment of the preparation of an expert's written evidence and, in my judgment, fully made out. Specifically, the prevalence of references in Dr Velez' first report to other experts' reports which he had accepted on the say-so of others (itemised at {H5.7/26/1842}) is a direct and extensive contradiction of his expert's declaration that he had not included anything in his report that had been suggested to him by others without forming his own independent view of the matter. I also accept the Defendant's submission that Dr Velez' second report appears to be stylistically different from his first in a way that suggests the input of lawyers. While recognising that I have only read his reports in translation and that Dr Velez did not provide for his second report a document similar to {H5.7/26/1842}, this apparent stylistic divergence adds to the uncertainty about what parts of his reports are truly his work and what was provided to him by others. This uncertainty is particularly acute in relation to the many parts of his reports where Dr Velez appeared to express clear opinions on causation of damage to the Claimants' land, for the simple reason that Dr Velez gave evidence (which I accept) that:
- "I also repeatedly said to Leigh Day, I said that what I discovered under consequences had to be backed up by experts in those areas of expertise where I'm not an expert, so I needed scientific back-up of what I discovered under consequences. So impact and cause, the experts whose area of expertise is to determine impact and cause had to back up my findings under consequences. Leigh Day assured me that there was scientific back-up under impact and cause for what I discovered under consequences" {Day33/9:5}
769. In these circumstances, I have concluded that it is not safe to rely upon passages in Dr Velez' reports where he appears to state opinions on causation, because I can have no confidence that they reflect his own expert opinion.
770. The prevalence and seriousness of these failures in the manner of preparing Dr Velez's reports and (just as importantly) the failure to disclose clearly what had happened might easily have led to the wholesale rejection of Dr Velez' evidence but for the fact that, when he came to give evidence, Dr Velez was clear and transparent in his answers and, when left to his own areas of expertise, a very impressive and highly expert witness. What is more, once it became possible to identify those parts

of his evidence that were genuinely his, it became clear that there was a substantial measure of agreement between Dr Velez and Dr Uribe.

771. Dr Uribe did not have the same extensive experience of farming in the areas where the Lead Claimants have their land as Dr Velez, though he has relevant practical knowledge, including having a farm in the Magdalena Valley and directly relevant practical experience elsewhere {Day43/7:21}. To that extent Dr Velez had an advantage, because due weight must be given to statements he made in the course of his evidence about practices in the particular region. But that advantage can be stretched too far. For example, while I accept the general proposition that farmers have been working their land in the region for 60 years or more since the onset of substantial deforestation, and that they have a detailed knowledge of their land accumulated over the years, it is stretching things too far to assert or conclude that all farmers through whose land the pipelines passed engaged in best practice in the management of their lands at all time. While recognising the relative disparity between the experts' knowledge of the particular region, I found both agronomical expert witnesses to be impressive and to contribute important evidence.

Agreed Matters

772. Except where otherwise stated, the following matters were agreed between Dr Velez and Dr Uribe and I accept them as being accurate.
773. The deforestation that has taken place on all properties is of the “logging and burning” type, the consequences of which include reduction in the organic matter content and fertility of the soil and erosion. The severity of those consequences depends on the vulnerability of the soil and the duration that the soil is exposed to erosion, the duration of the bush fallow (possibly reaching a secondary forest), and the management provided to the properties after deforestation. {H23.1/4/257} {H23.1/4/260}.
774. Slash and burn (also known as shifting) agriculture requires a period of fallow to allow the biomass of the area to recover. If the fallow period is too short there will be progressive and cumulative deterioration, and in severe cases irreversible deterioration of the chemical, physical, and biological soil conditions {H23.1/4/262}. However, where slash and burn agriculture is practiced traditionally in large forested areas, with low population densities, low impact technology and long rest periods, it can be managed in an ecologically sustainable way, without significantly compromising the fertility of the soil or the ecosystemic equilibrium {H6.3/3/593}.
775. There was some debate about the necessary length of the fallow period, although Dr Velez said (and I accept) that the longer the period the better it would be from the point of view of the ecosystem {Day33/79:1}. In his first report Dr Velez said that shifting agriculture with fallow periods between one harvest and the next sowing “requires an area four times (and up to 10 times) the size of the area planted” {H5.3/4/582}. In his second report he relied upon his field experience which, he said, had shown him “that the rest period can be between four and ten years, depending on the levels of productivity expected; in any event there is no deterioration of the ecosystem” {H5.7/10/1543}. Implicit in this evidence is the tension that may exist between economic, environmental and social considerations. There was an apparent disagreement between the experts on this point with Dr Uribe emphasising that in his

view the areas being farmed by the Claimants cannot generally be regarded as being of low density or as making entirely sustainable economic demands on the land. Thus, for example, he said that indigenous communities, “who rotate and leave fallow periods of 20 or 30 or 40 years”, may allow their land to recover “to a point where they can actually grow two or three crops again, successfully” {Day 43/96:7}. Dr Velez recognised the tensions that may exist and said that “the most intensive [pattern of rotation] that is available, given the resources that they have, is to use it in a three or four-year cycle. Other than that, if they would do it in another way they would need other resources and without them it would put the sustainability of the land in jeopardy” {Day 33/78:9}. Taking the evidence of the experts as a whole, I find that the most intensive pattern of rotation (adopting the shifting agriculture techniques commonly used by campesino farmers) that can be adopted without a severe risk of irreversible damage to the soils is a four (or possibly three) year cycle. That is the pattern that was typically adopted by the Claimants. I find that operating at this most intensive end of the spectrum carries with it a significant risk (but not certainty) of deterioration and irreversible damage. Whether or not the adoption of a four (or possibly three) year cycle will lead to deterioration of individual Claimant’s lands would depend upon a number of factors that would vary from place to place, such as topography, original state of the soils, and the nature of the crops that were grown.

776. I also find that inter-cropping (the technique of planting a combination of different crops at the same time so as to increase the quality and duration of coverage) and manual tools with limited or no tillage will tend to minimise the deleterious effects of the rotational system. The techniques are described by Dr Velez at {H5.3/4/593}ff and form the basis of good practice and economic efficiency where adopted by campesino farmers. I am not persuaded either by the expert or the lay evidence in the case to assume that good practice was always followed. In particular, I am not persuaded to make a general assumption that the Claimants all adopted agricultural practices that prevented deterioration of their land. The state of any Claimant’s land before the laying of either the ODC or the Ocesa pipeline is not something that is susceptible to a generic finding.
777. Although considerable time was spent on crop rotation and intercropping, the Defendant is right to point out that, in general, the Claimants’ lands are largely laid to pasture after one or more cycles of cropping. However, on the evidence at trial, most of the Claimants kept a part of their land for cropping. A pattern emerged of farmers changing the use of parcels of land over time from forest to cropping to pasture, often replacing what had been cropping land but had been changed to be pasture by cutting down further areas of forest and bringing it into cultivation. Conversely, there may be occasions when over-working of the land even for pasture may lead to deterioration, which may in turn cause the farmer to return pasture to fallow and secondary forest: on this point I accept Dr Uribe’s evidence at {H6.3/3/592} while recognising (as he did in cross-examination at {Day43/41:22} ff) that his apparently binary description of traditional indigenous and campesino versions of slash and burn agriculture is too simple and incorrect in failing to recognise a spectrum of behaviours depending upon many variables. I accept the Claimants’ submission that “understanding the environmental impact of the Claimants’ farm management requires an enquiry into their particular agricultural practices as informed by their social background” {C4/3.5/452}.

778. Unsurprisingly, the experts were agreed that the depositing of sediment on existing vegetation can be fatal or damaging depending upon the nature of the vegetation, the amount of the deposit and other factors, which it is not necessary to recite here. In particular Dr Uribe agreed at the theoretical level with Dr Velez's descriptions of damage mechanisms at {H5.7/12/1740} at [2.6]-[2.8] while Mr Layton QC correctly recognised that it would be for the Court to decide whether and to what extent those mechanisms had operated {Day43/131:12}- {Day43/135:19}.

Planned revegetation and its implementation

779. The Claimants seek a finding that the revegetation programme was poorly designed in that there was no clear revegetation programme, the selection of plants for revegetation was deficient, the fertilisation plan was inadequate and the scale of the plan was too large {C4/3.5/441}ff. They rely upon the evidence of Dr Velez to support an allegation that the revegetation programme was negligently compiled in these respects. I am not satisfied that it is within his expertise to give an opinion in support of a finding of negligence as he has never been involved with either the design or implementation of a large-scale revegetation programme for a large infrastructure project {Day33/24:22}. I am confirmed in my view that Dr Velez lacks authoritative expertise in this area by the lack of realism in some of the opinions he expressed in this area, for example that the revegetation plan should not merely have considered the specific conditions at each farm but also the conditions of the different areas of the farm crossed by the pipeline {H23.1/4/270}. By contrast, Dr Uribe has direct and relevant experience which leaves him better qualified to express an opinion on what did or did not amount to reasonable or good practice {Day43/146:22}.
780. A further weakness in Dr Velez's expressions of view is that it is very largely based upon a desk-top analysis of apparent discrepancies between or inadequacies in documents such as the RECS, the EMP and the February 1994 Bateman Report. That is not an irrelevant exercise, but its usefulness is reduced by the certainty that not all relevant documents were or are available. In particular, documents from Saipem are not available. I accept Snr Loeber's evidence, despite the vagueness of his recollection, that Saipem would have produced a revegetation plan which was used on spread A {Day18/129:19}. No such document is available. With one exception, the plans prepared by the contractors who were primarily responsible for carrying out the works are not available, with the result that they could form no part of Dr Velez's critique. It is not self-evident that the various contractors would have had no clear plan or a clear understanding of their responsibilities.
781. Dr Velez's main criticism of the choice of plants is that leguminous plants were not specified. The main variety of grass which was used was brachiaria which is appropriate to soils which are rich in aluminium and iron; and it is capable of providing full coverage {Day33/64:7} ff.
782. Turning to the question of fertilisation, there are discrepancies between the recommendations made in documents that are available. However, it is clear on the evidence that appropriate fertilisers were applied, including organic fertilisers, though the evidence does not permit the Court to make generic findings about the quantities that were used.

783. In the absence of compelling and authoritative evidence from Dr Velez, I am also influenced by the knowledge that the revegetation programme was subject to Ministry inspection and approval and that inspections of the revegetation work were carried out by the Environment Ministry and local municipal authorities, in addition to internal monitoring and audit {E1/5/261} ff {Day19/39:1}. Taken overall, I prefer the view of Dr Uribe that the documentation, including the RECS, provided adequate detail in relation to revegetation, including types of grass, fertilisation, organic material and methods of planting {H6.3/3/604} at [45]-[54]. I am not persuaded to make generic findings of negligence about the planning of the revegetation programme as sought by the Claimants.
784. The Claimants seek a generic finding that grasses were not sown adequately. The evidence establishes that revegetation of naked soil in the seasonal and geographical conditions that applied to the route of the pipeline was a challenging undertaking which, on the evidence, met with varying degrees of success, as it had done after the laying of the ODC pipeline. The Agroforestry report prepared for Ocesa in December 1997 identified a need for new planting in some locations where there was found to be a complete lack of vegetation and in other partially planted locations “where planting was not technically correct, leaving too much distance between plants or where the system employed did not match the required parameters [criteria], such as cases of flat terrain that should be evenly planted and was done in rows” {K52/534T/6}. Dr Velez gave evidence of places where his inspections revealed excessive gaps between planting, with 50cm or more between plants due to low sowing rates {H5.7/10/1518}. Taken together, this evidence supports a finding that there were places where using inadequate quantities of seed or sowing too far apart (or both) led to inadequate coverage. It does not support a finding that these failings were universal or that any identified area of no or partial coverage was attributable to such failings, and I make no such findings.
785. One reason why generic findings are inappropriate is the agreement of the experts that they cannot be certain which measures were effectively applied to revegetate the ROW in each of the properties {H23.1/4/268}. Even where there is specific factual evidence about what happened in a particular place, it has to be examined with care to see whether, and if so how, it fits with the case being advanced by the Claimants. For example, Snr Mesa’s evidence at {Day7/8:9} ff (which the Claimants rely upon in support of their case for a generic finding that grasses were not sowed adequately), when taken with the other evidence about his revegetation works includes at least three features of interest: he says he was not provided with sufficient seed, he was trying to sow in hard ground before the onset of the rains, and he was not paid for the work he did. This evidence certainly supports a submission that there were difficulties connected with his revegetation works that might explain a lack of coverage; but it does not justify generic findings of failure to sow grasses adequately. It will be necessary to examine the evidence relating to each property separately.
786. For similar reasons, I do not consider it profitable to attempt to make detailed findings about expected rates of revegetation. In passing, I accept the point that was put to Dr Uribe that any revegetation plan is going to involve a tradeoff between how comprehensive it is to get the best result on the one hand, and the cost of doing it on the other {Day43/150:23}; and I accept Dr Uribe’s evidence that what is adequate in a revegetation plan is what will achieve a sufficient degree of revegetation to protect the

ROW from erosion as soon as possible in practical reality {Day43/151:10}. However, it is clear on all of the evidence that rates of revegetation are highly dependent upon variables including the time of sowing and the weather that follows. Dr Uribe gave a detailed response to the question “how long after the completion of the construction process would you have expected the revegetation to have achieved complete coverage over the ROW” at {H6.3/4/573} which I accept as setting out how revegetation might progress in different circumstances and depending, mainly, on the weather conditions at planting and during the following months after germination. Under optimal conditions (which he described as adequate moisture most of the time) and provided that cattle were not allowed onto the revegetated area, he would expect that the ROW should be 100% covered by protective vegetation (this includes grasses and “weeds”) at about the 8th month after planting, assuming that the area was also fertilised as part of the revegetation scheme. Under sub-optimal conditions he would expect that the ROW should be 100% covered by protective vegetation at about the 12th month. It is clear from his text that he does not regard 12 months as being an outside limit and, if he had done so, I would not have accepted his evidence. Rather, the considerable variation that is evidenced in this case on both pipelines and within short distances leads to the finding that his proposed time-lines are ideals that may easily be rendered unfeasible by local factors. When seen in this light, the assessment of revegetation in the Agroforestry report is not indicative of systemic negligence in the planning or execution of the revegetation programme (except to the extent discussed above), even though it highlights significant areas where the state of the revegetation calls for further work.

Dr Uribe’s Sampling

787. Dr Uribe took soil samples which he analysed from an agronomist’s perspective, his objective being to acquire an objective and quantitative assessment of the fertility status of the soils on the Lead Claimants’ properties and, most importantly, to determine if there were significant differences between the fertility status of the soils inside and outside the ROW. Dr Velez did not take any samples or, if he did, he did not present the results of his work. Dr Uribe’s method was adapted from the standard procedure established by Corpoica, the Colombian National Agricultural Research Institution, the adaptations reflecting the limitations and objectives of Dr Uribe’s exercise.
788. The Claimants launched a sustained attack on Dr Uribe’s sampling. They point out, correctly, that Dr Uribe’s sampling method differs from that adopted by the pre-construction Bateman survey (which itself is not clearly explained) and that he did not attempt to take his samples at the same places as had Bateman. The Claimants are also right to point out that Dr Uribe’s sub-samples are likely to have caused a mixing of horizons, whether or not there had been inversion or mixing in the course of the works. These factors impose limitations on the extent or power of any conclusions that can be drawn from the composite sample results and any direct comparison with the results of the Bateman survey, as the Defendant recognises {C4/4.7/524}. Dr Obando went much further, alleging that Dr Uribe had sought sites “in which there was no apparent mixing and/or inversion, which is probable on the edges of the ROW where samples were taken” {H3.8/16/1860}, an allegation of (knowing) bias that, having read, heard and seen Dr Uribe’s evidence, I reject completely.

789. Dr Uribe's exercise could not and did not provide a statistically representative set of sampling results but his practice of taking six sub-samples inside and six outside the ROW in areas that he considered representative of the general conditions of the landscape of each property provided results that are a useful addition to the overall body of evidence. And, provided the comparison is taken as a high level of generality, his results corroborate what was diagnosed by the Bateman survey "(i) that the soils are generally acidic or very acidic; (ii) that high Aluminium toxicities are frequent; and (iii) that most essential nutrients are very frequently deficient, with the general exception of Iron and Manganese that are naturally abundant and occasionally toxic to plants in extremely acidic soils" {H6.1/1/50}. The Bateman study is agreed by Dr Obando to be the closest evidence in relation to the fertility status of the soils of the area before the construction of the Ocesa pipeline {H23.2/6/381} and this assessment is broadly non-controversial. I find it to be reasonable and correct: and see [289]ff above.
790. Allowing for the limitations in the exercise that he undertook, the presentation of Dr Uribe's results for soil organic matter (%) on the Lead Claimant properties is of interest {H6.3/3/624}:
- i) Dr Uribe took composite samples on and off the ROW on each of the 10 properties. He presented his results alongside Dr Obando's results for the same properties (save for the absence of a Dr Obando result on the ROW on LC61);
 - ii) On LC93 both Dr Uribe and Dr Obando found higher soil organic content on the ROW rather than off the ROW, with each expert's on the ROW reading being >40% greater than the off the ROW reading;
 - iii) On LC9 Dr Uribe recorded a higher soil organic content on the ROW than off it, while Dr Obando found a higher soil organic content off the ROW than on it;
 - iv) On LC 38 Dr Obando recorded a higher soil organic content on the ROW than off it, while Dr Uribe found a higher soil organic content off the ROW than on it;
 - v) On the remaining 6 LCs (LC10, 39, 50, 54, 74, 82) where both experts' results are shown, each expert recorded a higher soil organic content off the ROW than on it. On LC61, where only Dr Uribe has results recorded for on and off the ROW, he recorded a higher soil organic content off the ROW than on it;
 - vi) Dr Uribe's on the ROW results are above 2% on 7 of the 10 LCs (the exceptions being LC10 (1.04%), LC61 (1.81%) and LC82(1.60%)). Two of his on the ROW results are above 3% (LC9 (3.72%) and LC93 (3.82%)). Dr Obando's on the ROW results are above 2% on 8 of the 9 LCs presented (the exception being LC74 (0.91%)). His on the ROW results are above 4% on 3 of the LCs (LC9 (4.18%) LC54 (4.75%), LC93 (8.17%));
 - vii) Turning specifically to the trial LCs:

- a) Both experts' on the ROW results for each LC were lower than their off the ROW results;
 - b) Two of Dr Obando's results for on the ROW were either above or almost equal to 4% (LC39 (3.99%), LC54 (4.75%)). His result for LC50 was 2.47%. His result for LC74 was the lowest of all the experts' recorded results (0.91%);
 - c) All of Dr Uribe's results for on the ROW were above 2%;
 - d) Both experts found that the relative difference between their off the ROW and on the ROW results for LC54 was smaller than the relative difference between their off the ROW and on the ROW results for the other three trial properties – that remains the case if the results for LC10 and LC82 (the other two LCs where both experts had higher off the ROW than on the ROW results) are brought into account;
- viii) On the LCs where both experts found lower soil organic matter on the ROW than off the ROW, Dr Obando's off the ROW results were on average higher by a markedly greater proportion than were Dr Uribe's.
791. Taken overall, the results suggest that the laying of pipelines has tended to cause a reduction in soil organic matter % on the ROW, though this is not always the case, even where both the ODC pipeline and the Ocesa pipeline have been laid. Each expert's results for LC54 suggests a relatively smaller reduction than in other cases where both experts found a reduction, which could be consistent with there having been only one disturbance (by the Ocesa pipeline but not the ODC pipeline) but is not of itself of significant probative value. And the pattern of relative differences supports the conclusion that, as identified above, Dr Obando's approach to choosing sampling locations differed markedly from that of either Professor Montenegro or Dr Uribe.
792. Dr Uribe also gathered together his results for aluminium saturation on and off the ROW and placed them alongside Dr Obando's results from composite samples, which provides the best set of data for comparative purposes {H6.3/3/622}. I accept Dr Uribe's conclusion that the results do not reveal a pattern of Aluminium levels being higher on the ROW than off the ROW and do not support the conclusion that the construction of the pipeline(s) caused a consistent increase in the Aluminium saturation of the soil on the ROW, though it may have done so in some cases {H6.3/3/623}. I do not consider that Dr Uribe's sampling results or his interpretation of them are undermined by any lack of understanding of the processes of pipeline construction as suggested by the Claimants at {C4/3.5/479}.

Fishing and Aquaculture

The experts

793. The Claimants rely upon the evidence of Dr Atencio. The Defendant had instructed Dr Rodriguez, who carried out inspections, discussed the case with Dr Atencio, and produced a report before his untimely death. To present its evidence in place of Dr Rodriguez the Defendant appointed Dr Henderson, who relied to some extent upon Dr

Rodriguez' report but differed from his views in material respects. Dr Atencio and Dr Henderson were both highly expert and each gave useful evidence within their expertise.

794. In his written evidence Dr Atencio gave extensive statements of opinion on the processes of construction of pipelines and in support of the Claimants' case on the causation of the sedimentation he believed had occurred, but in doing so he went beyond his expertise. Where he was entitled to give evidence that is relevant to causation, and where his evidence is entitled to weight in the light of his extensive experience, was in giving evidence of fact such as in relation to LC50, where he said "I have visited many ponds similarly situated in deforested areas, in cattle farms and even in less favourable positions (steeper slopes), and I have never seen a fish pond sedimented in this manner" {H11/6/440}. In a number of respects he made assumptions that were wrong or at least not supported by the evidence, such as assuming that the Claimants would routinely clear "normal" sedimentation from their ponds. These occasions have been carefully highlighted by the Defendants, as part of an overarching submission that Dr Atencio lacked objectivity. Those criticisms would carry more weight if Dr Atencio had been an experienced English litigation expert. They do not lead me to conclude that Dr Atencio's evidence within the proper compass of his expertise should be generally discounted or disregarded.
795. The Claimants submit that "certain findings of the Defendant's experts are suggestive of bias" C4/3.5/481 at [1347]. On closer examination this submission appears to be largely or wholly directed at Dr Rodriguez and is supported by the fact that Dr Henderson did not adopt all of Dr Rodriguez' findings and opinions. I do not consider it appropriate to make a finding on this allegation in relation to Dr Rodriguez because (a) there was insufficient concentration upon the details of his evidence at trial or in closing submissions (written or oral) to enable a fully informed decision to be taken and (b) unless it is absolutely necessary to do so, it is undesirable to make a finding on the basis of a lightly sketched allegation of bias against a man who (so far as the court is aware) has a previously unblemished reputation and who is unable to defend himself because he has died. It is not necessary to make such a finding in the present case.
796. If and to the extent that the allegation is directed against Dr Henderson, I reject it. While it is true that he did not go to Colombia, that was a reasonable approach given the amount of information that was available for him to work with in any event and his extensive experience of fishing and aquaculture in the tropics. I have not been able to find whether the suggestion was put to Dr Henderson in evidence that he declined to go to Colombia because it would rescue him "from the awkward situation of finding that he observed evidence of fish ponds which Professor Rodriguez had denied" {C4/3.5/482}. Whether or not it was, on my overall assessment and review of Dr Henderson and his evidence for the purposes of writing this judgment, I reject the suggestion without hesitation. Overall, my assessment was that Dr Henderson was suitably qualified to give and did give useful evidence, which was characterised by a willingness to make concessions and agree with propositions put to him when it was appropriate to do so.
797. In large measure the evidence about the Claimants' fishing is case sensitive and will be considered when dealing with the four lead cases individually. Two sorts of fishing are alleged by the Claimants. First, it is alleged that fish ponds were present

and used for cultivating fish: this is sometimes referred to as fish farming, though it was generally on a small and simple scale. Second, in the case of LC39 alone amongst the four cases at trial, it is alleged that Snr Sequeda used to fish in La Enix for wild fish until sedimentation from the ROW destroyed that possibility.

Fishing and Aquaculture – the expert issues

798. I adopt Dr Atencio’s outline summary from his first report {H11/2/153} at [11.3] – [11.7]. “The fish farming practised in the municipalities of Caucasia, Zaragoza, Remedios, Tarazá, and therefore by the Lead Claimants, is artisanal pisciculture of limited resources. This pisciculture is characterised by self-managed small scale production with the aim of selling the produce autonomously or in business with other entities of a similar nature. The scale of production is low, and the management is simple. The principal species that are bred are cachama negra ..., hybrid cachama ... and tilapia roja at a stock of less than 4 fish/m², giving supplementary feed, usually agricultural by-products from the same farm and/or commercial fish feed. ... There are three types of pond that are used in rural, artisanal pisciculture: excavated, semi-excavated and dammed. ... The areas of the fish ponds vary between 10 and 1000m² with water flowing in and out through hoses of PVC tubing having a diameter of 0.5 to 1.5 inches.” Elsewhere he wrote that “the fish farming practised on the properties of the Lead Claimants is self-managed and of limited resources (artisanal pisciculture or of limited resources), for self-consumption with sales of some of the surplus” {H11/2/165}
799. For the purposes of his first supplemental report Dr Atencio reviewed official documents that describe fishing activity in the Bajo Cauca Antioqueño. “Fishing is described as an important activity for subsistence and food security in the communities” {H11/6/383} at [4.3]. This seems to me to be a fair reflection of the scale of the fishing operations as revealed by the evidence at trial, with the emphasis on subsistence and food security rather than on selling either autonomously or in co-operation with other farmers.
800. Small fish farmers frequently lack adequate technology and display poor management of their crops in earth ponds. This type of fish-farming is the one practised by the Lead Claimants who allege that they had ponds for breeding fish {H11/2/152} at [10.7]. Given those limitations, yields are typically quite low and the fish cultivation practised by the Claimants is also vulnerable, given its lack of technical parameters {Day45/45:15}.
801. Sedimentation of fish ponds may come from suspended solids in the water source, and organic matter such as foodstuffs and faeces. Sedimentation may hinder migration patterns, cause a reduction in oxygen levels, and affect the health and growing cycles of fish. Sedimentation should be removed to avoid problems with water quality {H23.5/16/1303}. The frequency of sediment removal should be determined by the weight of sedimentation coming to rest in the pond {Day46/133:22}. There has to be a mechanism to be able to drain the pond in order to remove organic matter from the bottom of the ponds as and when necessary {Day45/65:9}. (I note in passing that most of the ponds considered during trial did not have a mechanism for removing organic matter from the bottom, with water flow out of the pond typically being from surface level or part-way down.) The ponds that have been discussed in the course of the trial have had either no or no substantial perimeter edge and no sediment traps.

They are therefore vulnerable to sedimentation. Two aspects of water supply are important to be mentioned here: where a pond is located near to the channel of a stream, it may be vulnerable to sedimentation if the stream overflows; conversely, where a pond is fed from a stream, a seasonal loss of flow may be critical for the continued viability of the pond {H23.5/16/1308}.

802. There was a dispute between Dr Atencio and Dr Henderson about the frequency with which sediment should be removed. Dr Atencio said that he had observed cycles of two to three years between emptying, removing the sediment and refilling {Day45/64:10}. Dr Henderson argued for a shorter period, suggesting that it may be necessary at the end of every six-month cycle of fish cultivation, and not limiting his answers to still-water ponds {Day46/133:18}. I accept his evidence that where the flow of water out of the ponds is at surface or near surface level, it will have no impact on sediment that has sunk to the bottom, but I do not accept his evidence that complete drainage would either be necessary or customary at the end of each cycle – particularly in the low-technology subsistence approach being adopted by the Lead Claimants. While I would put Dr Atencio’s estimate of a two or three year cycle at the upper end of the time-scale that would prove to be necessary, and consider that every six-months is at or below the bottom end, the evidence as a whole suggests that drainage and removal of sediment about once every one or two years would be necessary in normal circumstances, the exact length of the cycle being dependent upon the volume of sedimentation and the amount that would be removed by water-flow, each of which could be highly variable. I also bear in mind that carrying out sediment removal is likely to involve or at least reflect a trade-off between investment in the state of the pond and productivity.

Stocking rates, water renewal, yields and competition

803. There is reasonable agreement between the parties about average and recommended stocking densities. The range of density varies between 1 and 4 fish/m² {H11/2/157}. The average stocking density of cachama for Colombia is 1.54 fish/m² and for Antioquia is 1.5 fish/m² {H11/6/450}. Density affects productivity: where a density of 4 fish/m² is exceeded the fish will not thrive, even where there is an adequate supply of water renewal {Day45/58:3}. In extreme cases this can lead to fish dying, with the risk that dead fish may lead to total loss of stock as their decomposition consumes the available oxygen {Day45/59:13}. There is no evidence of this having happened on any of the Trial Case properties.
804. Stocking density is closely related to yields, which generated the main expert disagreement in this area. The Claimants argue that it is possible to increase productivity and increase yield in fish ponds by increasing water renewal rates, and they submit that an article by Akifumi and Kubitza “validates as possible the water renewal theory relied upon by Dr Atencio” {C4/3.5/488}. Dr Atencio’s water renewal theory was expressed in his first supplementary report where he supported the productivity rates claimed on behalf of the Lead Claimants on the basis that sufficient oxygen to permit the claimed productivity rates could have been provided by adequate flows of water from streams into the ponds {H11/6/401}. The Akifumi paper is in four parts; the parties concentrated on Part 1 {H11/12/620}. It appears to have been issued under the auspices of the Argentinian Directorate of Fisheries and, while being originally based on experience in Brazil, is adapted for Argentine conditions {H11/12/621}. It applies to fish farming ventures of all sizes and complexities,

though it tends to address larger scale enterprises than those with which the Court is concerned in the present litigation. For present purposes, the theoretical support it provides is of general application. The text and Table 5 at {H11/12/625} illustrate that where the supply of water into a pond is the sole source of oxygen for the water that is in the pond, high water renewal rates would be necessary to ensure the survival of the fish. Table 5 does not expressly state the depth of the pond in question. Instead, it estimates varying rates of emptying (expressed in l/s/ha) that would be required to sustain a given biomass (weight of fish - expressed in kg/ha) taking into account the oxygen demands of the fish, their feed and their faeces. The rate of emptying is also expressed as the % of the volume of water in the pond that would be emptied per day. As calculated in the table 30% emptying (i.e. water renewal at the rate of 52 l/s/ha) is required to sustain 4000 kg/ha of biomass, increasing linearly to 105% emptying/water renewal being required to sustain 14,000 kg/ha of biomass. The proposed weight of fish that could be cultivated out of the pond is achieved by multiplying the sustainable biomass by the number of fish-harvesting cycles per year. It is these figures that Dr Atencio relies upon in his support of the feasibility of the losses claimed by the Claimants.

805. One of the points made by Akifumi in the cited passage is that the use of renewal water as the sole source of oxygenation is generally prohibited by virtue of water availability restriction. The Claimants' case is that their streams on sloping land provide security of water flow that removes this prohibition. In principle I agree that if a stream provides a suitable and reliable supply of renewal water into the pond then the general prohibition may be avoided, because it is common ground that flowing water is likely to be fully saturated with oxygen. Technical questions remain to be answered on a case by case basis. In some cases the pond is formed by damming the stream, so that the renewal of water will equate to the rate of flow of the stream, which will vary with the seasons. In other cases, the pond is fed by a pipe taking water from the stream, in which case it is not to be assumed without question that the rate of renewal of the pond water equates to the rate of flow of the stream. Dr Henderson was therefore right, when accepting (in answer to a question which elided a general proposition and specific reference to LC39) that it was theoretically possible for the fish farmer to achieve the water renewal rates set out by Akifumi, to add the qualification "at least at certain times of the year" {Day47/6:18}.
806. Once one moves from the theoretical possibility of oxygenation achieved solely by water renewal, the likely productivity of a given pond becomes case specific and will depend upon the competence and ambition of the individual fish farmer, the precise nature of the set up of the pond, and other variables. What Akifumi does not purport to do is to suggest that either the maximum levels of biomass or any particular levels of biomass indicated in Table 5 are likely to be achieved year on year in the field.
807. Dr Henderson relied upon a number of sources to support his view that 9,000-10,000 kilos/ha per annum is a reasonable upper estimate of likely production assuming reasonable levels of technological input and not the more basic operations that typify the Claimants' fish cultivation. His opinion was that 2,000-3,000 kilos/ha were more likely from a highly skilled farmer using an artisanal pond if the farmer was not using optimal cycles and 4,000-5,000 if strictly following optimal cycles: see {C4/4.7/545} at [72]-[74]. The Claimants' major criticism of this evidence is to submit that the papers on which Dr Henderson relies are not relevant to the situation of the

Claimants. Specifically, the Claimants criticise his reliance on papers by St Paul and by Ruiz as being referable to fish farming in standing water and (in the case of Ruiz) being economic models as opposed to the estimations of biomass in the Akifumi paper: see {C4/3.5/488}.

808. I will consider these criticisms by reference to the Ruiz paper {H11/13/635}. It is a 2009 doctoral thesis entitled “Economic Analysis of Rural and Artisanal Aquaculture in Ecuador” in association with two named universities, one of which is in Norway and one in Vietnam. It was produced in the light of the Ecuadorian Government’s “proposal of investment for the Agriculture sector with the installation of rural-artisanal Aquaculture farms to support the economical development of low income families living off short term Agriculture cycle[s]” {H11/13/640}. It is therefore directed to a similar level of economic activity, for which reason alone the Claimants are correct to concede that there is a point of comparison with the present litigation. The aim was to identify the likely economic benefit to those who took part in the proposed programme. It did so by proposing economic models, but they were based upon working assumptions about the costs and scale of return that could be expected from participation. Those working assumptions included that the pilot project was based on credits starting from US\$1,500-2,000, which would (on the Claimants’ own case) be a significant level of investment for campesinos such as are involved in the present litigation. The data required for the analyses was entirely provided by The Office of Projects & International Cooperation of the Under-secretary of Aquaculture in Ecuador and the spreadsheets were actual summaries of the Rural-Artisanal Aquaculture Project Budgets from three specific cultivations: one polyculture cachama-tilapia, cachama monoculture and red claw crayfish {H11/13/665}.
809. Two observations may reasonably be made. First, the type of water supply is not identified and few clues are provided. All that can be said is that the few photographic illustrations do not appear to include a dammed stream or a pond that is obviously fed from a stream in a hilly area; and that a significant part of the starting budget is the cost of a 2” in/out water pump with slip unions having a five year useful life {H11/13/671}. Second, the extent of oxygenation of the water in the ponds is not identified. However, these objections may be overstated. The absence of a nearby stream does not determine the renewal rate, and the presence of the in/out pumps indicates at least the possibility of their use for renewal and oxygenation purposes. What does appear is that the figures are presented from a reputable governmental source as reasonable working models and not as absolute maxima.
810. I accept that Ruiz’ data is from the state adjacent to Colombia and not from Colombia itself. It must therefore be treated with some flexibility to allow for differences in costs and working practices, including the potential differences in the method of water-replenishment and its possible effects on water-replenishment. However, as a soundly based model developed for the purposes of estimating the potential profitability of rural-artisanal fishing, it has sufficient points of similarity to justify Dr Henderson’s use of it as supporting evidence for his opinion on likely productivity from the Claimants’ operations.
811. A second major objection taken by the Claimants is that Dr Atencio has extensive experience in Colombian artisanal aquaculture while Dr Henderson has none. That is true, and is an observation that works in favour of placing greater weight on Dr Atencio’s opinion. But Dr Henderson has very extensive experience of fish

cultivation in the tropics, and he had ample information on the possible differences between fish cultivation in Colombia and in those jurisdictions where he had direct and expert experience.

812. Drawing these strands together, I conclude that the figures in Akifumi provide theoretical support for the biomass that could be supported with the projected levels of oxygenation provided by water renewal at the rates there set out. To that extent they provide validation for Dr Atencio's theory that oxygen starvation could be overcome by renewal water at the levels of production alleged by the Claimants. They are not, however, evidence in support of the Claimants' actual fish-farming practices; nor do the estimated figures purport to be an indicator of what levels of production might reasonably be expected from subsistence (or near subsistence) fish cultivation as practised by the Claimants. Dr Atencio's descriptions of the Claimants' fish farming practises, which I have set out at [798]-[800] above, support the Defendant's submission that yields will typically be low. That submission also receives support from Dr Henderson's evidence, which I have summarised at [807] above. On all of this evidence, I accept the Defendant's submission that achieving yields approaching the higher figures set out in Akifumi's Table 5, requires considerable skill and attention from the farmer and, probably, a more scientific and technically organised approach to production than appears typical on the evidence in this case. While I do not take Dr Henderson's figures as fixed upper limits, I find that to achieve yields significantly over 10,000 kg/ha requires skill and attention from the farmers and that claims alleging yields approaching or more than twice that figure require careful scrutiny on a case by case basis. An unskilful or casual farmer would be unlikely to achieve yields of 10,000 kg/ha.
813. The Competitiveness Agreement of the Fish Farming Chain in Colombia {H11/10/558} provides reliable statistics on overall levels of production in Colombia in the years to 2003. Between 1989 and 1999 there was a period of sustained growth, with tilapia being the largest contributor, followed by cachama, in part because of state support and programmes given to small-scale fish farming. There was a sudden slump in production in 2000 for which the reasons are said not to be clear. Three factors are suggested as contributing: first the economic crisis and recession in Colombia in 1999; second, public order problems affecting supply and production of fish; and third, the massive importation of tilapia primarily from Ecuador at throw away prices. I accept Dr Atencio's evidence that this collapse would primarily have hit those who were producing tilapia for sale (whether on an industrial or relatively smaller scale) harder than those whose dominant objective was to supplement their food supply and security {Day45/37:7}.

The need for permits

814. Article 91 of decree 2256 of 1991, statute of Law 13 of 1990 states that a permit is required to carry out commercial aquaculture. Colombian law draws a distinction between commercial fishing, which is defined as "that which is undertaken in order to obtain economic benefit" and subsistence fishing, which is defined as that which is undertaken "without a profit motive, to provide food for the fisherman and his family." Commercial fishing requires a permit; subsistence fishing does not. In strict logic there may be seen to be an interim stage, namely where the majority of the fish are produced for domestic consumption but any surplus may be used for sale or

barter. The Defendant argues that this intermediate position should be treated as commercial production and therefore requiring a permit.

815. The purpose underlying the Defendant's argument is that, if a Claimant's fishing venture required a permit but was carried out without one, that could amount to contributory fault and so cause damages to be reduced. The Legal Experts do not provide a detailed exposition of how or when the Court might take such a view in the case of the Claimants' fishing ventures. It seems to me that the most likely view that the Court would take would be to decide whether it was dealing with something that is in essence a commercial enterprise (in which case the fact that some fish was used for domestic consumption would not remove the need for a permit overall) or subsistence fishing (in which case the fact that small amounts were used for sale or barter would not generate the need for a permit). Moving from the strictly legal to the strictly pragmatic, it is not obvious to me (and the Legal Experts do not explain) why the court should reduce the damages if a Claimant establishes that a Defendant has prevented him or her from achieving a modest supplement to their subsistence levels, with or without a permit. I could understand the Court making the assumption for the future that the Claimant should and will obtain a permit (if appropriate) and deducting the cost to the Claimant of doing so: but that is not the way the case is put.
816. Given the limited scale of most of the Claimants' fish farming and the even more limited quantities of fish that were sold, most cases were cases of subsistence fishing that did not need permits. I deal with the need for a permit as it arises in each of the four Trial Cases.

Veterinary science

The experts

817. Each side called experts whose distinguished CVs suggested that they were fully competent to assist the Court. Each side submitted that the evidence of the other side's expert could not be relied on. Neither side's submission was persuasive.
818. The Claimants called Dr Delgado, a veterinary surgeon and expert in livestock production, who specialises in tropical cattle production and has worked in the Bajo Cauca region of Antioquia since 1981. He has many years of experience of giving advice to cattle producers of all sizes and was selected by the University of Antioquia as professor to train students of livestock production in the area of animal reproduction. The Defendant called Dr Avila, who has practical, academic and governmental experience over many years and is just as highly qualified as Dr Delgado. The main difference between the experience of the two experts is that Dr Avila's work in the field has generally been in the department of Casanare, and he divides his time between Casanare and Bogota. Casanare includes the Eastern Plains of Colombia and has various types of topography from steep mountains to flat plains. I accept his evidence that the Eastern Plains has all of the production systems that have been analysed by the Court; but there can be no doubt that Dr Delgado has an intimate knowledge of the Antioquia region as a result of working with cattle breeders and farmers that Dr Avila lacks. This does not, however, render Dr Delgado's evidence impervious to criticism, even when it comes to local practices.

819. The Defendant's overarching attack on Dr Delgado starts with his references to other reports, where his written evidence epitomises the problems described at [498] ff. Three examples illustrate the problem, two referring to Dr Card and one to Dr Obando:
- i) At {H20.3/3/510} referring to LC39 and giving an outline introduction to his case, Dr Delgado wrote "See the report by Geoff Card for information on the topography of the farm" thereby indicating that he adopted that information. But in evidence he said that he had not considered the parts of Dr Card's report which dealt with the topography of the farm {Day49/13:13};
 - ii) At {H20.3/3/521} (again referring to LC39) at [5.2.3] and [5.2.4] he wrote "As the expert GC explained in his expert report (numeral 4.13 to 4.27), during the construction of the Ocesa pipeline, the practices for preventing erosion in ground with high slopes were not taken into account," and "The expert Dr Card notes in his report that: The remains of an anti-erosion matting were identified on the property of Claimant 39, but it was severely deteriorated and absent in areas which are now subject to continuous erosion." Dr Card's disclosed report did not have any paragraphs with those numbers that said what Dr Delgado described. But Dr Delgado said that he had seen such a report from Dr Card in which he stated that he had seen anti-erosion matting on LC39 {Day49/17:8}. This was material as Dr Card's disclosed report said that erosion matting was *not* found during his inspections {H1.1/1/166};
 - iii) At {H20.3/3/525} (again referring to LC39) at [6.1.1.15] he wrote that in his experience he had not seen the degree of erosion observed on the Claimant's property and "I refer to the report provided by the expert Franco Obando regarding the types of erosion." But in his oral evidence Dr Delgado said that the reference to the report "is not a report written by Obando, it is the result of an interaction with him in the field, because I haven't seen [Dr Obando's] report" {Day49/20:16}, cf {Day49/21:22}.
820. Dr Delgado's evidence about what he had and had not seen from other experts was inconsistent, confused and confusing. On Day 49 he said that he had reviewed the reports of Dr Card, Dr Tobon and Dr Velez and had drawn his conclusions from reading them: "Leigh Day or nobody told me I had to put this in or that in." {Day49/32:10}. Yet on Day 50, in answer to questions from the Court, he said that "I did have available to me *parts of* these reports" (emphasis added) while maintaining that he had read them and made his selections from them {Day50/22:11}. A short while later in answer to a question from the Court he confirmed that he was not always sent the whole of his fellow experts' reports, but what happened on occasions was that he had a particular area where he felt he needed information, and he would then ask for the relevant part of his fellow experts' report which would deal with the information {Day50/24:2}.
821. Between receipt of Dr Delgado's report and his coming to give evidence, the Defendant had attempted to achieve clarity on this issue by asking, pursuant to CPR 35.6 "The documents you identify as those which you relied upon in order to prepare your report do not include copies of any reports or other documents prepared by other experts engaged by the Claimants. Please identify which draft reports and other documents you reviewed for each expert, by reference to date" {H20.4/9/851}. Dr

Delgado's reply was "the types of allegations I am instructed to analyse require an understanding of interdisciplinary issues. As part of my instructions, I was provided with preliminary findings of some of the other Claimant experts.. I confirm that my findings in my report of June 2013 are based entirely on my own observations, investigations and analyses in the expert discipline of veterinary science. To the extent that there are any errors in my own report with respect to paragraph references within the reports of other experts, I have clarified the same in the table below: ...". He then set out a table with two columns entitled (a) "Paragraph of my report/reference to [other Claimant expert]" and (b) "Correct paragraph reference within [other Claimant expert's report]". The table had three sections, referring in column (b) to the disclosed reports of Dr Card, Dr Tobon and Dr Velez respectively.

822. This answer, for which Dr Delgado must take at least a measure of responsibility, was unsatisfactory in a number of respects:
- i) It did not answer the question because it did not identify which draft reports he had reviewed from the other experts. On the basis of his evidence at trial, as summarised above, he should at least have identified that he had been referring to draft reports, even if the lawyers had required him to take a point on privilege or otherwise so that he transparently declined to identify the particular draft reports without a ruling from the Court;
 - ii) By referring to being provided "with preliminary findings of some of the other Claimant experts" it implied that he had not been provided with draft reports or parts of draft reports, which was contrary to the evidence he subsequently gave at {Day50/22:11} ff;
 - iii) The answer then went further by implying (by the tables) that he had in fact been referring to the disclosed reports, which he and the lawyers who assisted him with the preparation of the answer, must have known to be inaccurate.
823. In his oral evidence Dr Delgado maintained that the form of his CPR 35.6 answer was not provided to him by the lawyers and that it was his answer {Day49/27:10}. As I have made clear elsewhere, there would be nothing reprehensible in the Claimants' lawyers assisting a Colombian expert in the proper presentation of answers to questions submitted under CPR 35.6 – in fact, I would expect them to do so. To that extent I agree with the Defendant's submission that Dr Delgado's answer that the form of the answer was not provided to him is implausible. However, I do not consider that I would be justified in simply rejecting it out of hand. That is not, however, the end of the matter, because even if the answer was all Dr Delgado's own work, it should have been reviewed by the lawyers before going out and any review should have identified that the answer was unsatisfactory. It is for that reason that I said above that Dr Delgado must bear at least a measure of responsibility: on the information available to me, the lawyers having conduct of the case and responsibility for the presentation of the Claimants' expert evidence must also bear a measure. I cannot reach a valid conclusion about precisely what measure is the responsibility of the expert and what is the responsibility of the lawyers. The conclusion I can and do reach, however, is that Dr Delgado's evidence in his first report's reference to other Claimant experts and in his CPR 35.6 answer lacks transparency and is in places frankly misleading; and that his evidence at trial about how the references in his report came to be made was unsatisfactory in that it was neither clear nor consistent.

However, because it is not clear precisely how this unsatisfactory state of affairs came about, I do not consider that it would be right to go further than I went in [500] above when considering the problem as it affected other experts. Taken on its own, this criticism requires the Court to be astute to determine what is or is not an expression of Dr Delgado's own observations or opinions; but it does not require the wholesale discounting of his evidence provided the Court is satisfied that the evidence in question is genuinely Dr Delgado's and is within his proper sphere of expertise.

824. The second strand of the Defendant's attack on the overall reliability of Dr Delgado involves an allegation that he was prepared merely to rubber-stamp claims made by the Claimants {C4/4.7/553}. As my findings in relation to individual cases will make clear, I do not accept all of his evidence; and there are occasions when I find it surprising that he gave claims the support he did. The example cited by the Defendant of Dr Delgado supporting an annual investment of 4 days to maintain a 100m length of post and barbed wire fence is an example of evidence that is not simply insupportable but surprising {Day50/43:6}. But, while I suspect that Dr Delgado was too ready to endorse claims made by the Claimants without rigorous analysis, I am not satisfied that this requires his evidence as a whole to be downgraded as "unreliable". The Defendant's proper interests are suitably protected by close attention to individual assertions made by Dr Delgado on a case by case basis. Similarly, although Dr Delgado frequently made statements in his reports which appear to be opinions on causation that are outside his proper sphere of expertise, the limitations of his expertise are clear and the Court is well able to identify evidence that is outside its proper limits without applying a wholesale downgrading of his evidence as "unreliable".
825. The third strand is more troubling and is the identification of passages in Dr Delgado's report where he appears to neglect information that was available to him (and was adverse to the Claimants' case) when expressing unqualified support for individual claims. The three examples cited by the Defendant are:
- i) In relation to LC39's pasture management, at [8.1]-[8.3] {H20.3/3/533} Dr Delgado gave as his conclusion that the construction of the Ocesa pipeline on LC39 affected Snr Sequeda's agricultural activity due to the deterioration of the water sources for the cattle, the decrease in pasturing areas due to erosion and the formation of swampy areas; and he stated that "no activity by the Claimant was observed that could cause the damage observed at the farm of LC39." He did not, either in expressing his opinion or in recording the material matters on which he relied, refer to a conversation which he had with Snr Sequeda, in the course of which Snr Sequeda told Dr Delgado that before the pipeline he would leave his cattle on pasture for up to three months, depending on the quantity of cattle, and would then let the pasture rest for between fifteen days and a month, and Dr Delgado expressed clear concerns that this was an inadequate period of rest {H24.2/207.2/1015.114}. His concerns were because of the adverse effects of overgrazing and lack of recovery time for the pasture, and they were not mentioned in his report in relation to LC39. In the course of his conversation, referring to those concerns, Dr Delgado had said "that will not be in the document", which most naturally refers to the document that he would be producing (i.e. his report) {H24.2/207.2/1015.116}. On any view of what precisely Dr Delgado meant

by this comment, it suggests that the adverse information would not see the light of day, which is not satisfactory;

- ii) Dr Delgado supported LC54's claim for 11.5 cattle going lame and being replaced, which figure derives from the 2012 Statement of Loss at [42]-[43] {B4.1/23/273}. The Statement of Loss specifies that this claim applies every year from 1996. Dr Delgado's report referred to [170] of Snr Mesa's witness statement, which did not specify a period for the loss {H20.3/3/565}; and his report did not state the period to which he was referring. At the same time, Dr Delgado did not refer to the conversation he had with Snr Mesa in 2012 where Snr Mesa told him that the cattle had started going lame "5 or 6 years ago" (i.e. from 2006 or 2007, not 1996) {H24.2/258.1/1237.28}. So, at its lowest, he failed to make clear the limitation (or possible limitation) on the claim he was endorsing;
- iii) Dr Delgado supported LC74's claim to have suffered a loss of pig production on the basis that Snr Velez had to sell his pigs when he moved his house (because of damage to the water supply at the old house) as he could not build a new pen/corral at the same time as building his new house {H20.3/3/607}. This on its own would only explain the loss of claimed loss of pig production until he had time to build a new pen. Dr Delgado gave as an additional reason (which would explain a continuing loss of annual pig production) that "the current water source that he uses for domestic consumption and for the pigs does not have sufficient availability of water to sustain the same number of pigs, so he can only keep 1 or 2 pigs, which he currently uses for personal consumption." This explanation was inconsistent with what Snr Velez told him in interview, which was that his pigs had roamed loose, to which Dr Delgado's reaction had been that pigs that are loose walk about and drink water "from wherever they feel like it" {H24.2/301.2/1432}; nor did Dr Delgado mention that Snr Velez had told him in the same interview that he now kept the same number of pigs as before the pipeline {H24.2/301.2/1437}. The adverse implications of both these items of information for Snr Velez' claim would have been clear to Dr Delgado.

826. Taken together, these three examples provide a concerning picture of an expert who is not suitably rigorous in reporting all material evidence, whether it supports or is adverse to his opinion. This makes the Court's job more difficult because it cannot assume that all relevant material has been provided by the expert to enable his opinions to be suitably audited and tested. However, because of the allocation of enormous resources by the parties to this litigation, the Court can have a measure of confidence that material omissions have by and large been identified and raised in cross-examination and closing submissions. Therefore, while accepting the substance of the Defendant's submission that the Court cannot rely upon Dr Delgado to have brought forward all relevant material in his report, this difficulty can best be dealt with in the context of individual cases.
827. Taking the strands of the Defendant's submission together, I am satisfied that there is substance in each strand of complaint and that, taken together, they require the Court to be cautious in its approach to Dr Delgado's evidence when his reports express views on causation or make (express or implied) assertions that there is no evidence contrary to the view he is expressing. To that extent the Defendant has demonstrated

areas of unreliability in his evidence. However, the Defendant has not persuaded me that his evidence as a whole should be regarded as unreliable so as to be discounted generally. Lest there be any doubt, I would be much more critical of Dr Delgado if he had been an English expert or an expert who was fully familiar with English litigation's requirements of experts; and I bear in mind that I am not able to reach a valid conclusion on present evidence about precisely where responsibility lies for the defaults that have been identified by the Defendant.

828. The Claimants' overarching attack on Dr Avila had three strands. The first was based upon the similarities between his Supplemental Report {H21.9/13/1827} and the First Supplemental Report of Professor Montenegro {H4.9/10/1710}, to which I have already referred at [502] above. The similarities in structure, format and parts of the content make inevitable the finding that Dr Avila must have been provided with at least the framework that is common to the two reports. The fact that Dr Avila's report refers to Dr Obando, who was relevant to Professor Montenegro's report but not to Dr Avila's, strongly suggests that Dr Avila received the framework after it had been worked on by or with Professor Montenegro, rather than the other way round. However, with one exception to which I will return, the substance of Dr Avila's report was evidence that was within his expertise and not the expertise of either Professor Montenegro or of the lawyers: it is the similarities in form and the reference to Dr Obando upon which the Claimants primarily rely to support their submissions. The reference to Dr Obando is sufficient evidence to support my finding that the framework was provided to Dr Avila after it had been worked on by others. Beyond that, however, it is merely evidence of uncharacteristically sloppy preparation. The reference is out of kilter with the substance of the rest of the report, which makes clear that the reference should have at least been edited to refer to Dr Delgado rather than Dr Obando. It does not of itself either suggest or demonstrate that Dr Avila was prepared to express opinions that were not his own or to present information without verifying it himself.
829. This appears to be recognised by the Claimants because their attack in closing submissions concentrated primarily on an alleged attempted cover-up rather than upon the substance of the report itself. With questions of impeccable clarity Dr Avila was asked whether he had written all of his reports himself. He answered with equal clarity that he had {Day50/75:10}. He was evidently non-plussed when confronted by the obvious similarities between the two reports and the congruence of their paragraphs 2.4, and gave a series of explanations that were obviously wrong, including a suggestion that there had been an error of translation (which, demonstrably, there had not) or that the similarities were pure coincidence (which I have found to be an impossible explanation). When, after a passage of cross-examination that was notable for its fairness and effectiveness, Ms McGregor gave Dr Avila a final opportunity to recognise that part of his report had been drafted by the Defendant's lawyers, he was again adamant in his answer "No. No. No part of my report was written by the lawyers of the defendant. Of course the technical concepts that appear in my report were written by myself" {Day50/86:15}.
830. The Claimants submit that Dr Avila was not telling the truth in this passage of his cross-examination, meaning that he was giving answers that he knew to be untrue. In many ways, this passage of evidence bears comparison to the evidence of Dr Tobon about his use of the Bruijnzeel article: see [656] above. Dr Avila's denials in the face

of overwhelming evidence seemed logically absurd as he spoke them, because the evidence of the similarity of the two reports was so obvious and overwhelming. And yet, my impression as he gave the evidence was of a person who believed in the truth of his original assertion (that he had written all of his reports) and who was genuinely flummoxed at how to respond to the clear evidence to the contrary. Making all allowances for the fact that I was listening to his evidence in translation, the closest possible attention to Dr Avila as he gave the evidence did not leave me at the time with the impression that he was lying. Re-reading the evidence in its entirety, placing it in the context of his evidence as a whole, remembering the manner in which he gave the evidence, trying to audit my reaction by reference to the different conclusion I reached in relation to Dr Tobon, and taking the Claimants' clear submissions fully into account, I remain unpersuaded that Dr Avila was knowingly not telling the truth. He should certainly have realised that his position was untenable in the light of the evidence he was being shown, but that is a distinctly and importantly different finding.

831. For the avoidance of any doubt, I find that Dr Avila was an honest witness who was trying to assist the Court. He was certainly wrong to say that he had written all of his reports, for the reasons previously given, but he was not lying (i.e. knowingly giving false answers) when giving his evidence on this topic. I suspect that the clue to his evidence may lie in the last sentence of his answer to Ms McGregor that I have set out above. Subject to the point to which I will turn next, I am satisfied that the technical substance of his reports was written by Dr Avila. That is not to say that he did not have help in establishing the structure of his reports and in assembling and marshalling information. But I accept the substance of his evidence that the preparation of his reports (which run to over 1000 pages of material) was his work {Day50/75:21}.
832. The second strand of the overarching attack on Dr Avila also arose out of his Supplemental Report. The Claimants submit that his written evidence provides other examples of evidence “which are unlikely to have originated from himself, but which would have come very naturally to lawyers” {C4/3.5/495}. The example cited in support is in a section of the Supplementary Report where Dr Avila is commenting on Dr Delgado’s methodology. After pointing out that Dr Delgado did not appear to have made use of aerial photographs, he then wrote (at [5.8]): “I also note that, whilst Mr Delgado refers to having reviewed “various” parts of the Environmental Impact Assessment disclosed by Equion, he fails to identify those sections (or indeed the versions) which he has reviewed. Similarly, Mr Delgado refers to having reviewed “various” documents from the Claimants’ disclosure in relation to livestock management, but he does not specifically identify which. It is therefore impossible for me to establish whether Mr Delgado has formed his opinions on the basis of all relevant information.” {H21.9/13/1853}.
833. Dr Delgado had included as Appendix B to his original report a “List of Documents Reviewed” which normally identified the disclosure document reference of the listed document in the left hand column and which included the following entries:

Reference	Document name (English)
	Statements of Case (both parties) (relevant parts)
...	...
Various	Environmental Impact Assessment/Study (relevant parts)

Various	Documents from Claimants' disclosure related to livestock management.
...	...

834. The Claimants take the point that the only “versions” of the Environmental Impact Assessment available to the parties are the Spanish and English versions of the same document; and that Dr Delgado did not refer to the Environmental Impact Assessment in the body of his report. When cross-examined about this reference, Dr Avila at first said that he could not remember whether his [5.8] arose from commentaries received from the lawyers {Day50/83:8} and then said in answer to the question “Is it possible that paragraph 5.8 is not something that you had entirely written by yourself?” that “Well, that is the conclusion that I was reaching when I saw what Dr Delgado had written on the basis of the analysis he had read in the Environmental Impact Assessment. So that is the conclusion I reached after reading what he had said, and when drawing his own conclusions.” On the basis of this answer, which they correctly submit is inconsistent with the fact that Dr Delgado did not mention the Environmental Impact Assessment in the body of his report, the Claimants submit that “the nature of his argument in writing, and the complete misstatement of that argument when asked to explain in oral evidence, both point to this material not originating from Mr Avila’s own mind.”
835. This is, to my mind, a minor storm in a very large teacup that does not justify the time that has been invested in it. Certain things are obvious to anyone familiar with this litigation. First, the parties have attempted to leave no stone unturned in their attempts to secure legitimate forensic advantage. Second, one of the features of that diligence has been that each side has gone through the other side’s reports with a very fine toothcomb. Third, one of the things that has routinely been done is to analyse whether the opposing expert has material to justify the opinions he expresses. This can be seen in the reply reports on both sides. For present purposes it is sufficient to refer to Sections 5 of Dr Avila’s and Professor Montenegro’s supplemental reports. Section 5 of Dr Avila’s report is headed “Comments in relation to Mr. Delgado’s report” and lists 15 topics which Dr Avila duly covers in detail. Those topics include “(ii) the document review carried out by Mr Delgado; (iii) Mr Delgado’s review of the academic papers; ...” {H21.9/13/1851}. Professor Montenegro’s Section 5 is headed “Response to Dr. Obando’s Report” and is similarly detailed, though his structure is different in not itemising the topics to be covered in advance. The first topic, however, is “documents reviewed” and contains a detailed analysis of the documents that Dr Obando had or had not reviewed in the course of preparing his report {H4.9/10/1727}. Leaving aside the similarity (but not congruence) of approach, there is no reason to assume either that Professor Montenegro (or, for that matter Dr Avila) worked on these sections of their respective reports unaided, or that they did not. What is apparent is that the Defendant had taken the decision to analyse in great detail whether a documentary justification for the opposing experts’ views existed. In that context, it is not surprising that Dr Avila picked up that Dr Delgado had not used aerial photography or that Dr Delgado had said that he had reviewed relevant (or various) parts of the Environmental Impact Assessment but had not identified which they were.
836. It can be said that, to use a vernacular phrase, this approach to reply reports is grinding exceedingly small; and that to include the bracketed reference to different versions of the Assessment in Dr Avila’s [5.8] is to grind beyond reason. And it

seems entirely possible to me that it may not have been Dr Avila who first noticed this almost entirely trivial point. But I cannot persuade myself that it can be a reason for concluding on its own or in conjunction with anything else, that Dr Avila's evidence as a whole is unreliable; nor can I persuade myself that the answer about how he came to include the particular words in his [5.8] could possibly be a reason for treating his evidence as generally unreliable.

837. The third strand of the Claimants' submission is an alleged concession about forage availability testing. In his first report Dr Avila took samples of vegetation in order to assess the suitability of pasture for cattle. He set out his approach at [6.13]-[6.19] {H21.4/4/857}. As he there made clear, he selected samples from both on and off the ROW with a view to creating composite samples. The end point of the exercise was that once the samples had been weighed that would provide "an indication of the productivity of the site when these figures were averaged across the sampling sites and extrapolated across the total area of pasture. This would be used to calculate the number of animals that can be properly fed in such an area (the "load capacity" of that pasture). By calculating the weight per square metre, this measure can be compared against the typical weight for the same variety of grass, known as the "forage standard" {H21.4/4/858} at [6.19].
838. In accordance with his description of his method, Dr Avila took and reported on samples on each Lead Claimant property. The results were consistently presented in a table giving values for his on ROW samples, his off ROW samples and his chosen standard; and he would offer a commentary. His tables were typically entitled "Comparison of forage availability of [Carimagua/etc] samples compared to the forage standard", which is consistent with his explanation in [6.19]. In most cases, his commentary would be a comparison of his samples against the standard. For example, writing about LC39 at {H21.5/5/1077} his commentary was "As can be seen from the table, the amounts of forage present both inside and outside the right of way are well below the 8.0 tonnes per hectare expected in properly managed pastures. ..." There was in the case of LC39 no commentary on the relative values for his On ROW and Off ROW samples.
839. In relation to LC50, the table had the same title as usual and set out the results for the samples and the forage standard, which were similar. On this property Dr Avila wrote "[12.37] As noted in paragraph 6.19, forage sampling allows us to compare the availability of forage within a specific area. This is distinct from the overall coverage of the pasture ... and its nutritional properties... . [12.38] If I compare the samples of forage which I took (i) on the right of way, and (ii) outside the right of way ... it is clear that there is similar forage availability both inside and outside the right of way. This forage availability corresponds to the forage production standard (the weight of forage that would be expected of such pasture in a good condition). [12.39] The results of this testing indicate that there is no material difference between the availability of forage within the right of way and outside of it. This is despite the fact that there is a greater availability of forage in the rainy season than in the dry season."
840. In this particular instance, Dr Avila had made his comparison between the samples and the forage standard in his table and in [12.37] and [12.38]; and he had added a comment about the observable similarity in the sample results from on and off the ROW. He adopted a similar form of words to [12.38] when commenting on LC10 at

[9.40] {H21.4/4/949} but in relation to no other Lead Claimant property. In summary:

- i) LC9: the forage was not weighed and nor was forage availability calculated, since the grass on the property did not cover a large enough area to be able to make a suitable number of representative samples [8/42] {H21.4/4/886};
- ii) LC10: as LC50, see above;
- iii) LC38: Dr Avila presented results for Panameña forage [10.42] and Carimagua samples [10.44] compared to the forage standard {H21.4/4/1015}. He commented that the forage availability of Panameña grass was low both inside and outside the ROW (in comparison with the forage standard) but did not otherwise compare them with each other [10.43]. He found and sampled one area in the ROW where Carimagua was found under poor conditions which explained the low result. Dr Avila explained that he chose these particular sites because they represented two different sets of conditions inside the right of way and he considered it important to know the different biomass productions between the two [10.44]. He did not otherwise comment on or compare the differences between his results for on the ROW and off the ROW;
- iv) LC39: see above;
- v) LC50: see above;
- vi) LC54: Dr Avila presented results from on and off the ROW compared with the forage standard, without commenting on or comparing the results on and off the ROW relative to each other, essentially as with LC39 [13.40]ff {H21.5/5/1191};
- vii) LC61: Dr Avila presented results from locations on and off the ROW compared to the forage standard [14.40] {H21.5/5/1245}. Apart from a passing reference to the similarities in his results from on and off the ROW in [14.41] he made no further comment save to observe that his results indicated no material deficiency applicable to the pasture on the ROW only;
- viii) LC74: there were no on the ROW samples because of weed cover [15.37] {H21.5/5/1298};
- ix) LC82: forage was neither weighed nor sampled [16.39] {H21.6/6/1355};
- x) LC93: Dr Avila presented his results in the normal table, compared to the forage standard [17.39] {H21.6/6/1413}. Both results exceeded the forage standard. Dr Avila commented that “the pasture outside of the right of way has a marginally greater availability of forage, but I do not consider this to be material, especially since both samples exceed typical levels” [17.40].

841. When asked about LC50 Dr Avila maintained that it had not been part of the intention of the exercise to make a comparison between the on ROW and off ROW samples results. He was taken to his [12.39] as set out above, but not to his [12.37]. Nor was he or the Court taken to the full context for his commentary, based as it is on [6.13]-

[6.19] of his report, which I have summarised above. His response, once again, was “But the intention was not to compare them. In particular, in this table what I am saying is that both are below [the forage standard]” {Day50/143:19}.

842. The Claimants now submit that Dr Avila’s evidence that his intention had not been to compare the on ROW and off ROW samples was unreliable and casts doubt on the reliability of his evidence generally. I disagree and consider this to be an entirely false point. The purpose of the forage sampling was set out at [6.13-6.19] and was to compare the sample results with the forage standard. That is what Dr Avila expressly did in every case where he took samples by the presentation of his results in standard format as described above. It is what he did in relation to LC50 by his table and at [12.37] and [12.38]. His additional observations at [12.38] and [12.39] in relation to LC50 were relevant observations for an expert to make; but they did not subvert the intention of the exercise, which was as set out earlier in his report and pursued consistently for all Lead Claimant properties.
843. I have summarised at [840] Dr Avila’s approach in each case. While there are comments to be found about the on ROW and off ROW results, there is no analysis of those differences; and in each case it is made clear that the purpose of the exercise is to follow the procedure laid down earlier in the report i.e. to compare Dr Avila’s samples with the forage standard, not with each other. I therefore conclude that Dr Avila’s answer at {Day50/143:19} was correct and consistent with the substance of the exercise he had carried out. The third strand of the Claimants’ submissions is therefore without merit and fails.
844. Taking the Claimants’ submission overall, and for the reasons I have given above, I accept that Dr Avila had more support in preparing his supplemental report than he said in his evidence but reject the other strands of the submission. To that extent I find that his evidence in the areas criticised by the Claimants for the purposes of this general submission was unreliable. However, I do not consider that this finding requires or justifies a general finding that his evidence was unreliable. The Claimants have not persuaded me that his evidence as a whole should be regarded as unreliable so as to be discounted generally.

Cattle rearing in the tropics

845. There was a difference of emphasis between the experts on the challenges posed by cattle rearing on the fragile soils with which this litigation is concerned. Dr Avila emphasised the risks of soil erosion and losses of soil fertility, while Dr Delgado emphasised that adverse effects can be minimised by good husbandry and that there may be some benefits to be gained. There is substance in both experts’ positions, as is apparent from the literature and materials to which they referred. For example, a report by the Food and Agriculture Organisation of the United Nations {H21.10/28/2619} included the following:

“Ranch encroachment in tropical rainforest has typified the negative effects on environment of livestock development.

...

The transformation from tropical forest to crop and pasture brings about soil erosion and substantial losses of soil fertility. Soil nutrients are rapidly depleted after clearing and grasses are soon replaced by less useful vegetation as wooded fall[ow]s of low productive value. Furthermore, in many tropical rainforest areas, pastures can only be sustained for a short period, up to ten years, if no fertilizer is used, mainly phosphorus, the main limiting soil nutrient.

...

Pasture use and Maintenance: Change of pasture or rangeland ecosystem is an inevitable consequence of grazing. Grazing management is carried out by the manipulation of these changes through control of the intensity and timing of grazing. The overall objective is to achieve a plant composition within pastures which provides for an optimum animal production in the short term and which, at the same time, is more sustainable in the long term.

Appropriate Grazing and Browsing: Most human activities impact the environment and the keeping of livestock is no exception. Animal agriculture is frequently blamed for adverse effects on the environment. However, the positive role of livestock in environmental conservation is rarely emphasised to the same extent. The extent of impact from livestock on the environment, and whether the interaction is negative or beneficial, depends on the nature and level of management of the livestock concerned.

Well managed grazing: Grazing modifies plant communities and can be managed to sustain or to enhance desirable plant species and can be neutral or beneficial, for example to watersheds and to wildlife.

Poorly managed grazing: Improperly managed grazing can have potentially serious effects on the environment. Badly managed grazing has an adverse impact on watersheds, e.g. through the resulting erosion, and may have a serious impact on wildlife through habitat change.”

846. In addition to the main text, the report included a “Matrix of environmental risks in sub-humid and humid ranching and farming subs-systems – LGH3”. The adverse risks included (a) erosion as a consequence of excessive grazing and browsing, animal trampling and mechanization; and (b) decrease of organic matter content and loss of soil fertility as a result of deforestation for grassland establishment, change of land use and no fertilizer input. On the other hand, the matrix also included positive opportunities (c) nutrient cycling improvement as a consequence of pasture use and maintenance, permanent pasture stimulating soil macrofauna, microfauna and nutrient cycling, and (d) improvement of soil nitrogen content by biotic fixation as a consequence of good grazing management.

847. Viewed overall, the FAO report supports the view that taking tropical forests into cattle production is likely to cause erosion and loss of soil fertility. The warning that pastures may only be sustained for short periods, up to ten years, if no fertilizer is used is stark and is indicative of the fragility of the land: on the evidence in this case, campesinos using the traditional extensive production system seldom use fertilizer – see, for example, [861.i)] below. The report makes clear that adverse effects can be minimised by good management and husbandry, and that there may be some environmental benefits as well. It also supports the view that there is a tension between the needs of production and the impact on the environment which requires careful management. That is consistent with the view expressed in a paper by Mahecha and others {H20.6/34/2037} (of which more later) which lists among the limitations to achieving development in Colombian cattle farming “the extensive-extractive production, poorly defined production systems, inappropriate use of production technologies, *conflicts regarding water and soil use, poorly managed organic and inorganic waste, ... low business acumen of cattle farmers...*” {H20.6/34/2046}. In context, the words I have emphasised are a clear reference to the potential adverse impact of farming on the fragile environment. This is made clear later in the paper where the author states: “Taking as a starting point the concept of the soil as a building block for agricultural and livestock activities, its use as an indiscriminate recipient of waste, without taking into account its dynamic, leads to a loss of its ability to regenerate and recycle organic products. This can be seen in the progressive processes of erosion and compaction, as well as loss of hydric balance, salinisation, loss of fertility, nutrient excess, presence of heavy metals, and the alteration of the microbiological conditions, amongst other aspects. Erosion is mainly caused by the high pressure exerted by grazing, by overgrazing and the development of cattle farming on unsuitable land, while compaction is directly associated with loss of structure and a drop in the water retention capacity” {H20.6/34/2044}.
848. Further insight is provided by the Edaphic (i.e. soil) management maps produced by Bateman at {K13/84} ff. Large swathes of the mapped area are categorised as Red, which signifies “Soils specially fit for conservation of the wildlife and/or protective vegetation: where the topographic and edaphic conditions so allow, cattle raising can be carried out with practices of soil protection management and conservation.” This categorisation covers LC74 and, probably, LC50. The next category is blue / dark green, which signifies “soils fit for extensive and semi-intensive cattle raising and agriculture and protective producing vegetation. In the areas where the erosive processes are more evident, soil conservation works must be implemented, as well as in sections with greater incline and erosive processes.” The next category is orange, which includes LC39 and LC54 and signifies “soils fit for extensive cattle raising, subsistence agriculture in the areas where the relief is less strong and protection coverage in more inclined and/or degraded areas, where soil conservation works must be implemented.” The best category is green, which signifies “soil fit for extensive and semi-intensive and intensive cattle raising and agriculture in the best drained sections. It is necessary to develop adaptation activities such as drainage in the [areas] susceptible to flooding and waterlogging.” Each of these categorisations carries with it the implication that care will be required to be taken in conducting cattle raising or other agriculture; and the lower three categories (which make up the majority of the mapped areas) refer to the greater vulnerability of sloping, degraded or eroded land, to the extent that land categorised as red indicates that, where topography

and soil conditions allow cattle raising at all, practices of soil protection management and conservation will be required.

849. Drawing these strands of the veterinary experts' evidence together, I find that they support the view that the Claimants' land is inherently fragile and susceptible to deterioration in the absence of careful management. That is consistent with all of the other evidence in the case about the nature of the soils and topography which are the subjects of this litigation. It does not mean that cattle farming cannot be carried out on the land – plainly it is carried out extensively. Nor do I find the use of the word “unsuitable” helpful except in relative terms: what all the evidence establishes is that the challenges of cattle farming on a sustainable basis increase with the fragility and lack of fertility of the soils. Those challenges are further increased where the farming is carried out on sloping rather than flatter land. Viewed overall, the challenges are liable to lead to the deterioration identified in the FAO Report and Mahecha and, where they do, farming on the deteriorated land will become progressively less sustainable.

Herds and UGGs

850. It is common ground that mature cattle of the types commonly kept by the Claimants weigh about 350kgs, with bulls weighing more and heifers and calves weighing less. It is also common ground that herds will contain animals of different maturity, the exact mix of which will vary from herd to herd depending upon that herd's rates of reproduction and the farmer's management of his cattle, including his decisions about what animals to sell at any given time. Dr Avila agreed as broadly correct Dr Delgado's estimation of differing load capacities depending on the age and weight of the cattle {H20.5/11/1052} {H21.9/13/1841}. He did not adopt Dr Delgado's estimate that a herd would be composed of adult cattle without calves (40% of adult cattle) adult cattle with calves (60% of adult cattle), calves (same number as adult cattle with calves) and heifers (unspecified in numbers), preferring to rely upon direct evidence from the farmers as to the composition of their herds {Day50/161:14}. His qualification was justified, though it is not always possible to identify the age-distribution of a particular Claimant's herd, not least because it will fluctuate with time. However, he also accepted Dr Delgado's estimate as being reasonable assumptions when applied to LC39's herd although the exact breakdown of the herd was not known {Day50/158.11}.
851. On this evidence, I accept Dr Delgado's estimates as reasonable assumptions about what the age distribution of an established herd could be; but it will be necessary to look for specific evidence (or lack of it) in each case.
852. When attempting to identify the load capacity of land, it is conventional to do so by reference to UGG (Unidad de Gran Ganado) as a standard unit of cattle. While the unit might vary with different breeds or different places, the experts agreed that for present purposes 1 UGG could be set at 350kgs, being the typical weight of a mature cow of the sort kept by the Claimants {H23.5/13/1084}. Dr Delgado's estimate of relative weights (which was broadly accepted by Dr Avila) was: adult cattle without calves (350kg) 1 UGG; adult cattle with calves (525kg) 1.5 UGG; heifers (175kg) 0.5 UGG. The imprecision of this scale is clear from the fact that it attributes the same weight to calves as to heifers, but it serves for general estimates. Also, in general

terms, the amount eaten by cattle is in proportion to their weight, which translates into the UGG estimations.

Load capacity of land

853. The experts adopted a classification of land use established by the Centre for Livestock and Agricultural Studies of Colombia, as set out in Mahecha {H20.6/34/2039}, as follows:
- i) The *extractive system* is based on the production capacity of the natural environment to create biomass, with minimal human interference with these processes. This type of cattle farming is developed in remote regions of the Eastern Plains, characterised by poor soils, natural meadows with very low and variable load capacities, and with a high dependence on the climate regime and the available resources. It is not applied in the present cases;
 - ii) The *traditional extensive grazing system* is characterised by the incorporation of cultural management practices, both of the grassland and the animals, geared toward preserving and, sometimes, enhancing the productive capacity of the cattle farming agro-ecosystem. The fundamental basis of production is the natural or introduced low-productivity grassland:
 - iii) The *improved extensive grazing system* involves the producer establishing technical relationships geared toward enhancing productivity, both of the land and of the animals. Although the basis of production is still grazing, improved grass strains are relied on alongside native or introduced legumes, managed in a more intensive form, with weed control and the application of fertilisers; a permanent supply of mineral salts is relied upon, and in many cases it is formulated to correct the deficiencies in the forage; sanitary management of a preventive nature; breeding programmes and genetic improvement based on selective breeding and artificial insemination;
 - iv) The *supplemented semi-intensive grazing system* is developed in areas close to urban centres. Intensive management of high yield pastures is practised, with electric fences, regular watering and fertilisation related to programmes of nutritional supplementation. It is not applied in the present cases;
 - v) The *confinement system* is characterised by the total elimination of grazing. It is not applied in the present cases.
854. The prevalence of the traditional extensive and improved extensive systems as the basis for cattle production in Colombia is shown by a table in Mahecha to which extensive reference was made. Mahecha's paper was submitted in 2001 and accepted in 2002. The table is described as an adaptation carried out by the authors of the paper, based upon a 2000 contribution to an FAO online conference by Gomez and others, a 1994 paper by Balcázar, and an (undated) interview with Professor Restrepo of the University of Antioquia. None of these sources is in evidence before the Court. Dr Delgado said at one point that what has been described as the revolution brought about by introducing new strains of more productive grasses, typically strains of *Brachiaria*, had not yet taken place by the time of Mahecha's report {Day50/9:14}. That is relied upon by the Claimants as supporting a finding

that Mahecha assumed that native grasses only were being used under the traditional extensive system as she describes it. However, Dr Delgado later dated the revolution from when Brachiaria arrived in Colombia, with the smaller producers following the lead of larger producers in changing their grasses {Day50/67:15}. That was clearly before 2001, as appears from the fact that Brachiaria was used for reseeding at least two of the Lead Claimant properties after the Ocenca pipeline, LC50 and LC54 {K52/534T/11} {K52/534T/25}.

855. Two things emerge clearly from Mahecha’s report. First, she did not refer to the “improved grass strains” in relation to the traditional extensive system: her reference to introduced grass strains described them as “low productivity grassland”. Second, her description of the improved extensive system did involve the use of the new improved grasses - “improved grass strains are relied on alongside native or introduced legumes.” The experts did not suggest that the improved grass strains being referred to in this context were other than those such as Brachiaria. Despite evidence from Dr Avila to the contrary {Day50/169:18}, it would not be right to interpret Mahecha as meaning that her improved extensive grazing system only uses old, native and unimproved grasses. Her description could cover the situation where there was a mix of old and improved grasses or exclusive use of improved grass strains under the improved extensive grazing system. Based upon the evidence of use of Brachiaria grasses when revegetating Lead Claimant properties, which confirms that the arrival of Brachiaria grasses was well before 2001/2002, and the explicit description of the use of improved grasses in the paper, I reject the submission that Mahecha assumes the use of native grasses throughout.
856. Omitting the columns for the extractive, supplemented semi-intensive and confined systems and some of the rows that are not directly relevant for present purposes, the Mahecha table is as follows:

Parameters	Traditional Extensive	Improved Extensive
Production activity	Breeding, raising, fattening, complete cycle, dual-use	Complete cycle, breeding, raising and dual-purpose
Predominant breed	Crossed with Zebu	Crossbred zebu and zebu crossbred with European breeds
Products	Weaned calves, milk, calves of almost 30 months and fattened males	Weaned calves, fattened males and milk, sold mostly as cheese
Area occupied	14.6 million ha.	4.5 million ha.
Head of cattle	14 million	6.5 million
% contribution of beef production	41.8%	49.1%
Load Capacity	0.8-1 head/ha	1.2 animals/ha*

*Note that the load capacity for the supplemented semi-intensive system is given as 3-3.5 head/ha.

857. It is (or should be) common ground that the load capacity of a given farm will depend upon the area given over to pasture, the system of farming being adopted, the grasses used, and the quality of the pasture (determined by soil quality, availability of nutrients, the extent of coverage and the presence of non-nutritious vegetation in amongst the desired forage). It is also common ground that improved grass strains, typically Brachiaria, have a greater carrying capacity than unimproved native grasses, such as Uribe, Carimagua and Panameña. Although not expressed as an expert

agreement, I find that the descriptions of the systems described by Mahecha and adopted by the experts are not set in stone and that each categorised system may comprehend a range of farming practices: for example, although Mahecha does not refer to the use of improved grasses in the traditional extensive grazing system, there is no reason why a farmer who is generally to be described as within the traditional extensive grazing system should not sow some improved grasses. This is implicitly recognised by the Defendant in its detailed submissions about the load capacity of Brachiaria grasses in the context of the traditional extensive grazing system {C4/4.7/567}. There are therefore two points of interest: the theoretical difference made by introducing Brachiaria in place of unimproved native grasses, and the likely productivity and load capacity of farmers adopting the traditional extensive grazing system or the improved extensive grazing system respectively. The points are not the same, because the productivity of particular grasses within a particular system will depend upon the other variables to which I have referred at the start of this paragraph.

858. The experts agreed that for native grasses used in the traditional extensive system, the appropriate load capacity was 1 UGG/ha {H23.5/13/1084}. There is disagreement about the load capacity for Brachiaria grasses, both when being considered as an alternative to native grasses (but otherwise on a like for like basis) and when used in different systems.
859. The Claimants seek a finding that Brachiaria grasses have twice the carrying capacity of other grasses. The Defendant contends that the load capacity for the traditional extensive system using Brachiaria grasses is 1 UGG/ha. In the light of the experts' agreement set out at [858], this is equivalent to saying that using Brachiaria grasses instead of native strains does not improve the load capacity for the traditional extensive system.
860. In his first report, Dr Delgado expressed the view that "in humid tropical wooded and hilly areas, for grasses such as Uribe and Carimagua, the load capacity is about 0.8 to 1 UGG/ha/year, whereas for Brachiariae, the load capacity can be doubled to between 1.8 to 2 UGG/ha/year" {H20.3/3/427}. He did not specify what system he was referring to, though the reference to 0.8 to 1 UGG/ha/year suggests that he was referring to the traditional extensive system in each case. He returned to the subject in his Supplementary Report, justifying his view on the basis that Brachiaria pasture "is more stable during the greater part of the year (10 months) and they only go into decline for a period of two months." He qualified his opinion by saying that "this is an approximate estimation since the load capacity varies depending on climatic factors, the production system, and other factors such as whether supplementary feed is used in the diet of cattle" {H20.5/11/1041}. This clarifies that his estimate of 1.8-2 UGG is not specific to the traditional extensive grazing system and that the estimate may involve supplementary feed in the diet of cattle, which is typically a feature of the improved extensive grazing system: see the Mahecha description set out above.
861. In support of his opinion, as expressed in his Supplementary Report, Dr Delgado referred to literature and research on the subject:
- i) A short paper entitled "Genetic parameters and genetic trends for age at first calving ... in Colombia" by Vergara (2009) was based on a study of a large commercial enterprise in Caucasia {H20.6/26/1470}. In the course of describing the animals and data, Vergara states that cows were rotated on

pastures composed primarily of Brachiaria grasses with a stocking rate that ranged from 2.3 to 2.6 animals per hectare. Cattle were provided corn silage and either sorghum or guinea grass during the dry season. The greater weight of the cattle on this farm (400 kgs or more) suggests that the same system would support a stocking rate of 2.6-2.9 350kg cattle (2.3-2.6 x (400/350)). As is recognised by the Claimants, the venture being studied by Vergara is of a different order from the farming ventures of the Claimants, not least because “the Claimants do not fertilise their pastures in the way that such an exploitation does” {C4/3.5/512} and the widespread use of silage and other feed supplements is not evidenced in the present case. In his oral evidence Dr Delgado acknowledged that the farm being studied by Vergara was “managed technically, with improvement programmes, with genetic improvement and supplements” and that “the production [levels that could be achieved by LC39 and LC74] is very far below this kind of production levels mentioned in the paper” {Day 49/114:11};

- ii) Data sheets were issued by Corpoica (the Colombian Agricultural Research Corporation) including one for Brachiaria humidicola {H20.6/27T/1474.1} which stated that it tolerates high loads and poor soil management and “Animal load of up to 4 animals/ha.” The production system is not stated in the data sheets. While Dr Delgado accepted that Brachiaria grasses can be used in extensive or intensive systems, he did not accept that the UGG would be affected by the production system in operation. This seems implausible since, for example, the supplemented semi-intensive system includes the intensive management of high-yield pastures, with regular watering and fertilisation, which are not features of the extensive systems;
- iii) He stated that a hectare of Brachiaria grass produces twice the weight of fodder produced by traditional grasses {H20.5/11/1043} at [4.33].

862. In the experts’ joint statement Dr Delgado gave as his opinion that for Lead Claimant properties using Brachiaria pastures the load could be 1.5-2.0 UGG/ha/year {H23.5/13/1085}.

863. Before turning to Dr Avila’s evidence on this topic, it is worth returning to Mahecha again. When read in context, it is plain that the load capacity figures of 0.8-1.0 head/ha, 1.2 animals/ha and 3-3.5 head/ha for the traditional extensive, improved extensive and supplemented semi-intensive are not immutable or rigid findings, even where a range is given. For the purposes of simplicity Mahecha has given her figures (or, in the cases of the traditional extensive and the supplemented semi-intensive systems, her limited range) to provide indicators of typical load capacity under those systems. The paper does not purport to provide maxima and minima or to cater for all the variables that may affect the productivity of a given farm. I therefore accept the submission that her figures are an indication of typical load capacities for typical (or “normal”) examples of each system to which she refers. As such, they are not the figures that would necessarily apply in the case of the best managed, or the worst managed, farms; nor do they assume the best quality of land, or the worst quality.

864. During the trial there was discussion of what condition of farm Mahecha had in mind in giving her estimates. I accept the submission that on a typical type of farm adopting the traditional extensive system “there will perhaps have been some artisanal

or manual form of weed control and there will not be any use of fertiliser, and therefore the pastures will not be ... in the ideal conditions in the view of Dr Avila” {Day52/52:17}. This seems to me to be a realistic approach to the realities of typical campesino farming as disclosed in the course of the trial and, with suitable modifications, a similarly realistic approach should apply when considering what is a typical example of the improved extensive system. It does not suggest a farm that is entirely weed-free or entirely covered by pasture that is in very good condition. It therefore seems clear that there may be examples of each system where the load capacity will be above or below the figure or limited range that Mahecha gives. That said, Mahecha supports the view that the improved extensive system will typically be more productive than the traditional extensive system by between 20% (1.2/1) and 50% (1.2/0.8); and that the supplemented semi-intensive system will typically be more productive than the improved extensive system by a factor of between about 2.5 (3/1.2) and 2.9 (3.5/1.2). These differences are not solely attributable to the types of grass being used, as Mahecha’s categorisations set out above make clear: but the use of improved strains in the improved extensive system and the intensive management of high yield pastures (which implies the use of improved strains of grass) in the supplemented semi-intensive system are important contributory features. It is, to my mind, of more than passing interest that Mahecha’s figures suggest that the supplemented semi-intensive system will typically be more productive than the traditional extensive system by a factor of between about 3 (3/1) and 4.3 (3.5/0.8). That is at least consistent with the Corpoica data-sheet references to *Brachiaria humidicola* supporting an animal load of up to 4 animals/ha and supports the inference that the reference to that level of animal load is referring to the use of the grass in an intensive system rather than an extensive system.

865. Dr Avila accepted Dr Delgado’s estimates as set out in his original report (and set out above at [860]) on the basis that “they may reflect the highest possible load capacity for a Traditional Extensive farm”; but he expressed the view that these levels were “simply unattainable on the Lead Claimant properties, given the poor nutritional state of the pasture.” {H21.9/13/1842}. Despite this qualification, his acceptance of Dr Delgado’s figures as reflecting the highest possible load capacity for a traditional extensive farm implies that the use of *Brachiaria* instead of grasses such as Uribe and Carimagua may, all other things being equal (i.e. assuming the most favourable traditional extensive farm characteristics) double the load capacity of the farm.
866. For the reasons I have already given, I do not accept that the figures in Mahecha of 0.8-1.0 are to be taken as the highest possible load capacity for a traditional extensive farm; but Dr Avila’s acceptance of the relative difference that can be made by the substitution of *Brachiaria* for traditional grass strains remains significant. However, it leaves open the question why the difference in the load capacity suggested by Mahecha as between the traditional extensive and the improved extensive systems is no more than 20-50% rather than at least 100%. Two answers suggest themselves. The first is that Mahecha’s figures assume either (a) the use of some improved grasses in the range of traditional extensive farms, or (b) that improved extensive systems do not use exclusively improved grass strains, or (c) a mixture of both. The second is that the figures in Mahecha are (a) approximate, or (b) based on a more limited use of improved grasses dating back to 1994, the date of one of the sources for the table, or (c) a mixture of both. On the information before the Court it is not possible to determine whether any, and if so which, of these answers may be correct.

867. In the end, I have decided that it would be placing too much weight on Mahecha to take her figures as set in stone or determinative of the uplift in load capacity that can be achieved simply by substituting improved grass strains for traditional ones. In the light of Dr Delgado's evidence, as summarised above, and Dr Avila's acceptance of those figures in the manner I have indicated, I conclude that substituting improved strains of grasses for traditional strains may improve load capacity by *up to* 1.5-2 times, all other things being equal.
868. I accept Dr Avila's evidence that the actual load capacity of a given area of pasture will depend upon its condition, which in turn will be a function of the state of the soils, the nature and extent of the forage, and the extent of any non-nutritious vegetation. I also accept that pasture of poor quality could lead to a significant reduction in load capacity from Mahecha's figures (just as untypically good quality pasture could lead to an increase). These questions need to be addressed on a case by case basis.
869. The question remains whether Mahecha's figures are a reasonable estimation of load capacity for typical or average farms adopting a particular production system. The figure of 1.2 animals/ha for the improved extensive system is a surprisingly modest increase on the figures for the traditional extensive system, given that the introduction of improved grass strains is only one of the features of improvement that are included in the improved extensive system but absent from the traditional extensive system. The source of Mahecha's figures of 0.8-1 and 1.2 animals/ha is not obvious from the paper. All that can be said is that they do not simply reflect the ratio of head of cattle to area occupied: that would lead to a load capacity of 0.95 (14/14.6) for traditional extensive and 1.44 (6.5/4.5) for improved extensive. However, the figure of 1.2 UGG/ha for improved extensive is supported by another published text (Arboleda 2003 {H20.6/25.1/1468.10}) which Dr Delgado referred to as authoritative on other issues; and Arboleda provides a figure of 1 UGG/ha (rather than Mahecha's range of 0.8-1.0) for traditional extensive {H20.6/25.1/1468.8}. Neither side identified later published material to contradict these figures; nor did either side adduce cogent reasons for departing from them.
870. In the light of this evidence I find that Mahecha's figure of 1.2 animals/ha is a reasonable estimate of load capacity for typical farms (in the sense discussed above) operating the improved extensive system in about 2003. That figure may vary depending upon the quality of the particular farm and pasture in question. Given that switching from typical traditional extensive production to typical improved extensive farming leads to an uplift in load capacity of c. 20% (1.2/1) or possibly more, Dr Delgado's evidence that the load capacity of an improved extensive system farm could be 1.8-2.0 UGG, an uplift of 50-66% over Mahecha's typical figure, seems extreme. On all of the evidence, an uplift of about 40% (i.e. to about 1.7 UGG) would seem the likely maximum. A similar uplift to the figure of 1 UGG for traditional extensive farms would lead to a likely maximum of 1.4 UGG.
871. I can therefore summarise my findings on this section of the experts' dispute as follows:
- i) The substitution of new improved strains of grasses (typically *Brachiaria*) for traditional strains can improve load capacity (all other things being equal) by up to a factor of 1.5-2;

- ii) The descriptions of production systems as set out in Mahecha are capable of encompassing a range of farming practices within each category. The quality of pasture and consequent load capacity will be a function of human husbandry and natural resources;
- iii) Mahecha's figures of 0.8-1 UGG/ha (taken by agreement between the experts as 1 UGG/ha assuming a 350kg adult cow) for traditional extensive production and 1.2 UGG/ha for improved extensive production are reasonable estimates of the load capacity of typical farms falling within that description in 2002/2003. Those figures do not assume that only traditional grasses are used, though they assume that traditional or "low productivity" grasses will be used in traditional extensive production. Nor do they assume that all pasture is in very good condition, or that it is weed-free;
- iv) In consequence of (iii), Mahecha's load capacity figures may be exceeded on a farm that is of untypically good quality and may not be achieved on a farm that is of untypically poor quality;
- v) In the light of Mahecha's load capacity figures, a load capacity of about 1.4 UGG would be the likely maximum achievable on a good quality farm practising traditional extensive production and a load capacity of about 1.7 UGG would be the likely maximum achievable on a good quality farm practising improved extensive production. I do not exclude the possibility of higher figures in particular cases, but clear proof would be required.

The problems of overgrazing in Colombia

872. After a period of grazing, pasture needs a period of rest during which to form new webs of roots, leaves and stalks, and to accumulate biomass, protein, energy, minerals and vitamins before being grazed again. The recommended rest periods for pastures in the humid tropical forest are between 35 and 45 days in the rainy season and 50 to 60 days in the dry season. There is usually no growth in times of drought {H20.3/3/429}. A failure to allow sufficient rest periods leads to overgrazing.
873. The main environmental impact of overgrazing is the degradation of pasture and consequential deterioration to soils and surrounding water courses. There may also be effects of trampling of hooves, which can cause soil erosion and over-compaction. Overgrazing removes protective vegetation which would otherwise trap and stabilise the soil, while the cattle hooves trample the exposed soils. These then become vulnerable to erosion by water and wind, which removes the nutritional content of the upper layers of the soil. This renders the soil unable to support new vegetation. Overgrazing therefore limits further vegetation growth, further reducing the amount of pasture available to cattle and therefore exacerbating these difficulties {H21.4/4/846} {Day49/76:5}. The papers cited by Dr Avila at [5.23]-[5.26] {H21.4/4/797} amply support his evidence and I find that overgrazing is a prevalent problem in Colombia.
874. Whether or not overgrazing has occurred can be approached and evidenced by calculation or by observation or by both combined. I have considered the basic building blocks for calculation of load capacity above. Observation may be on the basis of aerial images or closer observation. Dr Avila based his opinions in part upon

Dr Savigny's photo-interpretation work, which I have already found to be helpful though subject to significant limitations: see [509]. He also based his opinions on his own observations. The Claimants make trenchant criticisms of Dr Avila's approach, including that it is too complicated to be applied in practice and that it contains errors (for example, by producing large variations in calculated load capacity on the basis of small changes in underlying data) which, in combination, undermine his exercise {C4/3.5/513}ff. These criticisms serve to emphasise that the actual load capacity of a given farm from time to time and the reasons for that load capacity are both case specific, and I deal with the evidence as necessary when addressing the Lead Claims individually. In general terms, I consider that a relatively broad brush approach to the calculation of load capacity is appropriate because of the uncertainties and imprecision about (a) the pasture and how it has developed in terms of fertility and vegetation and (b) the loads that have been imposed on it from time to time. In reaching this conclusion I take into account that overgrazing may be localised on a given property as a result of failure to rest particular pastures, or that it may be prevalent because of generalised overloading of the pastures that are available to the farmer.

875. The Defendant submits that, because of the prevalence of overgrazing in Colombia and the damage that overgrazing may cause to soils and watercourses (both of which I accept at a general level), "the Court [should] reject Dr Delgado's assertion that such damage is not normally found on livestock farms {Day49/37:17}. It depends on the level of mismanagement." I accept that the level of mismanagement will affect damage that may be caused by overgrazing. However, that is not of itself a reason for rejecting Dr Delgado's referenced evidence, which was that in all his extensive experience of farms in the area dedicated to livestock production, where there would be slash and burn and deforestation, he hadn't found the type of damage on other farms that he saw on the Claimants' farms that were alleged to be affected by the pipelines. That is admissible evidence in support of the Claimants' case and requires to be tested by reference to the alleged damage on each farm. It is not susceptible to a generic finding at this point.

Bromatology

876. Bromatology is the science of foods. In the present context it means the science of the composition of pasture with a view to assessing its quality as forage. It is common ground that visual observation alone is insufficient to establish the quality of pasture {Day33/17:21} {Day49/124:10}. Dr Avila carried out bromatological testing; Dr Delgado did not. Dr Velez accepted that Dr Avila's bromatological results were the most objective evidence as to pasture quality {Day33/24:10}. I agree.
877. Dr Avila set out his methodology at [6.13]-[6.23] of his first report (which also covered the separate exercise of forage testing) {H21.4/4/857}. The Claimants criticised his methodology with a view to discrediting his results. They did not dispute the accuracy of the laboratory findings as such. In their closing submissions some of the Claimants' criticisms have fallen away; but they maintain their challenge as follows:
- i) *Insufficient number of samples*: Dr Avila typically took 8 to 10 samples which he then composited. Various different published methodologies recommend different numbers of samples to be composited {C4/3.5/520}. Dr Avila said

(and I accept) that he was familiar with the methodologies and that he had adapted them on the basis of his experience, which had given him very good results {Day50/107:5} {Day50/110:9}. The Claimants' criticism has to take into account Dr Delgado's acceptance that the guidance on which he had relied in support of a minimum of 10 samples was only a general guide {H20.6/23/1437} {Day49/156:4}. As a result, the Claimants' criticism in closing is that "there is a risk that Mr Avila's samples were unrepresentative because he took an insufficient number of samples" {C4/3.5/520} and that although "this does not mean his samples are wholly compromised, ... it raises concerns about whether they are sufficiently representative" {C4/3.5/521}. I accept that greater numbers of samples may increase the power of the study; but I accept Dr Avila's evidence that his methodology has given him good results and find that the number of samples he took was sufficient to provide valuable results;

- ii) *Preservation of samples*: the Claimants allege that "there is a risk that Mr Avila's samples were not well preserved" {C4/3.5/521}. Dr Avila dried his samples by exposing them to the air {H21.4/4/858}, which was in accordance with the UNAM methodology {H21.10/23/2522}. Dr Delgado agreed that drying was appropriate (though he advocated the use of a microwave) {Day49/154:18} and that Dr Avila's practice of storing samples in paper bags was appropriate {Day49/154:7}. His point was that the laboratory would want dry matter. It is agreed that the laboratory used by Dr Avila is excellent (so that its results are not questioned) {Day49/151:5} and I accept Dr Avila's evidence that it would assess samples on receipt and would reject any that had deteriorated such that their results might be affected {Day52/83:14}. That provides considerable assurance of quality which, taken together with Dr Delgado's evidence and the UNAM methodology, leads to the finding that no significant risk has been shown;
- iii) *Height of cut*: it is alleged that Dr Avila did not systematically cut at a height of 5cms or more. This was based on a photograph at {H21.10/15/2415}. Dr Avila agreed that the most recommendable practice was to ensure that he did not sample grass below 5 centimetres from the soil {Day50/122:22} but did not accept that the subject of the photograph (who is his son and assistant) was cutting at a height less than 5 cms. It is not possible to form a valid assessment of the height of the cut from the photograph, though it looks close to the ground from the angle of the camera. However, given Dr Avila's clear understanding of the need to cut at or above 5 cms, and his close involvement in the process, it would be surprising if there had been frequent cutting at a point that was lower than recommendable. The Claimants do not allege the existence of evidence to suggest that cutting too low was systematically done but submit that the photograph "adds to the concerns about the reliability of the values obtained in these samples" {C4/3.5/523}. I find no satisfactory evidence to support a finding that low cutting was a material problem and reject this submission;
- iv) *Samples from areas affected by sedimentation from the ROW*: Dr Avila accepted that if samples that he thought were off-ROW were in fact within an area that had been impacted by the construction of the pipeline, that would

impact the reliability of his analysis as to the comparison between on-ROW and off-ROW pastures {Day50/114:15}. He relied upon Snr de los Rios to identify suitable off-ROW areas and it is not within his expertise to tell whether or not they were affected. The Claimants have cited two samples on LC39 and two on LC54 which they submit are or may be affected by sedimentation from the ROW. These are matters to be considered on a case by case basis. They do not undermine the fundamental validity or usefulness of the exercise as a whole;

- v) *Sampling grasses at a different stage of growth:* it is common ground that the nutritional value of grasses changes during their cycle of growth and that it is not valid to compare (for example) a grass that has grown for two weeks with a grass that has grown for eight weeks {Day50/125:13}. The Claimants allege that the on- and off- ROW samples taken by Dr Avila were not necessarily taken at the same stage of growth. They rely primarily upon Dr Avila's answers to questions pursuant to CPR 35.6 at {H21.6/10/1487} and, in particular, that in the cases of LC50 and LC74 the on-ROW sample was not being grazed at the material time but the off-ROW sample was. Both of these will be assessed in greater detail on a case by case basis, but it is immediately to be noted that LC50 is a special case because the ROW was on a ridge and any off-ROW samples would have to come from a distance away. Dr Avila responded to the criticism that he may have selected samples of grasses that were at different stages of the grazing cycle at {H21.9/13/1837}. In general terms, Dr Avila's answer was that he had tried to select sites that looked comparable, without knowing precisely what stage the grasses were at {Day50/132:12} and that where he found two grasses with similar compositions, it means that the grasses have got the same conditions or very similar stages of development {Day50/133:15}. Although Dr Delgado did not answer the question directly, he did not dispute this as a proposition {Day49/140:16}, and he accepted that where samples of grass taken relatively close together and on the same farm showed roughly similar NDF, it is possible (his word) that they are at a similar stage in the grazing cycle {Day49/142:24}. I therefore accept that, where there is reason to suspect that samples were taken that were at different stages of growth, comparisons between them are to be treated with caution. But, where they can be shown, I find that the Defendant is entitled to rely upon similarities in the biomass produced and similarities between NDF results as between samples as evidence that samples were taken at a similar stage in the grazing cycle. The need to exercise caution in some cases does not invalidate Dr Avila's bromatology testing as a whole.

878. The Claimants submit that Dr Avila's chosen benchmark for assessing the absolute nutritional value of the tested grasses was inappropriate because it represents the standards of the American Forage and Grass Council, which are said to be inapplicable to grasses grown in the more challenging environment of the Colombian tropics. There is nothing in this criticism. The chosen benchmark is widely acknowledged and used as a benchmark, including in Colombia. In particular it is the benchmark routinely used by the laboratory which carried out the testing on Dr Avila's samples {H21.10/21/2461} and Dr Delgado accepted that it was "the reference that all laboratories use" {Day49/146:13}. I am not satisfied that Corpoica

has either established or promulgated an alternative benchmark or series of benchmarks. Dr Delgado's evidence that it has (if that was the intent of his answer) was confused, confusing and unconvincing {Day49/149:6}, and I reject it. It is well understood that the use of the benchmark does not mean or imply either that the Colombian grasses should achieve the same nutritional value as grasses that would be found in the United States or Canada {Day50/149:1} or that the highest benchmark standards are necessary for the support of Colombian cattle {Day50/152:14}.

879. Standing back, I accept that there are points to be made in relation to Dr Avila's bromatological testing, generally on a case by case basis. However, I do not accept that the Claimants' attacks on his methodology should lead to the conclusion that his testing has little probative value. It is objective evidence which, if applied with suitable caution and attention to detail on a case by case basis, provides valuable information.

Milk productivity

880. The competing positions for annual milk production from cattle being raised and milked under the traditional extensive system are:

- i) Claimants: 630 litres per year;
- ii) Defendant: 525 litres per year.

881. Both experts rely upon the statistics provided by the Statistical Yearbook of the Agricultural Sector in the Department of Antioquia 2010 {H20.6/31/1478} {H20.6/31T/2021.1} {H20.6/32/2022}. At first sight, these documents seem opaque, but I understand and accept the explanation provided by Counsel at {Day52/71:6}. I also accept Dr Delgado's evidence that he checked the manner in which the statistics were compiled with the relevant body and the explanation he says he was given {Day50/69:4}. On the basis of those explanations it is clear that the figures for Cow production (litres/day) set out at {H20.6/32/2022} are to be multiplied by 365 to get the average annual production per milking cow. On this basis the annual statistics support Dr Delgado's evidence and I prefer his estimate to that of Dr Avila.

882. The parties are agreed that it takes 10 litres of milk to produce 1 kg of the cheese typically made by the Claimants {H23.5/13/1090}.

Ingestion of bags left during construction

883. There are claims in the litigation that cattle ate polythene bags which caused them illness or death. It is common ground that the ingestion of polythene bags could have these effects. The Claimants make two submissions. First, they submit that cattle will eat foreign objects whether or not they are suffering from mineral deficiencies. On this point I accept Dr Delgado's evidence that cattle are an indiscriminate breed that will ingest foreign bodies including objects such as feed sack bags (or other similar objects such as polythene bags) whether or not they are suffering from mineral deficiency {H20.6/35/2052}. If they are suffering from pica that may increase the likelihood that they will try to supplement their diet, but it is not a precondition to their doing so. The second point is in part related to the first. The Claimants submit that the ingestion of foreign objects including bags left during construction is not a

consequence of the Claimants' management of their cattle. I am not prepared to make a generic finding to that effect. It is part of a cattle farmer's normal husbandry to ensure that his livestock are not exposed to danger. On the Claimants' relatively small farms, if polythene bags were left for any great length of time, they could and should have been seen and picked up. If nothing was then done to pick up and remove the bags, the farmer would have a measure of responsibility, at least in terms of proper husbandry. This conclusion is consistent with Claimants' submission that the ingestion of foreign objects is common behaviour among cattle and that is why farmers are careful not to leave any objects within their pastures which might be ingested by cattle {C4/3.5/529}.

Cows that get stuck in the mire

884. It is agreed that the main preventive measure to protect cattle from being stuck when swampy areas exist on a farm is to install fencing to keep them out. Where cattle are trapped in swampy areas, what is most important is a timely rescue, trying not to injure the animal. If the rescue is timely, before 12 hours, it is likely that the animal will recover and be able to stand up {H23.5/13/1087}. It is agreed that the risk to the animal increases after it has been stuck for 12 hours, but the rate of increase of risk is not agreed between the experts and is not capable of precise definition by the Court.
885. The parties cannot agree whether a cow that is stuck in the mire will moo. Behind this remarkable and apparently trivial dispute lies a more serious intent because the presence or absence of noise from a cow that is stuck might alert the farmer who would otherwise be unaware of its plight. I accept Dr Avila's evidence that, given the small size of the farms and the close involvement of the Claimants (or in some cases those who work on their farms), a farmer should usually be aware that one of his cows was stuck in a swamp before it remained there for 12 hours, even if it was mute, since farm-hands and managers on small farms ought regularly to be checking on their cattle by visiting the pastures where they are grazing at least twice a day to ensure that their cattle have not got into any difficulty {H21.4/4/839}. Serious questions should be asked about the competence of a farmer who did not adopt so basic a practice of livestock husbandry. I also accept Dr Avila's evidence (ibid) that trapped cattle would generally draw attention to themselves by lowing. The noise made by distressed calves is particularly loud, calling out to their mothers. I do not accept that calling out by cattle or calves in distress is limited to circumstances where a cow is separated from its calf and I reject Dr Delgado's evidence, first raised in cross-examination, that cattle of the types kept by the Claimants will make no noise when stuck in the mire.

Pipeline Project Management

886. The Claimants called Mr Willis, ostensibly as an expert in pipeline project management. As was made painfully clear in the course of his cross-examination, he was no such thing, not least because he had never been the project manager of a construction project during his career {Day52/106:2}. His report, as originally provided and subsequently amended, was largely used as a vehicle to rehearse the Claimants' case; but it did not advance it. By the end of a further immaculate cross-examination by Mr Lewis, there was nothing left that could properly be called expert opinion evidence from Mr Willis upon which the Claimants could properly rely. The Claimants implicitly recognise this in their closing submissions, in which the only

observation they make is that Mr Willis had referred to BS6079: 1996. As Mr Willis and the Claimants recognise, this British Standard was a guide and not a code of practice {Day53/20:4}, being informative rather than prescriptive {Day53/21:18}.

887. In these circumstances it was not necessary for the Defendant to call evidence on Pipeline Project Management of its own and it did not do so. It is also not necessary to spend any more time on the subject here other than to say that I accept the Defendant's submissions on this discipline as set out at {C4/4.7/581}-{C4/4.7/588}. BS6079 speaks for itself. Mr Willis added no expert opinion evidence that assists the Court.

Economics and pricing

The experts

888. The Claimants called Snr Perez, who had extensive experience of and knowledge about the practicalities of campesino farming; and they also relied upon evidence from Dr Velez which went to pricing. The Defendant called Ms Navas who did not have Dr Perez' experience in the practicalities of campesino farming but who brought an economist's analysis to bear on the assumptions underlying the presentation of the Claimants' cases. The experts found much common ground but some matters of principle divided them. When giving their evidence the distinction was marked. Ms Navas gave her evidence with clarity and conciseness. Snr Perez gave his with enthusiasm and at a length that in another expert might easily have been regarded as filibustering, such as when Mr Campbell QC attempted to cross-examine him on the productivity of different types of timber {Day51/63:17}. The Claimant's submission that "there was no effective challenge" to Snr Perez' views on this topic is accurate {C4/3.5/542}; but that was the result of the manner Snr Perez' reply when time was short rather than the questions Mr Campbell QC was trying to ask.
889. Detailed findings as to pricing and productivity are made difficult by the fact that the Claimants keep either few records or no records at all that demonstrate the financial consequences of their farming. The Claimants have therefore had to resort to alternative sources of information about both pricing and productivity; and they invite the Court to assume that each of the Claimants would have been sufficiently close to a norm as to justify the adoption of these secondary sources of information. In this section I consider the information that is available as source material to the experts. I consider how apt that information is for application to individual claims when considering the Lead Claims in detail.

Productivity

890. Ms Navas audited Dr Velez's estimates of productivity. The overall result was that, in general, Dr Velez's estimates can be described as feasible. It will be a matter for determination whether on any given farm those levels of productivity were achieved. Ms Navas had not understood about inter-cropping, an established technique which makes more intensive use of land for crops by growing three different crops on the same parcel at the same time. Once again it will be a matter for determination on any given farm whether intercropping was practised and, if so, what levels of productivity were achieved. There was a dispute on the likely productivity figures for timber put

forward by Snr Perez which I will address as necessary when considering individual claims.

Production costs for cattle milk and cheese

891. The profit margins claimed for the sale of cattle or milk in the Claimants' Schedules of Loss are very high – typically over 90%. The objective evidence before the court is to the effect that these margins were not achievable. Ms Navas identified published data relating to Antioquia indicating that the costs of milk production account for 86.4% of the sale price of a litre of milk and that the costs of production of cattle represent approximately 79% of the market value of the animal {H17/1/54}. Those figures related to more technically advanced operations. Snr Perez was not in a position to give an opinion on the relative rates of return for campesino cattle farmers as opposed to more technological farms {Day51/73:4}. Nor was Ms Navas, but her argument was that it would make no sense for commercial producers to invest in technology and upscaling of operations if they could in fact obtain such greater returns without it {Day51/139:5}. This argument requires some qualification, because the benefits of scale may not simply be driven by improved margins; and there are distinct differences between commercial and campesino operations that work in the campesino's favour, such as the use of unpaid labour, non-payment of tax, and (possibly) reduced transportation, administration or insurance costs.
892. The Claimants rely upon the fact that the estimates of costs are based on evidence from Dr Delgado. That will be examined in individual cases. However, there is evidence which did not appear in the Claimants' expert evidence that is material to this issue. In particular, Dr Velez' interview with LC74 (Snr Velez) at {H24.2/301.2/1443} is not reflected in the written evidence of Dr Delgado or Dr Velez. In it Snr Velez makes clear that arrangements under which cattle belonging to others are raised on his land with the sale proceeds being split leave him with no profit. He makes the point that it is better to lease the grass but that is not what the cattle owners will accept. This is a different model from breeding and raising his own cattle on his farm, but it supports the notion that cattle raising is unlikely to generate the profits projected in the Schedules of Loss.
893. At this stage, I conclude on the basis of Ms Navas' evidence that the profit margins claimed in the Schedules of Loss are likely to be overestimates and require careful scrutiny on a case by case basis to see if they are justified.

Opportunity costs and lost production

894. The Defendant submits that the Claimants should give an allowance for labour saved where there is a claim for reduced production. This submission is based on twin assumptions, namely (a) that the reduced levels of production release family labour to an extent that make it feasible for the person so released to seek remunerative employment elsewhere, and (b) that there would be remunerative employment available for the person to obtain. Both these assumptions are highly questionable. First, where the claim is (for example) that damage to a Claimant's farm has rendered it less productive so that he can maintain (say) three fewer head of cattle, it is not obvious that the presence of three fewer animals would release labour so as to enable someone to go and seek remunerative work elsewhere. Second, although there is evidence of occasional remunerative employment of labour on farms, the economic

model requires paid labour to be minimised. It follows that even if a person on a given farm had the time during which he could undertake remunerative employment there is no basis for assuming that such employment would be available. While Ms Navas' analysis of opportunity costs {Day51/140:23} would have a practical logic in other economic circumstances, I am not satisfied that as a general approach it is realistic in the current circumstances. A more realistic approach is that work by family members (particularly by women) tends to be unpaid and not readily transferable to other employment; however, the need to feed the family remains the same in the face of reduced productivity. While I accept that this is an issue to be considered again where raised in relation to the Schedules of Loss, I accept the evidence of Snr Perez that "for men, work as a jornalero (day labourer) is only an occasional job, and while women work on their own farms it wouldn't be possible for them to find work as day labourers on other farms" {H16.2/4/379}. I have not ignored the fact that LC39's original Schedule of Loss asserts that the three male members of the family who previously lived on the farm now earn a living elsewhere as farm labourers in order to support their families {B4.1/8/73} and that Schedule 4 gives credit for earnings from labouring over a period of 10 years {B4.1/8/76}. Irrespective of whether this assertion is accurate, it is not a sufficient basis for a finding that alternative remunerative employment was available as a matter of course in the event of reduced production on any or every farm.

Prices

895. The Claimants rely upon three main sources as the basis for their pricing of the Schedules of Loss:
- i) Published pricing data including statistical directories published by the Municipal Units of Technical, Agricultural and Livestock Assistance (UMATAS) whose function is to collect prices on a weekly basis at the producer level (i.e. at the farm gate), which Ms Navas agreed was a useful starting point in seeking to establish prices {Day51/103:17};
 - ii) A price list compiled by Snr Lozano in the circumstances set out below;
 - iii) Interviews which Snr Perez carried out with producers and those involved in the sale of products.
896. Snr Perez did not interview the Claimants themselves because, as he explained in evidence, he wished to be and to be seen to be independent of them and because of the distance involved in visiting their farms {Day51/27:21}. That was reasonable and probably prudent given the highly adversarial nature of this litigation.
897. The Defendant challenges the admissibility of the Lozano price list on the basis that it is expert opinion evidence which Snr Lozano was not entitled to give. This point was not taken in the Defendant's opening submissions. The point that was taken then was that because Snr Lozano was not being called, the Defendant was not in a position to test his methodology or the reliability of his prices {C4/4/625}. The Defendant accepts that if Snr Lozano had given evidence "that producer X told me he sold cattle for Y price, that might have been admissible evidence of fact, albeit hearsay evidence" {C4/4.7/593}. That is effectively what Snr Lozano did as described in his statement {D11.1/165/2005}: he decided "to supplement the available data sourced

from local municipalities by directly meeting and obtaining prices from various producers and those engaged in small scale trading in the region to determine the historical prices of products as there are not definitive records reflecting the reality of the region.” He made a list of individuals that included local producers, owners of farms who engaged in agricultural and livestock activities similar to those engaged in by the Lead Claimants, fishermen, workers of farms, shop owners, butcher shop owners, fishmongers, sawyers, owners of lumber yards and transporters of goods. This was similar to the exercise that Snr Perez carried out, which Ms Navas described as an important source of observable information {H17/2/158} and an appropriate methodology given the lack of official data {H17/2/177}.

898. On this evidence, although it is not clear precisely how the information from these local sources was translated into his list, it appears that Snr Lozano gathered factual evidence on prices which he then tabulated. That was a legitimate (albeit hearsay) exercise which did not involve the giving of expert evidence; and it is admissible. In general, Snr Lozano’s prices tend to be lower than those provided by UMATAS, reflecting the fact that the producers who provided him with information were operating at a level similar to that of the Claimants, at the lower end of the supply chain. Ms Navas agreed that prices which were lower than those reported in official sources were likely to be a good approximation {Day51/114:5}. Where the UMATAS prices are lower than those from Snr Lozano, that may suggest in the absence of an explanation to the contrary that error has crept in to Snr Lozano’s pricing; but that cannot simply be asserted as a general conclusion. It may simply be a reflection of the fact that identifying exact prices over a period of significant inflation is difficult and frequently imprecise {H17/2/158}.
899. One of the checking exercises carried out by Ms Navas was to compare the historical price series relied upon by the Claimants with the evolution of food inflation during the same period. She accepted that in a price series where the latest (2012) price estimate is the most reliable and the price series increased over time at a rate faster than inflation, that would imply that the historical prices in the series could be an underestimate. It is to be noticed that, while logically impeccable, this point implies likely inaccuracies in all historical prices as generated by Snr Lozano and Snr Perez since their methodology was the same for all historical series and there was a similar absence of documentary evidence to support the producers’ recollection. This is not of itself a criticism of the process; rather it is a note of caution against taking the prices that have been obtained as being entirely reliable or precisely accurate.

Claims for domestic consumption

900. I gave a brief account of the nature of the rural economy applicable to most of the Claimants at [295] above. Most of the claims involve allegations that damage from the Ocesa pipeline caused damage to the Claimants in the form of loss of production that would have been for domestic consumption. The claim by LC39 is typical:

“[D]ue to the damage caused by the pipeline construction, resources on the farm have been lost or damaged with consequent decreased productivity. The loss of productive resources ... has meant that, without remedial action being taken, the diet of Señor Sequeda and his immediate family is less nutritionally rich, varied or balanced than it had been

previously. Señor Sequeda did not necessarily go into the market place in all instances to purchase replacements for produce that would otherwise have been used in domestic consumption. The situation of subsistence farmers is such that they may lack financial resources to purchase substitute produce, and may instead have to choose to go without or indeed go hungry.” {B4.4/1/13}

901. These claims have given rise to a discrete issue of principle. The Claimants claim the value of replacing the “lost” produce at market rate i.e. the amount it would have cost the Claimant to purchase replacement produce, whether or not the Claimants did purchase such replacements (ibid). In their Amended Schedules of Loss the Claimant quantify their claims by reference to the cost that would have been incurred if the Claimants had gone to market in Medellin and then adding 15% to that market price, which is described as a merchant’s handling fee, in order to find the average consumer purchase price per kilo in Caucasia {H16.1/2/185} {Day51/31:12}: these have been described as town prices. By contrast, the Defendant submits that the appropriate measure by which to quantify the loss would be the price that would have been obtainable by the Claimant if the “lost” production had been sold at the farm gate or payable if a replacement purchased from a neighbour at “farm-gate” prices.
902. The premise for both sides’ submissions is that there has been a loss of production for which the Defendant should be liable and that the lost production would have been used for domestic consumption. My starting point is that if there were evidence that a Claimant had in fact gone to market in Medellin (or elsewhere) and paid town prices, that would be the appropriate measure of damage for the Claimant to recover. However, as the extract from the Schedule of Loss set out above recognises, that is not what happened. As a general statement, there is no evidence that Claimants incurred town prices to replace lost production that would have formed part of their domestic consumption. Instead, the more likely outcomes are that the quantity and quality of the Claimants’ diet was reduced by the absence of the lost production, or that the Claimants may have bartered with or bought from neighbours to the extent that they made good the deficiency by obtaining replacement products.
903. These apparently simple statements cover what is likely to have been more complex working out of the loss of production. It is important to say at the outset that there has been no evidence of frank malnutrition (still less starvation) as a result of loss of production, despite the Claimants being correctly described as subsistence farmers. It is in theory possible that in some cases a farmer might change his diet so to compensate for the lost production by using some other type of food produce from his farm that he might otherwise have bartered or sold. As a further possible complexity, it is alleged in some cases that the damage to the productive capacity of the farms caused people to leave, which may be associated either with loss of basic domestic consumption or loss of what was previously a surplus that could be traded or both, or with other reasons entirely.
904. While recognising the existence of the barter economy and of the prospect of purchasing from neighbours at farm-gate prices, the ability to do so presupposes a number of things which may not hold good in a particular case. In particular, (i) it assumes that the Claimant has either cash or surplus in some other area of his production that he can use to barter or trade; and (ii) it assumes that a neighbour has a

surplus of the product he wants (or some alternative product) that he is prepared to sell or barter. As a general rule, it cannot be assumed that neighbours are going to be either able or willing to simply give away produce, except (for example) in times of fruit glut: but at times of fruit glut a modest reduction in the Claimant's own crop may not require to be or be supplemented as he may still have more than enough. On this area I accept the evidence of Snr Quevedo at {Day12/161:1} as typical and generally applicable in the absence of contrary evidence and find that, except when in possession of a glut that they could not otherwise get rid of, neighbours might help each other out to a limited extent, but they could not afford to subsidise each other to a great extent and so would charge, whether in money or by barter.

905. Equally, although the Claimants did not generally incur town prices by going to market and buying substitute goods, the evidence does not establish as a general rule that this was because of impecuniosity. To my mind, it is indicative and typical of the tough, rugged, rural communities that they simply got on with the lives that they were used to and made do with what they had for domestic consumption, supplementing it locally where appropriate rather than making the journey to town or market and replacing like with like. In these circumstances, I am not persuaded that the appropriate measure of damage is to apply town prices. There is no real analogy to be drawn with urban life in a crowded island such as England and Wales where the natural reaction if food produce is lost would be to go to the nearest town or supermarket and replace it at the prices ruling there. There are, however, two reasons for favouring farm-gate prices. The first is that *if* the Claimants chose to replace lost produce they are more likely to have done so locally, where farm-gate prices would rule. The second is to imagine what would have happened if the "lost" produce had not been lost but the Claimants had chosen to sell it rather than consuming it domestically. This possibility is neither outrageous nor outlandish given that, in many if not most cases, the "lost" domestic consumption is not alleged to have caused malnutrition or ill-health. *If* the Claimants had chosen and been able to sell the "lost" production, they would have recovered farm-gate prices and not town-prices.
906. The parties were not able to identify authority precisely in point and I have found none. I do not find cases about damage to profit-earning and non-profit earning chattels such as cars particularly helpful, save possibly to the extent that they indicate that the claim for "lost" production for domestic consumption is analogous to the claim by an individual for loss of the use of his car, which may (at least in part) sound in general damages: see *Beechwood Birmingham Ltd v Hoyer Group UK Ltd* [2010] 3 1677 at [48]. At one level, having a less nutritious diet may sound like the stuff of general rather than special damages, but the Court would still have to find an appropriate measure to apply when quantifying those general damages. If, therefore, it were to be held that the claim for "lost" domestic consumption was properly to be regarded as a claim for general damages, I would still look to the farm-gate cost of replacing the lost production as an indicator of the appropriate measure to be applied.
907. Accordingly, and subject to evidence to the contrary in particular cases, I conclude that the local or farm-gate cost of replacing "lost" production that would have been destined for domestic consumption is a better measure of damage than the town prices claimed by the Claimants.

Double recovery and setting off the value of sold animals

908. Claimants in a number of cases claim to have sold an animal and subsequently claim the lost production from that animal without giving credit for the proceeds of sale. The Claimants attempt to justify this {C4/3.5/553} by saying that the animal (say a pig or a chicken) would have had to be sold at some point anyway so that the income from the sale is income they could expect regardless of when they sold the pig. This is wrong for two distinct reasons. First, there is a difference between a pig (or hen) sold early and a pig sold later, which should reflect in the value obtained on the sale: an aged pig sold after the end of its reproductive life has value only for food; but a young and still fertile pig has value as a future producer of piglets as well as the residual value it will have when its reproductive life ends. The same is true for the chicken and the egg. Second, even if the price of a young and productive pig were to be the same as an aged and infertile one, the Claimants have had the benefit of accelerated receipt of the sale proceeds. The need to give credit is implicitly acknowledged in the Claimant's elegant sentence: "[pigs and chickens] have the disadvantage of mortality, *although they do return high profit margins*" {C4/3.5/554}. The purchaser of the young pig or hen is buying the future profits as well as the animal for the pot. On this point I accept the evidence of Ms Navas at {H17/1/54} at [176].

Agricultural family Units (UAFs)

909. UAFs are creatures of Colombian law which are used in different ways for different purposes under different laws. Ms Navas carried out an exercise designed as a cross-check to help assess the reasonableness or otherwise of the Claimants' claims. The debate between the experts became mired in increasingly detailed references to the relevant (or irrelevant) laws where UAFs have been used, culminating in a final paper from Dr Velez well after he and Ms Navas had given their evidence {H5.7/14/1761}. The end result is that the Defendant does not place any particular reliance on the UAF analysis except in relation to LC39. The Defendant asserts that it is clear from other sources that the Claimants' claims are grossly inflated and that the UAF analysis does no more than confirm it. With the greatest of respect to the efforts of the experts, I do not consider that UAFs are going to determine or significantly influence the outcome of this litigation. They need not lengthen this section on expert evidence further.

Discount rate and multipliers

910. Professor Castro gave evidence in her original report {H14/1/106} that "a 6% discount rate (legal interest) must be applied to bring [the calculation of future losses] to present value." She repeated her view in the Joint Statement in identical terms {H23.2/7/541}. Although this appeared under the heading "issues that are disagreed", Professor Vallejo did not express disagreement and did not offer a contrary opinion or assertion. I accept Professor Castro's evidence as an accurate statement of the practice adopted by the courts of Colombia as a matter of fact on this point. However, the parties are agreed that the quantification of loss is a matter for English law as the *lex fori*. I therefore approach the question of the discount rate on the basis that English principles must be applied to the facts as they exist in Colombia.

911. The basis for the current discount rate of 2.5% in English personal injury cases is the Damages Act 1996 and the Damages (Personal Injury) Order 2001. Section 1 of the

Act provides that the Court must take into account the rate of return prescribed by order of the Lord Chancellor in determining the return to be expected on the sum awarded as damages for future pecuniary loss in an action for personal injury. Section 1(2) leaves the Court with a residual discretion to take a different rate of return if any party to the proceedings shows that it is more appropriate to the case in question. The Lord Chancellor's determination is based upon his view of the real rate of return on future index-linked government bonds. Neither the Act nor the Order apply to the present proceedings, but the real rate of return on Colombian index-linked government bonds has been raised for consideration in the present case on the basis that the discount rate in this case should bear some relation to the likely real rate of return in Colombia.

912. Ms Navas gave as her original opinion that a discount rate of 2.5% would be “far too low” for Colombian economic conditions. She came to be cross-examined when the Court, the cross-examiner and the witness were under severe time constraints. The cross-examination established that recently announced Colombian index-linked government bonds offered real rates of return of between 2 and 4% with periods to maturity of between 6 and 20 years {H16.2/12/564}. Ms Navas' evidence, which I accept, was that these were the rates to be paid by the primary buyer on issuance but that the relevant rate was that on the secondary market, which would be higher {Day51/154:17}. But after further consideration she gave as her opinion that a real rate of return of 2.5% would be “a bit low” for an investment in a Colombian government bond and that volatility in the secondary market because of people's perception of risk and the Colombian Government's ability to pay its debt would affect the expected rate. The thrust of her answer appeared to be that 2.5% would not be far off a reasonable real rate of return for an investment in Colombian Government bonds.
913. There is a significant disparity between the 6% discount which the Colombian Court applies to future losses and the discount that would be suggested by the application of English principles to the evidence of Ms Navas as I have summarised it above. Unfortunately, neither the experts in Colombian Law nor Ms Navas was asked what is the logic that underpins the Colombian courts' practice of adopting 6%. While I strongly suspect that it is rationally based upon Colombian economic conditions, I do not know what the logic may be. What is clear on the basis of Ms Navas' evidence is that, if the Colombian court were to be acting on the same factual information as is available to this court, the practice of the Colombian Court must be based upon a different logic. I would not agree with the Claimants' submission that the lack of explanation makes the Colombian court's universal practice irrelevant; but it would be wrong in principle to follow that practice where the application of English principles to evidence before this Court leads to a markedly different answer.
914. I accept Ms Navas' evidence that 2.5% would be too low. She moderated her position on the extent to which it was too low during her oral evidence. Taking her evidence as a whole and placing it in conjunction with the known rates of return as summarised above, I conclude that a discount rate of 3.75% should be applied to damages for future losses on the basis that real rates of return would be likely to be between 2 and 4% for the primary market (depending upon the duration of the security) but higher for the secondary market.

Fruit Production

915. There is a wealth of evidence to the effect that fruit tends to come in gluts with the result that farmers can neither consume it themselves, sell it or preserve it. This is the direct result of the absence of efficient technology, transportation and an effective operative market for their produce. If a farmer is lucky, a trader may come to the farm and buy the entire crop, but this is not the general experience and often farmers will receive nothing for crops that they have grown. Even when fruit has been given away to neighbours, there is likely to be much left over that goes to waste: see the evidence cited at {C4/4.7/601}ff. The evidence also establishes that the prices obtained from a trader who visits the farm will be lower than those that would be achieved if the farmer were able to get his produce to market or to make small-scale farm-gate sales.
916. On the basis of this evidence, the mere fact that a farmer's crop is reduced does not show a loss, because the additional crop may have been of no value to the farmer either for domestic consumption, or for sale or barter or for feeding animals. The effect of this evidence is that, when reviewing individual cases, it is necessary for the Claimant to show that he had a use for that part of the crop which he claims was lost as a result of damage for which the Defendant should be held liable: real loss in times of glut or over-production is not self-proving. Equally, it is necessary for the Claimant to demonstrate what he would have done with the part of the crop which he claims was lost so as to show what, if any, value should be attributed to it. These are matters that must be dealt with on a case by case basis.

Fish prices

917. Snr Perez gave evidence about the price of cachama after it had been cleaned and gutted and was ready for consumption. His prices assumed that the weight after cleaning and gutting was 450-500 gms and he said that smaller fish would fetch lower prices {Day51/68:15}. He was not asked and did not say either what reduction in weight is achieved by cleaning and gutting or what the lower prices for smaller fish would be. Professor Rodriquez had suggested that cleaning and gutting a fish will reduce its weight by 8-16% depending upon type of fish {C4/4.7/604}. No other expert commented on or gave an opinion on these figures.
918. On this basis, it appears reasonable to adopt a broad-brush reduction of 12% across the board to reflect the difference between whole fish and fish that have been gutted and cleaned to achieve Snr Perez' prices.
919. The Defendant also points to the fact that Professor Rodriquez had provided prices from published sources that were rather lower than those provided by Snr Lozano and which were adopted by Snr Perez. I am not persuaded that the published sources provide sufficient detail to justify a further reduction from Snr Perez' figures.

Sums Received

920. In the absence of good reason to the contrary, the Claimants would be required to give credit for sums received in respect of the same damage for which they now claim damages. Whether the sum received requires to be set off is for consideration on a case by case basis.

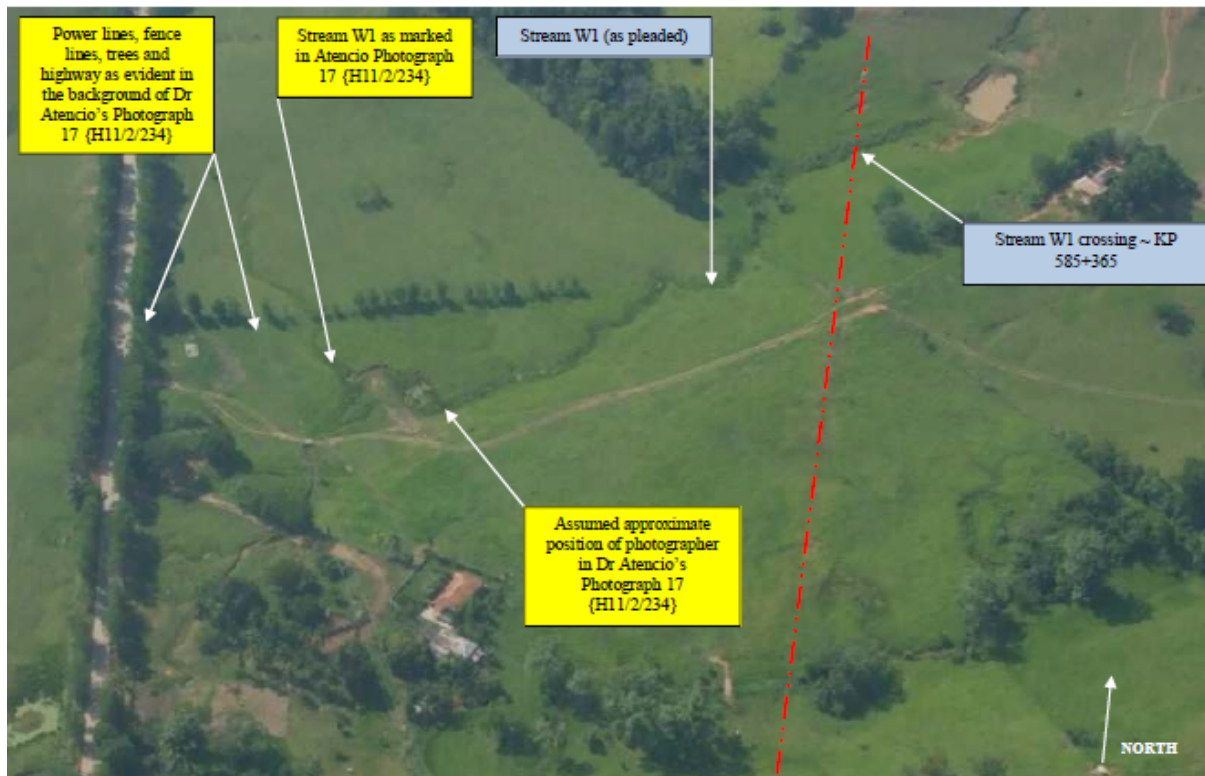
11. Note on Expert Evidence

921. It is not necessary or desirable to try to establish a generalised pecking order among the experts. Nor is it necessary or desirable to repeat here the observations I have made in Section 10 and make in the Sections dealing with the Trial Lead Cases in detail. However, for the purposes of the larger cohort of claimants there is one feature of the expert evidence that needs to be highlighted for general consideration.
922. I have previously referred to the mantra among lay witnesses that the ODC pipeline caused no damage and that all of the Claimants' difficulties were attributable to the Ocesa pipeline. Given the nature of the ODC pipeline works, that was a mantra that should have been questioned rigorously by the experts instructed for the Claimants. In some cases the alarm bells should have rung for all of Claimants' advisers, both technical and legal. For example, the suggestion that Snr Velez had suffered no significant damage from the ODC pipeline is evidently highly dubious even without any reference to technical experts because of the terms of his multiple settlements with ODC. Yet, far from investigating the historic impact of the ODC pipeline, the technical experts appear to have accepted the mantra of the lay witnesses without question and to have set out to support the mantra as being correct. That was, in my judgment, a fundamental failure in the preparation and presentation of the Claimants' cases. Even if it were a sustainable opinion that there were places where the ODC pipeline was not over-worked by the Ocesa pipeline and no material damage was observed, that could not and did not mean that a general assumption could be made that the ODC pipeline works were benign. There was compelling evidence that should have caused the Claimants' experts to reconsider their unqualified support for the Claimants' cases, at least by the time of trial. To take just one example, knowing that the ODC ROW on LC50 had been laid in about 1991 but was bare of vegetation in September 1995 demanded a reasoned analysis by the Claimants' experts of the consequences of that state of affairs. There was none; and it was not until cross-examination that Dr Card acknowledged that the ODC ROW would have been a continuing source of erosion during that time.
923. It should be clearly understood by all concerned that if other cases were brought before the English court where the Ocesa ROW followed the path of the ODC ROW, the Court would expect to see a reasoned analysis of the effects of the ODC works and the extent to which the Ocesa works made things worse. At present, because of the destruction of Dr Card's calculations in his fourth report, there is a complete absence of reliable quantitative evidence such as the Court would normally expect to see in relation to both the ODC and the Ocesa works. That is not an evidential gap that the Court can or will fill on its own.

12. LC54 in Detail

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Introduction

925. The Claimants are husband and wife, Snr Rodrigo de Jesus Mesa Leon and Sra Rita Ines Arango Aguilar. Their main home has always been in Medellin. LC54 (La Fe) is and was a holiday home which has also been operated as a cattle farm. Snr Mesa bought the part of the property with which their claim is primarily concerned (La Fe 1) in the early 1980s. The Claimants jointly became the registered owners of the property as a whole (La Fe 1 and 2) in April 1991, pursuant to INCORA resolution 1097.

926. The Claimants are intelligent and educated people, neither of whom showed any signs of being overawed by the process or intimidated or disadvantaged when giving evidence. Sra Arango is an accountant. Snr Mesa is a successful businessman. As one of his lines of business he has for a number of years acted as a cattle farmer and trader. He intended to sell off blocks of La Fe over time, and sometimes he would help other people sell land or cattle in return for a commission. He keeps minimal records and pays no tax on the profits from his farm at La Fe. His wife confirmed, and I accept, that his record keeping is rudimentary at best. He was vague to the point of being evasive on the profitability of the farm until it became clear that documentation could be obtained which would show the basis of the tax returns he says he submits. At that stage he settled on about COP 20,000,000 (c. £5,000) as the profit he had made in the last year that was declared for tax purposes {Day6/1:6}. I do not accept that evidence as reliable either as an estimate of the profitability of the farm or as being what he declared to the tax authorities. Some of his evidence is uncontroversial, but on a number of topics (of which the fish pool and lameness of cattle are two) the true picture did not emerge from his evidence until cross-examination and then only after detailed (and justified) probing. These features do not require the wholesale discounting of his evidence, but they require me to maintain my critical faculties when assessing his evidence. Sra Arango gave evidence impressively by video-link. She maintained that she was more frightened of what might happen with the water than about what the guerrillas might have done after the pipeline {Day7/105:14}. I do not doubt her courage in the face of danger, but I am satisfied that she was deterred by the security situation just as her husband was {D6/100/1179}. I did not find her evidence to the contrary to be convincing.
927. Two other lay witnesses gave evidence about LC54. Snr Herrera was the Claimants' farm manager for many years including at the time of the Ocesa pipeworks. He struggled to give coherent evidence. This did not appear to be because he was in any way intimidated but was because his cultural background combined with his advancing years resulted in a poor memory and difficulty in giving clear and coherent evidence. Two examples of his difficulty are illustrative: he did not remember the works carried out by the Ocesa pipeline workers on the fish pool on W1, and his estimates of cattle numbers on La Fe were internally inconsistent and, when suggesting that there were as many as 800 cattle on the farm, wrong by a large margin {Day7/139:6}. Snr Ramirez is a butcher who has been buying about 150 head of cattle per year from Snr Mesa for 15-20 years. He did not appear to be overawed, though the surroundings in which he gave his evidence by videolink would have been unfamiliar to him. When he realised that he did not understand a question he asked for it to be repeated {Day7/125:5}, but normally his responses showed that he had understood what was being asked. His oral evidence about lame cattle was less clear and certain than the apparent clarity of his witness statement. I formed the impression that the lack of clarity or conviction in his oral evidence was the result of a genuine lack of recollection rather than an inability to do himself justice in the witness box.
928. The Original Schedule of Loss in 2008 claimed COP 3.9 billion (c. £1-1.3 million, depending on the exchange rate), a sum which would have been hilarious if not of such potential consequence for the Defendant's pocket. By the conclusion of the trial, the claim had reduced to COP 177.6 million (c. £66,000) plus moral damages and damages for loss of amenities. Claims made in 2008 for the reduction of the Claimants' herd from 200 to 50 cattle, the abandonment of a programme of artificial

insemination, and for loss of ability to produce eggs, maize, plantain and yucca had been abandoned. I find as a fact that the Claimants did not know what was being claimed on their behalves in 2008; and I accept that Snr Mesa's complete astonishment at the size of the claim (which he immediately thought must be for a group – or the group – of claimants) was genuine. If the later iterations of the Claimants' schedules of loss were either provided or read to them, they did not give them sufficient attention to enable them properly to state in their witness statements that the schedules provided a precise description of their losses. On present information I am not in a position to tell whether that state of affairs involves a failure on the part of the Claimants' lawyers, the Claimants themselves, or both.

929. The Claimants' present claim is dominated by three items. Lame and dead cattle are claimed at c. COP 117 million (£43,500). Loss of fish production is claimed at c COP 23 million (£8,646). Loss of fruit trees is claimed at c. COP 19 million (£7,012).

Description of the Property

930. La Fe 1 and 2 are 32 and 68 hectares respectively. They span the main highway from Zaragoza to Caucasia, with La Fe 1 to the east and La Fe 2 to the west, being about 20 kms south of Caucasia and about 60 kms north of Zaragoza. The ODC pipeline passed through La Fe 2; the Orensa pipeline passed through La Fe 1.
931. When La Fe 1 was first acquired the Claimants' two children (who were born in 1983 and 1987) were either very young or not yet born. One of the features that made La Fe attractive was the quality of the water. In the early days, there were pools on the main stream (W2) in which the family would swim. When it was not the rainy season the water from W2 was clean and the family would drink it {Day7/37:20}; but in the rainy season they got water from a neighbour who had a good well as well as making a well themselves {Day7/39:3}. From the beginning the water in the streams would become murky when it rained {Day7/117:17} and the family had always boiled their water before drinking it. The cattle on the farm would drink from the streams and from time to time would defecate in them, which contributed to the contamination of the water. Sra Arango gave evidence that the water quality deteriorated after the pipeline was installed, including times when the water was not merely murky but "swampy" {Day7/96:7}, meaning that when they turned on the taps, bits of marsh land and earth would come out {Day7/118:10}. Her evidence at one point appeared to be that she first noticed murkiness in the water about a year after the pipeline had been installed {Day7/114:20}, but that would be inconsistent with her evidence and that of her husband that it had been murky before the pipeline, which I accept. What appeared clearly from her evidence was that there was a long period of progressive deterioration until they got to the stage that, when they flushed the toilet, what came out was "just marsh land, ...just brackish water." I will return to this evidence later, to see how it matches the technical case that has been advanced on the Claimants' behalf. For present purposes I note that her description of a progressive deterioration in the water supply is consistent with Snr Mesa's evidence that the water was normal during the construction of the pipeline and that sediment only reached the water during the rainy season, with abnormalities not being noticed until well after the construction of the pipeline {D6/100/1210} at [154]. I accept that evidence.
932. From the 1980s the security situation in the region of La Fe has been very difficult. Snr Mesa would spend periods of up to a couple of months at a time at the farm, and

has always had a manager or foreman on the farm to run it for him on a day-to-day basis. His wife and family would come during holiday periods though their visits became less frequent with time. This was probably for a number of reasons including that their children grew up, the security situation, their purchase of another holiday home only 45 minutes from Medellin, and a lack of enthusiasm as the family stopped using the water on the farm for swimming and drinking.

933. The Claimants' house and cattle corral are on La Fe 1. The house is about 50 metres from the highway along a sand and gravel track. Most of La Fe 1 is relatively flat, with gradients typically in the region of 8-11%. At the northern end, the slope increases up to and beyond the northern boundary of La Fe. I do not accept Dr Card's evidence that the slope towards the northern end of La Fe has a gradient of or approaching 40% {H1.1/1/185}. Dr Savigny recorded one measurement in the region of 17-18% at the very northern end of LC54 {H2.6/8/1455}. This appears to be something of an outlier, both in terms of being at the very northern end of the property and because it does not sit easily with the evidence of the many photographs of the property and the spread of gradient measurements set out by Dr Card at {H1.6/24/1320} and {H1.6/24/1452}. Taking all of the evidence into account I conclude that Dr Savigny's measurement of 17-18% may be an over-estimate and that, if it is correct, it only affects a very short stretch on LC54.
934. The Ocesa ROW passes across La Fe 1 generally from south to north. There are no substantial cross-gradients across the ROW as it passes through LC54. Of the four trial cases, LC54 has the least complicated topography for the laying of a pipeline. The ROW crosses three watercourses. Each is concave while on La Fe 1, as its gradient gradually decreases. W1 is the most northerly of the three. It has two sources, each of which is beyond the northern boundary of La Fe. The first is a pair of embankment dams with reservoirs behind, the lower of which provides a modest seepage of flow during the dry periods {H2.3/3/784}. The second is a modest source emerging from woods further to the west. For most or all of its path across La Fe 1 it is a small stream which may be dry or virtually dry for part of the year {H7.4/4/902} at [1.2.3]. Although on the Claimants' case the stream is now sedimented in a way that it was not before the Ocesa pipeline, that sedimentation has not materially altered the volume of water that has fed into W1 or the variations in the volume of its flow with the seasons. I find as a fact that W1 was routinely dry or virtually dry in the dry season long before the Ocesa pipeline. Downstream of the ROW there was at one point a fish pool, of which more later. Further down, W1 historically meandered until its course was changed by the Claimants digging a canal which straightened the course for the flow of the water. The original route of W1 and the canalisation works are shown on {L6/841/856}. It flows under the driveway to the house and between the house and the highway until it meets the other two streams near to the highway.
935. Stream W2 is the most substantial of the three, having a large catchment area of approximately 154 hectares to the point where it crosses the ROW {H8.22/26/5780}. It twists and turns on its way down and has a distinctive oxbow feature that is clearly visible in the photographs. The family used to swim in a pool or pools on this stream and used water from the stream for domestic consumption. There is one photograph of children happily playing in a pool of water, which appears to be shallow, but there is no information about where it was and I cannot identify its location {M/146.1.1/512.3.1}. There was evidence that the water in the stream would come up

to an adult's neck, but that seems contrary to all the objective evidence about the gradients, dimensions and flow rates of the stream and I find it to be an exaggeration, even if some damming of the stream was carried out.

936. Stream W3 is the southernmost of the three and rises off the property to the east. It is smaller than W2 and meanders across the southern section of La Fe 1. The three streams merge in the area close to the house and the highway in flat terrain that represents the floodplain of W2 and W3, with W1 joining from a different angle. The water from the three streams then passes through a culvert under the highway and onto La Fe 2.
937. Two features beyond the northern boundary of LC54 came in for detailed scrutiny. The first is the pair of embankment dams that form one of the effective sources for stream W1. Some photographs (e.g. the 2012 Satellite image as reproduced at {H2.3/3/782}) show the dams retaining some water, while others (e.g. {H2.3/3/793}) suggest that they are or may sometimes be ineffective. There is evidence, which I accept, that the dams have been breached on at least one occasion {H2.3/3/794}. The second feature is a nearby area of erosion known as E1. It is the Claimants' case that a substantial part of the sedimentation of W1 came from area E1. Dr Savigny accepts that some, but not all erosion from what he called the E1 polygon would travel towards and into the embankment dams and that some would flow to the south west of the ROW towards stream W1 {Day37/38:8} ff. It is the Defendant's case that sedimentation of stream W1 was significantly contributed to by the breaching of the embankment dams.
938. Aerial images are available from 1966, 1978, 1985, 1995, 2002, 2009 and 2012. They show that much of the forest was cleared by 1966. Further clearance took place between 1966 and 1978, by which time the forest was largely cleared both on La Fe and (so far as can be seen in the images) to the north of the Claimants' land, which forms the drainage basin for the streams.
939. An annotated version of the 2002 aerial photograph at {H2.3/3/778} provides a convenient summary of the route of the ROW, where it crosses the streams, the position of the fish pool in the line of flow of W1, the position of the Claimant's house, where the confluent streams pass under the highway, and the off-property features to which I have referred. The 1995 aerial photograph {L1/143/143} shows that no fish pool then existed. {L6/839/854} provides a good overall aerial view of La Fe 1. It was taken in June 2012. The course of the ROW can just be discerned in places. The off-property features to the north of LC54 are usefully shown in a blown-up and annotated aerial image at {H2.3/3/782}.
940. The Claimants' annotated aerial image ["CAI"] is at {B2.3/47/548}. The key is at {B2.3/48/549}. Photographs giving a general impression of the ROW from South to North are at:
- i) {H5.4/5/872}, which is taken from near the southern boundary of La Fe 1 (at a point near point 149 on the CAI), south of W3 looking North;
 - ii) {H6.1/1/240} taken from between W3 and W2, again looking North. A similar view is provided by {H3.5/5/1027}; and

- iii) {L6/836/851}, which shows the area at the northern end of the ROW as it passes through and out of La Fe 1. This last picture shows W1 flowing from right to left, the line of the ROW going away from the camera and the area to the north of LC54's boundary about which lengthy evidence was given. A similar view is provided at {H1.1/1/187}.
941. La Fe has always been prone to flooding. Photographs taken in September 2010 {H2.3/3/780}, {H2.7/9/1948} and {L6/835/850} show widespread flooding of W2 and W3 including upstream of the ROW, above the point of their confluence and across their floodplain on La Fe 1. They also illustrate that the flow rate of W1 is limited even in times of heavy rainfall. On the other side of the highway, the photographs show widespread flooding on the undulating flat lands of La Fe 2.
942. At first sight these photographs are consistent with the Claimants' case that sedimentation from the ROW and Area E1 caused sedimentation of the streams leading to overflowing, flooding and swampiness caused by deposit of sediment on the flooded lands. However, they are important for two particular reasons. First, because they show dark, sediment-laden waters in areas that cannot have been affected by the Ocesa pipeline, particularly in the upper reaches of W2 {Day27/77:16}. Second, flooding such as is seen in the photographs (and worse) was an almost daily occurrence on La Fe before the construction of the Ocesa pipeline as well as after it. {Day6/143:21}, {Day7/70:13}. Although the waters did and do subside quickly, the land would stay wet and muddy for several days {Day7/71:4}. Snr Mesa acknowledged that there had always been deposits of material from the higher ground (i.e. the drainage basin for the streams), but he drew a distinction between what he regarded as beneficial organic deposits before the pipeline and later deposits of "sedimentation" {Day7/71:21}, a point to which I will return.
943. On the basis of this evidence, I find that in times of heavy rainfall the streams on La Fe 1 have at all material times since deforestation of their basins carried significant quantities of sediment from their respective catchment areas (ignoring any contribution from the Ocesa pipeline works). I also find that in times of heavy rainfall W1, W2 and W3 have, since well before the Claimants acquired La Fe, overflowed their original banks before the points of their confluence, with the flooding extending to a greater extent than depicted in the flooding photographs. As the velocity of the water flow reduced, with decreasing gradients and as the water spread from its original channels, sediment would be deposited and would accumulate over time.
944. One of the effects of digging the canal has been to prevent W1 repeatedly overflowing its previously meandering banks, with the beneficial effect that there is no longer a swamp in that section, at least until W1 reaches the area affected by its confluence with W2 and W3 {H7.4/4/903} at [1.3.4], {H7.4/4/908} at [1.5.10]. The Claimants have not removed sediment from any other stretch of the streams crossing La Fe 1. While Dr Tobon's view (based upon Dr Card's estimates) was that W1 would have refilled with sediment ({H7.4/4/909} at [1.6.1.7]) that is not borne out by experience in the canalised stretch; and it is Dr Tobon's view that if sediment had been cleaned from the stream channel of W2, it would not display an accumulation of sediment and the swampy area would not exist {H7.4/4/921} at [2.6.1.6]. His opinion that W3 would have refilled is based upon an un-stabilised landslip upstream of the ROW

rather than upon erosion from the ROW itself {H7.4/4/923} at [3.1.6], {H7.4/4/930} at [3.6.10].

945. Dr Tobon's report states that W2 retained and did not lose its natural width at the ROW intersection {H7.4/4/912} at [2.3.4], {H7.4/4/913} at Photo 4. On this evidence I find that the banks of W2 were not materially eroded or significantly damaged at the ROW intersection. His report does not evidence any reduction in the natural width of W1 or W3 at the ROW intersection. I am confident that, if there had been any material alteration in the width, he would have noted it. Consequently, I find that the banks of W1 and W3 were not materially eroded or significantly damaged at the ROW intersection: see [720.ii)]. That being so, there was no need for revetments to preserve the banks at the ROW intersections, and none was installed. The absence of damage to the banks may have been because the use of boring techniques meant that they remained undisturbed: see [976].

The Pleaded Case on the Impact of the Ocesa Pipeline

946. The Particulars of Claim (which incorporated the original Schedule of Loss) alleged that the construction of the pipeline caused extensive damage as set out at {B1.3/6/547}ff. In briefest summary, the damage alleged in the body of the Particulars of Claim included:

- i) Removal of "the extensive, thick, natural vegetation, which had covered the right of way" and revegetation that was "thin and sporadic" with some parts of the ROW not being revegetated at all. This is alleged to have been caused by the use of inappropriate or inadequate techniques and methodology and species of vegetation. The vegetation is alleged to have deteriorated or failed to develop adequately and the soil on the ROW has been left exposed to the elements;
- ii) The exposure of soil to the elements, the decrease in the water retention capacity and the use of heavy machinery during the construction are alleged to have caused significant soil erosion. This in turn is alleged to have caused substantial amounts of sediment (from soil erosion and from excavated soil) to move outside the ROW to various parts of the Property;
- iii) Water sources are alleged to have been destroyed, with sedimentation causing water sources to dry up or very significantly reduce in volume. The sedimentation is alleged to have rendered the water sources unsuitable for human consumption. It is alleged that drained mud now contained in the water contains high concentrations of natural organic material, minerals and other compounds;
- iv) It is alleged that water is no longer channelled through the streams but instead floods the surrounding areas; animals became trapped in the mud and were lost; the fish pool became sedimented and unusable; the quality of soil has been adversely affected resulting in reduced fruit production. Trees were damaged during the construction process. Crops and new vegetation can no longer be grown on the property, which is alleged to have become infertile; the lack of water led to poor quality of pastures, reducing the number of cattle that can be reared on the property. Contamination led to the suspension of chicken

breeding and frequent illness of farm animals. A programme of artificial insemination had to be abandoned;

v) A bridge on the property was destroyed.

947. The 2012 Further Information on LC54 alleged damage as set out at {B2.2/33/392}ff. The Claimants' case was updated by successive versions of the Revised Schedules of Loss, most recently on 23 January 2015 {B4.4/3/109}. Again, I provide a brief summary of the case as set out in the 2012 Further Information, with interpolations from the 2015 Re-Amended Revised Schedule of Loss ("RARSL"). The alleged damage included the following:

- i) Erosion "caused in and along the entire length of the ROW", which is to be inferred from (a) erosion currently present on the ROW; (b) the condition of the soil and vegetation there; and (c) the inadequate measures said to have been taken in relation to erosion prevention and control and in relation to soil and vegetation;
- ii) Erosion caused outside the ROW, on the sides, caused by run off and/or dragging and/or in areas where sediment moved from the ROW or from near to the ROW;
- iii) Active erosion from E1, beyond the northern boundary of La Fe, with sediment being transported down slope and into W1 on the northern margin of La Fe;
- iv) Sedimentation of water sources, of which one cause was the lack of measures to prevent erosion in the water sources:
 - a) Sedimentation of W1 has been caused by movement and/or deposit of eroded and/or excavated material from the ROW, near the ROW and E1;
 - b) Sedimentation of W2 has been caused from the intersection of the stream with the ROW until shortly after the stream flows away from the ROW. "During and immediately after the construction, the water in La Fe developed high turbidity, [and] an unpleasant taste and odour (which may be attributable to high levels of iron and turbidity). The Claimants immediately stopped drinking it as the water could not be used for human consumption." W2 overflows in the wet season and during rainfall events due to the accumulation of sediments in the stream bed, creating swampy areas that form part of SW1;
 - c) The stream bed W3 has been sedimented throughout the course of its length from a point above the intersection of the stream with the ROW and over the ROW by movement and/or deposit of eroded and/or excavated material.
- v) Mixing and inversion of soil horizons, loss of top soil and compaction along the entire area of the ROW;

- vi) Poor quality of vegetation cover in the ROW, although the quantity of cover is reasonable;
- vii) Creation of swampy areas marked as SW1, SW2 and SW3 on the CAI. SW2 is alleged to have caused the death of “approximately 20-25 cows” in “swampy areas created along this stream”. (The Claimants “consistently lost and had to replace 1 to 2 cattle which died each year as a result of damage to the Property ... as a result of becoming stuck in the mud”: RARSL {B4.4/3/124}). The swampy areas have reduced fertility and productivity and, during the rainy season provide no pasture and no safe water for animals. (It is said that the numerous deaths of cattle have required Snr Mesa and Snra Arango and their family to be more vigilant in minding the cattle and to spend time and resources in ensuring that their herd remains safe: RARSL {B4.4/3/116});
- viii) Following the construction of the pipeline, “a consistent number of Snr Mesa’s cattle became lame as a result of damage to the Property. ... The wet or humid conditions caused by the swamp areas had an adverse effect on the cattle’s health, notably leading to a loss of weight. Every year, on average 11.5 cattle became lame as a result. ...”: RARSL {B4.4/3/124};
- ix) In 2006 100 metres of fencing was erected around a swamp area to prevent cattle becoming stuck and dying. The cost was COP5,000 (roughly £2);
- x) Reduction in productivity and fertility of the entire Property due to damage to the water sources summarised above, which has also caused a reduction of water availability for human and animal consumption. The productivity and fertility of the entire property is also reduced due to erosion and the condition of the soil and vegetation;
- xi) Loss of trees on the ROW during construction and destruction of trees during and shortly after construction by sediment from excavated or eroded material from the ROW (or from near the ROW) and/or from water logging and/or flooding of the three streams;
- xii) The fish pool was sedimented by sediment transported in the channel of W1 “during or shortly after the construction works. Ever since then the fish pool has been inoperable and is permanently waterlogged”. (Until September 1996, Snr Mesa produced Cachama fish, of which a small amount was kept for domestic consumption; RARSL {B4.4/3/117}. Until September 1996 the fish pool was approximately 600 square meters. Snr Mesa produced approximately 1,000 cachama fish every 6 months, which gave an annual average production of 650 kg of fish. Post 1996 he was not able to produce and sell fish, as the fish pool was destroyed and fish suffocated: RARSL {B4.4/3/128}.);
- xiii) A bridge was destroyed during construction and a cow died at the point where the bridge had been;
- xiv) The gravel path from the highway to the Claimants’ house was damaged by flooding and had to be repeatedly repaired. These repair works started in 2001 and required 10 loads of sand and gravel to be applied to the entrance road.

Thereafter he had to apply 2 loads each year until 2006 when he carried out the canalisation works: RARSL {B4.4/3/125};

- xv) For six months during the construction of the pipeline, Snr Mesa had to rent pasture for 35 cattle as the construction works reduced the availability of pasture on the Property. (The cows could not be milked while off the property: RARSL {B4.4/3/128}) After the construction until 2002 he had to rent additional pasture to accommodate 3 head of cattle more than he would otherwise have done due to the damage to the property. Following re-seeding he was able to increase the number of cattle he kept on the property to 250 following re-seeding; but he still had to rent additional pastures for 6 cows that he would not otherwise have needed to rent for 4-5 months of the year because of the poor coverage of pasture on the ROW and the swamp areas: RARSL {B4.4/3/123}).

The State of the Property before Construction of the Pipeline

948. When Snr Mesa acquired La Fe it was largely converted to pasture. There was a small area of scrub at the South of La Fe 1 which he cleared. In the normal way, he initially grew cassava there before sowing grass. When the pipeline was laid, the area was still being used for cassava {D6/100/1166} at [13]ff. The property also had some fruit trees on it. Snr Mesa did not buy the property for its fruit trees, but he was approached by traders who would buy the produce of a tree at a low price, leaving enough on the property for the family and, when they got tired of eating fruit, they would give some away to neighbours {D6/100/1174} at [44]ff. The general impression given by Snr Mesa and his wife is that cattle farming was the commercial purpose behind the purchase of the farm and that the presence of fruit in season was a bonus during family holidays and when, on occasions, Snr Mesa would take some home to Medellin.
949. I will consider the cattle farming operation in greater detail later.
950. The Claimants' pleaded case about the fish pool as set out in his RARSL was that a pool of 660 sq. metres was producing 1000 fish every 6 months before September 1996 {B4.2/6/274}. It was supported by Snr Mesa's witness statement {D6/100/1175} at [48], {D6/100/1199} at [152]. His evidence originally was that he built the fish pool in or about 1992/1993 and that he was harvesting 1000 cachama fish every six months. The clear implication was that this harvesting was going on well before the pipeline was laid, though no start date was specified.
951. That evidence was wrong. There was no fish pool in existence when the aerial photograph was taken on 27 June 1995 {L1/143/143}. In evidence, Snr Mesa said that he had dug "a very small pool" before the pipeline was laid and that, during the construction of the pipeline, some of the workers offered to improve or clean it (though he also said there was nothing wrong with it) or to help increase its size. The original pool, according to Snr Mesa was 8 or 10 metres by 15 or 20 (i.e. between 120 and 200 square metres) {Day6/47:9}. The work carried out by the pipeline employees is alleged to have increased the size to the 660 square metres alleged in the RARSL. The fish pool as expanded was located directly on the course of stream W1, and I infer that any original smaller pool was located there too. Soil from the excavation by

the pipeline employees was dumped, predominantly to the eastern side of the fish pool as can be seen from the 2012 overflight DVD {H12.4/4/917}.

952. On this evidence, I am not satisfied that there was a fish pool of any significant size between June 1995 and when the works were carried out by the pipeline workers. I accept that Snr Mesa (or others working on his behalf) had made an attempt to dig a small fish pool but not one of a size that would support commercial production: and I reject the evidence that it was as large as 8 x 15 metres. Snr Mesa was not interested in fish farming: he was a cattle trader and farmer and, on his evidence, had no intention of starting a significant fish farming operation when he bought La Fe. Furthermore, on this evidence, the very small pool that he had dug was already showing signs of sedimentation, which is why the original conversation with the workers included talking about cleaning and improving the existing pool. I am not satisfied that Snr Mesa kept fish in any significant numbers or with any regularity before the works carried out by the pipeline workers.
953. It is not necessary for present purposes to decide when Snr Mesa realised that his witness statement and pleaded case were wrong or to resolve the apparent possible conflict between his evidence that he did not tell his lawyers of his mistake and Leading Counsel's statement (which I accept) that his "instructions were that [Snr Mesa] was mistaken about that date" and that he (Leading Counsel) had intended to clear it up in evidence in chief but had not done so.
954. There is no evidence that the management of La Fe was defective so as to cause exceptional problems of erosion or sedimentation. Professor Montenegro expressly accepted that there is no clear evidence of erosion and that because of good farm management it is difficult to see erosive processes taking place {Day42/75:6}. Both La Fe 1 and La Fe 2 were used for the cattle operation and, from time to time, Snr Mesa rented additional property elsewhere as dictated by the numbers of his herd. Since the operation involved breeding, the herd had cattle of various ages at different times. For present purposes it is sufficient to make the general finding that the land was generally suitable for cattle production, provided that suitable care was taken of the land, with a Horizon A of varying depth that was generally between 8 and 18 cms.
955. Erosion of and sedimentation from the higher grounds was a regular occurrence with rain before the pipeline was laid, which is what turned the water murky. The deforestation of the lands in the drainage basins of the streams contributed to this phenomenon: see [289] and [943] above. As a general statement of the position, I accept Dr Savigny's summary {H2.3/3/799}:

"Streams:

- i. They have their headwaters in residual hills to the east of the Claimant's property. As soon as the original forests are removed the hills become prime areas of erosion (Sec 4.2.1.9.1)
- ii. Sediment is shed from the hills quickly during precipitation events by virtue of their moderately steep to steep headwater slopes and corresponding stream gradients. However, these gradients soon give way to

lower and lower ones, thus creating an overall concave stream gradient profile that characterizes the transition between the residual hills and lowlands.

- iii. The low gradient meandering streams across the lowlands cannot easily pass all of the sediment. Sedimentation occurs in the channels and the channels naturally aggrade ...
- iv. During flood periods when the streams naturally carry the highest sediment loads, the flood waters easily overtop the stream banks and flood the adjacent lowlands. ...”

956. Over time, this process was contributing to sedimentation on La Fe 1. In 1991 the ODC Environmental and Geotechnical Protection Manual described land in the area (but not specifically in relation to LC54): “Alluvial plain soil are largely well drained, but with some sectors subjected to floods and swamping” {K2/2T/84}. The 1994 Bateman Report (again, not farm-specific) describes the geomorphological features in the area as including “light to moderate water erosion, diffuse runoff, fissures and small landslides” {K14/102T/131}. The process is evidenced by Dr Savigny’s attribution of certain areas as wetlands in his Land Use Maps for 1966, 1978, 1985 and 1995 {H2.8/10/2107}, which were not contradicted by Dr Gundlach and can be taken as general indicators of the existence of the process and the changing state of the ground from time to time. In particular, the Land Maps evidence the development of wetlands in the area of the confluence of the streams at and about SW2 and also in the areas of SW1 and SW3. I accept the evidence of Dr Savigny and Professor Monsalve that the history and topography of the area provides a ready explanation for the development of swampy areas. First, as just described, erosion and sedimentation from the basins above LC54 was a regular occurrence before the pipeline was laid. Second, the undulating slopes flattened on LC54 progressively so that by the confluence of W2 and W3 the land was a flood plain. Third, the regular flooding of LC54 was liable to deposit sediment as it drained and dried. On this evidence I find that Dr Savigny’s Land Maps correctly identify that there were swampy areas in the general areas now described as SW1, SW2 and SW3 before the laying of the Ocesa pipeline. Their areas may not be precisely marked on the map, and may have fluctuated with time; but the general progression over years led to the formation and development of swampy areas in those parts of LC54. To the extent that Snr Mesa gave evidence that the development of swampy areas was progressive, I accept it; to the extent that he said or implied that there were no swampy areas before the laying of the Ocesa pipeline, I reject it: see {D6/100/1203}ff.

957. The significance of this finding is immediately apparent when the extent of SW1, SW2 and SW3 after the laying of the pipeline is clarified:

- i) SW1 is a narrow swampy strip consisting of small swampy areas that have formed to the sides of stream W3 starting approximately 100m upstream of the ROW and continuing below the ROW to near where W3 merges with stream W2 {H7.4/4/912} {H7.4/4/924}. The width of the swampy area in the area where W3 crosses the ROW is shown at {H7.4/4/913} {H7.4/4/925}. Another view, taken upstream of the ROW, is at {H8.11/11/2981}. All of these images

illustrate that it is narrow and largely flat. The area where SW1 has formed is largely flat {H7.4/4/922};

- ii) SW2 is the swampy area in the flood plain between the confluence of W2 and W3 and the culvert under the road. It is now about 40m x 40m and was fenced off by Snr Mesa in about 2006, though cattle still feed there during the dry season {Day6/38:4};
- iii) SW3 is a narrow strip to the sides of W1 between the northern boundary of LC54 and where the fish pool once was. The previous swampiness downstream of where the fish pool once was has gone as a result of digging the canal: see [944].

958. I will consider later whether and if so to what extent the swampy areas increased in size, or otherwise got worse, after the laying of the pipeline and, if so, the cause or contributing causes of those developments. For present purposes it is sufficient to find that swampy areas formed in the area of each of SW1, SW2 and SW3 before the laying of the pipeline, caused by natural processes of erosion and sedimentation. There is no evidence to suggest that those processes would have ceased after the laying of the pipeline and, on the evidence of Dr Savigny and Professor Monsalve, I find that they did not do so.

The Relevant Factual Background: Pre-construction Period

959. Much of the relevant factual background is uncontroversial; some of it has already been set out above. I make findings of fact in accordance with the narrative set out above and below.

960. On 24 September 1991 the ODC Public Deed for the ROW over La Fe 2 was executed {M/118.1/411.1}, having been signed by Snr Mesa before the notary's office in Medellin {Day6/82:20} ff. There is no evidence that Snr Mesa made a claim or entered into a settlement agreement with ODC after the construction of the ODC pipeline.

961. Because he was frequently absent from La Fe, Snr Mesa did not attend any of the public meetings about the Ocesa pipeline, though his neighbours told him what was discussed {D6/100/1182} at [81]. He took some comfort from the fact that he had already had experience in the negotiation and construction of the ODC pipeline. He met some people who came to the farm who wanted to talk about negotiating the easement and who told him that there was a standard price per hectare. Subsequently a man called Pino came and they discussed what was to happen. About two months or so later, he went to an appointment in Medellin, where he met Snr Pino again. He was told that there would be revegetation of the ROW and that they would pay both for the easement and for the damage that would be caused. {D6/100/1182} at [81]-[85].

962. On 21 March 1995, the Claimants and the Defendant entered into the first ROW Agreement relating to La Fe {M/119T/420.1}. It is apparent from the reference to the property being 68 hectares, the reference to a 276 metre long strip for the ROW, and the reference in Clause 5 to the ODC ROW that, at this stage, it was intended that the Ocesa pipeline would follow the route of the ODC pipeline across La Fe 2. Its terms

were materially standard as at [369] above. The consideration was at the rate of COP600 per m², equivalent to COP6,000,000 per hectare (although Snr Mesa had tried to negotiate the price upwards) and COP4,140,000 in total, calculated by reference to the area of the ROW. Snr Mesa and his wife both read and signed the document {Day6/87:14}. The Annex setting out the damages recognised in the negotiation described them as “Damage to improved pastures, 4-line barbed-wire fences with wooden posts”. These were specific references to improved pastures and fences on the proposed ROW. I accept Snr Mesa’s evidence that he did not think there would be damage outside the ROW and that the people with whom he was negotiating said that, if there was damage outside the ROW they would pay the same price {Day6/89:9}. The 70% first instalment of the price was paid on 16 May 1995 {M/122T/426.1}. The balance of 30% was paid on 31 October 1995 {M/129T/462.1}.

963. On 17 May 1995, the Claimants signed the Public Deed relating to the first ROW Agreement in favour of the Defendant {M/124T.1/447.12} before the notary in Medellin {B4.1/11/104}. It was materially in standard form as at [371].
964. On 16 August 1995, the Claimants entered into a second ROW agreement {M/126T/457.1}. It has two peculiarities of note. First, it was intended to regularise a change in route because the Ocesa pipeline was now to go over La Fe 1. This had the effect of increasing the overall length of the ROW that would pass over the Claimants’ land from 276 metres to 402 metres. Yet the second ROW Agreement again referred to the land as being 68 hectares in total (i.e. La Fe 2). The intention of the parties to reflect the diversion of the planned route from the ODC ROW to passing over La Fe 1 is made clear by the agreement referring only to a length of 126 metres in Clause 5, which is explained by the note in the Annex that “the settlement is made on the basis of 126.0 m. which is the excess in meters resulting from the diversion made in said property.” The Annex provided a description of the recognised damages that was identical to that in the first ROW Agreement. Second, where the parties to the first agreement had been the Claimants and the Defendant, the parties to the second ROW Agreement were the Claimants and Ocesa. Both ROW Agreements were signed on behalf of the contracting Company by Alexander Rojas, an employee of the Defendant who worked on the Ocesa pipeline project.
965. On 6 December 1995 the Claimants and Ocesa executed the Public Deed reflecting the second ROW Agreement {M/130T.1/471.15}. Once again it referred to the property as having 68 hectares (i.e. La Fe 2) but was intended to cope with the additional length of 126 metres caused by the diversion to cross La Fe 1. It was materially in standard form as at [371]. Snr Mesa confirmed that he and his wife read and executed the Public Deed before the notary in Yarumal {Day6/94:12} – his answer in relation to whether he understood it was more equivocal. There is no suggestion that the Claimants asked for an explanation either from the notary or from anyone else.
966. The Claimants were paid the second instalment of 30% of the money due under the second ROW Agreement on 11 March 1996. The date of payment of the first instalment of 70% is not known and is not material.

The Relevant Factual Background: Construction Period

967. The ROW opening over La Fe 1 took place between 8 and 14 September 1996. The trench was opened between 1-3 October 1996 and backfilled after the pipe had been laid shortly thereafter, probably on or about 3-4 October 1996. Snr Mesa was told that the trench spoil was out of the trench for 1 or 2 days, and I find that to be a correct assessment {D6/100/1187} at [102]. Reconfirmation took place over about 1.5 working days between 1 and 3 November 1996, at which time any remaining piles of soil would have been spread back onto the ROW. Long-term geotechnical works were completed during the week of 15-21 December 1996 {E3/9/557-558}.
968. During the course of the works, a cattle bridge over W2 was destroyed and, at some point after its destruction, a cow trying to cross the stream in the absence of the bridge became mired and died. Also during the course of the works, and at the request of Snr Mesa or Snr Herrera on his behalf, the very small and partially sedimented existing fish pool was enlarged by pipeline workers using the machinery they had on the ROW: see [951].
969. There is an issue about when revegetation works were carried out. Snr Mesa was contracted to carry out the works. His workers started at or near La Fe and covered a 25km stretch. His evidence originally was that the work was carried out in the dry season and that it took about 5-6 weeks to do the work {D6/100/1193} at [127]. In evidence he repeated that it had been very dry and that the rains had not established themselves, which caused him to suggest watering the ground – a suggestion that was not taken up. When pressed, he said he thought it had been before April, finally plumping for March or April 1997. Snr Herrera said the replanting had taken place in the rainy season and that sometimes the rain was heavy {D6/111/1289} at [19]. Snr Cardenas estimated that revegetation was taking place on the sector in which LC54 is placed during the week of 19-25 May 1997 on the basis of the entry in the weekly report for that week under the heading “Revegetation” {K45/471/2}. The weekly reports for 21-27 April ({K44/464/3}), 28 April-4 May ({K44/466.1/3}) and 5-11 May ({K45/468.1/2}) report on Revegetation in the same format but none evidences revegetation works occurring in the vicinity of La Fe or near it. The weekly reports for the periods from 9 March to 20 April 1997 do not have entries specifically for Revegetation. The weekly report for 12-18 May 1997 is not available.
970. Snr Mesa used *Brachiaria decumbens* grass for the revegetation, which was suitable for the region in his opinion {Day7/4:2}. There is evidence, which I accept, that both lime and fertiliser were used both generally and on LC54’s property. Snr Mesa agreed that lime was used {Day7/8:13} but said that fertiliser had not been provided by Dinosaurios {Day7/9:5}. However, he told Dr Velez that fertilisers were applied {H5.4/5/874}, in addition to which Snr Herrera said that fertiliser had been used during revegetation {D6/111/1289} and there is more generalised evidence of the use of fertiliser when revegetating from the Claimants’ witnesses ({D2/45/466} {D3/68/680} {D11.1/153/1852} {D11.2/171/2071}). On this evidence I find that both lime and fertiliser were used on LC54’s property on revegetation.
971. There is no reliable evidence about what Snr Mesa did with his cattle during and immediately after the period of construction. According to his witness statement, when he came to the farm about 15 or 20 days after construction had started he saw “the [ROW] with the soil uncovered, with no protection, no vegetation, and no fences

to prevent the cattle from walking on the soil” {D6/100/1187}. He does not expressly say that there were cattle in the affected fields at that time, though his evidence carries that suggestion. He says that during the construction process he rented pasture for 35 animals for 6 months, “roughly speaking” {D6/100/1188}; but it is evident that he had cattle on La Fe 1 in the area of the pipeline early on because he claims (and I accept) that a cow died when it got stuck in W2 where the bridge had been damaged by the works. The letter of complaint which he sent in April 1997 is not clear as to the date of the loss of the cow, meaning either that the death occurred or that it was first complained about in December 1996 {M/133T/476.1}: on either view this would have been within about three months of the ROW being opened, little more than a month after reconfirmation, and very close in time to the carrying out of long-term geotechnical works. Later in his statement he refers to cattle getting onto the revegetated ROW some three months after sowing {D6/100/1193}. On this evidence I am not persuaded that Snr Mesa took his cattle out of the affected fields for six months or anything approaching that length of time. I find that he kept cattle in the affected fields for most of the time after the reconfirmation of the ROW, though I am not able to determine how many cattle or precisely where on affected parts of La Fe 1 he kept them.

972. For whatever reason, the revegetation works carried out by Snr Mesa’s workforce were not satisfactory. As a result, he was not paid the full contract price. His evidence suggests that in the three months after his work was done, the money was withheld and Dinosaurios fenced off the ROW with an electric fence to keep cattle off it; and that, after this had happened, the rainy season came {D6/100/1193} at [129]ff. That would put his works on La Fe back to about February 1997. On the basis of the evidence I have summarised above, and particularly the evidence of the weekly reports, I reject that possibility. The conflict in the evidence is between the weekly reports and the evidence Snr Herrera, which would support a finding that Snr Mesa’s works were done in mid to late May, and Snr Mesa’s evidence, which would support a finding that they were done earlier. No explanation has been provided for the absence of the mention of Revegetation in the earlier weekly reports. On the other hand, it seems unlikely that no Revegetation work would have been carried out at all on Spreads A and B before the week of 21 April, given the onset of rainier weather before then. Conversely, I formed the impression that Snr Mesa’s evidence about carrying out the work when it was still dry, and asking for facilities for watering, was based on genuine recollection. I accept his evidence that the initial germination on La Fe was only partially successful, with some plants taking root and others not. If that had been because the unsuccessful planting had been washed away (rather than failing to germinate because it was still dry) I would expect him to have remembered that. I have therefore concluded that his workforce carried out their work on La Fe in March, carrying on elsewhere in early April 1997. On that basis, the weekly report entry for the week of 19-25 May 1997 is likely to have been a reference to Dinosaurios’ remedial works. Whether that finding is correct or not, the soil would have been poorly covered by the end of May.
973. As would be expected, the period from September 1996 to May 1997 had some heavy rain, as illustrated by the summary of the daily rainfall data from the Caucasia and Zaragoza camps, for neither of which are the records complete {C6/24/6}ff. The heaviest rain recorded at Caucasia between September and December 1996 was 102 mm at night and in the early hours of the morning of 2 November; the next heaviest is

52 mm on 11 September; there is one record of 42mm and three of 30 mm and above. The only record of rain between 1-4 October 1996 is on 3 October with 35 mm in the small hours and the morning. The heaviest rain recorded at Zaragoza between January and May 1997 is 115 mm on 19 April followed by 75 mm on 20 April. There is one record of over 50 mm (18 January), three over 40mm, and 4 over 30mm. To put these figures in perspective, the recorded rainfall on 19 & 20 April 1997 is roughly equivalent to 20% of a year's rainfall in the South of England.

974. The records at Cacaoteras Del Dique, which Professor Monsalve considers and I find to be the appropriate reference weather station for LC54, provides the following information (summarised at {C4/3.7/954}):

Month (96/97)	Month's Rainfall	Max (24 Hours)	Days with Rainfall
September	248	52	17
October	352	170	17
November	143	35	16
December	70	27	7
January	5	4	4
February	31	12	6
March	25	16	4
April	147	57	10
May	137	54	15

975. The evidence does not enable me to make precise findings about when or how heavily it rained on LC54 during the period, though there is a broad similarity between the numbers of days in the month with rainfall recorded at Cacaoteras Del Dique and the pattern of frequency shown by the (incomplete) records from the camps at Caucasia to the North and Zaragoza to the South. The difficulty in drawing more precise conclusions from the data is shown by the fact that the very heavy rain in Zaragoza on 19/20 April 1997 clearly passed Cacaoteras Del Dique by. The most that can be said is that there is no evidence (either from the records or from the lay witnesses) of particularly heavy rain while the trench was open; and there will probably have been a number of occasions of heavy rain on LC54 between the stripping of the ROW and the carrying out of revegetation. Accepting (as I have done) the evidence that LC54 flooded during the rainy season on a regular and almost daily basis, I conclude that it did not need particularly heavy rain to cause flooding on LC54 either before or after the Ocesa pipeline was installed.
976. The lay evidence provides little detail about the construction process, not least because Snr Mesa was away from the farm for most of the time. The description that he was given by Snr Herrera is consistent with the general procedure described at [302] above ({D6/100/1187} at [100]ff). His evidence is that he arrived about 15-20 days after work had started and could not see how the construction had been done, and I find he arrived after the trench had been refilled. His description is that he saw "the right of way with the soil uncovered, with no protection, no vegetation, and no fences to prevent the cattle from walking on the soil." He gives no evidence of any significant piles of soil. His evidence is that when he came, what was on top was not the topsoil because the earth had a reddish colour. That would be correct on his evidence that he arrived 15-20 days after construction started because reformation had not happened by then. His evidence is that he did not see wooden structures or other kinds of geotechnical works or biomats, but it is not clear when this evidence is referring to. He was told by a friend and neighbour that the crossing of water sources

was done by boring under them and that long metal plates were placed over them for heavy machinery to cross. He remembered seeing cortacorrientes made up of polypropylene sacks across the width of the right of way wherever there were streams of water, which he said were laid a few months after laying the pipeline. I accept that evidence as probably being correct.

977. Snr Gasca and Snr Loeber gave general evidence about the systems that were to be adopted, but were not able to give specific evidence about LC54. I have summarised how the system was meant to work at [302] above. There is nothing in the documentation available to the Court to indicate that there were any major difficulties on or near LC54, but this is of limited assistance since the available documentation is not comprehensive. More assistance can be drawn from the absence of any regulatory complaint or enforcement relating to LC54.
978. In the absence of any detailed factual evidence on behalf of the Claimants about what happened on LC54, I find considerable help in the video evidence as analysed by Dr Savigny: see section 10 above. In their closing submissions the Claimants' criticisms of the carrying out of the works on LC54 are divided into four categories: (1) Soil piles; (2) Erosion on the ROW/Long Term Measures/Revegetation; (3) Soil mixing and inversion; and (4) Failure to protect watercourses. I shall follow broadly the same course.
979. **Soil piles:** the findings for which the Claimants contend {C4/3.7/970}ff are:
- i) Retention structures were not provided to protect stockpiles prior to or during ROW opening, or Trench excavation or at all in circumstances that amounted to negligence;
 - ii) Further or alternatively, retention structures that were provided failed or were inadequate in circumstances that amounted to negligence;
 - iii) Stockpiles were not covered in circumstances that amounted to negligence;
 - iv) Stockpiles were left standing from September 1996 until early November 1996 in circumstances that amount to negligence;
 - v) There was a failure to review or maintain or replace so that the failure to install or the inadequacy of the retention structures was not rectified in circumstances that amount to negligence;
 - vi) Stockpiles were not placed and shaped at suitable locations and in particular were placed (i) outside the 25m ROW width, (ii) on or next to sloping ground (iii) at locations close to watercourses; and/or (iv) too high and/or of too large volume in circumstances that amount to negligence;
 - vii) There was soil loss from piles of topsoil and/or subsoil and/or trenchspoil (i) during ROW opening in September 1996; (ii) during trench excavation in early October 1996 and (iii) at all times from ROW opening until ROW recomposition in early November 1996.

980. There is no satisfactory evidence that there were any substantial stockpiles on LC54. I accept that when the topsoil was stripped it would have had to be stored, but the topography at LC54 means that it cannot be inferred that substantial stockpiles, such as contemplated by the Claimants, were formed. After the works were completed, the Claimants entered into a settlement agreement with Ocesa in relation to sobreanchos; but that does not prove the existence of stockpiles. On some properties there is objective evidence of where soil had been placed off the ROW; but there is no such evidence on LC54. The absence of evidence of substantial stockpiles from Snr Mesa is telling: if there had been stockpiles even approaching the size of those contemplated by the Claimants, he would have seen and remembered them or at least have been told about them. After the trench had been backfilled on 3-4 October 1996, there would only have been modest windrows of stripped earth. Reconfiguration happened at the beginning of November 1996 after which there would have been no significant piles of earth exposed to the elements.
981. The excavation of the trench would have generated a pile or windrow of trench soil, but it was only out of the trench for 1 or 2 days: see [967]. Thereafter, the great majority of the trench soil would have been back in the trench, so that only limited amounts remained exposed to the elements.
982. I find that the ROW on LC54 would have had a general appearance similar to that identified by Dr Savigny from the relevant video evidence: see [978]. It would have approximated to the picture as shown in Brown & Root's drawing {K21/173/1}. This does not mean that no soils could escape from the ROW under any circumstances; but the likely volume of any escape was restricted by the relative absence of cross or longitudinal gradients and the consequent minimalisation of the amounts of soil to be stripped, excavated and stored.
983. With these primary findings, I address the Claimants' criticisms as follows:
- i) Because there were no substantial stockpiles and the trench spoil was only out of the ground for 1-2 days, combined with the relatively gentle topography, there was no call for retention structures and none were provided. Their absence did not amount to negligence in the circumstances of LC54;
 - ii) No question of failure of retention structures arose, since none was provided;
 - iii) There were no substantial stockpiles to be covered. The more modest piles of topsoil and trenchspoil were not covered but that did not amount to negligence in the circumstances of LC54 because of the limited surface that was exposed and (in the case of the trenchspoil) the limited time that it was out of the ground;
 - iv) No stockpiles were left standing from September to November 1996;
 - v) The failure to install retention structures was not negligent in the circumstances of LC54. Consequently there was no requirement to review, maintain or replace them;

- vi) No stockpiles were placed outside the 25m ROW width or on or next to (significantly) sloping ground or at locations close to watercourses or too high or of too high volume;
 - vii) The Defendant accepts that there would have been some loss of soil from the ROW between September and November 1996, but disputes the amount. I return to this later.
984. In summary, subject to (vii) above, I reject the Claimants' criticisms relating to soilpiles on LC54.
985. **Erosion on the ROW/Long Term Measures/Revegetation:** the findings for which the Claimants contend {C4/3.7/976}ff are:
- i) There was no erosion matting on the ROW between long term works (about 15-21 December 1996) and Revegetation (End of May 1997) in circumstances which amount to negligence;
 - ii) If any erosion matting was installed, it was installed on the basis of dispensing with matting from slopes of 10 to 20% in circumstances which amount to negligence;
 - iii) If any erosion matting was installed, it was not consistently provided at all or provided between ditch diverters across the full width and length of the ROW in circumstances which amount to negligence;
 - iv) No longitudinal drains (or "channels") were installed on LC54 and no sediment traps were provided at the discharge points of longitudinal drains in circumstances which amount to negligence;
 - v) No energy dissipation structures were installed on LC54 in circumstances which amount to negligence;
 - vi) There was a significant delay between ROW opening and recomposition in circumstances which amount to negligence;
 - vii) There was a significant delay between ROW Recomposition and Long Term works in circumstances which amount to negligence;
 - viii) There was a significant delay between Long Term Works and Revegetation in circumstances which amount to negligence;
 - ix) There was a failure properly to review and maintain the ROW throughout the periods cited above including a failure to maintain and replace long term measures which became ineffective and/or failed in circumstances that amount to negligence;
 - x) Fencing was not installed to protect the ROW from cattle. When it was installed, it collapsed in circumstances which amount to negligence;
 - xi) There was increased erosion on the ROW at all times (i) from ROW opening until ROW reconstitution (ii) from reconstitution until the long term works (iii)

from the long term works until revegetation works (iv) after revegetation works onwards.

986. *Erosion matting*: [985](i) to (iii) can be taken together. No erosion matting was installed on LC54 {D6/100/1188} at [109] and {H1.1/1/188} at [15.2.6]. Dr Card confirmed in cross-examination that he did not criticise the long-term geotechnical works on LC54 apart from his concern about the absence of longitudinal drains, subject to the reservation that he thought his only criticism “might be about erosion control mats”; but he agreed that any criticism in relation to matting was minimal even by his standards because of the gradients on the property being 9-11% {Day24/146:8}. I have found (at [933] above) that, if the maximum gradient at the very northern end of LC54 was in the region of 17-18% as measured by Dr Savigny, it is over a short stretch of the ROW, the exact length of which has not been established. If there was any area of LC54 where erosion matting should have been laid because of the gradient on the strict application of the original design, it was minimal. The Claimants’ complaints are not made out.
987. *Longitudinal Drains and Energy Dissipation Structures*: it is accepted that none was installed. Nor was any called for, as the ROW was virtually flat for much of its passage across LC54 with no substantial cross gradients. That being so, LC54 is effectively a section that is “Right of Way Parallel to Natural Slope” on the RECS technical drawing at {K14/95/1}, which does not indicate longitudinal drains and does not support the Claimants’ case. The effect of installing longitudinal drains would have been to increase the disruption of the Claimants’ land and to concentrate the flow of water into watercourses or other discharge points instead of allowing it to flow more diffusely across and off the ROW onto the surrounding land. In such circumstances longitudinal drains were not a requirement of good practice: see [329.vii)]. Similarly, I do not accept that good practice required the installation of energy dissipation structures off the ROW: see [329.viii)].
988. *Delay*: [985] (vi)-(vii) allege delay in each of the phases from ROW opening to revegetation: opening between 8-11 September 1996, recomposition eight weeks later on about 2 November 1996, long term works six or seven weeks later in the week commencing 15 December 1996, and revegetation first attempted in March 1997 with remedial works by Dinosaurios in May 1997. [985](ix) alleges a failure to maintain the ROW throughout those periods. The Claimants found their case upon the self-evident proposition that the longer the ROW remained partially or completely unprotected and un-revegetated, the greater the likelihood of erosion of materials off the ROW onto surrounding land. In relation to LC54 they rely upon the fact that in July 1996 the Sectoral Environmental Division of the Ministry of the Environment carried out a follow-up regulatory visit to Spread A and had noted “the effort made by the project for the environmental management of the site is recognized, but here, the delay in replanting and building the final geotechnical structures, with respect to laying and covering, is even greater [than in the Southern sector]. This sector is favored by the ground conditions; however, this is no reason for the delay in the final reshaping activities” {K41/432T/10}. Three points may immediately be made. First, this observation was made in July 1996, and therefore cannot have applied directly to LC54. Second, the passage recognises the favourable ground conditions in the northern sector, which I take to be a reference to the less challenging topography of which LC54 is an example. And, third, the general principle that the processes

leading to revegetation should be carried out without unreasonable delay so as to minimise erosion is not controversial. This was recognised by Snr Loeber who agreed that final geotechnical work should start immediately after the recomposition of the ROW has been concluded because soil in a naked condition is more likely to erode {Day19/8:7} ff. It is also (inevitably) recognised by the Defendant in its closing submissions {C4/4.7/318} at [190]. The Claimants also rely upon Snr Loeber's positive answer to the question: "Do you agree that, in respect of [the period between November/mid-December and about mid-April] it would have been possible to have long term works and recomposition at the same time if you had in fact increased the density of the works?" {Day19/12:9}.

989. The primary findings about when the various stages of the works were carried out are set out above; and it will be necessary to examine the impact of the laying of the pipeline later. The question to be addressed now is whether the Claimants have demonstrated that all or part of those periods were due to negligence on the part of the Defendant. This is not a question that can be answered simply by reference to Snr Loeber's answer about increasing the density of the works. Delay is of course undesirable in any major civil engineering project, not least for those responsible for carrying it out: it almost always has adverse financial consequences and is a fertile ground for dispute and litigation. It is a commonplace for anyone familiar with such disputes that the causes of delay may be many and varied and that even contractual fault does not necessarily (or even probably) imply a failure to exercise reasonable care. Simple reliance upon Snr Loeber's answers does no justice to the complexity of what was being undertaken in the Ocesa Pipeline Project. Two pieces of evidence illustrate why not. First, Mr Allison was right to qualify his acceptance of the general principle by saying that "you want to stabilise the Right of Way as quickly as possible and then you want to revegetate it *at the right time of the season, if you can.*"(Emphasis added) {Day15/105:20}. The difficulties that Snr Mesa described in his witness statement that arose from doing revegetation works in the dry season are testament to this {D6/100/1193} at [127]. Second, for public policy reasons, Article 21 of the environmental licence required Ocesa to give priority to hiring the inhabitants of the area: see [341] above. This was not necessarily conducive to immediate and unlimited supplies of suitable human resources.
990. I have set out the deficiencies in the Claimants' evidence about *culpable* delay at [563]. I am no more able than Dr Card to form an opinion, still less make a finding, about the reasons for delay either on individual properties or generally. In those circumstances, though the dates upon which various events happened are the subject of findings, I am not persuaded that the periods taken between initial stripping of the ROW and revegetation on LC54 were wholly or in part attributable to negligence on the part of those responsible for the works.
991. In support of the allegation set out at [985](ix), the Claimants rely upon:
- i) The statement in the Weekly Report for Spread A for 17-23 November 1996 that "the subcontractor has been asked to take actions on the face of Geotechnical Maintenance, because problems have arisen with the bad condition of the works all along the line, and the necessary corrections have not been made." {K39/408.1.2T/2}. This was at a time after re-conformation on LC54. There is no evidence that there were geotechnical works in bad condition on LC54 in November 1996;

- ii) The statement in a memorandum to Mr Loeber dated 6 December 1996, which refers to the maintenance crew having worked little between 562+120 and 546+580 and says “According to the above it is recommended to inform the contractor about these requirements, insofar the effect on the water bodies is currently noticeable; furthermore, there are a lot of excavated soil material rolling downhill without the appropriate protection” {K40/411T/3}. Neither Snr Loeber nor the Claimants have identified where this stretch of the ROW may be. There is no evidence of a lot of excavated soil material rolling downhill without appropriate protection on LC54, and my findings on the topography and lack of substantial stockpiles (such as to call for protection) mean that this is probably not referring to LC54. This conclusion is supported by the reference to water bodies being affected, which is contrary to the evidence about the water on LC54 not being affected until later: see [931] above;
 - iii) The statement in the Weekly Report for 12-18 January 1997 that “Geotechnical Maintenance: Works are expected to resume again in the course of next week” {K41/429T/3}, which is entirely unspecific and begs the question whether any geotechnical maintenance works were required on LC54;
 - iv) A passage in Snr Loeber’s evidence where he was asked about the memorandum at (ii) above. In his evidence he said that there were problems and that they took action every time they were informed or issues were raised. He accepted that they could not always hire, train and support the necessary people and that in December 1996 they were restricted to 5 kilometres. He did not accept that they had a problem over the whole of Spread A in that erosion control measures were not being implemented {Day18/58:15} ff. This evidence does not support the Claimants’ case that there was a *negligent* failure to maintain the ROW on LC54 in December 1996, or thereafter.
992. I reject the criticism in [985](ix) because there is no satisfactory evidence that the ROW was in need of maintenance (rather than merely waiting for the next stage of the works to be carried out) and, in particular, there is no evidence that any long term measures on LC54 were or became ineffective during the periods alleged.
993. **Fencing:** Snr Mesa’s evidence on this point in his witness statement and at the conclusion of his cross-examination was that about three months after finishing his work (i.e. in about June 1997) cattle were getting onto the ROW and eating the vegetation. Dinosaurios took the decision to fence off the ROW and installed a fence made from stakes and an electric fence. He says that the fence lasted about 5 months because Dinosaurios did no maintenance and the cattle knocked it down {D6/100/1193} at [130], {Day7/56:5}. However, his evidence on this point was not consistent. Snr Herrera had said in his witness statement that Snr Mesa directed his workers to fence off the ROW after their revegetation work and that they did so {D6/111/1290} at [23]. When cross-examined, Snr Mesa agreed that he had given those instructions but gave confusing evidence that he only fenced “a bit of the Right of Way to protect it”, saying that Dinosaurios didn’t provide him with wire and so it was personal work {Day7/10:3}. In the result, it is unclear to me what fencing of the ROW was done by Snr Mesa and what was left for Dinosaurios.

994. Even if I were to accept Snr Mesa's original account I would reject the suggestion that it amounted to negligence on the part of Dinosaurios or the Defendant (or anyone else responsible for the carrying out of the works). It is clear that Snr Mesa appreciated the implications of having a strip of bare or recently revegetated earth on his farm, because one of his claims is for rented pasture for cattle for 35 cattle for 6 months during (and after) construction.
995. It is not clear whether the alleged negligence is said to lie in not erecting the fence until three months after Snr Mesa's works (which would have been about one month or so after Dinosaurios re-did them) or in erecting a fence which failed after 5 months. In either event, the criticism is misplaced. Leaving aside the fact that it would have been open to Snr Mesa to erect fencing himself at any stage so as to manage the farm competently balancing the needs of his cattle and his pasture, the considerations that I have outlined mean that it is not self-evidently careless for Dinosaurios not to fence the ROW immediately. The Claimant has not proved that he had his cattle on the affected fields either when he did his revegetation works or when Dinosaurios did theirs, and his claim for additional pasture suggests that he may not have. Snr Mesa says that he had suggested fencing off the ROW before Dinosaurios did so, but does not say when. On this scant evidence I am not satisfied that it was negligent not to install the fence sooner. Turning to the failure of the fence, the fact that cattle damage an electric fence after 5 months does not of itself imply negligence in its construction: cattle damage fences and electric fences are typically less robust than barbed wire ones, not least because they may be used in circumstances which may require them to be moved. Dinosaurios could not reasonably be expected to maintain a permanent presence on site after erecting the fence, and cannot reasonably be expected to know if and when cattle damage it. The obvious, simple and immediate solution (if desired) is for the farmer to reinstate the fence by knocking stakes back in or re-attaching the wire. If, as the allegation implies, the farmer did nothing to reinstate the fence, subsequent damage would be the consequence of his decision not to reinstate. There is a complete absence of evidence about the nature of the damage or about how or when Dinosaurios were or should have been aware of it that is a necessary prerequisite to a finding that they were negligent in failing to reinstate.
996. **Increased erosion and its causes:** the Claimants' case is summarised at [985](xi). In brief, the Claimants allege that there was increased erosion from the ROW over time. Taken together with the allegations of soil mixing, inversion and compaction, and the allegations that water-courses were not protected or reinstated it forms the basis for the Claimants' case that they have suffered continuing and serious loss and damage.
997. I accept that there will have been increased rates of erosion from the ROW in times of rainfall between when it was stripped and when it achieved a state of revegetation such that rates of erosion returned to background levels. The issue is whether the rate or the volume of that erosion caused material damage to the Claimants' property and, in particular, the damage in respect of which the Claimants bring their claim.
998. For present purposes, it is notable that there is no lay evidence that begins to support Dr Card's exorbitant estimates of erosion from the ROW. It will be remembered that Dr Card's estimate in his fourth report was that an average of about 100 tonnes per day, or 825 tonnes per week, or 11,350 tonnes during the period of 13.8 weeks would have flowed from the ROW on LC54 (i.e. excluding any contribution from the features beyond the Northern boundary of LC54). Even his revised estimates

predicted that hundreds of tonnes would have flowed from the ROW during that period: see generally [504.iv)]ff above. While acknowledging that Snr Mesa was not at the farm all of the time and that Snr Herrera now has an extremely fallible memory, it is inconceivable that such quantities flowing from the ROW would not have been noticed and remembered by those who were there. The lay evidence gives no support to a case asserting very large quantities flowing from the ROW during the period of construction. There is no lay evidence of substantial flows of sediment across land and I have accepted the evidence that there was no immediate impact on the water during construction and that sediment only reached the water later with abnormalities first being noticed long after construction: see [931] above. If there had been substantial damage to the streams on LC54 due to the deposition of substantial quantities of sediment in them during or immediately after the construction period, that would have been observed by those working and living on the farm; and I would have expected it to be reported and remembered. Furthermore, on my assessment of Snr Mesa, his understanding and his willingness to claim if he thought he had suffered damage, I consider it highly improbable that he would not have complained vociferously if anything as dramatic as suggested by Dr Card had actually happened. The absence of evidence is therefore at least some evidence of absence of substantial quantities of sediment being deposited during or immediately after the construction period.

999. I have provided a summary of the development of the Claimants' case on the impact of the pipeline at [946] above. It was an important feature of the Claimants' case both in their Statements of Case and in opening that there was a close temporal connection between the construction works and the occurrence of damage. For example, the impact on the water in W2 was said to have occurred "during and immediately after" the construction; cattle were said to have died and become lame because of swampy conditions from 1996 onwards; the fishpond (which was said to have been full size before the construction works) ceased to be used for fish from September 1996 because of sedimentation transported in W1 "during or shortly after the construction works." A further feature of the evidence of Dr Card and Dr Tobon on erosion was that it was intimately linked to the state of streams W1, W2 and W3.
1000. Dr Card's inspections did not reveal direct evidence of significant erosion from the ROW on LC54. He set out his initial findings at [15.2.2]ff of his first report {H1.1/1/186}. Having stated that "evidence of soil erosion was observed at various points along the ROW" he referred to his Table 15.2 for a summary of details and notable features. That table referred only to E1 and E2: it did not refer to any erosion on LC54 itself {H1.1/1/188}. He did not mention any "small eroded areas with poor vegetation coverage the southern extreme of La Fe 1", to which Dr Obando referred in his first report {{H3.5/5/1032}. In his text Dr Card referred to E1 at [15.2.3], saying that it measured "some 800m² and up to 1m deep. Evidence of sediment transport can be seen downhill of these features." In addition he identified "areas of sheet erosion on the ROW itself but these areas are relatively small." He expressed the opinion that E2 (which he described as 26m² and up to 0.5m deep) "could not be the cause of sedimentation of the Claimant's fish pool because the sedimentation in the fish pool is of significantly larger area and volume as determined by Dr Conrado Tobon and described in his expert report." For this reason he concluded that the sediment arrived in the fish pool from pipeline construction activities and in particular the stockpiling of soil material during the period of ROW construction." Later, at

[15.2.14] he expressed the view that the sediment that Dr Tobon considered had arrived in the fish pool came either from pipeline construction activities and, in particular, the stockpiling of soil material during the period of ROW construction, or soil erosion on the ROW slopes just beyond the northern boundary of the property at E1, or a combination of both. In his oral evidence he confirmed that he was not able to point to any erosion on the ROW on LC54 as causing the damage he said that he had found on the property {Day24/93:2}.

1001. In their closing submissions, the Claimants make generalised assertions about susceptibility of the ROW to erosion over time, but only identify E1 as a material source of actual erosion. Thus:

- i) At [2867] {C4/3.7/1021} they submit that “as vegetation on the ROW did not take quickly, the ROW was more exposed and liable to soil erosion”, but they do not identify any area on LC54, pointing to the ROW to the North in general and E1 in particular;
- ii) At [2909] {C4/3.7/1032} they refer to Dr Obando’s small areas of erosion on the ROW at the southern extreme end of LC54;
- iii) At [2915] {C4/3.7/1034} they submit that active erosion continues at E1 and that sediment is being transported downslope and into stream W1;
- iv) At [2928] {C4/3.7/1038} they submit that E1 was caused by Ocesa ROW works.

1002. A further feature of Dr Card’s observations is that he did not observe widespread or damaging sedimentation of fields. His opinion was directed almost exclusively to the sedimentation of streams on LC54. In expressing that opinion, his original report supported the close temporal connection that was a central feature of the Claimants’ case, as summarised above. His expressed opinion was that there had been erosion which caused sedimentation during the period of construction and, in particular, during a period when he assumed that there had been significant stockpiling. This immediacy was a necessary plank of the Claimants’ case because it would support the opinion expressed by Dr Tobon that the reason for sedimentation of the streams was that it arrived from the ROW at such a rate as to overwhelm the stream’s ability to purge itself. Dr Card’s support for that case was clear and stated repeatedly:

- i) “Sediment arrived in the fish pool from pipeline construction activities and *in particular the stockpiling of soil material during the period of ROW construction*” [15.2.4] at {H1.1/1/187};
- ii) “Sedimentation [of W3] is from the ROW and construction activities, such as *poor management of soil stockpiles which can lead to soil erosion and sediment transport*” [15.2.11] at {H1.1/1/190};
- iii) “Dr Tobon describes in his Expert Report that the waterlogging on the property is due to a high rate of deposition of sediment and that *the most likely cause was intense soil erosion from stockpiled soil during ROW and pipeline construction*. I note that Dr Tobon’s opinion appears to be consistent with witness statements given by the Claimants as well as construction workers

who also describe soil erosion *from stockpiled soil during ROW and pipeline construction.*” [15.3.3] at {H1.1/1/192};

- iv) “Sedimentation of areas SW1, SW2 and SW3 is from the Ocesa ROW and pipeline construction activities and, *in particular, the stockpiling of soil material during the period of ROW construction.*” [15.3.5] at {H1.1/1/192};
- v) “The current accumulation of sediment in streams and water logged areas is due to large volume of sediment deposition *from ROW and pipeline construction activities together with poor site management and lack of **short-term** geotechnical control measures.*” [15.4.5] at {H1.1/1/194}. [Emphasis added].

1003. As the notion of immediacy was challenged, Dr Card tried to bolster it with the calculations in his fourth and fifth reports. I have dealt with the deficiencies of these reports at [504.iv]) and do not repeat my criticisms in detail here. It is sufficient to say here that the ridiculous suggestions that were implicit in Dr Card’s fourth and (to a lesser extent) fifth reports provide no support at all for the Claimants’ case in relation to LC54 or any other Lead Claimant’s case, serving merely to cast doubt on Dr Card’s overall competence for the reasons I have already discussed. If there is any useful material to be gleaned from the exercise it is that the rate of soil loss per hectare from the ROW that he ultimately proposed for the period from June 1997 to June 2000 was not materially different from the rate of soil loss elsewhere on the property {Day25/126:1}.

1004. In his first report Dr Tobon described the cause of the damage to the streams in terms that emphasised the sudden and overwhelming rate and quantity of the erosion from the ROW as follows:

- i) “... the damage displayed by stream W1 was caused in large part by Ocesa *during construction of the pipeline.*” [1.6.1] at {H7.4/4/908};
- ii) “... the damage displayed by stream W2 was caused by Ocesa *during construction of the pipeline.*” [2.6.1] at {H7.4/4/919};
- iii) “... the principal cause of damage observed on stream W3 was construction of the Ocesa pipeline, due to soil erosion and disposition on the streambed ... as well as soil erosion eroded to it from the ROW, *both during and subsequent to the construction of the pipeline*” (W3) [3.6.1] at {H7.4/4/928}. (Emphasis added).

1005. Quite apart from the absence of any observations of eroded land to support these expressions of opinion, whether from his own inspections or those of Dr Card, Dr Tobon’s opinion is contradicted by the evidence of Snr Mesa that “what I experienced on the farm was that the process of sedimentation was not immediate: the sediment accumulates little by little in the bed of the streams during the rainy season. This is the only time that the sediment reaches the water sources” {D6/100/1200}. According to Snr Mesa, there were no problems during construction but “with the arrival of the rainy season, about 3 months after the construction of the pipeline, the earth on the [ROW] crumbled. This happened on my farm as well as on my neighbour’s farm and this earth [went] towards the water source [W1]. The water

started to come down a reddish colour; this was visible from the moment the water left the neighbour's farm." I accept Snr Mesa's evidence that there would have been some run off from the ROW during the rainy season following the construction works that would have been sufficient to discolour the water coming off the ROW, and I take it into account in reaching my overall conclusions on LC54. Returning to the expert evidence, however, it does not support the case being advanced by the Claimants of an overwhelming flow of sediment at the time of construction. Nor does it support a case that there would have been months (or longer) between erosion from the ROW and the affected waters reaching the streams of LC54.

1006. Dr Obando's evidence went substantially to soil mixing, inversion and compaction and the consequences of mixing, inversion and compaction on productivity. But Dr Obando made direct observations which are relevant to the issue of the extent of erosion from the ROW. His observations do not support a case of widespread and serious erosion from the ROW. In his first report he recorded that "Vegetation coverage on the farm is generally good, greater than 90% *except in a small eroded area on the ROW in a neighbouring farm affected by construction, for example, in area E1* where the pasture is found to be degraded due to loss of coverage and consequently sediments are produced which run towards stream [W1]" {H3.5/5/1028}. To similar effect, and commenting specifically on the state of the soil at {H3.5/5/1029} he said "in some areas light to moderate erosion is presented and frequent to moderate mass movement, principally so-called cow hooves, and very localised landslides." In providing his detailed analysis at {H3.5/5/1032} he wrote "Hydric erosion, and the risk of hydric erosion: I observed various processes of localised erosion on the ROW, where ridges were probably built, because I found evidence of these structures in an advanced state of collapse. I also observed small eroded areas with poor vegetation coverage at the southern extreme of [LC54]." This is, by Dr Obando's trenchant standards, very mild; and he attributed the cause to poor vegetation coverage, which he considered to be a consequence of soil degradation rather than specifically of erosion {H3.5/5/1039}. His observations do not support a finding of widespread and significant erosion from the ROW on LC54 or the property to its North.
1007. I note in passing that for reasons given elsewhere, I do not find any support, whether quantitative or qualitative, for the Claimants' case in their re-working of the USLE calculation. I accept Professor Monsalve's evidence, at a high level of generality, that over time the absolute quantity of background erosion and sedimentation far exceeded what would have come from the ROW.
1008. Drawing these strands together, the lay and expert evidence reviewed thus far does not support the Claimants' case that there was rapid and overwhelming erosion from the ROW (on or off LC54) at or shortly after construction or that there has been substantial on-going erosion from the ROW. I reject the evidence (primarily from Dr Card and Dr Tobon) that there was rapid and substantial erosion at the time of or soon after the opening of the ROW and find that erosion such as they have suggested did not happen. I accept that the rate of erosion from the ROW per unit of area will have been greater than the background rate until Snr Mesa's revegetation took hold, but there is no direct observational evidence of substantial or continuing erosion from the ROW on LC54. Areas E1 and E2 will have contributed to incremental erosion both initially and with time but there is no reliable evidence of the quantity of sediment

that will have left the ROW from these areas. Neither Dr Card's calculations nor the re-working of the USLE calculation by the Claimants' lawyers provide reliable evidence on which to base findings. Although the relative rate of soil loss from the ROW until satisfactory revegetation will have been greater than the rate of soil loss from the basins feeding the streams, the overall volume of sediment from the basins over time will have exceeded the overall volume from the ROW (including from the area to the north of LC54's boundary) substantially.

1009. **Soil mixing, inversion and compaction:** the findings for which the Claimants contend {C4/3.7/988} are that:

- i) Soil mixing and/or inversion occurred.
- ii) Topsoil was not properly and carefully removed and stored and preserved separately from other soil in circumstances which amount to negligence.
- iii) Topsoil was not returned onto the ROW after all other soils had been placed back in circumstances which amount to negligence.

1010. I have accepted as a general proposition that some mixing of soils is inevitable because of the processes involved in laying the pipeline. Snr Herrera gave Snr Mesa a description of the processes that is largely consistent with the evidence of the videos. First of all people with chain saws cut down vegetation and removed fences that had been on the ROW. Then bulldozers cleared the ROW, removing all the grass and vegetation that was left. A labourer told him that the bulldozer tore out all vegetation and churned up the earth. Then a digger excavated the trench, piling the earth by the trench where it was left for 1 or two days {D6/100/1187}. I accept this as a general account of what happened. Tearing out all vegetation was what the bulldozer was meant to do and some churning of the earth was inevitable and well evidenced on the DVDs. It is not evidence that the limited supply of topsoil had not been separated out: there is ample evidence on the DVDs of bulldozers tearing out vegetation, churning the soil as bulldozers do, and separating out the topsoil at the same time with both the skill and the limitations to be expected of doing such an operation by bulldozer. By the time Snr Mesa came to the farm, reformation had not happened so that topsoil would not have been re-spread.

1011. There is nothing in the lay evidence that compels, justifies or supports a conclusion that the stripping of the ROW was conducted negligently on the relatively benign topography of LC54. The Claimants' proposed findings on soil mixing must therefore be justified on the basis of expert evidence if they are to be sustained. For that, the Claimants look to Dr Obando.

1012. The Claimants' pleaded case is that "along the entire area of the ROW soil horizons A and B ... have been mixed and/or inverted and/or soil horizon A has been lost as a continuous layer on the surface of the soil" and that "along the entire area of the ROW the soil is over compacted" {B2.2/33/395}. This case is supported by Dr Obando, who expressed the opinion that there had been mixing of soils on the basis of visual observations, which he illustrated with photographs at {H3.5/5/1032} ff. At [4.2.2.3.3] he expressed the opinion that mixing and/or inversion of soils had occurred along the whole length of the ROW; and that there was over compaction of the soils along the whole length of the ROW "because of the observation and touch of soils at

intervals along the whole length of the ROW, compared with the observation and touch of soils outside the ROW” {H3.5/5/1035}. It was his opinion that “the compaction by machinery and inversion/mixing produced a drastic decline in the quality of the soil that gave rise to the degradation of the pasture owing to the invasion of weeds” {H3.8/16/1901}. Professor Montenegro’s opinion was that there was no evidence of inversion, mixing or over compaction of soils on the ROW on LC54.

1013. I have referred to the differing approaches to sampling locations and the implications of the different methodologies at [727]. The results of the chemical analyses undertaken for the experts are to be found at {H4.13/19/4011}. On the LC54 ROW Dr Obando dug one observation hole on his first inspection and one trial pit on his second inspection. Self-evidently, these two holes do not provide a statistically valid basis for extrapolating to express opinions about the state of the entire length of the ROW. He provided photographs of those holes:

- i) At {H3.5/5/1033} photograph LC54.12 (which was printed again as photograph LC54.15) showed the observation hole dug on the ROW on the first visit. Dr Obando compared it with photograph LC54.11, a photograph taken of an observation hole dug off the ROW on the same (first) visit;
- ii) At {H3.5/5/1033} photograph LC54.14 showed the trial pit (TP1) dug on the ROW on the second visit. Dr Obando compared it with photograph LC54.13 (which was printed again as photograph LC54.7), a photograph taken of the trial pit (TP2) dug off the ROW on the same (second) visit;

In addition he provided photographs of holes dug on CF54 as photographs LC54.8, LC54.9 and LC54.10, taken on his third visit, by way of comparison.

1014. Making due allowance for the different exposures and printing of the photographs, neither of the photographs of the holes dug on the ROW evidences a complete lack of Horizon A. There is no photographic evidence of inversion. I accept Professor Montenegro’s evidence that he found no evidence of inversion. In the absence of any observational evidence of inversion, I also accept that there is nothing in the physical testing results (to which I will return later) to justify a finding of inversion. I therefore conclude that the allegation of inversion (whether along the entire length of the ROW or any significant part of it) fails.

1015. Also, making due allowance for the different exposures and printing of the photographs, neither photograph provides reliable evidence of mixing: Dr Obando did not provide any other objective or semi-objective classification of colour, such as by adopting the Munsell classification. I do not consider that the differences in colouration between the various photographs provide independent support for an allegation of mixing: to my eyes, and in the light of the expert evidence that was given to assist the Court, the photographs of the holes dug on the ROW, when compared with their off-ROW comparators, are equally consistent with the retained presence of different horizons rather than the opposite. What can be seen is that photographs LC54.12 and LC54.14 show only a narrow band of Horizon A, though the thickness of the horizon cannot accurately be assessed even by reference to the presence of Dr Obando’s dagger. The thinness of the Horizon A supports the allegation of damage and reduction of the thickness of Horizon A at the point of the

trial pit. It is at this point that Dr Obando's selection of sample sites becomes relevant once again. Because he selected sites that were intended to show observable damage, the absence of other reliable evidence that the band of Horizon A on LC54 was generally similarly thin precludes extrapolation to make such a general finding. Furthermore, there is reliable evidence from Professor Montenegro, which I accept, that the observed state of the soils where he examined them was not consistent with serious mixing or inversion.

1016. Comparisons between the respective experts' findings of organic matter and other chemical analyses are complicated by the fact that they did not sample at equivalent depths either as between the the different experts or within their respective sampling. While I accept that there is evidence that higher rates of organic material were found in the upper layers of the soils on CF54 when compared with the rates overall, the evidence of chemical composition of soils does not compel or justify a finding that there was significant mixing on LC54, for the following main reasons:
- i) Dr Obando's data from his first inspection show comparable results for organic carbon, CEC, base metals, iron, manganese and saturated aluminium on and off the ROW on LC54: see {C4/4.7/478} at [333] where the results are summarised;
 - ii) The results for organic content from the samples taken on his second visit on and off ROW are confounded by the fact that they were taken at different levels: see {C4/4.7/479} at [334(3)];
 - iii) The sampling depths when sampling soils from CF54 on his third inspection are materially different from those previously adopted when sampling on the LC54 ROW, which again confounds the interpretation of his results: see {C4/4.7/479} at [333(4)]²⁶.
1017. Once the methodological difference are taken into account, the experts' results show a consistent pattern of organic matter decreasing with depth. The chemical analyses in large measure follow the patterns that would be expected in the absence of serious mixing, though at least some are suggestive that some mixing may have occurred. Viewed overall, the experts' objective testing does not support or compel a finding of serious mixing.
1018. The Claimants rely separately upon Dr Obando's reported finding of some fragmentary elements of plinthite on the soil surface on LC54 {H3.8/16/1869} at [6.2.2]. Dr Obando did not report having found plinthite on LC54 in his first report, from which I deduce that he did not then consider it to be a material observation. I reject the submission that his finding of fragmentary elements of plinthite on LC54 is evidence of significant mixing. As I have accepted at [766], plinthite may form close to the surface, so that the finding of fragments of plinthite on the soil surface does not evidence the mixed presence on the surface of soils from a great depth. Furthermore,

²⁶ For the avoidance of doubt, I find that where in Appendix 2 to Dr Obando's first report at {H3.5/5/1044} the column headed "Location (depth cm)(if applicable)" includes a single figure that represents the depth at which the sample was taken. Where the column includes a range of figures, the sample was taken between those depths. This reflects the identification of the samples and I found Dr Obando's evidence to the contrary at {Day31/12:3} ff unconvincing.

the presence of fragments that did not merit reporting in his original report is consistent with the limited mixing of soils from the upper layers that I have held to be an inevitable consequence of the processes involved in laying the pipeline. Similarly, although they were recorded in his first report, I do not consider that the presence of fragments of rock at the surface {H3.5/5/1035} demonstrates or evidences significant mixing.

1019. The off-ROW sample from Dr Obando's first inspection showed bulk density of 1.23 g/cm. At his second inspection Dr Obando tested for bulk density both on and off the ROW, obtaining results showing less compaction on the ROW (1.33 g/cm) than off it (1.47 g/cm). Instead of acknowledging that these results were adverse to his opinion that there was increased compaction on the ROW, Dr Obando tried to explain it away with the suggestion that the Claimants' cattle did not feed (or, by implication walk) on the ROW {H3.5/5/1035}. This speculative explanation was unjustified and contrary to the evidence of photographs {H5.4/5/872} and to the Claimants' evidence that cattle do feed on the ROW, and I reject it as a matter of fact. On the issue of compaction I accept the evidence of Professor Montenegro that he found no evidence of over-compaction or a reduction in the water-retention capacity of the soil of the property since the construction of the Ocesa pipeline {H4.5/5/1047}.
1020. I have rejected Dr Obando's sustainability analysis as summarised at {H3.8/16/1895} for the reasons set out at [741]ff. It is, however, relevant to the issue of compaction that his assessment of bulk density on LC54 was 3 on the ROW and 4 (i.e. worse) off the ROW. The evidence of any lasting impact of the Ocesa ROW on the fertility and sustainability of the soils on the ROW on LC54 primarily comes from other sources than Dr Obando.
1021. On any view of the evidence, the pasture on LC54 is only slightly affected by the laying of the pipeline. Revegetation was problematic, as already explained. The Agroforestry Report in late 1997 identified that there was 60% coverage on the ROW, which was a combination of pasture and weeds: the weeds were indicated as being 40% though it is not clear whether this means 40% of 100% of the ROW or 40% of the 60% coverage. To the left and right of the margin the coverage was 80% with a mixture of pasture and weeds (in unspecified proportions). The most noteworthy species to the left and right of the ROW was said to be Brachiaria; on the ROW the most noteworthy species were said to be Brachiaria, poppy, sage and chilinchil. The nutritional and sanitary condition was said to be fair to the left and on the ROW, and good outside the ROW's right hand margin. There was said to be a requirement for substantial quantities of fertiliser and planting of new herbaceous plants {K52/534T/25}. I accept this as being a reasonable description of the state of the pastures both on and off the ROW at that time.
1022. By the time of the various inspections and evidence for this litigation, the situation was much improved. Dr Obando's evidence was that coverage on the ROW was 90.5% and off the ROW 95.3%. This assessment bears comparison with his evidence that coverage on the ODC ROW on CF54 was 99.5% and off the ROW was 99.3%. It is also to be compared with the differentials on the other lead properties included in his table at {H3.10/20/2319} as follows:

	LC39	LC50	LC54
On ROW % coverage	46.9	52.8	90.5
Off ROW % coverage	92.3	100	95.3
On ROW/Off Row %	50.8	52.8	95.0

These figures suggest that the impact of any damage to the ROW on coverage is limited on LC54.

1023. There is a divergence of evidence about the quality of the vegetation on the ROW. Dr Obando's first report said that the dominant vegetation on the ROW was generally carimagua and brachiaria decumbens grasses. In degraded grasses shrub-like weeds proliferated. Vegetation cover on the ROW was generally good, though of poor quality {H3.5/5/1036}. In his oral evidence Dr Obando went much further, stating at one point that there was no grass on the ROW, only pajon (meaning a number of types of dried weed {H3.5/5/1028}), which he said the cattle would not eat {Day31/48:24}. He later appeared to limit this assertion to a sector in the north of the property {Day32/165:9}. Dr Delgado's evidence was that the vegetation off the ROW was more homogeneous, with the vegetation on the ROW being less dense and having a greater presence of weeds {H20.3/3/557}. Contrary observational evidence came from Dr Uribe who said that the ROW is not distinguishable from the ground or the air {H6.1/1/241}, Dr Avila who considered that the pastures along the ROW and to its sides were in a very similar or consistent condition {H21.5/5/1185}, and Dr Card who said that there is no discernible difference in vegetation cover between that seen on the ROW when compared with that on the neighbouring adjoining land {H1.1/1/185}, and Dr Velez, whose evidence was that there were no significant changes to vegetation cover in the ROW and its area of influence, the main vegetation cover being weedy pastures {H5.4/5/873}. Dr Card confirmed in his oral evidence that there was no discernible difference in the coverage at the time of his first visit, by which time the Claimants had re-seeded and fertilised the ROW {Day24/91:6}.
1024. Dr Velez described the Claimants' land as being "more than 85% ... under weedy pasture coverage", with the pastures being "of low quality"; and he commented on the Claimants' management practices as being "done without technical criteria, without the required frequency nor the appropriate dosage and without technical parameters, such as fertilisation, weed control, cutting the grass after it is consumed by livestock ..., paddock rotation ... and the loading capacity of each paddock and of the farm" {H5.4/5/881}ff. His observations are consistent with other observations of the presence of weeds and the lack of weed control summarised at {C4/4.9/928} [178(3)]. While I have no doubt that the quantity of weeds varied from time to time, Snr Mesa gave evidence that weed control had always been necessary on his farm {D6/100/1169}.
1025. Dr Avila's testing indicates comparable quality of pasture on and off the ROW and provides useful objective (though not of itself determinative) evidence that the pastures on and off the ROW were generally in a similar condition.
1026. The photographic evidence supports the observational evidence that there is little or nothing to distinguish the state of the pastures on the ROW and those off it: see Dr

Avila's photographs 13-9 to 13-13 {H21.5/5/1227}ff, Dr Uribe's photographs 26-27 {H6.1/1/240}, Dr Velez' photographs 1-LC54 and 2-LC54 (H5.4/5/872} and Professor Montenegro's photographs 13.1-13.4 (H4.5/5/1051}. There are others: in particular, Snr Mesa accepted that Professor Monsalve's photograph {H8.11/11/2842} showed the pasture on the ROW in very good condition {Day7/30:4}. More generally, he agreed that the pasture in the fields described as AF1, AF2 and AF3 was adequate throughout the seasons {Day6/141:13} and that they were "fine for the cattle to graze" {Day7/75:17}. When offered the opportunity to say that they had been better before the Ocesa pipeline was laid, he did not take it, though he pointed out that he had changed from uribe grasses before the pipeline came to brachiaria after it had been laid {Day7/75:19}.

1027. I will deal with the issue of sedimentation of watercourses next. On the issues of inversion, mixing, compaction and the effect of the Ocesa pipeline on coverage I make the following findings at this stage:

- i) I reject Dr Obando's evidence that there has been any significant inversion of soils on the LC54 ROW. I accept that Professor Montenegro found no evidence of inversion. I find that there has been no significant inversion of soils on the LC54 ROW;
- ii) There is no evidence of significant mixing of soils over and above what I have already described as inevitable to any material extent. I am not persuaded that Dr Obando's photographic evidence supports a finding of mixing in the holes he dug and, even if it did, it would not be safe to extrapolate to general conclusions because of his site sampling methods. Taking into account the features to which I have referred above, the organic content readings do not support a finding of significant mixing. Dr Obando supported his opinion on mixing by asserting that it had produced a drastic decline in the quality of the soil. That assertion is not borne out by the chemical analyses that were undertaken. Nor is it supported by the observational or the objective evidence on the coverage and quality of pasture on LC54: to the contrary, the fact that there is no material difference between the coverage and quality of pasture on and off the ROW strongly militates against a finding of substantial mixing. On the basis of the evidence available to the Court I find that there was no significant or widespread mixing of soils on LC54;
- iii) I accept that Dr Obando's photographs showing a very narrow band of Horizon A evidences a reduction in the thickness at that point as a consequence of the pipeline construction or, possibly, subsequent erosion. However, because of Dr Obando's site sampling methodology and the findings I make about coverage and pasture, I reject any suggestion that there was widespread failure to restore or damage to Horizon A on LC54;
- iv) There is no objective evidence of over-compaction. Dr Obando's testing indicated that compaction was greater off the ROW than on it and I do not accept that his observational evidence to the contrary was reliable. I find that there was no over-compaction on the ROW;
- v) After the initial difficulties with re-vegetation, LC54 recovered so that there is generally no material difference between the coverage and quality of pasture

on and off the ROW. Even on Dr Obando's assessment of coverage, the relative difference that he evidenced was only 5%, which is not reliable as evidence of material difference. I find that weeds have always been a problem and that the non-technical approach of the Claimants to their farming meant that they would continue to be so both on and off the ROW. I reject as wrong Dr Obando's evidence that there are areas of the ROW with no grass and only weeds on them, preferring the evidence of other witnesses to the contrary. I also reject his evidence that cattle do not either go onto or graze on the ROW as being contrary to the photographic evidence of cattle grazing all parts of LC54's fields and the evidence of Snr Mesa, to which I have referred, that the pasture on his fields is adequate. I take into account the fact that Snr Mesa has re-sown with brachiaria grasses, which does not of itself affect my finding that the pasture is of equivalent quality on and off the ROW. I make that finding on the basis of the evidence I have summarised, both observational, objective and photographic.

1028. I have not yet referred to the comparative evidence from CF54. That is because, although there are differences in the observations and findings made by the respective experts on LC54 and CF54 respectively, I accept the evidence of the Defendant's experts that it is not possible to deduce that the differences are attributable to or evidence of damage to LC54. In particular, I do not find assistance in Dr Obando's data from his test pits on LC54 and CF54 as the data was taken from samples at different depths on each property, which confounds direct comparison. Once that is taken into account, the results do not materially support the allegations of damage on LC54 and do not in any event compel different findings from those indicated by the rest of the evidence, which I have summarised above.
1029. **Failure to protect watercourses:** the findings for which the Claimants contend {C4/3.7/989} are:
- i) There was no proper investigation of watercourses on this property prior to construction in circumstances which amount to negligence;
 - ii) There was no proper monitoring of watercourses on this property before during or after construction in circumstances which amount to negligence;
 - iii) There was no proper protection of watercourses to protect from the ingress of soil, in particular to protect from stockpiles and soil erosion from the ROW and/or having regard to the practice in relation to flume pipes and/or in that there were no sediment traps in circumstances which amount to negligence;
 - iv) No or no sufficient measures were installed to protect the stream bed or banks in circumstances which amount to negligence;
 - v) Following ROW recomposition soils which escaped into water sources during construction were not removed and flow conditions were not reinstated to their pre-construction condition in circumstances which amount to negligence.
1030. There is no documentary evidence of specific consideration being given to how to cross the streams on LC54. That does not mean that no consideration was given to them. Each was a minor stream (with W1 being ephemeral) and the topography of

LC54 was straightforward. The absence of documentary records (particularly in the absence of Ocesa's documents) means that the Defendant cannot show that specific attention was given to each of the streams by reference to records. However, I infer that specific consideration was given to the watercourses on LC54 which led to the decision to use boring techniques to cross them: see [976]. There is a similar absence of any documentary or direct evidence of monitoring of the watercourses on LC54 or about what steps, if any, were taken to protect the watercourses from the consequences of erosion from the ROW. No sediment traps were provided, but I do not consider that to have been negligent given the benign topography and lack of stockpiles or other reason to foresee excessive erosion that could feasibly be diverted into sediment traps. I reject Dr Card's evidence that revetment was necessary for the watercourses on LC54 to stabilise the banks and to prevent scour erosion over the trench backfill material {H1.4/22/973} because of the use of boring techniques. The justification for the absence of revetment lies in the fact that the banks of the streams have not proved to be unstable at their crossing with the ROW: see [720.ii].

1031. The real substance of the Claimants' case lies in the allegation that no sufficient measures were installed to protect the stream bed or banks, which may be taken with the allegation that the streams have been materially sedimented as a consequence of the Ocesa pipeline, causing the formation of SW1, SW2 and SW3: see [947.iv)] and [947.vii)]. I turn to these allegations now, having already found that there were swampy areas in the location of SW1, SW2 and SW3 before the Ocesa pipeline was laid. It is convenient to work from South to North. It is also necessary to remind myself that Dr Tobon in the course of his oral evidence expressly disclaimed any ability to provide any scientifically based assessment of where the sediment that he observed came from: see [706].

W3 and SW1

1032. Dr Card's evidence was that SW1 was downstream of the ROW {H1.1/1/216}. That evidence was wrong and I prefer the observational and photographic evidence that there was sedimentation and swampiness both above and below the ROW. He discounted any contribution to the swampiness from features upstream of the ROW {H1.1/1/217}. He relied upon Dr Tobon's description that the accumulation of silt that was found in SW1 "required a sudden large volume and high rate of deposition to have occurred" and gave as his opinion that the most likely cause of this release of sediment was "from soil erosion from stockpiles of soil temporarily located on the side of the ROW during construction" {H1.1/1/227}.
1033. Dr Tobon's evidence was that there was a large landslide 200m upstream of the ROW, which continuously channels sediment to the stream bed {H7.4/4/923}. The effect of this landslide was that the stream at points 21 and 22 was "full of sediment. It is completely blocked with sediment" {Day29/28:17}. Nearer to the ROW, at point 293 "the channel is completely filled with sediment, causing flood, during the events of rainfall, according to the proprietor of LC54" {H7.4/4/928}. Dr Tobon's evidence was that the stream was otherwise clear of sediment between points 21 and 22 and point 293. In this he was contradicted by Professor Monsalve whose evidence (which I accept) is that there were areas where sedimentation could be seen between those points, though not as big as the sedimentation between point 293 and the ROW {Day40/69:15}. In his original report Dr Tobon commented on the area upstream of the ROW referring to damage upstream "caused by an area of erosion to one side of

the stream. The sediment has been dispersed downstream of the ROW over a distance of about 300m. The sediment accumulation filling the streambed also resulted in water and sediment collection, which is causing the damming of the water and a swampy area at the point of conflux with streams W1 and W2” {H7.4/4/927}. In his oral evidence, when asked about his reference in his report to “a swampy strip on either side of the stream, starting from about 100m upstream of the ROW down to the point it merges with streams W1 and W2” {H7.4/4/923} he responded that “this strip of marshy land is by the stream and it seems to be related to the redistribution of sediments that came from the landslide that ... occurred above” {Day 29/30:12}.

1034. The evidence of sedimentation and swampiness both above and below the ROW undermines the Claimants’ case that what is seen below the ROW is caused or materially contributed to by erosion from the ROW. As Dr Tobon accepted, there is no reason to attribute sedimentation and swampiness upstream of the ROW to the ROW itself; and there is no qualitative difference between the condition of W3 and its associated narrow strip of swampiness that indicates either that the upstream sources of sedimentation have ceased to have effect or that sedimentation from the ROW has made a material contribution. The state of the stream does not of itself provide any evidence of an overwhelming deposit of sediment from the ROW during the construction of the pipeline and, for that reason and for the reasons already given in more general consideration of the case on LC54, I find that no such overwhelming deposit happened. If it had happened, either in relation to W3 or elsewhere on his property, Snr Mesa would have complained about it: but he did not do so.
1035. I prefer and accept the evidence of the Defendant’s experts that the state of W3 and SW1 is explicable by reference to longstanding processes and the natural topography assisted in this case by the landslides that had occurred on LC54. There is no evidence that would justify a finding that the rate of sedimentation or the end result of the sedimentation process was materially affected or contributed to by erosion from the ROW; and on the evidence that I have accepted I find that it was not.

W2, W3 and SW2

1036. I reject any suggestion that SW2 was caused by a sudden and overwhelming deposit of sediment from the ROW attributable to the construction works. What in fact happened was a gradual build up of sediment on the flood plain by a process that had started and had given rise to the presence of wetlands before the Ocesa pipeline was laid. The gradual nature of the build-up of sediment is evidenced by the fact that Snr Mesa neither fenced it off nor lost a cow in it until 2006. Had there been a significant deposit of sediment from the ROW that made a material change to the size or swampiness of SW2, he would have noticed and done something to protect his cattle before 2006. On this basis alone I would reject the Claimants’ case and expert evidence on the mechanism of how SW2 was formed, since it was Dr Tobon’s evidence that he would have expected W2 to transport sediment quickly and for sedimentation damage to have been noticeable around the area of the culvert quickly {Day28/114:7}. That did not happen.
1037. The evidence from W2 itself does not support the existence of a sudden and overwhelming deposit of sediment. In his original report, Dr Tobon recorded that W2 does not display high sediment accumulation on its bed, despite the natural stream channel remaining completely covered with aquatic vegetation {H7.4/4/919}. “Due

to the channel being deep and not filled with sediment, it was not possible to measure sediment layer depth. However it was assumed that such depth was not significant because the channel appears rather clean” {H7.4/4/911}. However, on his third visit he recorded sediment depth and found it to be 0.64m at the intersection with the ROW, an area of very flat topography {H7.4/4/913}. This provides some inferential evidence of gradual accumulation, or at least fluctuation from time to time. The inference that sedimentation is attributable to sources other than the ROW is also supported by Professor Monsalve’s observation (which I accept) of sedimentation upstream of the ROW. That observation is consistent with the images of LC54 when flooded: see [942].

1038. On SW2 I prefer the expert evidence of the experts for the Defendant that the formation and development of the swampy area is consistent with the gradual carriage of sediment down the streams of LC54 to the point of their confluence on the flood plain. Dr Savigny and Professor Monsalve proposed an additional explanation for the formation of SW2, arguing that the highway embankment and culvert under the highway gave rise to an obstruction and sediment trap. While a finding on this point is not necessary for my overall conclusion on SW2, I accept the evidence of the Defendant’s experts that the highway embankment and culvert have made some contribution to the collection of sediment in SW2. I find support for their views in the different flow and sedimentation patterns on the far side of the culvert {H2.9/12/2469} and accept that the embankment and culvert would, as a matter of fact, provide some obstruction to the flow of water, as is apparent from the photographs of LC54 when flooded: see {H2.3/3/780} and {L6/835/850}.
1039. I find the evidence about CF54 of limited assistance; however, I accept the broad thrust of Dr Savigny’s Supplemental Report 16 that, with the exception of water flowing through the culvert, the same long term processes with the progression of wetlands can be seen on CF54: see H2.9/12/2443}ff. I accept Professor Monsalve’s evidence that he observed sedimentation on water courses on CF54 {Day50/90:12} {H8.26/30/6620} {H8.26/30/6623} {H8.26/30/6630}. I also accept that Snr Mesa told Dr Savigny that he had lost cattle on CF54 as well as on LC54 {H2.3/3/789} as he confirmed in his oral evidence {Day7/27:6}; and that (notwithstanding valiant efforts to obtain coherent answers in re-examination) Snr Herrera was wrong if he intended to say that no cattle had been lost on CF54. All of this evidence tends to confirm that CF54 was subject to the same natural processes as LC54, though the exact topography and working out of those processes would have differed.

W1 and SW3

1040. I have already found that:

- i) W1 is a small stream that may be dry or virtually dry during the dry season. Its course below the fish pool has been changed by digging a canal which straightened it: see [934];
- ii) There was no fish pool in existence in June 1995. The Claimants dug a very small pool that would not have been capable of supporting commercial production between June 1995 and the laying of the pipeline. That pool was already showing signs of sedimentation when the pipeline was laid. The

workers who laid the pipeline dug a larger hole, dumping the excavated soil to the eastern side of the pool: see [951]-[952];

- iii) There was swampiness along the course of W1 as it crossed LC54, both above and below where the fish pool was dug before the pipeline was laid: see [956]. The swampiness below the fish pool was cured by the digging of the canal: see [944].

1041. On the basis of evidence which I summarise at [1063] below, I find that Snr Mesa stopped using the fish pool towards the end of 1999 or in the first half of 2000, by which time he had carried out no maintenance to clear out sediment. On the basis of evidence which I summarise at [1064] I find that Snr Mesa carried out the canalisation works between 2002 and 2009, probably in the latter half of that period.
1042. In his reports, Dr Card's opinion was that "soil loss from temporary construction stockpiles located either side of the Ocesa ROW are the prime cause of sediment deposition in the fish pool ..." {H1.6/24/1366} and see [1002.i)] above. He attempted to sustain that opinion in his fourth report on the basis of his flawed assumptions and calculations; and he continued to maintain it in his oral evidence {Day25/155:1}. In re-examination, he was given a summary of Snr Mesa's evidence that flooding was a frequent occurrence and that he had continued to fish in the fish pool for two or three years and asked what effect that would have on his conclusions about sedimentation of the fish pool. His answer was "that would change my conclusions slightly from that it was soil erosion coming from uphill from erosion point E1 and the failure of the ditch diverters and long term erosion control measures. So a slight change of emphasis [as] to the cause" {Day27/96:22}. Leaving on one side that this could not reasonably be described as "a slight change of emphasis", the substance of this answer was that he recognised that the theory that he had espoused until then was untenable. I agree and have no hesitation in rejecting the basis upon which the Claimants had previously advanced their case: there was no sudden deposit of sediment from the ROW which caused the sedimentation of W1 or the fish pool.
1043. The question remains, however, whether the Ocesa pipeline caused any material increase to the processes of sedimentation which had long pre-dated the Ocesa pipeline and caused the swampy area that existed before it had been laid. By closing submissions:
- i) The Claimants were submitting that chronic erosion from E1 had found its way into stream W1 and had caused or materially contributed to its present state; while
 - ii) The Defendant submitted, as it had done throughout, that the state of stream W1 and SW3 were adequately explained by the natural processes that predated the pipeline with an additional contribution from the breaching of the dams at E2.
1044. The positions of E1 and E2 and the debate about sediment flows is well illustrated by Dr Gundlach at {H22/10/554}-{H22/10/555}. A further helpful image, annotated by Dr Savigny, is at {H2.3/3/782} and a smaller scale image which places E1 and E2 in context is at {H2.3/3/778}. An inverted view can be seen at {H22/10/553}. Snapshots from the 1998 overflight video show that the ROW beyond the northern

boundary of LC54 was less well covered than the ROW generally on LC54 and that E1 appeared virtually bare: see [1061]. By 2002 and subsequently by the time of the various experts' visits, E1 was still visibly exposed to a greater extent than the surrounding land, as is shown in the images presented by Dr Savigny and Dr Gundlach.

1045. Two questions arise in relation to E1. The first is where eroded soils would go. By the end of the trial there was a measure of agreement between Dr Gundlach and Dr Savigny and I find that the blue arrows on his figure 2-5 on {H22/10/555} provide a reasonable summary of the lie of the land and the consequent tendency of sediment flows under the pull of gravity. I accept Dr Savigny's evidence that erosion from E1 or just to the north of it would flow towards E2 (described by Dr Gundlach as the holding ponds). Further to the North some would also flow to the west, as illustrated by the most northerly blue arrows pointing to the left in both parts of figure 2-5. I accept that sedimentation flowing out of E2 (the holding ponds) would flow in the direction of W1 towards LC54. Also, in theory, sediment going west from the ROW on the adjoining property might follow a circuitous route that, in theory at least, might lead back to the source of W1 in the woods to the west of the ROW. However, that would involve a significant distance over land and there is no evidence that satisfies me of any substantial quantities from E1 or the ROW near to it getting into W1 by that route. I also accept that the flow line on the slope between the northern boundary of LC54 and E1 would tend to be down towards where W1 flows across the slope and towards LC54. However, there is no evidence to justify a finding of significant increased sedimentation reaching W1 from the ROW on that slope in the medium to long term after revegetation was established. Equally, there is nothing in either the dimensions of E1, its current state, or the flow lines that sediment from E1 would have followed to support an allegation of sudden and overwhelming sedimentation of E1. There is no reliable evidence upon which to make a quantitative assessment of the contribution of E1 or even of its relative contribution to the sedimentation of W1. At a more general level, the evidence does not establish that sediment from E1 flowing into W1 significantly changed the nature of W1 initially or with time. It may have had the effect that W1 has become sedimented at a faster rate than would otherwise have been the case. There is, however, no claim for the costs of more frequent removals of sediment from W1 or anything of that nature, so that an incremental rate of sedimentation is not significant unless it caused damage or expenditure that would not otherwise have been incurred. Taking that as the touchstone, the increased sedimentation from E1 to W1 was not material.
1046. The second question on E1 is why is it still poorly covered? I accept that initially the laying of the pipeline through the area of E1 was a significant factor. However, I accept Dr Savigny's evidence that its present condition is a consequence of the congregation and passage of cattle over time, which is the responsibility of Snr Mesa's neighbour and has prevented satisfactory revegetation as illustrated in the images to which I have referred. {H2.3/3/782} illustrates what are reasonably described as myriad livestock trails and I accept Dr Savigny's explanation of the state of the area at {H2.3/3/791} at lines 1129-1140, supported as it is by Snr Mesa's evidence at {Day6/71:1} ff. It is not caused by any deficiency in the carrying out of the pipeline works as such.

1047. Dr Savigny's opinion is that the sedimentation of W1 has been increased by breaching of the embankment dams at E2. As is clear from my description of E1 and its effects, the embankment dams will have acted as collecting pits for sedimentation both from E1 and from the other surrounding land that was criss-crossed by cattle trails. I accept Dr Savigny's opinion that the embankment dams have been breached on a number of occasions and that the breaching of the dams would have caused sediment (some of which may have come from E1) to flow into W1. The direct flow of sediment from E2 into W1 is to be contrasted with the indirect flow from E1 into W1 (which will have left some of any sediment from E1 on the land before it reached W1). However, the evidence does not enable me to reach any quantitative conclusions about the sediment from E2. As with sediment passing from E1 into W1, it will have contributed to the processes that had been going on for years. My assessment, based upon the opinion evidence of Dr Savigny, is that the effect of sediment from E2 is likely to have been greater than the effect of sediment from E1 on W1. Beyond that it is not possible to go.
1048. The scale and seriousness for the Claimants of the remaining part of SW3 is evidenced by the fact that, although the canalisation works solved the problem of swampiness below the fish pool, the Claimants have not carried out any similar works to the stretch of SW1 above it.
1049. For these reasons, I find that SW3, which predated the laying of the Ocesa pipeline as a result of natural processes unconnected with the pipeline, was not caused or materially affected in the short term by the pipeline works. In the longer term, erosion from the ROW during the period before revegetation took hold, will have increased the rate of sedimentation of W1 but not to such an extent as to change materially the size or nature of SW3. Erosion from E1 is now caused by the congregation and passage of cattle there. While some sediment from E1 will have found its way across land to W1 and may have contributed to the sedimentation of the stream, any difference it has made has not been proved to be material. It could have been excavated above the fish pool as happened below it, but the Claimants have chosen not to do so.

The Factual Background – Post-construction

1050. On 6 March 1997, Snr Mesa entered into the first settlement agreement with Ocesa {M/132T.1/175.3.2}. It was in the standard form of settlement agreement with Ocesa alone set out at [387] above. The second point of recital identified the damage caused by Ocesa as the destruction of "a bridge ... located in the right of way and not paid in the initial negotiation [COP] 2,500,000." The third point of recital recorded that Snr Mesa had claimed COP4 million as payment for the damages caused in the plot identified in the second point of the recital, for "damages and temporary loss in transfer to pastures", meaning that Snr Mesa had claimed COP 4 million on the basis that the destruction of the bridge had caused him to be unable temporarily to transfer cattle across it to pastures that he would otherwise have used. The fourth recorded that Ocesa thought that too high and assessed the value of the damages at COP2,000,000. The first clause of the settlement contained the agreement that Ocesa would pay Snr Mesa COP2,500,000 "as the full and sole value of the damages caused to the plot identified in the First point of the recitals... ." Snr Mesa explained that "they" had promised to rebuild the bridge immediately but had not done so. So he had complained so that they would build it. There were negotiations,

which led to the settlement figure of COP2.5 million {Day6/99:6} ff. The settlement sum was paid on 16 April 1997 {M/132.1T/475.5}. On its face, this was clearly a claim for loss and damage (in the form of restricted access to grazing for cattle by crossing stream W2) caused by damage to the bridge, which had been on the ROW and had not been included in the original negotiations which had been concluded by the ROW agreements.

1051. Two weeks later, on 30 April 1997, Snr Mesa sent a complaint to Saipem's Damages and Complaints Section reiterating complaints made since December 1996 about the death of the cow during the works, for which he was claiming COP1.2 million, and claiming payment for sobranchos {M/133T/476.1}.
1052. I find that there was a walk-through in late April or early May 1997 as described by Snr Loeber {E2/7/346} at [19.1-19.3] which probably occasioned the re-doing of Snr Mesa's revegetation works. Snr Loeber did not take part in that walk-through.
1053. On 5 July 1997, the Claimants entered into the second settlement agreement with Ocesa, which this time was acting on behalf of Saipem {M/145T.1/510.5}. It was in the standard form of settlement with Ocesa/Saipem for damage sustained outside the originally negotiated strip for the ROW, as set out at [388] above. The fifth point of the recitals recorded damage in the form of 1367 (square) metres of sobranchos which, at a rate of COP 300 per square metre led to a settlement figure of COP 410,000. The first clause of the Settlement recorded that Saipem would pay Snr Mesa the amount of COP 410,000 as "the full and sole value of the damages caused to the plot identified in the first point of the recitals". By this time, Snr Mesa was representing other people in their negotiations and his settlement payment was included by Saipem in a cheque for COP 6,022,400 for four claims in all on 23 July 1997 {M/133.1/476.2}. The receipt that Snr Mesa signed on 11 August 1997 declared that that he was "fully paid up in all respects" {M/135T/479.1}.
1054. On 11 August 1997 Snr Mesa signed 2 Paz y Salvos on his own behalf and three on behalf of others who he had been representing. One of the two signed on his own behalf was with Saipem and was also signed by Snra Arango. It was in standard form as at [389] {M/134T/478.1}. It referred to the calculation of 1,367 square metres of sobranchos damage and released Saipem "for all the damage and losses caused outside the Right of Way Corridor (25 meters)..." and renounced any right to bring a claim against either Ocesa or Saipem for damage and losses caused "to the pasture, crops or goods *outside the ROW corridor* ["por fuera del corredor de la linea"]". As with other Paz y Salvos it declared receipt of satisfactory payment of all damages caused to the property and released Saipem and Ocesa from all obligations "arising by reason of the construction works for the Pipeline and the complementary works for the same."
1055. Snr Mesa recorded on the back of the Saipem Paz y Salvo that he was claiming payment for the cow that had been killed due to lack of the bridge and that it was the opinion of Snr Hugo Rodriguez that the case of the cow was the responsibility of Ocesa, which opinion was considered valid. "Therefore, the additional land [extra width] negotiation did not include payment of this animal." Snr Mesa therefore reserved his position in relation to payment for the cow. The annotation was signed by the Claimants and by Snr Perez, who signed on behalf of Saipem. This annotation and reservation of his position was consistent with Snr Mesa's evidence that the cow

had perished where the destroyed bridge had been, which was on the ROW. The annotation therefore recognised that damage on the ROW was to be the subject of claims to Ocesa and that damage off the ROW was to be claimed from Saipem.

1056. The second Paz y Salvo signed by Snr Mesa on his own behalf was with Ocesa and was in the slightly shorter form set out at [392] {M/136T/480.1}. It adopted the same course as was adopted with other Claimants who had pursued claims against both Ocesa and Saipem, by recording that Ocesa had affected his property over an area of 402 metres long by 3.4 metres wide, a total of 1367 square metres, which was a reference to the *sobreanchos*: see [394] above. Having recorded that Ocesa was fully paid up “for all damage, losses or compensation resulting caused or resulting from any legal, contractual or non-contractual relationship in the course of the contract of Easement of pipeline and Transit legally constituted for the purposes of carrying out the construction works of the pipeline ...” Snr Mesa renounced the right to present any form of claim against Ocesa “regarding their obligations, agreements, loss and damage to the pastures, crops or movable property *inside the corridor* of the line [“por dentro del corridor”], or the alteration in the economic exploitation of the plot during the construction of the pipeline”. It will be noted that both of the LC54 Paz y Salvos referred to the 1367 square metres of *sobreanchos*. If the Ocesa Paz y Salvo is read in isolation, the effect appears to be to treat the *sobreanchos* as an additional width of the ROW and to settle the claim for *sobreanchos* as an extension of the landowners’ right to payment for additional land as contemplated by Clause 7 of the ROW Agreements: see [369]. However, whether that was the reason or whether the fact of the *sobreanchos* was recorded in each Paz y Salvo as a form of “belt and braces” approach, the over-riding intention of the Paz y Salvos to settle potential liabilities both inside and outside the ROW was clear. There was no mention of the cow in the Ocesa Paz y Salvo. There was also no mention of the bridge that had been the subject of the first settlement agreement with Ocesa. No separate Paz y Salvo relating to the bridge is in the trial bundle. I infer that none was executed.
1057. Snr Mesa said that he understood that Saipem and Ocesa were for practical purposes interchangeable, that he went to Saipem’s offices on numerous occasions to complain, and that he complained to Saipem because a neighbour told him that was what he had done {Day6/96:9} ff. I accept his evidence that he complained more than once and suspect that there may be some substance in his evidence that Ocesa and Saipem were for practical purposes interchangeable, at least in some respects. But I do not accept that he would have been unaware that he had entered into two separate settlement agreements, one of which included Saipem and the other of which did not, and into two separate Paz y Salvos, one with Ocesa and one with Saipem.
1058. Although no submissions were directed to the point, the implication of the annotation on the back of the Saipem Paz y Salvo about the exclusion of the claim for the cow is clear, and I find as follows. Snr Mesa had brought his claim for damage to the bridge against Ocesa, who would have settled it on the basis that it had been on the ROW. He had then wished to claim for *sobreanchos* (by definition off the ROW) and had included a claim for the cow. He had directed these claims to Saipem, who were dealing with claims for damage off the ROW. Saipem settled his claim for *sobreanchos* but would not settle his claim for the cow because, as noted on the back of the Saipem Paz y Salvo, that was considered to be intertwined with the claim for the destruction of the bridge, and therefore should not be included with the off-ROW

claim against Saipem. That *must* have been the subject of a discussion with Snr Mesa and he *must* have understood the distinction between claims on and off the ROW, as is shown by his endorsement on the back of the Saipem Paz y Salvo. In fact, Snr Mesa knew of the distinction earlier because he knew of the terms of the Saipem settlement agreement which he had signed on 5 July 1997, which made the distinction clear. I reject any suggestion that Snr Mesa, who was by then conducting negotiations on behalf of others as well as on his own behalf, did not understand the distinction being drawn by Saipem and Ocesa in the various documents which he signed or that he did not understand that Ocesa was dealing with all claims for damage on the ROW and Saipem with claims for damage off the ROW. He may have had that knowledge and understanding by March 1997 when he entered into the settlement agreement with Ocesa; he probably had it by the end of April 1997 when he sent his complaint to Saipem; and he certainly had it by July 1997 when he entered into the settlement agreement with Saipem and by August 1997 when he entered into the two Paz y Salvos on the same day, one with Ocesa and one with Saipem. I am also in no doubt at all that he knew that the intended effect of the Paz y Salvos was to bring an end to any possibility of making further claims arising out of damage caused by the Ocesa pipeline, whether on the ROW or beyond it.

1059. I also find that, in addition to knowing where Saipem were, visiting their offices on numerous occasions, and making complaints to them, Snr Mesa could have tracked down Ocesa at any time, as he did when he visited their offices in Caucasia in 2011 {Day6/120:7}.
1060. On 17 August 1997 a punch-list was prepared that covered LC54 {J24/74T/5}. It identified filling and shaping of gullies, the need to repair one or more Type 2 cortacorrientes on LC54 and to revegetate, spray and fertilise a longer spread of which LC54 formed part. The revegetation work was completed by 18 November 1997, but the repair to the cortacorrientes was not {J24/80/1}. On a date between September and December 1997 the Agroforestry Diagnostic report observed that vegetation cover within the ROW in the area of LC54 was 60% and in fair nutritional and sanitary condition, whereas vegetation cover outside the ROW's right margin was 80% and in good condition {K52/534T/25}. I accept that documentary evidence as being accurate.
1061. In 1998 when the overflight video was taken {C5/5.5} the ROW was quite well covered with some areas that were still bare of vegetation {Day44/91:7}. Most of the ROW on LC54 was covered by vegetation {Day44/91:13} but the position was worse on the ROW beyond the northern boundary of LC54 {Day44/91:18}. In particular, there was the area at E1 without any significant vegetation cover.
1062. In about 1998 or 1999 Snr Mesa reseeded some or all of the ROW {B2.1/17/117}. There is a complete lack of clarity about whether and if so when Snr Mesa attempted to do any further re-seeding specifically on the ROW (rather than on the farm in general). In his witness statement {D6/100/1206} at [178]-[179] he says he sowed *Brachiaria Decumbens* grass both on and off the ROW two years after digging the channel on W1. That would be in between about 2004 and 2010: see [1064]. However, in the Further Information provided in June 2011 it was said that he sowed *Brachiaria Decumbens* in approximately 1999 and had not attempted to sow grasses or other vegetation on the ROW since then {B2.1/17/117}. In February 2012, new Further Information pleaded that he had re-seeded the whole pasture the year after his

original contract (i.e. in 1998) but that “vegetation has never grown adequately on the ROW and seeding has not been repeated” {B2.2/33/396}. His ARSL claims COP 200,000 for *Bracharia Decumbens* grass seed, apparently for re-seeding in 1998 {B4.2/6/272} at [46]ff. On this conflicting material, I find that Snr Mesa did not re-seed the ROW alone after 1998/1999 although he did later carry out general re-seeding on the farm in about 2003 which included the area of the ROW.

1063. Snr Mesa said in his oral evidence that he had stopped using the fish pool because of sedimentation about 2 ½ to 3 years after it had been enlarged by the pipeline workers. He had by then had about 4-6 harvests of fish from it {Day6/73:18}. During that time he had carried out no maintenance of the fish pool to clear out sediment {Day6/61:13}. When he stopped using the fish pool he drained out all of the water by removing the overflow pipe. His evidence was that he did this in the summer. On this evidence I find that he stopped using the fish pool for fish and drained it towards the end of 1999 or in the first months of 2000, which is consistent with what he told Dr Atencio {H24.1/5/233}. He has done no work on it since to remove sediment {Day6/77:1}. He has made no attempt to re-establish his old fish pool or to make another one.
1064. At some stage between 2002 and 2010 Snr Mesa took steps to prevent the flooding of the entrance road from the highway to his house by digging out the canal for the flow of W1 upstream and downstream of the entrance road, where previously it had run a meandering course {Day7/44:14}. The canal was not present in 2002 {L1/258/258} and was present by 2009 {L2/473/473}. The exact date of excavating it cannot be ascertained. The entrance road crossed W1 in the area of a depression {M/142/488}. The area on either side of the entrance road had been an area of wetland before the Ocesa pipeline was laid {H2.8/10/2110} and had been subject to flooding for many years: see [943] above. During the same period, but before resorting to digging the canal, he imported some loads of material and dumped them on the entrance road to replace materials that had been lost by the flooding. He repeated that exercise when the loads he initially dumped were washed downstream by the periodic flooding: this continued until the excavation of the canal cured the problem of the wetlands and the flooding in that area.
1065. In 2006 a cow became stuck in the area of SW2 and died. That was the first cow to have got stuck apart from the death of a cow in 1996 when the bridge over W2 was down. Snr Mesa fenced off the relevant area, which was an area of about 40 metres by 40 metres, and no cow has got stuck or died since then either there or elsewhere {Day6/38:14} ff.
1066. From about 2006/2007 (and not before) Snr Mesa has had a problem with lameness of cattle in his herd {H24.2/258.2/1237.81} {Day6/40:15}. Snr Mesa has never had his lame cattle examined by a vet {Day6/36:23}. I deal with numbers and causation later.

The Impact of the Ocesa Pipeline

1067. I have discussed the impact of the pipeline on the soils and streams of LC54 above. The Claimants’ primary case, that there was a dramatic and overwhelming loss of soil from the ROW during or shortly after the pipeline works, fails. So too does the Claimants’ case that there was substantial, widespread inversion, mixing or compaction of soils. I find that the incremental sedimentation from the ROW

(including the ROW beyond the northern boundary of LC54) made no material difference to the state of LC54 in general or to the sedimentation of its watercourses or to the development and state of the swampy areas in particular.

1068. One specific item has not yet been addressed. The Claimants allege that a number of fruit trees were either felled during the construction works or destroyed by sedimentation afterwards. I deal with that allegation when dealing with the specific heads of claim: see [1110] below.

The Claimants' Heads of Claim

Production from the Fish Pool – COP23,300,316 (c.£8,500)

1069. As finally presented in the Re-amended RSOL the Claimants' claim was that there was a 660 sq metre fish pool up until September 1996 which produced approximately 1,000 cachama fish every 6 months. It is claimed that each fish weighed 300 to 400 grams, thereby affording an annual average production of 650 kg of fish, of which the Claimants would keep approximately 9.75 kgs of fish for domestic consumption on the farm every year {B4.4/3/128}.
1070. There is no truth in the alleged factual basis for this claim. Quite how it came to be made and pursued in this form is not a matter for this judgment. It is sufficient to refer to the findings that I have already made at [951]-[952], [1040] and [1063]. In summary, Snr Mesa had an operative fish pool that was big enough to offer the prospect of commercial production from the end of 1996 to about the end of 1999 or early 2000. It was achieved by simple excavation and the placing of a dam situated on the course of W1, which has always had limited flow rates and may be dry or virtually dry in the dry season. It was therefore not capable of providing the levels of oxygenation necessary to maximise fish production in the way discussed at [804]. I do not accept that the evidence advanced on behalf of the Claimants as to the numbers of fish farmed or their weights while the fish pool was operative is reliable. Snr Mesa maintained that he had harvested approximately 1000 fish every six months from 1992/1993. I do not accept that he had any memory of this level of fish production either from 1992/1993 or at any stage. I reject the implicit suggestion that a stream with the limitations of W1 either could or did sustain such quantities of fish: to the extent that the claim is based upon theoretical calculations it is therefore unreliable and to be rejected. I also am unable to accept that Snr Mesa invested the level of interest or organisation that would have been required to farm fish on that scale. The reality, I find, is that he took the opportunity to have a bigger hole dug while the pipeline workers were on his farm, but did not at any stage thereafter attempt to manage a commercial fish farming organisation. That is evidenced by the fact that he took no steps to keep the pool clear of the sedimentation that was gradually accumulating in the pool. In his witness statement he said that "the fish pond can be re-built, but the truth is that I do not have the spirit anymore to do it" {D6/100/1209}. I agree, provided that it is not being suggested that Snr Mesa's spirit was broken by anything to do with the pipeline works. I formed the clear impression as he gave his evidence and find that Snr Mesa's interest in LC54 was as a cattle venture and holiday home which, he hoped, might provide the possibility of selling off plots of land over time. If he had wanted to re-establish the fish pool, he could have done so {Day45/115:13}.

1071. It follows that I reject the fish production claim for the following reasons, each of which is a complete answer to the claim either on its own or in conjunction with the others:

- i) Sedimentation from the ROW did not make a material difference to the level of sedimentation reaching the fish pool. Any incremental contribution could have been removed from the fish pool in the course of normal maintenance along with the other sediment;
- ii) Snr Mesa stopped using the fish pool because it had become sedimented in the normal course of events and, rather than engaging in routine maintenance in the form of sediment removal, he terminated the operation;
- iii) Snr Mesa could have rebuilt the fish pool at any time but chose not to do so. The continued absence of the fish pool was therefore a consequence of his decision.

1072. Because the claim has no substance in fact, I am not going to try to determine what level of fish production Snr Mesa either had in the period from 1996 to 1999/2000 or might have achieved if he had maintained his fish pool properly and attempted to maximise his production. I merely find that, because of the very limited flow that was always a feature of W1 {H7.7/52/1852}, it was and would have been a small proportion of the level of fish production alleged in the claim.

1073. It follows that, irrespective of any further legal arguments, the claim for fish production fails.

Dead and Lame Cattle – COP117,405,289 (c£43,500)

1074. The development of the Claimants' claims for cattle deaths is traced at {C4/4.9/959}. The SOCI claimed that cattle died "as a result of the animals becoming trapped in the soft mud (average loss of 4 cows a year)" {B4.1/11/112}. The 2008 Schedule of Loss also claimed the loss of 4 cows per year but said that they "become stuck and buried in the soggy earth when they go to drink water at the streams" {B4.1/12/117}. The claim now is that 1.5 cows per year have been lost in SW2 per year since 1996 {B4.4/3/124} and will continue to be lost at the same rate in the future {B4.4/3/133}.

1075. I have made relevant findings at [1065]. It is not clear how or why the much more extensive claims that were advanced at every stage since the original SOCI were either constructed or advanced. Snr Mesa's statement that the Schedule of Loss had been read to him and his confirmation that it was a precise description of the losses the Claimants' had suffered {D6/100/1199} was not a statement that I am able to accept as having any evidential value: see [407]ff and [928]. In the light of his oral evidence, I do not understand how Snr Mesa came to include [169] of his witness statement, in which he asserted that cattle started getting stuck in the mud the year after the construction of the pipeline and that of 5 that got stuck per year, 2 die {D6/100/1203}. He should have known that his witness statement was misleading if he had troubled to read it. I am not in a position to make a positive finding whether he did or did not do so, nor is it necessary to make such a finding in this judgement. But, as with the fish pond claim, the startling disparity between his evidence and the claim advanced on his behalf, on the one hand, and the true position as he confirmed

it to be in oral evidence, on the other, casts a shadow of doubt about the processes by which his evidence and claim were constructed to which I have already referred elsewhere. It only serves to make the Court's task more difficult than it would otherwise be in trying to decide whether any part of his original evidence is reliable.

1076. The claim for dead cattle fails in its entirety on the facts because:

- i) Only one cow has died after becoming stuck in the mud on LC54. That was the cow that died in 2006 in SW2;
- ii) The state of SW2 in 2006 was not materially affected by the pipeline works, for the reasons given earlier;
- iii) The death of the 2006 cow is therefore not attributable to the pipeline works;
- iv) There have been no further deaths on La Fe 1 since 2006 and there is no reason to predict further deaths provided that Snr Mesa maintains his fences around SW2 when it is not fit for use to feed his cattle. If he does not do so, the consequences for his cattle will be attributable to his failure to keep them out of SW2. In the future as in the past, the state of SW2 has not been materially affected by the pipeline works and, for that reason also, any future deaths are not attributable to the effect of the pipeline works.

1077. As an additional observation, if cattle had suffered injury or death in SW2 with any regularity, that would be a serious indictment of the level of husbandry on LC54 given the proximity of LC54 to the house and to the operational areas of the farm: see [884].

1078. The development of the claim for lame cattle is traced at {C4/4.9/965}. The claim was first raised in the June 2012 Schedule of Loss {B4.1/23/272}. It is maintained in the same terms in the Re-amended SOL {B4.4/3/124}. The substance of the claim is that "the sedimentation of three streams on the Property led to the formation of swamp areas in or around the pastures. ... The wet or humid conditions caused by the swamp areas had an adverse effect on the cattle's health, notably leading to a loss of weight. Every year, on average 11.5 cattle became lame as a result. Señor Mesa sold lame cattle as soon as the illness was noticed and purchase a healthy replacement. However, Señor Mesa incurred an expense in the 30% shortfall between the sale price of lame cattle and that of healthy cattle." The claim is made in respect of the period from 1996 to date and continuing for the future.

1079. I have made relevant findings at [1066]. The evidence in support of this claim is startlingly vague. Snr Herrera's evidence was that the problem occurred in the summer, which is counter-intuitive: his evidence was otherwise so vague as to be of no assistance on this topic {D6/111/1294}. Snr Mesa's only reference to lameness in his witness statement, apart from his general endorsement of the Claimants' Schedule of Loss, was to say of cattle that got stuck in the mire but did not die "There are cows that become lame; they have to make more effort in their legs to find water and because it is a continuous effort, they will start to have problems with their hoofs and this causes limping" {D6/100/1204}. Even assuming that this means that making effort in their legs when finding water (which is not clear) this is insufficient to establish a causal link between the alleged effects of the pipeline and the onset of

lameness. In his oral evidence Snr Mesa made clear that he did not know the reason for the lameness {Day7/61:6}. Neither Snr Ramirez nor Snr Herrera were in a position to give reliable or useful evidence on the cause of lameness.

1080. Two things are obvious: first, if Snr Mesa was losing 30% of the value of 11-12 cows per year in this way, he would wish to identify the cause with the aid of a vet; and, second, if this claim was to be pursued, proper expert evidence to support a causal connection would be required. Neither of these things happened. The only evidence of any contact with a vet was elicited in re-examination, when Snr Mesa said that he had spoken to a vet who had been unable to diagnose the cause of the lameness {Day7/62:6}.
1081. The absence of veterinary evidence is fatal to the success of this claim. However, an additional concern arises from the terms of an interview between Snr Mesa, Dr Delgado and Snr Mesa's solicitor in February 2012, in which Snr Mesa made plain both that the problem of lameness had started relatively recently and that he (Snr Mesa) did not consider it had anything to do with the pipeline {H24.2/258.2/1237.81}. These highly relevant features were not mentioned either in Dr Delgado's reports or in Snr Mesa's statement, which was made four months later in June 2012. It is not clear how or why a claim for lameness in and from 1996 could properly be maintained in the light of the knowledge that Snr Mesa dated the onset of lameness from about 2006/2007.
1082. Dr Delgado did not examine a lame cow and was therefore unable to put forward a reliable diagnosis. He appeared to recognise this in his first report when he said "it is feasible and reasonable that the damages to the water sources and the resulting formation of the humid areas of the La Fe 1 property are responsible for the hoof problems that the Claimants report; therefore it is possible that the number of animals reported by the claimants fell sick" {H20.3/3/566}. Feasibility and possibility are insufficient to establish causation, particularly when the expert has not examined an affected animal. His underlying suggestion in support of the feasibility and possibility was that cattle had to place their hooves in muddy areas in order to access drinking water and that their hooves are therefore damp. The theory continues that the skin and the hoof remain moist during most of the day and therefore become soft so that when the cow moves around the pasture in search of grass their hooves can be injured by rocks or pieces of wood due to their fragility. It is not clear where on LC54 it is suggested by Dr Delgado that the cattle would be having to put their feet in muddy areas. Since the lameness started, SW2 has been fenced off except when it has been dry enough for feeding cattle; and the swampy areas on W1 and W3 are limited. Dr Delgado's underlying analysis was challenged by Dr Avila, whose evidence was that cattle would not stand in the swampy areas for long periods unless they got stuck there (which, notably, was not the theory being propounded by Dr Delgado). I accept Dr Avila's evidence on this point. However, it is not strictly necessary to make a finding as Dr Delgado's evidence is (in scientific terms) mere speculation with nothing to support it by way of observation of the cattle in the field or examination of a lame cow. Nor is it necessary in this judgment to accept the challenge laid down by the Defendant in its closing submissions by asking why Dr Delgado had supported this claim {C4/4.9/973}.
1083. I accept, however, the Defendant's description of this head of claim as hopeless for the following main reasons:

- i) The witness evidence in support of the claim does not support the pleaded case of lameness from 1996 and therefore removes any temporal link between the pipeline works and the alleged lameness;
- ii) It has not been established that the pipeline works made any material alteration to the state of the land on which the cattle grazed. It therefore cannot have made a material contribution to the lameness if that was a consequence of the state of the land;
- iii) There is no reliable expert evidence to establish the cause of the lameness. I reject Dr Delgado's suggestion that the state of the land meant that the hooves of cattle were moist for most of the day, preferring Dr Avila's evidence on this point. If, as a matter of fact, the hooves of Snr Mesa's cattle are moist for most of the day that is a consequence of the state of the land generally which is not materially affected by the pipeline works.
- iv) The numbers claimed are in any event exaggerated. Snr Mesa was not able to support the pleaded case of 11-12 per annum and did not know how it had been reached {Day6/123:16}. His evidence was not reliable on actual numbers but he said that of the 10-12 that went lame he would save 4-5 for fattening {Day7/63:23}.
- v) Overall, I am not satisfied that there has been any regular number of cattle going lame year on year; nor am I satisfied that the cause of the lameness within the herd is either constant or attributable to the pipeline works.

1084. It follows that, irrespective of any further legal arguments, the claims for cattle deaths and lameness fails.

Pasture Rental and Associated Claims

1085. The Claimants claim:

- i) The cost of renting pasture for 35 cattle for 6 months during construction (COP630,000, c£234) plus loss of income from milk from cattle being kept on the rented pasture (COP709,425, c£263);
- ii) The cost of renting pasture for three additional cattle between 1997 and 2002 (COP864,000, c £321);
- iii) The cost of renting pasture for 6 additional cattle for 4-5 months of the year between 2003 and 2014 (COP2,034,720, c£755);
- iv) Future pasture rental (COP3,598,560, c£1,335).

1086. The development of the claim for pasture rental is traced at {C4/4.9/976}. Before the June 2012 Schedule of Loss there were claims that Snr Mesa could no longer maintain the same number of cattle on LC54, but there was no claim for renting additional pasture as such. From the 2012 Schedule of Loss until the January 2015 Re-amended Schedule of Loss the claims stated that Snr Mesa rented additional pasture for which he paid rent. Thus "For the six months during the construction of the pipeline, Señor Mesa had to rent pasture for a futher 35 cattle, as the construction works reduced the

availability of pasture on the Property. ... In 1996, the cost of pasture rental was COP 3,000 per cow and per month. Accordingly, Señor Mesa had to expend a further COP 630,000 to accommodate his cattle during the construction of the pipeline”; and “Following the construction of the pipeline, Señor Mesa had to rent additional pasture to accommodate his cattle due to the damage to the Property. ... Señor Mesa already rented pasture for 90 cattle, but had to rent for 3 more cattle during 12 months of the year as a result of the damage to the Property’s pastures and water sources. For the period of 1997 to 2002, the average cost of pasture rental was COP 4,000 per cow and per month. The additional yearly expense in pasture rental during this period therefore amounts to COP 144,000”; and “From 2003 ... Señor Mesa still has to rent additional pastures for 6 cows that he would not otherwise have needed to rent for 4-5 months of the year during the dry season. For the period of 2003 to 2012, the average cost of pasture rental was COP 6,000 per cow and per month. The additional yearly expense in pasture rental during this period therefore amounts to COP 162,000” {B4.4/3/124}.

1087. Snr Mesa’s evidence in support of the pasture rental claims was couched in the same terms of having actually rented additional land. In respect of the three periods he said:
- i) “During the construction process I had to take the cattle out of the fields where the construction was going on, and rent pasture on a nearby farm. I had to rent pasture for 35 animals for 6 months, roughly speaking” {D6/100/1188};
 - ii) “As I said before, during the construction of the pipeline, I had to rent pasture for the cattle for 6 months. Then, as a result of the swampy areas that caused the loss of some areas of pasture and the poor vegetation on the right of way, I had to rent pasture for about 3 additional cows per year, apart from the 90 animals I already had on rented pasture. So I lost the income of the milk of these cows, which, although there weren’t many of them, were important for us” {D6/100/1203};
 - iii) After describing his renewal of the pastures by reseedling in 2003, Snr Mesa said that “I had to rent more pasture, approximately for 6 more cows during 5 months” {D6/100/1204}.
1088. Snr Herrera supported Snr Mesa’s evidence, saying that they “had to turn the livestock out onto other grass at a neighbour’s place and we had to pay for the grazing there” {D6/111/1291}. He explained the need to turn the livestock out by saying that “they” put up wire fencing at the start of the construction process but later the machinery pulled it down. He also said that (by implication later) because the grass went bad and there were marshlands they had to go on renting grazing from the neighbour.
1089. I take the post-construction claims first. Although expressed as claims for monies paid out as rent for additional pasture, that formulation was misleading and wrong. The post-construction claims are in fact notional claims based upon an assessment of the effect of the reduced load-carrying capacity of the allegedly damaged areas of LC54. The misleading nature of the formulation only emerged during the cross-examination of Snr Mesa {Day6/147:3} {Day6/157:3}.

1090. There are three reasons why the claims for post-construction pasture rental fail:
- i) The case which the Defendant was required to meet was that money had been paid out for additional pasture. That did not happen, as Snr Mesa accepted;
 - ii) If the claim were to be reformulated as a mathematical exercise based upon the claim that there is an area on Snr Mesa's farm where the pasture is not as good as it should be because of the effects of the pipeline that claim fails in the light of my finding that once the revegetation was re-established there has been no material difference between the quality of the coverage on and off the ROW and that any incremental sedimentation from the ROW has not materially affected the size, nature or development of the swampy areas of which the Claimants complain: see [1027] and [1032]ff;
 - iii) Snr Mesa's evidence made clear that a notional calculation such as had been carried out was inappropriate on the facts of this case as there is no sound basis for finding that putting three extra cattle out on rented land would in fact lead to increased expenditure. In answer to a question from the Court suggesting that such an approach would be inappropriate Snr Mesa confirmed that "you never look at the size of the farm in itself, when you want to go and rent more land you look at the size of the pasture fields and then you calculate how many cows you can put on it. Besides, they have pasture fields reserved, really, earmarked, and then they say, they distribute the cattle, I am going to put 30 here, 20 here, et cetera. So they have pasture fields in reserve for when they don't have enough space left on one, they put them on another. All properties are divided into pasture fields." {Day6/156:14}. So the amount paid out for rent would be determined substantially by the pasture fields that were available for rent, onto which the renter might put a number of cattle up to the maximum that the field would sustain. Snr Mesa made clear that the numbers of cattle he would put on rented pasture would depend upon the numbers he decided to buy {Day6/151:5}. He did not have a set number that required him to rent additional pasture.
1091. The claim is not formulated as a claim that Snr Mesa in fact kept three (or 6 head) of cattle fewer than would otherwise have been the case. Such a formulation would not work either because it presupposes that Snr Mesa always maximised the number of cattle that he could maintain. This presupposition is inconsistent with the vaccination certificates produced by Snr Mesa which show fluctuating numbers. It is also inconsistent with the evidence of Dr Velez, to which I have referred at [1024] above, that the management of LC54 was not a technical operation geared to the loading capacity of each paddock and of the farm. In the light of that evidence in particular and of all the evidence about the operation being conducted on LC54 it would be wrong to assume or find that a reduction in the theoretical load carrying capacity of LC54 would result in (a) any or any proportionate reduction in the numbers of cattle maintained on the property, or (b) any or any proportionate reduction in the number of cattle maintained overall by Snr Mesa, or (c) any or any proportionate increase in the numbers of cattle placed on rented pasture off LC54. In the light of my finding that there was no material reduction in the load bearing capacity of LC54 once re-vegetation had taken hold, these questions are hypothetical. If they were not, and it had been shown that there was some relatively modest reduction in load capacity (such as in theory might lead to the need for additional pasture for 3 or 6 cattle) I

would make findings of fact that there was no consequential reduction in the number of cattle maintained on LC54 (either proportionate to any reduction in load capacity or otherwise), nor any consequential increase in the numbers of cattle placed on rented pasture, nor any consequential increase in costs attributable to placing cattle on rented pasture.

1092. Snr Mesa's evidence about renting pasture in the post-construction period has been shown to be so unreliable and so far from the truth as to cast doubt on the reliability of his evidence about renting pasture at all. It would of course have been understandable if he had moved cattle off LC54 during the works, but it is not self-evident that he would have rented additional pasture for some or all of them given the availability of CF54 and the fact that, as I find, he routinely rented additional pasture in the years before 1996 in any event. In addition, it is evident that he kept at least some cattle on La Fe 1 during or shortly after the works because that is how the cow that died near the bridge came to be there. It is therefore necessary to examine the claim and the supporting evidence with particular care. The following material points emerge:
- i) The claim was formulated on the basis that Snr Mesa had 200 cattle at the time of the works of which 90 were kept on pastures rented from others. The claim is that the works required him to rent pasture for another 35 cattle {B4.4/3/123}. In the absence of any supporting documentation or other supporting evidence, I do not accept that the stated number of 200 cattle is accurate. Snr Mesa accepted as much {Day6/146:19}. The vaccination certificates for the periods of their availability show that numbers fluctuated and I am not satisfied that Snr Mesa has any reliable memory of numbers at the time of the pipeline works;
 - ii) Snr Mesa's evidence is vague about both the numbers and the period of renting, qualifying his evidence by the words "roughly speaking" as set out above. He has not identified the farmer on whose land the cattle are said to have been pastured and there are no supporting documents to assist the court or corroborate his evidence. At one point, when asked whether he knew what he was claiming for additional pasture he gave evidence that he took cattle out for "three, four, five months while they made good the losses on the Right of Way. So we had to rent land on another farm" {Day6/144:11}. I am not satisfied that he has any recollection of either the period or the number he stated in his evidence;
 - iii) In the course of his re-examination Snr Mesa gave an answer which suggested that, contrary to his case, the fields through which the ROW was laid were being grazed at the time of the construction works {Day7/77:20}. While it is possible that Snr Mesa's answer was based on a misunderstanding, it supports the finding that I would make in any event that there were cattle kept on those fields during, or at least shortly after, the actual pipelaying works were carried out: see [1092] above. That would limit the duration of cattle being off the fields to the period from about 8 September 1996 to shortly after 3 November 1996, approximately 2 months.
1093. The Claimants' evidence on pasture rental during and after the works is vague, inaccurate and unsatisfactory. It leaves me with no confidence that the claim is well founded in terms of period, numbers of cattle or sums paid. I conclude that there

probably was a relatively short period when Snr Mesa took cattle out of the fields through which the pipeline was being laid. I am not satisfied that it was for materially longer than 2 months in all, and I am not satisfied that Snr Mesa cleared all the affected fields for all of that period. Nor am I satisfied that he took 35 cows off to pasture belonging to other people. I find that he probably put at least some of any cows that he moved from La Fe 1 onto La Fe 2. If he did place some additional cattle on rented pasture, I am not satisfied that the exercise involved renting additional pasture as opposed to putting cattle on pasture he was already renting. Finally, I do not accept that he made payments for the additional pasture. I find that the figure claimed is a construct of what might have been paid rather than being based on any recollection or other reliable basis.

1094. For these reasons I find that the claim for renting additional pasture during and shortly after the construction works is not made out.
1095. An ancillary claim for loss of milk production from cattle pastured out on rented lands was made. It has no merit, whatever the view taken of the pasture rental claims. Snr Mesa's evidence was that "the pasture was rented for the infertile cattle or those that did not have calves, and for the young female cattle, in other words, the cows that were not producing milk. This way I did not lose any milk from the cattle on the rented pastures on other farms" {D6/100/1178}. Even in the absence of this evidence I would have rejected as incredible a suggestion that a farmer such as Snr Mesa, who had long notice of the coming of the pipeline, would have put lactating cows onto rented pasture where he could not milk them, leaving them to suffer the pain of enforced drying off (not to mention his own loss of income) that would inevitably follow from such a course.
1096. It follows that, irrespective of any further legal arguments, the claims for renting additional pasture and associated loss of milk production fail.

Entrance Road and Canalisation Works (COP4,100,000, c£1,522)

1097. This claim was first mentioned in the Claimants' 2012 Further Information {B2.2/33/398}. The allegation is that the Claimants did the canalisation works because, as a result of the pipeline works, sedimentation filled the channel of W1 so that during heavy rains it burst its banks and flooded the surrounding area, including the area of the gravel pathway from the house to the highway. It is alleged that the Claimants repaired the gravel path repeatedly. The Re-amended SOL pleads that the repair work to the entrance road started in about 2001 and that Snr Mesa applied 10 loads of sand and gravel, using approximately 2 loads per year until he carried out the canalisation works.
1098. I accept Snr Mesa's evidence that the canal was built to prevent the flooding of the entrance road {Day7/44:14}. Also, as found elsewhere, he was right to accept that the flooding had occurred before the pipeline {Day7/45:25}. This claim fails because the wetlands and flooding associated with W1 existed before the pipeline works and were not materially aggravated in their size, development or nature by any contribution from the ROW. The dumping of loads of sand and gravel was an attempt to improve the state of the drive but was not made necessary by sedimentation from the ROW: the need to deal with the effects of flooding on the drive would have existed anyway. The canalisation works were an effective remedy to the flooding problem below the

fish pool, but sedimentation from the ROW neither caused nor made a material contribution to the need for the works.

1099. Given my finding of fact on the cause of these works, it is not necessary to consider the sums claimed in any detail.
1100. It follows that, irrespective of any further legal arguments, the claims for works on the drive and canalisation works fail.

Fencing (COP5,000, c.£2)

1101. The need to fence SW2 in and from 2006 was not attributable to sedimentation from the ROW, for the reasons set out earlier.
1102. It follows that, irrespective of any further legal arguments, the claim for fencing fails.

Re-seeding the ROW (COP200,000, c £74)

1103. I have already referred to the lack of clarity about re-seeding on LC54: see [1062] above. This claim was not advanced or mentioned until the Claimants' Further Information in June 2011, which referred to Snr Mesa having sowed the section of the ROW on his property in accordance with his contract with Dinosaurios and averred that "the Claimants subsequently sowed "brachiaria [decumbens] on the ROW on their property in approximately 1999. This seed did not prosper and the Claimants have not attempted to sow grasses or other vegetation on the ROW since then. Other areas of pasture sown in this manner outside of the ROW at this time have grown successfully. However, this has not been the case on the ROW" {B2.1/17/117}. The assertion that the Claimants have not attempted to sow grasses or other vegetation on the ROW since 1999 is wrong, not least because Snr Mesa re-seeded the farm generally in or about 2003, including the ROW.
1104. The Claimants' Further Information in February 2012 referred to Snr Mesa having sown in accordance with his instructions and continued that "the following year [Snr Mesa] re-sowed the same seed again, on the whole pasture, however vegetation has never grown adequately on the ROW and the seeding has not been repeated" {B2.2/33/396}. This would imply that Snr Mesa sowed the whole pasture, both on and off the ROW in 1998 (that being the year after his initial efforts). It is again wrong in suggesting that the ROW was not re-seeded after that. Because of their demonstrable unreliability on a matter as important as whether the ROW was re-seeded again subsequently, I am unable to rely in any way upon the contents of these two pleadings as evidence of what happened.
1105. The claim is currently formulated at [47]ff of the Re-amended Schedule of Loss in the following terms: "In or about 1998, Señor Mesa re-seeded the ROW when vegetation sown after construction did not take. As described above, the vegetation over the ROW is of poor quality, and as set out in the Further Information in respect of Señor Mesa, revegetation measures for the ROW were inadequate. As a result Señor Mesa took the step of sowing Brachiaria Decumbens grass seed on the ROW in order to improve the quality of vegetation cover. However, this was unsuccessful and the seeds did not take. The cost of the seeds amounted to approximately COP200,000" {B4.4/3/126}.

1106. Snr Mesa's evidence sheds no light on this claim. Although he refers to re-sowing the whole farm in 2003, he does not refer at all to re-sowing the ROW. There is therefore no evidence about a re-seeding exercise in 1998. It is therefore realistic of the Claimants to acknowledge in their written closing submissions that, although Snr Mesa discusses re-sowing in his witness statement "he displays a lack of clarity about dates" {C4/3.7/1022}.
1107. I accept, on all the evidence in the case, that steps were taken to improve the position on at least part of the ROW between the initial re-vegetation by Snr Mesa and when he re-seeded the entire farm in about 2003. However, the evidence does not establish when, where, how or at what cost those interim steps were taken, save that it was probably in about 1998 or 1999. There is no evidence at all on the basis of which I could conclude that the Claimants incurred COP200,000 or any other sum of expenditure even if the other evidence about this claim were satisfactory, which it is not.
1108. I note in passing that the Claimants do not address this head of claim in their closing submissions on quantum {C4/3.7/1085}ff. Whether that was an omission or a withdrawal of the claim, it has not been proved that the Claimants incurred any costs as alleged and the claim therefore fails on the facts.
1109. It follows that, irrespective of any further legal arguments, the claim for re-seeding fails.

Fruit Trees (COP18,898,093, c£7,012)

1110. The original SOCI alleged that "Quality of soil has been adversely affected resulting in the reduction fruit production. The Claimants can no longer grow crops on the Affected Property. A large number of fruit trees were damaged by the heavy machinery that was used during the construction process" {B4.1/11/113}. And "As a consequence of the lack of water on the farm the land became extremely arid and the quality and production level of the fruit trees was significantly reduced. ... Some of the Claimants' fruit trees were damaged by the heavy machinery that was used during the construction process. The damage caused to this area of the right of way has rendered them completely unproductive. The Claimants have not been successful in growing new vegetation on this area of the farm as it appears to be infertile." {B4.1/12/118} I note in passing that the reference to the ROW becoming completely unproductive and infertile was a gross exaggeration; and that this was the SOCI that produced the astounding claim figure of COP3.9 billion, which is of itself sufficient to cast doubt on all and any assertions made in it. That said, the claim for fruit trees appears to have been related to damage to trees on or near the ROW, though the reference to the farm becoming arid was entirely general and not limited to the ROW.
1111. The Particulars of Claim alleged that "a large number of fruit trees were also damaged during the construction process" {B1.3/6/551}. The 2011 Further Information alleged that "there were approximately 20 fruit trees (lemon, mango, and guayaba) ... on the ROW. All were cut down during the construction process" {B2.1/17/115}. Later, in answer to a request to identify the areas of the property which had been used for growing fruit but which had been adversely affected by the construction of the OCENSA pipeline, it alleged that "the areas of fruit trees affected by the construction were found in the lower part of the farm, where the ROW passes towards the southern

exit point. The areas affected were to the sides of the ROW spreading for 100 to 200 metres on either side of the ROW. The trees were growing in this area prior to the construction of the ROW” {B2.1/17/131}. It does not clarify whether any (and if so how many) trees in addition to the 20 alleged to have been cut down on the ROW there were in the affected area. The implication of the Further Information is that the loss of fruit trees was something that happened during or immediately after construction.

1112. The 2012 Further Information identified the area of SW2 as implicated. It alleged that fruit trees were cut down both on and off the ROW during construction and that others were destroyed “during and shortly after construction by sediment from excavated and/or eroded material from the ROW (or from near the ROW) and/or from water logging and/or flooding of the three streams” {B2.2/33/396}. This marked a significant extension in the nature of the claim but it remained the Claimants’ case that there was a close temporal link to the pipeline works.
1113. The annotations to the CAI identified Point 17, which was near to the intersection of W2 and the ROW as being “Area of affected fruit trees” {B2.3/48/549}.
1114. By their Re-amended Schedule of Loss the Claimants allege that 10 guava trees, 3 mango trees and 4 lemon trees were felled during the construction works {B4.4/3/129}ff. The Claimants’ case is that other fruit trees were destroyed during and shortly after construction from excavated and/or eroded material from the ROW (or from near the ROW) and/or from water logging and/or flooding of the three streams: see, for example, {B4.4/3/130} at [71]. 20 guava trees are alleged to have been lost in this way “in the area around swamp areas 1(a), (b) and (c) ... and in fields AF2 and AF3 and the confluence of the 3 streams, which is a swamp area (Image/SW2)” {B4.4/3/129} at [66]. 5 mango trees and 3 lemon trees are alleged to have been lost in the same way and the same area {B4.4/3/130} at [71], {B4.4/3/131} at [76]. The numbers claimed in closing submissions are 10 guava trees, 12 mango trees and 11 lemon trees {C4/3.7/1028}, or 30 guava trees, 12 mango trees and 11 lemon trees {C4/3.7/1091}.
1115. The evidence on the felling of trees is sparse. For the most part, the ROW passed through pasture with occasional non-fruit trees also being present. Despite that, I accept that some fruit trees were felled during the construction works, but I am not satisfied that it was in the numbers alleged. Had there been that many trees on the ROW or in positions that meant they were liable to be cut down, I consider that Snr Mesa would have ensured that they were noted on the ROW Agreements as specific damages, which he did not do. Alternatively, if that number of trees had been felled which had not been noted on or covered by the ROW Agreements, I consider it probable that he would have claimed for them when making his claims in 1997, which he did not do. Snr Mesa knew at the time that the Paz y Salvo for the ROW covered the damage that had been caused on the ROW, including fruit trees {Day6/114:12} so that it was his understanding that he could not later bring a claim for them, despite the fact that they had not been mentioned in the settlement agreement or the Paz y Salvo itself {Day6/131:18}. I will consider the legal significance of the Paz y Salvo separately: but it is relevant here to the question whether there were the numbers of fruit trees on the ROW that are now claimed. The fact that he did not raise them separately as items of claim in 1997 supports my conclusion that there were fewer trees than now alleged. In the absence of any satisfactory or reliable evidence from

the Claimants on numbers of fruit trees on the ROW before the pipeline works were carried out, I find that about four fruit trees, at the outside, were felled during the works. The evidence does not permit a finding as to whether those trees were mango, lemon or guava trees.

1116. Snr Mesa's evidence about the trees that died subsequently was that they "gradually dried out" {D6/100/1205}. His wife's evidence was that the trees she could see from the house "were very dry ... they were just dry branches" {D6/105/1251}. This is different from the original assertion that *the land* was arid. Dr Obando supported this claim on the basis that "according to [Snr Mesa's] statement, the sedimentation caused prolonged flooding in the areas with pastures, crops and trees. This prolonged flooding caused the death of several plant species that are susceptible to oxidative stress. ..." {H3.10/20/2325}. He was supported in this analysis by Dr Velez {H5.7/12/1747}. The view of both experts was predicated on the formation of the swampy areas being caused by sedimentation from the ROW, which I have rejected as the correct explanation for the flooding, progressive sedimentation and formation of swampy areas on LC54. It follows that I reject the suggestion that fruit trees off the ROW were killed in the way alleged by the Claimants or for any reason attributable to the pipeline works.
1117. Dr Velez's support for the claim on the basis of sedimentation in the swampy areas and the Claimants' perseverance with it are surprising and troubling in the light of the transcript of Dr Velez's interview with Snr Mesa about the death of the trees. At {H24.2/246/1178} Snr Mesa told Dr Velez that there had not been fruit trees in the swampy areas. The understanding that the trees were not affected by the swampy areas was expressly confirmed by the Claimant's solicitor who was in attendance.
1118. Because the Claimants' case in relation to fruit trees off the ROW fails on the facts, it is not necessary to say anything about the numbers claimed save to record that I satisfied that they are inaccurate. In particular, to the extent that the Claimants' case asserts the loss of fruit trees in SW2, I reject it because there were no fruit trees in that area. {H24.2/255/1228}ff strongly suggests that Snr Mesa had no clear idea of how many trees he had or how many were lost, an impression that was reinforced to the point of certainty by his cross-examination at {Day6/139:11} ff.
1119. Assessing quantum on the basis of four unidentified fruit trees cut down during the works on the ROW is not straightforward, for two main reasons. First, the value of fruit trees to the Claimants varies according to type, with the annual net income from mango being higher than the annual net income from lemon or guava. Second, the Claimants have subsequently planted new fruit trees around the house, which their closing submissions accept can be taken into account as mitigation of any loss {C4/3.7/1091}. There was no reason why replacement trees could not be planted at any stage after the pipeline works had finished. If replacements were not planted, it suggests that the remaining fruit trees were sufficient to the Claimants' needs and additional product would have been surplus to requirements. I conclude that the Claimants have not shown any continuing loss for a period of more than about 10 years, during which time replanting and effective mitigation could have been achieved. Because it is not possible to identify the type of fruit trees, I adopt a figure that is loosely based upon the annual claimed production for lemon trees, which are the middle-ranking trees in terms of net income according to the Re-amended Schedule of Loss. At {B4.4/3/131} the Claimants allege that the net annual income

from 7 lemon trees would have been COP62,790. That equates to approximately COP6,900 per tree per year. Four lemon trees for 10 years would therefore equate to COP276,000. Allowing for the possibility that one or more of the trees may have been a mango tree, I would round that up to COP500,000 (or approximately £185).

1120. It follows that, subject to any further legal arguments, I find that the carrying out of the pipeline works caused the Claimants to suffer a loss of four fruit trees on the ROW, which in turn caused them to suffer loss in the sum of COP500,000 (approximately £185).

Moral Damages

1121. I have set out the principles applicable to the awarding of moral damages at [194] above. The Claimants summarise the basis of their claim for moral damages in their closing submissions: “The Claimants have suffered due to witnessing the damage to their farm, in particular the damage to water sources. They have no longer been able to have the same enjoyment of the property as a holiday home, and this has caused them emotional distress and loss of enjoyment” {C4/3.7/1097}.

1122. On the basis of my findings of fact about the causes for the progressive sedimentation of water courses and my rejection of the Claimants’ factual case that there has been substantial damage to LC54 as a result of the pipeline works, there is no proper or principled basis upon which an award of moral damages could be made.

Damages for loss of amenities of life

1123. I have set out the principles applicable to the awarding of damages for loss of amenities to life at [198] above. The Claimants summarise the basis of their claim for damages for loss of amenities of life in their closing submissions: “The lost income from the farm has meant that they are no longer able to support the same quality of life in Medellin as they had previously. They have no longer been able to have the same enjoyment of the property as a holiday home, and this has been distressing for them” {C4/3.7/1097}.

1124. On the basis of my findings above, the Claimants have not lost any appreciable income as a consequence of the pipeline works. While the progressive sedimentation of their water courses has affected the property over time, that is not caused or materially contributed to by the pipeline works. For these reasons, there is no proper or principled basis upon which an award of damages for loss of amenities of life could be given.

1125. In summary, I reject the Claimants claims that they have suffered loss or damage as a consequence of the pipeline works, save that I accept that some fruit trees were cut down on the ROW in the course of the works. The economic consequence of the cutting down of those trees is assessed to be COP500,000.

Bases of Claim

1126. The Claimants included claims for damage on and off the ROW. The claims for pasture rental, re-seeding the ROW and loss of trees that were felled during the Ocesa works were for damage on the ROW. The balance of their claims (i.e. the fish

pool, dead and lame cattle, post-construction pasture rental, the entrance road and canalisation works, fencing of SW2 and loss of trees off the ROW) are for damage off the ROW. On my findings, they have proved that the loss of four fruit trees on the ROW was attributable to the Ocesa works and that the loss of the trees caused them to suffer loss in the sum of COP 500,000.

1127. There were two ROW Agreements: see [962] and [964]. Taken together, the Annexes referred specifically to damage to improved pastures and barbed-wire fences. Although not specified, I would hold that the ROW Agreements covered trees growing on the ROW since both parties would have known that it was inevitable that trees on the ROW would be uprooted or felled. For reasons given earlier, the ROW Agreements did not cover damage suffered off the ROW.
1128. The ROW was stripped between 8 and 14 September 1996. Initial revegetation took place in March 1997 but was not satisfactory, so that remedial works were undertaken, probably in May 1997. On my findings, the Defendant was subject to the dangerous activities doctrine as guardian. Accordingly, it would be liable to the Claimants for the damage to the trees unless its liability is excluded or extinguished.
1129. The history of Snr Mesa's claims and settlements is set out at [1050] above. In briefest outline, Snr Mesa went to Saipem's offices on numerous occasions to complain. He went both on his own behalf and on behalf of other claimants for whom he was acting. Snr Mesa's first settlement with Ocesa alone was made on 6 March 1997. By then any damage to the ROW was done, though the unsatisfactory results of the initial revegetation may not have been apparent. He then complained to Saipem on 30 April 1997 reiterating complaints he had been making since December 1996 and entered into a settlement with Saipem and Ocesa on 5 July 1997. He then signed Paz y Salvos for Ocesa and Saipem respectively on 11 August 1997, which expressly excluded the claim for the cow that had died because of the lack of the bridge on or near the ROW. He could have tracked down Ocesa at any stage if he had wanted to look to them for compensation.
1130. For the reasons set out in Sections 3 and 7 above, Snr Mesa's conduct in pursuing and settling with Ocesa and Saipem rather than with the Defendant amounts to tacit acceptance of the assignment of the ROW Agreement by the Defendant as assignor to Ocesa as assignee. That has the effect that the Defendant can no longer rely upon the invoking of Article 5 in the ROW Agreement.
1131. The settlements with Ocesa alone and with Ocesa and Saipem, whether taken on their own or read in conjunction with the Paz y Salvos, effected a settlement of all claims on and off the ROW (present and future) as between the Claimants on the one hand and Ocesa and Saipem on the other. In doing so, they effected a novation by substituting the new contractual rights and obligations under the settlements in place of any existing or future obligations in tort. As a result, any liability which the Defendant might otherwise have had to the Claimants for the damage alleged to be attributable to the Ocesa works (including liability for trees felled on the ROW) was extinguished by novation.

Conclusion

1132. The Claimants' claim fails.

13. LC74 in Detail

1133. Section Index:

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Introduction

1134. The Claimant is Snr Rogelio Velez Montoya whose property, La Nieve, falls within Spread B and is in the municipality of Remedios in the Department of Antioquia. The land through which the ODC and Ocesa pipelines ran is approximately 47 hectares, and was inherited by Snr Mesa from his father. His ownership of that land was formalised by INCORA Resolution 0333 in February 1986 {M/168T/584.1}. Subsequently Snr Velez acquired a further 33 hectares adjacent to the land he had inherited. The dates on which he acquired these additional parcels of land and precisely where they are have not been explained. The 80 hectares are run together as

one farm and are collectively called La Nieve {D8/125/1485}. Little or no evidence was given about the collective operation of La Nieve. I shall refer to the 47 hectares Snr Velez inherited as LC74 and shall refer to La Nieve when I mean the larger unit of Snr Velez' collective 80 hectares.

1135. Snr Velez is a tough and canny campesino farmer who can neither read nor write. He did not show signs of being overawed, and was quite able to hold his own in cross-examination, which he did with courtesy at all times. He was firm in much of the evidence he gave. Often, as I find, he was unjustifiably firm in giving apparently clear and certain answers that were wrong. Those representing him submit that this misplaced certainty was a cultural response, particularly when being asked about dates. I accept that his grasp of dates as such was limited and that he sometimes found it easier, when trying to give an account, to give it by general reference to whether something happened before or after other events rather than by saying specifically (by date) when it happened or how long before his narration it took place. To that extent I accept the Claimants' submission summarised at {C4/3.7/1227} ff that he had difficulty recollecting dates, sometimes appeared to use a period of "three years" as a default expression for variable periods, and that he could be suggestible as to dates. Although I accept that he found it easier to deal with dates by general reference to other events, it does not follow that his evidence when given in that way was any more reliable than when he tried to be more specific as to dates or periods. Overall I find that he was not a reliable witness about when things happened, even on those occasions when he gave an account in his evidence in a manner consistent with an account he had given previously. This is a particular disadvantage for the Claimant and the Court given the fact that, as with many campesinos, Snr Velez did not routinely keep documentary records.
1136. Snr Velez accepted that he always knew how to complain about the Ocesa works and that whenever he noticed damage, he complained {Day4/123:24} {Day4/125:7}. Documents have been disclosed which show Snr Velez to be a man who has always known how to complain and would do so if he thought that some wrong was done to him; and that he was ready and able to mobilise others (such as a notary {M/186T/747.3}, the local ombudsman {M/186T/747.9}, and groups of complainants {M/186T/747.14}) to work on his behalf if he thought appropriate. I rely upon that demonstrated ability in support of my initial description of Snr Velez as tough and canny. He told the Court that he had earned respect in his region because he had stood up to guerrillas {Day5/85:3}, which I accept. The disclosed documents also demonstrate beyond argument to the contrary that LC74 sustained damage as a result of the laying of the ODC pipeline, that Snr Velez claimed in respect of such damage and that he was compensated for it. The precise significance of that damage will be considered later; but the general thrust of Snr Velez' evidence, that he did not anticipate that the Ocesa pipeline would cause problems because the ODC one had not caused many problems {D8/125/1495} is unsustainable and wrong.
1137. Viewed overall, I formed the clear impression that the Claimants' lawyers were too protective of Snr Velez and overstated his asserted vulnerabilities. He was astute and quick to follow points that were being made, including being quick to pick up points that were suggested when his lawyers intervened on his behalf. While I accept that he is not familiar with sophisticated technology, he evidently knew how to use a mouse {Day5/58:17}, and I do not accept that he was particularly vulnerable as a witness

when being asked to look at images of his farm, including aerial images (on which his evidence was inconsistent – {Day5/29:15} {Day5/34:21} cf {Day5/35:24}). I formed the view at the time, which re-visiting the transcript has confirmed, that there was an inexplicable distinction between his professed difficulties in understanding photographs in cross examination and the ease with which he understood them in re-examination: see, for example, {Day5/111:20} ff.

1138. Reviewing Snr Velez’ evidence for the purposes of writing this judgment has confirmed the view that I formed provisionally during the trial: his canny toughness showed itself in his ability to take a line and stick to it, but it did not make him a witness whose evidence could be accepted without considerable scrutiny. He was, in my judgment, a poor historian whose evidence could not generally be relied upon on any matters of detail or on some of the more general strands of his evidence. While some of his difficulties with dates were understandable and excusable for the reasons I have summarised, other inaccuracies in his evidence could not be so readily explained.
1139. Two other witnesses of fact gave evidence in support of Snr Velez’ claim. The first, Snr Perez, kept cattle on La Nieve from about 2000 to 2010. In his witness statement he said that he started to experience problems in about 2002 or 2003; but in oral evidence he said that the problems started in 2009 {Day5/134:1} ff. That provides a sensible chronological explanation for his decision to remove his cattle soon after, in 2010, and I accept it. The second, Snr Jaramillo, helped Snr Velez build his new house – of which more later. On the Defendant indicating that it did not wish to cross-examine him in the light of Snr Velez’ evidence, his statement was admitted in written form.
1140. The Claimant’s claim as set out in the original SOCI was for COP 375,178,511 (c.£140,000). The final formulation of the claim in the January 2015 Re-amended Schedule of Loss amounted to COP 323,401,226 (c.£120,000) {C4/4.22/1452}. The largest heads of claim relate to loss of fruit from fruit trees (c. COP 100,000,000, c.£37,360) and cedar trees (c. COP 32,000,000, c. £12,000). Loss of income from having to reduce the numbers of pigs on LC74 from 10 to 2 (c. COP 103,500,000, c. £38,000) and costs associated with moving house (c. COP 46,500,000, c. £17,500) make up the remaining major heads of claim, though there are also claims in respect of the deaths of cattle, dairy products from the dead cattle, pasture rental and loss of dairy products from cattle on rented pastures, and loss of fish from fish pools make up most of the balance.

Description of the Property

1141. La Nieve is in the Central Cordillera, which is characterised by steep-sided slopes. {H3.5/5/1109} provides a good overview of the type of terrain in which La Nieve is situated. It is much more challenging terrain than that encountered on LC54. The ODC and Ocesa pipelines followed generally the same route from south to north through LC74, with the Ocesa pipe being laid some metres to the east of the ODC pipe {H2.3/3/880}.
1142. The overall length of the Ocesa pipe as it passes through LC74 is approximately 429 metres, from its entry point at 428+071 to its exit at 428+500. From the southern entry point the ROW runs along a ridge [“the Ridge”] with gentle gradients along the

Ridge and to the east but much steeper slopes to the west. At the northern end of the Ridge there is a marked change, with a steep slope [“the South Slope”], down which the ROW passed into and across a small valley before climbing up an almost equally steep slope on the other side [“the North Slope”] to its exit from LC74. Where the Ridge has an average gradient of about 9%, the South and North Slopes have average gradients of about 30% {H2.3/3/891}, with parts being steeper than that: see the summary of readings at {H1.6/24/1454}. Flowing through the valley between the South Slope and the North Slope is the main watercourse on LC74, known as W1 (or, sometimes, as “El Coco”), which flows through the valley from west to east. The area where the ROW crosses W1 is known as the Quebrada Crossing. In rough terms, the distance from the ROW’s southern entrance to LC74 to the northern end of the Ridge is about 150 metres (from 428+071 to 428+220); the distance from the northern end of the Ridge (roughly where the South Slope starts to take over) down to the Quebrada crossing is about 120 metres (from 428+220 to 428+340); and the distance from the Quebrada crossing to the top of the North Slope and exit is about 160 metres (from 428+340 to 428+500).

1143. The discussion of LC74’s case requires knowledge of other landmarks and features, which can again be described going roughly south to north. When the ODC and Ocesa pipelines were laid, Snr Velez and his family lived in a house in the valley to the west of the Ridge, near to which they had various other structures including a pig pen and a chicken hutch. Stream W1 rose in the valley below and to the West of the Ridge towards the south of LC74. It joined another stream, W2, which rose not far away. Snr Velez got water for the old house and his animals by gravity from stream W1 at a point after it had merged with stream W2. There was another small water source, emerging from a spring known as SP5, which rose on the same western side of the Ridge, about half way along the length of and 50 metres below the Ridge. Water from SP5 and any other water from its small catchment valley would run into W2 at a point upstream of where W2 merges with W1.
1144. Towards the northern end of the Ridge there was a gate on the western side which gave onto the south-western valley above the Claimant’s old house. Tracks and erosion immediately below that gate and above the old house were a source of considerable argument, to which I will return.
1145. The eastern side of the ridge was relatively flat. About half way along its length and a little distance to the east a small spring (SP6) rose and fed a minor watercourse that headed east. The most prominent feature now on the eastern side of the Ridge is the Claimant’s new house, which stands well up the slope above his new corral, pens and water tanks. That is now fed with water that is pumped from W1 near to but further upstream than the point from which he drew his water for the old house. The point from which he draws his water now is upstream from where W1 and W2 merge.
1146. Going further north along the ROW, it is immediately obvious (and common ground) that the South Slope is much steeper than the Ridge and that it would present much greater challenges for the laying of a pipeline than anything encountered on the Ridge (or, for that matter, anything encountered on LC54). As it presents now, there is clear evidence of a substantial cut in the slope to the east in the upper reaches of the slope and, for anyone who has read thus far in this judgment, it is obvious that there would be a need to store significant quantities of soil during the works.

1147. To the northern side of the Quebrada crossing and to the east of the main line of the ROW there were four springs (SP1, SP2, SP3 and SP4) which the Claimant alleges were free-flowing and fed into stream W1 as it flowed to the east. Then, shortly beyond the crossing, the North Slope climbs sharply out of the valley. It is common ground that its steepness and topography caused significant challenges for the laying of the pipeline, once again giving rise to the need for substantial cutting into the slope on its western side near to the top of the slope.
1148. Two more features bear mention at this stage. First, there is a concrete longitudinal channel to the east side of the South Slope. Second, there are some gabion walls part way up the North Slope and to the east of the ROW, which were installed as a protective measure against the flow of sedimentation from the North Slope.
1149. There are photographs which show the features to which I have referred and which provide a clear context for the Claimant's claims. I provide further description and findings by reference to those photographs.
1150. The Claimant's aerial image ("CAI") was amended during the trial and is at {C6/19}. It shows the three main areas of alleged damage, which may be summarised as being (i) the Ridge and the slopes to its west, on which are to be found SP5, the old house and the area marked AF2; (ii) the Ridge and the area to its east, including AF3 and SP6; and (iii) the area of the North and South Slopes, AF1 on the upper reaches of the North Slope, the Quebrada crossing, SP1-SP4 and the main area of alleged swampiness downstream of the Quebrada crossing.
1151. {L7/851/866} provides a general view of LC74 with the ROW going from right (south) to left (north). A number of features stand out prominently. The Ridge itself looks in reasonable condition to the untrained eye. The main western slopes below the ridge appear to be almost triangular, falling down from the line made by the Ridge from its entry point to the gate above the old house. There is a line of exposed soil going down from the gate towards the old house. To the south of that line it is just possible to see the lie of the land within the triangle, which provides a small catchment area including SP5 in its middle. It is not clearly apparent from this photograph, but I find on this and other evidence that the exposed area coming down from the gate runs either on or just beyond a ridge that forms the northern limit of that catchment area.
1152. The area to the east of the Ridge, and the position of the new house and corrals can clearly be seen, as can the marked change in the slope as the ROW reaches the top of the South Slope. The photograph shows the exposed soil of the cut slope to the east of the South Slope, stream W1 flowing away from the camera to the Quebrada crossing and beyond, and the North Slope.
1153. An annotated version of {L7/851/866} is at {L8/6/879}. It identifies many of the features to which I have referred. Its particular value is in showing the triangular area to which I have referred (which is described as AF2) and the flow of the stream down from SP5, which passes by the old house to join W2 before W2 in turn joins W1. Although not clear from the photographs, as Snr Velez got his water by gravity from W1 after it had joined W2, it follows that the merged streams were above the level of the old house at that point. As delineated on this annotated image, the clear erosion below the gate from the Ridge is just outside AF2, which is correct because of the

presence of the ridge on which the erosion is found. And it highlights the fact that the clear erosion is directly above the old house.

1154. A general view of the Ridge is provided by {H2.4/4/905} (on which Dr Savigny has applied annotations that I accept as being broadly accurate). It shows the topography of the Ridge itself to be uncomplicated. {H5.4/5/956} is a general view of the ROW looking south from near the gate that is above the old house. {H5.4/5/957} provides the reverse view from near the entry point of the ROW towards the new house and pens, with SP6 being off to the right in an area with no more than gentle slopes. These two photographs were taken for Dr Velez' original report during the dry season. A similar view is given by {H7.4/4/1007}, taken by Dr Tobon in November 2011. These photographs show the ROW reasonably well vegetated along the Ridge. {H8.13/13/3376} is a similar view of the ROW looking south along the Ridge taken on 24 June 2010 (during the wet season). Dr Obando was grudging in his acceptance that it shows dense unweeded pasture in good condition {Day32/28:11}, which it clearly does. Dr Card's reaction to the state of the Ridge as shown in {H2.4/4/905} (which was taken on 19 July 2012, also during the wet season) was not grudging: he agreed that the Ridge was in "splendid" condition {Day26/97:24}. To similar effect, {L7/847/862} shows the Ridge looking north towards Snr Velez' new home and corral, with grass that appears to be abundant and in good condition.
1155. Turning to the slopes to the west of the Ridge, Dr Tobon's annotated photograph at {H7.4/4/967} illustrates that SP5 emerges part way down a channel and is not directly above the old house. The channel in which SP5 rises can be seen clearly at {H7.4/4/1000}, which also shows the significant slope up to the left of the channel towards the ridge that I have described as coming down from near the gate on the ROW. The area of erosion coming down from the gate on the ROW is directly above the old house, as is clearly shown by {L7/848/863}, {L7/850/865}, {L7/852/867} and {L7/853/868} and {H2.4/4/908}.
1156. Moving to the North and South Slopes, {L7/852/867} provides a good general view of the two slopes and the Quebrada crossing. There are exposed areas of soil where cuts were made to the east of the ROW at the side of the South Slope and heavily trafficked paths up and down each slope. {H5.4/5/958}, taken in January 2012, provides a similar view and illustrates the exposed area where the cut was made to the east of the South Slope and the relative lack of vegetation on parts of the South Slope. {L7/849/864} shows the South Slope and its relationship with the Ridge, the gate on the ROW at the top of the slope and the area in which the old house is situated. {H2.4/4/909} provides a view of the longitudinal channel to the east of the South Slope, also seen in a more general view of the South Slope showing the bare track down the slope as it was in February 2011 {H5.4/5/969}. {H1.1/1/215} shows scouring and erosion at the bottom of the longitudinal channel, where water is funnelled back onto unprotected soil.
1157. The Quebrada crossing is shown from the air by {H7.4/4/971}, which provides a useful indication of the position of SP1-SP4 and the direction of their flow. {H7.4/4/972} gives a view from in the valley, looking downstream and with the area SW1 outlined by Dr Tobon. A contrasting view is provided by {L7/855/870} which shows the crossing with the path from the South Slope coming to the water from the right and continuing up the North Slope to the left.

1158. {H2.4/4/940} shows the North Slope with the well-worn track up it which can be seen on other photographs. The position of soil cement sack and gabion walls is indicated on the lower reaches of AF1, near to and above the position of SP1-SP4. Towards the top of the North Slope the profile becomes complicated, as illustrated by {H2.4/4/942} and {H2.4/4/943}. Looking straight up the North Slope and working from left to right, there is a cut at the left hand side (which I find was made in the course of the ODC works and call “the ODC Cut”), then a relatively flat area before a further fall (less steep than the ODC Cut) caused by another cut (which I find was made in the course of the Ocesa works and call “the Ocesa Cut”) and another relatively flat stretch to the right hand side of the ROW. The ODC Cut is approximately 5 metres in slope length and falls at an angle of about 42° below the horizontal: it is therefore about 3.3 metres in vertical height from top to bottom. The Ocesa Cut has a short section of similar steepness to the ODC Cut but is in general less prominent and steep {H2.4/4/944}. Apart from the evidence that the two cuts are attributable to the ODC and the Ocesa works respectively, the precise boundaries of (and overlap between) the two ROWs cannot be identified.
1159. A contrasting picture, which provides context for some of the allegations that will be examined later, is to be found at {H21.5/5/1341} which shows deep erosion on a steep slope remote from the ROW.
1160. Historical aerial photographs are available from 1968, 1985, 1995, 2009, and 2010 which provide additional useful information:
- i) In 1968 the area of LC74 was completely covered by forest {L1/63/63};
 - ii) By 1985 the area of LC74 was approximately 30% cleared {L1/121/121} {L1/127/127}. This is consistent with Snr Velez’ evidence that the land was dense forest when he started working on it and that he got 10-15 people to help him clear it {D8/125/1485};
 - iii) By 1995 much of the property had been deforested, including land to the east of the Ridge to make the field in which SP6 is found. The old house is plainly visible, as is evidence of disturbance caused by the ODC works {L1/181/181}. The new house had not been built. I accept Dr Savigny’s evidence (as summarised on his image LC74-2 {H2.3/3/894}) that the image shows a disturbed area close to but generally downstream of the Quebrada crossing on its northern side, water bars on the South Slope, a construction cut into the slope to its east and a longitudinal channel down the eastern side. Dr Savigny assesses that the cut slope to the east of the South Slope is 90-100% exposed soil, which I accept as a reasonable general assessment. The image also shows that the slope immediately above the old house is subject to erosion with what Dr Savigny described as a “channelized erosion scar” {H2.3/3/894}. The image shows no sign of a fish pool. I return to Dr Savigny’s analysis of this image later;
 - iv) The 2009 aerial image {L2/445/445} shows many of the features identified by the experts on their visits. Dr Savigny’s annotation of the image at {H2.4/4/903} usefully identifies the paths of the ODC and Ocesa pipelines, the position of the old and new houses, the cuts into the slope adjacent to the

North and South Slopes, the area identified as being disturbed in 1995, the Quebrada crossing and numerous livestock trails;

- v) The 2010 aerial image {L2/771/771} shows that further deforestation has taken place. Dr Savigny has provided an annotation of the image which shows the drainage patterns on LC74 {H2.6/8/1650}, which provides a useful visual summary of W1 and W2 rising and being joined by the water from SP5 before passing to the west of the old house on their merged journey to the Quebrada crossing.

The Pleaded Case on the Impact of the Ocesa Pipeline

1161. The Particulars of Claim (which incorporated the original Schedule of Loss) alleged that the construction of the pipeline caused extensive damage as set out at {B1.4/8/714}ff. In briefest summary, the damage alleged in the body of the Particulars of Claim (which was in similar terms to the damage alleged in relation to LC54 as summarised at [946] above) was:

- i) Removal of “the extensive, thick, natural vegetation, which had covered the ROW” and revegetation that was “thin and sporadic” with some parts of the ROW not being revegetated at all. This is alleged to have been caused by the use of inappropriate or inadequate techniques and methodology and species of vegetation. The vegetation is alleged to have deteriorated or failed to develop adequately and the soil on the ROW has been left exposed to the elements;
- ii) The exposure of soil to the elements, the decrease in the water retention capacity and the use of heavy machinery during the construction are alleged to have caused significant soil erosion. This in turn is alleged to have caused substantial amounts of sediment (from soil erosion and from excavated soil) to move outside the ROW to various parts of the Property;
- iii) Water sources are alleged to have been destroyed, with sedimentation causing water sources to dry up or very significantly reduce in volume. One water source is alleged to have dried up as a result of earth generated during the construction process running off into the water source. Two further water sources are alleged to have become completely silted with earth and sediments following construction and no longer exist. The fourth water source is alleged to have become silted and sedimented such that it could not be used for human or agricultural purposes. It is alleged that drained mud now contained in the water contains high concentrations of natural organic material, minerals and other compounds;
- iv) It is alleged that sedimentation of the fourth water source caused localised flooding. “Some of the Claimant’s cattle” are alleged to have died after getting stuck in the boggy areas around this stream;
- v) The Claimant’s two fish pools became sedimented and unusable;
- vi) As a result of the destruction of the water sources, the Claimant had to rebuild his house on another part of the property and construct a dam to ensure a regular supply of water to his house;

- vii) As a result of the shortage of water, the Claimant was unable to continue to rear pigs on the property;
- viii) A number of the Claimant's fruit trees were damaged by heavy machinery during the construction process;
- ix) The construction process involved cutting into the land so as to create a ridge 5 metres high near the ROW. Some of the Claimant's cattle died as a result of falling from that ridge.

1162. The 2012 Further Information on LC74 alleged damage as set out at {B2.2/33/421}ff. The Claimant's case was updated by successive versions of the Revised Schedules of Loss, most recently on 23 January 2015 {B4.4/4/156}. Again, I provide a brief summary of the case as set out in the 2012 Further Information, with interpolations from the 2015 Re-Amended Revised Schedule of Loss ("RARSL"). The alleged damage included the following:

- i) Erosion "caused in and along the entire length of the ROW", which is to be inferred from (a) erosion currently present in the ROW; (b) the condition of the soil and vegetation there; and (c) the inadequate measures said to have been taken in relation to erosion prevention and control and in relation to soil and vegetation. The Claimant identifies:
 - a) Sheet erosion in patches on the North Slope and the South Slope, with the erosion on the North Slope being more pronounced including:
 - i) An area of erosion measuring approximately 15 x 10m and about 30cm deep on the North Slope at Point 1 on the CAI;
 - ii) A 2 metre vertical cut on one side and a 5 metre cut on the other side on the North Slope at Point 2 on the CAI;
 - iii) An area of void in the pipe trench backfill on the ROW at point 685 on the CAI (close to the Northern boundary of LC74);
 - iv) An area of erosion on the South Slope measuring approximately 50m² on the South Slope at point 99 on the CAI;
 - ii) Erosion caused outside the ROW, on the sides, caused by run off and/or dragging and/or in areas where sediment moved from the ROW or from near to the ROW;
 - iii) Sedimentation of water sources:
 - a) Substantial sedimentation of the stream bed of [W1] has been caused from the intersection with the ROW onwards for the length of the stream by transport and/or deposit of eroded and/or excavated material from the ROW (or from near the ROW);
 - b) SP1 has been completely sedimented from the spring head such that in the wet season water runs over the sediment and drains into the swamp and in the dry season there is no surface water flow in the spring;

- c) SP2, which is about 6m below the gabion wall on the North Slope, is completely sedimented;
 - d) SP3, which is about 4-5m below the gabion wall, is completely sedimented;
 - e) SP4, which is about 2m away from the foot of the gabion wall, is completely sedimented;
 - f) SP5 has been completely sedimented by movement and/or deposit of eroded and/or excavated material along its entire flow path and is now entirely covered in sediment;
 - g) SP6 has been substantially sedimented by movement and/or deposit of eroded and/or excavated material from the ROW (or from near the ROW) and/or “by sediment generated from the cut and fill in the slope on a hillside slope above the spring.” It is alleged that the start of surface flow from SP6 has shifted downhill from point 62 to point 180 on the CAI, with deep gully erosion around point 180 due to a concentrated flow of water and substantial sedimentation further downstream flowing into SW4.
- iv) Sedimentation of land:
- a) Field AF2 in the south west of the property is alleged to have an affected area of 4,000-5,000 m² including SP5. It is alleged that the slope “runs ... toward the Claimant’s former house ... [which] lies at the bottom of this valley. The house itself was also affected by sediment”;
 - b) Field AF3 to the east of the ridge is alleged to have an affected area of approximately 6,528 m². It is also alleged that soil was stripped from this field in order to fill the trench in the ROW, leading to an absence of topsoil in the field. SP6 and SW4 are alleged to be downhill from AF3;
- v) Mixing and inversion of soil horizons, loss of top soil and compaction along the entire area of the ROW;
- vi) Poor vegetation cover in the ROW, and poor quality of vegetation with weeds throughout the ROW;
- vii) Creation of swampy areas:
- a) Marked as SW1-3 and AF1 on the CAI. This is the area to the north east of the Quebrada crossing. It is alleged to be approximately 3,740 m² and to be caused by the sedimentation of SP1-4 and the stream, causing water logging and flooding of the entire area;
 - b) Marked as SW4 on the CAI. This is an area to the east of the Ridge. It is said to be approximately 3,270 m² and to be caused by the sedimentation of SP6;

- viii) Reduction in productivity and fertility of the entire Property due to damage to the water sources summarised above, which has also caused a reduction of water availability for human and animal consumption. The productivity and fertility of the entire property is also reduced due to erosion and the condition of the soil and vegetation. SW1-3 and SW4 cannot be used for crops and are waterlogged during the wet season so that they cannot be used for pasture. Even in the dry season it is alleged that there is deep mud, which poses a risk to cattle. Fields AF1, AF2 and AF3 are alleged to be less productive and fertile;
- ix) Destruction of fruit and cedar trees to the east of the ROW in an area in the north of the property with the approximate size of 3,308 m² by “movement and/or deposit of sediment from excavated and/or eroded material from the ROW (or from near to the ROW)”²⁷;
- x) Destruction of fruit and timber trees on the ROW that were “cut down and/or damaged by machinery on and off the ROW during construction and/or were damaged or destroyed by sedimentation or logging as described above. The trees were primarily in the north of the property ...”. (Snr Velez lost the production of 7 guama, 15 guanabana, 7 orange, 8 avocado and 10 mango trees: RARSL {B4.4/4/170}). Snr Velez lost 60 cedar trees as a result of the construction of the pipeline. Each timber tree would have produced an estimated 4.5 rastras of timber when reaching maturity: RARSL {B4.4/4/173});
- xi) The two fish pools (at point 31 on the CA1) were filled with sediment caused by movement and/or deposit of excavated and/or eroded material from the ROW (or near the ROW);
- xii) (Until August 1996, Snr Velez kept 100 cattle on [LC74], of which 30 belonged to him and 70 belonged to other owners: RARSL {B4.4/4/180}²⁸). Seven cattle are alleged to have died:
 - a) 3 died at the Quebrada crossing after getting stuck when trying to drink water (point 9 on the CAI);
 - b) 2 died in the area near the old house near points 103 and 10A on the CAI;
 - c) 2 died when they fell off the ridge created by the construction cuts at point 33 on the CAI (i.e. at the top of the North Slope on its western side);

(Approximately half of the 7 cattle which died belonged to Snr Velez, the rest belonging to other owners. Snr Velez was entitled to half of the income generated by cattle kept a utilidad. He therefore lost all of the income from

²⁷ Although this is referred to in the 2012 Further Information as being in AF2 on the CAI, I understand that the reference should be to AF1, since AF2 is in the south of the property and to the west of the ROW.

²⁸ Elsewhere the RARSL says that he kept 100 cattle on LC74 in the period to August 1996 of which 70 belonged to Snr Perez

dead cattle belonging to him, and a half of the income from dead cattle kept a utilidad. But for the construction of the pipeline, causing the formation of areas dangerous to cattle, Snr Velez would have earned COP 2,275,875 from selling these 7 cows at the end of their productive lives: RARSL {B4.4/4/181});

- xiii) (Snr Velez had to place 40 cattle on rented pasture for 6 months during and immediately following the construction of the pipeline: RARSL {B4.4/4/176}. After the construction of the pipeline, the pasture areas damaged by its construction could have accommodated 2 additional cattle RARSL {B4.4/4/180});
- xiv) The Claimant was forced to relocate his house as a result of damage to SP5 and did so about 2 years after the construction works. “The Claimant’s ability to keep pigs and hens was also affected for a period during and/or after construction by damage to [SP5] and the shortage of water”.

The State of the Property before Construction of the Ocesa Pipeline

- 1163. When Snr Velez’ father left him LC74, it was “dense forest, big trees, in other words, a jungle” {D8/125/1485}. He set to clearing the forest. By 1985 he had cleared about 30% of the property and that process continued in the decade to 1995, by which time much of the property was cleared: see [1160] above. Despite some confusing evidence at {Day5/32:3} I find that Snr Velez would clear forest to increase his pasture (sometimes after using the cleared land for crops for a while) and as a supply of timber for sale or fencing {D8/125/1486}.
- 1164. The underlying soils were as described at [289]-[291] and, unless disturbed, would generally exhibit Horizons A, B and C {H23.1/2/158}. The A horizon would typically be thin but could be up to about 20 cms deep {H3.8/16/1864}. As elsewhere, the soils are fragile and susceptible to erosion, with steepness of slope being a factor that increases that susceptibility. Also, as discussed elsewhere, the process of deforestation will have led to increased rates of water run-off and erosion. It is material that, in the case of LC74, the ODC and Ocesa pipelines were running through land most of which had been deforested within the last 10 or 15 years and that, in the case of the Ocesa pipeline, where its ROW overlapped with that of the ODC pipeline, it was running through land that had already been subject to major and recent disruption.
- 1165. On or about 24 August 1988 Snr Velez signed a First Letter from ODC thereby indicating his consent for the commencement and performance of the ODC works {M/169T/586.2}. It was in standard form and was similar in terms to the later Ocesa First Letters, including a statement that “Ecopetrol guarantees you a fair and equitable compensation for the damages that [it] may cause you”: see [255] above for the full text and, for comparison, [368] above for the text of the standard Ocesa First Letter.
- 1166. On 19 June 1990 Snr Velez entered into a ROW Agreement with ODC {M/183T/726.0.13} in terms that were similar but not identical to those of the subsequent ROW agreements entered into for the Ocesa pipeline: see [369]. I have set out the Agreement in detail at [256]. Clause 3 identified that “within the property, the works necessary for the construction of the ... Pipeline with buried pipes of 24”

(inches), affecting a section of the land of Twenty Meters (20 mts) in width by 424 Meters in length for a total of 8,480 Square Meters ... [sic].” Clause 6 provided that “as compensation for the easement right and the Damages and injuries caused, [ODC] shall pay [Snr Velez] the sum of \$798,000 as follows: 1) 70% of the total sum ... once this document is executed... . 2) The remaining 30% ... by way of easement to the granting of the respective Public Deed. PARAGRAPH: the total value of this compensation, ..., contains, pursuant to Article 5 of Decree No. 1886/1954 not only the rights of transit, occupancy and use of the area described in Clause Three, but also the injuries or damages caused during the construction performed in the property and particularly, those related to the attached list, containing an inventory of goods that will be affected during the works, in accordance with the estimates made by the parties.” Clause 11 stated that the legal easement of the pipeline was subject to the rules of the Civil Code, the Petroleum Code, Decree 1886/1954 and to the Mining Code, where pertinent. The inventory of goods referred to in Clause 6 was annexed and, under the heading “Description of Damages” stated “Destruction of 8,400 [sic] m² of Uribe grass, 480 m² of mountain, 40 meters of fence of 4 threads.” It is apparent that the destruction of 8,400 (in place of 8,480) m² of Uribe grass was the surface of the ROW. It is not clear where or what the 480 m² of mountain was or whether it was on or off the ROW. Snr Velez gave no evidence about his ODC ROW Agreement and had no memory of it {Day4/67:23}.

1167. Snr Velez entered into an addendum to his ODC ROW Agreement on 17 May 1991 {M/183T/726.0.12}. The sum payable by ODC was increased to COP 1,696,000. COP 1,696,000 would represent a rate of COP 200 per square metre for the 8,480 square metres identified in the ROW Agreement. The reason for the increase of COP 898,000 was not explained in the witness evidence and was not the subject of submissions. However, there are disclosed documents that are relevant to what happened in the intervening period, even if they do not (in the absence of coherent witness evidence) provide a clear or complete explanation for the addendum to the ROW Agreement:

- i) On 27 August 1990 ODC authorised the consortium responsible for the ODC pipeline to perform its works on Snr Velez’ land {M/169T/586.1};
- ii) On 28 August 1991 {M/183T/726.0.20} Snr Velez entered into a settlement agreement with ODC (represented by “Ricardo Vargas E”) which referred (by Recital A) back to the ROW Agreement of 19 June 1990. Recital B recorded that “due to the previous rights and purpose of the [June 1990] agreement, the parties agree that [ODC] shall pay to [Snr Velez] and it did so, the amount of \$1,454,206 that contained the rights of use, easement, occupancy and transit, as well as the damages and injuries caused to the property.” Recital C stated that “due to public order reasons (*force majeure*) known by the parties completely irrelevant to [ODC] the suspension of construction works of the ... pipeline was necessary, from January 18, 1991”; and Recital D recorded that the parties had agreed to execute the settlement agreement “in order to compensate the damages and injuries that may be caused or derived on the affected area because of the construction during the time in which the works were suspended.” After these recitals, Clause 1 provided that ODC would pay Snr Velez COP 1,695,999 as compensation for the damages referred to in the fourth recital (i.e. the damage caused by the *force majeure* delay); and Clause

2 recorded that the dispute was now *res judicata* and that Snr Velez granted ODC and its contractors authorisation to continue with the works.

1168. On 9 March 1992, Snr Velez entered into a ROW Easement with ODC, reflecting the terms of his ROW Agreement {M/170T/592.1}. It referred to the necessary works involving a ROW of 8,480 m², and to the compensation of COP 1,696,000 (which Snr Velez was said to have received to his satisfaction). The ROW Easement was notarised.
1169. The dates between which the ODC pipeline works were carried out are not known. Snr Velez gave no evidence about his ROW Agreement with ODC, its amendment or the *force majeure* settlement agreement. I do not criticise him as a witness for this absence of evidence, and think it likely that the sequence of events I outline below had slipped his mind with time, which contributed to his certainty that he had suffered much more severe damage from the Ocesa pipeline than from the ODC pipeline. However, without the assistance of any evidence from Snr Velez (whether reliable or not) I make the following findings of fact on the basis of the documents to which I have referred above:
- i) The original ROW Agreement between Snr Velez and ODC was on 19 June 1990;
 - ii) ODC gave authority for its consortium to carry out the necessary work on Snr Velez' land on 27 August 1990;
 - iii) Although the date of commencement of work by ODC on Snr Velez' land is not known, the work was in progress when ODC suspended work on 18 January 1991. The duration of the suspension is not known;
 - iv) The addendum to the ROW Agreement was made on 17 May 1991. It more than doubled the compensation payable under the ROW Agreement. The reasons underlying this increase in the compensation payable under the ROW Agreement have not been explained in evidence, but I infer and find that the increase came about because the damage to LC74 was greater than originally contemplated;
 - v) Separately, damage was caused to LC74 by the *force majeure* suspension of work in and from 18 January 1991, as a result of which ODC paid a further COP 1,695,999 (thereby effectively doubling the amount that had been payable under the ROW Agreement as amended). I infer that the damage attributable to the suspension was regarded as being roughly equivalent to twice the damage that had been envisaged under the ROW Agreement in its original form, or roughly equivalent to the damage that was envisaged under the ROW Agreement as amended, or both. I do not know why the *force majeure* settlement referred to \$1,454,206 rather than \$1,696,000 (or some other sum) in Recital B.
1170. Snr Velez entered into three further agreements settling claims for damages arising out of damage alleged to have been caused by the ODC pipeline, which have been the subject of some evidence from Snr Velez and submissions on his behalf. They were on 5 August 1993 ("the First ODC Settlement"), 10 May 1996 ("the Second ODC

Settlement”) and 12 November 1997 (“the Third ODC Settlement”). In the light of the limited evidence (reliable or otherwise) about these agreements from Snr Velez and his insistence that the Ocesa pipeline caused much more damage than had been caused by the ODC pipeline, it is necessary to look at the three ODC Settlements in detail.

1171. *The First ODC Settlement* {M/183T/726.0.8} was signed on 5 August 1993 by Snr Velez on his own behalf and by a Snr Ricardo Vargas Escobar on behalf of ODC. Little is known of Snr Vargas save that he acted for ODC and had previously signed the Addendum to the ROW Agreement {M/183T/726.0.12} and the *force majeure* settlement agreement {M/183T/726.0.20}. The Settlement recorded Snr Velez’ ownership of La Nieve, which was stated to be 47 hectares in size. Clause 4 recorded that Snr Velez granted ODC rights for use and occupancy established by the Law in favour of the oil industry, pursuant to which ODC “may perform the works necessary (cuts and/or embankments) according to the technique required, to repair the Pipeline, and to perform the works required for maintenance and repairs... .” Clause 6 recorded that, as compensation for the Occupancy right and the Damages that are caused, ODC would pay Snr Velez COP 2,500,000 upon conclusion of the construction work. Clause 8 empowered ODC to remove trees, objects or plants found in the area of the works. Although the main body of the agreement referred both to damage and to damages, it did not expressly cross-refer to the Annex, which said “DESCRIPTION OF DAMAGES Destruction of 10,000 m² of Uribe and Angleton grass, because the hill is going to be used to cover the gullies in the right of way km: 108+400. Gullies produced by rainfall waters, they have a depth of 18m and 4m wide.”
1172. Snr Velez said in cross-examination that he did not remember this agreement or the damage that it was referring to and asserted that the worst damage came from the Ocesa pipeline {Day4/72:15}. The Claimants submit {C4/3.7/1147} that this agreement “does not cover the damages alleged in the present claim, namely damages due to the sedimentation of the Claimant’s house, water sources and adjacent fields.” In other words, it appears to be the Claimant’s case that the First ODC Settlement is irrelevant to the present litigation. That is not a submission that I am able to accept.
1173. A number of points emerge clearly from the terms of the First ODC Settlement. First, it is clear that there were gullies in the ROW which had a depth of 18m and were 4m wide. Second, the gullies had been produced by rainfall waters. Third, 10,000 m² of grassland is going to be destroyed. And, fourth, the grassland is going to be destroyed “because the hill is going to be used to cover the gullies.” What is not specifically stated is the exact location of either the gullies, the hill or the 10,000 m² of grassland. The only reference to location (apart from the general identification of La Nieve) is the reference to km 108+400. No submissions were addressed to this point. I note however, that in the letter of 14 January 1996, to which I refer below, La Nieve was said to be “located at kilometer 109”, with another farm (El Tajo) being said to be “located at kilometer 108” and a third farm (Monterey) said to be “located at kilometers 108 to 109”. I do not know how any of those locations, or the location of the gullies referred to in the First ODC Settlement Agreement, were settled on or whether any or all of them are accurate.
1174. On any view, this was a major operation as can be gauged from the facts that (a) the 10,000 m² of grassland is a significantly larger area than the entire area of the original

ODC ROW (8,480 m²), (b) the gullies were very deep and wide, and (c) the compensation due under the First ODC Settlement was nearly half as much again (2,500,000/1,696,000) as the compensation that Snr Velez was paid under the original ODC ROW Agreement as amended. In the absence of any direct witness evidence about where the gullies were, I consider it to be highly probable and find that they were on the steep slopes of LC74 because there is no reason to suppose that ODC would either have wanted or have been allowed by Snr Velez to destroy 10,000 m² of his grassland in order to remedy gullies on someone else's land: ODC would have wanted to minimise the distance they had to transport the materials, and Snr Velez would have been keen to protect his topsoil. I bear in mind that 10,000 m² is equivalent to a strip about 70 metres wide running the whole 150 metre length of the Ridge. This illustrates the significance of the area in question, though there is no internal or witness evidence to indicate precisely where the area in fact was apart from the reference to "the hill". It is to my mind inconceivable that Snr Velez would not have remembered the stripping of such an area for use on someone else's land. As it is, I was not convinced at the time he gave his evidence and, on review, am not convinced now that Snr Velez had no recollection of what this settlement agreement was about. I formed and retain the view that he could have given evidence about this settlement agreement if he had wished to do so.

1175. There is no reference to works of this type in Snr Velez' statement. This is surprising in the light of the allegation in the Claimant's 2012 Further Information {B2.2/33/426} that soil was stripped from Field AF3 in order to fill the trench in the ROW. There is no evidence from Snr Velez in support of that allegation apart from [97] of his statement {D8/125/1506}, which endorses his Schedule of Loss without further detail being given. There is no direct evidence linking the allegation of stripping field AF3 to either ODC or Ocesa. No Settlement Agreement with Ocesa has been disclosed that obviously relates to the stripping of a large area of land.
1176. On this evidence and for these reasons I find that the First ODC Settlement came into existence because ODC needed to destroy an additional 10,000 m² of grassland on LC74 in order to carry out remedial works to large and deep gullies that had formed on either the North Slope or the South Slope or both slopes as a result of heavy rainfall. I reject Snr Velez' evidence that he had no recollection of what this settlement agreement was about. Although there is no evidence about the carrying out of the works contemplated by the First ODC Settlement; there is no reason to suppose that they were not done, as Snr. Velez was compensated for them. Despite the absence of witness evidence, it seems most likely (and probable) that the First ODC Settlement related to and involved the stripping of soil which came from Field AF3, and I make a finding of fact to that effect, relying in part on Dr Savigny's analysis of the state of AF3 in 1995 to which I will return. It also seems probable that it was those works that formed the subject of the First ODC Settlement that the Claimant had in mind (if he himself applied his mind to it at all) when mistakenly alleging in his 2012 Further Information that such stripping works were caused by Ocesa. Having reviewed all of the evidence relating to the allegation of stripping Field AF3 as set out above and the other evidence (and lack of evidence) presented in relation to that allegation, I record the finding of fact at this stage that the stripping of soil from field AF3 alleged in the 2012 Further Information was attributable to the ODC works and not the Ocesa works.

1177. *The Second ODC Settlement* {M/183T/726.0.5} came about after a complaint by Snr Velez made in January 1996. On 14 January 1996 Snr Velez and five others wrote to ODC complaining about damage that the ODC pipeline had caused their properties {M/186T/747.10}. Snr Velez' complaint in the letter was that he had "suffered damages on one of his farm's pasture fields, below the pipeline. The land along the line has blocked the passage of a water current, thus forming a huge puddle of about 50 meters long and 20 meters wide. In addition, backhoes have been crossing my property, leaving in their wake a slope about 50 meters long, which has damaged my land without paying me any compensation. It is important to clarify that all this has taken place outside or apart from the strip sold to Ecopetrol."
1178. On 10 May 1996 Snr Velez and ODC entered into the Second ODC Settlement {M/183T/726.0.5}. It was in substantially the same form as the First ODC Settlement Agreement. Clause 3 said that works necessary for the repair of the pipeline were being or would be carried out within an area of 20,000 square metres. The agreed compensation was COP 5,000,000. As before, the Annex described the damages: "There were damages due to the passing of the back drill outside the [ROW] in order to make repairs to the pipeline. There were damages on the artificial pastures in an area of 10,000 square metres. It has an area of [illegible] of big dimensions that at the same time formed a lake with sediments in the [ROW], in a total area of 20,000 square metres."
1179. It was evident during his cross-examination about this complaint and settlement that Snr Velez was having difficulty in answering the questions that were being put to him, even with the clarifications being offered by his own Counsel. He was asked questions in cross-examination by reference to the 1995 annotated image at {H2.3/3/894}, which shows the landslide scar near to his old house, a channelized erosion scar further to the north, and the disturbed floodplain identified by Dr Savigny downstream of the ROW; but this was a passage of his evidence where the use of photographs did not lead to clarity in his answers. However, he did appear to confirm with reasonable clarity (and I find) that the puddle he was talking about in his complaint was downstream of the ROW. In that passage of evidence he continued to maintain that he suffered more damage with the Ocesa works {Day4/83:1}.
1180. The Claimants submit that the location of the "lake" referred to in the Second ODC Settlement is unclear. They submit that it cannot be a reference to the area now known as SW1-SW3 because (a) the Agreement refers to pooling rather than sedimented ground and (b) on Dr Savigny's evidence the swamp area is not visible in 1995 {C4/3.7/1148}. They make no submissions about the location of the slope caused or damaged by backhoes.
1181. Five pieces of evidence lead me to find that the area being complained about was the area just upstream and downstream of the ROW and that it included the area now known as SW1-SW3 which was being affected by sedimentation, probably from the South Slope. The first is Snr Velez' assertion in his letter that "the land along the line" had blocked the passage of water. On its own that is consistent with a blockage on the line of the ROW causing a puddle upstream of the ROW. The second piece of evidence is the statement in the settlement agreement that what formed was "a lake with sediments", which suggests disturbance of W1 by, or at least including, a process of sedimentation. The third is Snr Velez' evidence in the course of cross-examination which, as it seemed to me at the time and still seems on review, settled on an answer

that this complaint and agreement related to a place downstream of the ROW. The fourth is the area of 20,000 m² for which Snr Velez was compensated, which seems more consistent with a large area affected by sedimentation than a transient puddle (even a huge one) upstream of the ROW. The fifth is Snr Velez' evidence, to which I refer in more detail below, that the lost ODC cheque was related to the need to do further work because a piece of his land was being carried downhill to the stream, a large amount of mud had come down in that area and that a channel with cement was the proposed remedy. This evidence supports the finding that the Second ODC Settlement was concerned with sedimentation from the South Slope, where subsequently a cement channel was installed: see generally [1328] below. In reaching this last conclusion I have taken into account the fact that the First Ocesa Settlement was reached soon after the conclusion of the Second ODC Settlement, and my review of the First Ocesa Settlement at [1317] below.

1182. The points made by the Claimants in support of some other finding are not substantial. The Agreement refers expressly to sedimentation; and the fact that Dr Savigny did not identify the swamp as such in the 1995 image is not determinative of the position then because of the limitations of his exercise. In any event, the Second ODC Settlement was concluded some 8 months after the 1995 aerial photograph was taken on 30 September 1995, so that both conditions on the ground and the parties' description of what they were settling may reasonably have changed, just as the dimensions referred to changed between the letter of complaint and the date of the Settlement.
1183. *The Third ODC Settlement* {M/183T/726.0.1} was in substantially the same form as the previous two. Clause 3 said that works necessary for the repair of the pipeline were being or would be carried out within an area of 10,000 square meters. The compensation payable was COP 5,000,000. The Annex described the damages in conjunction with photographs that are of such poor quality as to be useless: "Damages in an area of 10,000 m² due to current breakers and strong rainfall in the region. Some hectares of Sierra were negotiated in order to be able to enter with the back drill to correct the failure and be able to cover the pipe. They were paid for damages caused to artificial pastures, which can be seen in the photographs. [Photographs, with caption under] Area that will be used to over the pipe. Ocesa Construction's rates are applied, \$500 per square meter."
1184. In cross-examination, Snr Velez said that he remembered making this complaint and that it came about because the pipeline was uncovered and a soldier had an accident early in the morning on the North Slope, breaking his ribs. But he said it related to the Ocesa pipeline, not ODC {Day4/90:24} ff. By the time of the Third ODC Settlement, the Ocesa pipeline had been laid; and there is no documentary or other evidence that determines when the problem that led to it first arose. The Claimants submit that a portion of the ODC ROW was re-worked and re-graded by Ocesa and that this is therefore irrelevant to the present litigation {C4/3.7/1148}. What matters, to my mind, is that responsibility for the problem was accepted as resting with ODC, who settled the claim. This settlement agreement is therefore evidence (and I find) that heavy rain caused damage and erosion, which caused the ODC pipe to become exposed for reasons that were not attributable to Ocesa and therefore remained the responsibility of ODC. The damage, erosion and exposure of the ODC pipe necessitated substantial works to cover the pipe again and caused lasting damage that

affected 10,000 m² of Snr Velez' land. In the light of Snr Velez' evidence, I find that the erosion and exposure of the ODC pipe occurred on the North Slope and was sufficiently wide and deep to cause a soldier to fall and break his ribs. It is to be noted that the combined area of AF1 (3,308 m²) and SW1-SW3 (3,740 m²) is significantly less than the 10,000 m² for which Snr Velez was compensated under this Settlement.

1185. The evidence of the ODC Settlement Agreements falls to be weighed in the balance with all other relevant evidence when considering Snr Velez' evidence that he suffered much more damage as a result of the Ocesa pipeline than he did as a result of ODC's. In his witness statement he maintained that the ODC pipeline "didn't cause many problems" {D8/125/1495} at [54]. In his oral evidence he accepted that some damage was caused by the ODC pipeline, including sedimentation of water courses, but he maintained that it was less severe than the damage caused by the larger-bore Ocesa pipeline works because Ocesa had failed to take necessary protection measures {Day5/18:9}, and he continued to maintain that the ODC pipeline works did not block water sources {Day5/15:6}.
1186. When considering Snr Velez' evidence it is also necessary to bring into the balance the expert evidence about the state of the property before the Ocesa pipeline. For that, the main evidence comes from Dr Savigny, whose analysis of the position on LC74 as disclosed by the 1995 aerial photograph and the other materials that he analysed in his reports was not materially challenged by Dr Gundlach. Allowing for the acknowledged lack of precision inherent in the exercise (so that any percentages are approximate), I found his analysis to be both careful and compelling, and I accept it.
1187. Starting at the southern end of the property:
- i) At the time of the 1995 aerial photograph the ROW along the Ridge was difficult to distinguish from the large field AF3 to its east side. Field AF3 between the entry point to LC74 and the northern end of the Ridge was between 50% and 90% exposed soil {H2.3/3/893}. The 1995 aerial photograph shows a wetland along SP6 to where SW4 is marked on the CAI. Dr Savigny noted that the high level of exposure in field AF3 represented "unusually rapid deterioration in land quality" {H2.4/4/913}. In the absence of good evidence that Snr Velez pursued farming practices in that area which caused unusually rapid deterioration in land quality, the state of AF3 is explained by the works carried out in relation to the First ODC Settlement. Those works also explain (or at least would have contributed to) the sedimentation of the stream with soils from AF3;
 - ii) The slopes to the west of the Ridge were generally between 10% and 50% exposed soil. The western slopes adjacent to and to the north of the Ridge included areas with trails, a large landslide scar with the appearance of two fingers at its lower end, and channelized erosion scars that were all 90% to 100% exposed soil. The trail down from the gate at the northern end of the Ridge towards Snr Velez' old house was 90% to 100% exposed soil {H2.3/3/893} {H2.8/10/2134};

- iii) The disturbance caused by the ODC ROW on the South Slope was unusually wide, and much wider than the generally intended 20 metres. The surface of the ROW was substantially disturbed, with numerous closely spaced water bars and an undifferentiated longitudinal channel or drop structure to the east of the ROW. In addition there was a prominent cut slope to the east side of the ROW. The soil in and near the area of the South Slope was 90% to 100% exposed {H2.3/3/894};
 - iv) The North Slope was subject to considerable soil exposure and erosion over the width of the ROW, with 50% to 90% exposed soil. As previously mentioned the field to the west side of the ROW was 10% to 50% exposed soil with the exception of the erosion and landslides scars that were 90% to 100% exposed soil. The pasture field to the east of the ROW was 0% to 10% exposed soil. The width of the ODC ROW increases towards the top end of the North Slope so that for the last 70 m before the exit point it is in the order of 40 metres wide {H2.4/4/935};
 - v) There was a disturbed area along the main stream course of W1 and its North bank. The disturbance began a short distance upstream of the ODC ROW's crossing of the main stream course. It extended over the crossing reach and continued downstream for at least 100 metres beyond the eastern edge of the ODC ROW. The disturbed area extended north of the stream course for a distance of about 40 metres to 50 metres. Dr Savigny identified various possible explanations for the disturbance, including the placing of waste material or a landslide originating on the ODC row or a combination of factors {H2.4/4/918}. The disturbed area is roughly outlined and indicated in Dr Savigny's figures LC74-2 {H2.3/3/894}, LC74-9 {H2.4/4/924} and LC74-10 {H2.4/4/925}.
1188. In the course of his investigations Dr Savigny took a photograph (Figure LC74-11 {H2.4/4/926}) which was a view looking upstream along stream W1 towards the crossing and was taken about 50 metres downstream from it. Dr Savigny considered that the photograph evidenced a recent change in the course of the channel of W1, which he considered had happened between 2009 and 2010. Elsewhere, it was his view that the mainstream channel passing by the disturbed area downstream of the crossing showed less evidence of recent instability, which he considered to be consistent with the evidence that the disturbed area had impacted the mainstream channel sometime earlier - in his view, shortly before the aerial photograph was taken in September 1995. On that basis he formed the view that the disturbed ground had in some way obstructed the original stream course thereby causing flooding and forcing it into a new channel a short distance south of the crossing. Dr Obando disagreed with Dr Savigny's analysis. His opinion was that the picture showed a colluvial zone, not a flooding zone. In his view material had come down the steep hillside and covered pre-existing horizons {Day32/38:8}.
1189. Although Dr Savigny referred in his report to the letter of 14 January 1996 which preceded the Second ODC Settlement, neither side's experts (so far as I have been able to determine) analysed the potential implications of the ODC Settlements themselves. Having reviewed those settlements in detail above, I consider that they are relevant in clarifying two particular aspects of the condition of LC74 after the ODC pipeline works but before the Ocesa works were carried out. The first, as I

have already held, is the relevance of the First ODC Settlement in providing evidence supporting the conclusion that the state of the Ridge, field AF3, SP6 and SW4 was at least in part attributable to the stripping works referred to in that settlement. The second is the relevance of the ODC Settlements in evidencing that there was significant damage to the North and South Slopes and to the area near the Quebrada crossing that was attributable to the ODC works, for which Snr Velez claimed and was paid compensation. Specifically:

- i) The *force majeure* settlement taken in conjunction with the Addendum to the ROW Agreement evidences that the damage caused by the ODC works (including as a result of their suspension) was significantly worse than had originally been anticipated when compensation for the carrying out of the ODC works was negotiated in advance;
- ii) The First ODC Settlement evidences that, in addition to the damage already covered by the original ROW Agreement, the Addendum agreement and the *force majeure* settlement, substantial damage was caused to the North Slope or the South Slope (or both) as a result of heavy rainfall, which necessitated remedial works to large and deep gullies;
- iii) The Second ODC Settlement evidences that there was sedimentation from the South Slope where subsequently a cement channel was installed. The consequences of that sedimentation included the formation of a huge puddle and disturbance of the area downstream of the crossing. The affected area was said to be 20,000 square metres;
- iv) The Third ODC Settlement evidences substantial damage to the North Slope causing erosion and exposure of the ODC pipe, which was sufficient to cause a soldier to fall and break his ribs. The affected area was said to be 10,000 m².

1190. Drawing these strands together, I reject the Claimant's case that the ODC pipeline caused no damage and Snr Velez' evidence that "not many damages" were caused. I have come to the conclusion that Snr Velez gave no reliable evidence at all about the true state of his property immediately before the Ocesa works were carried out. Furthermore, I find that his evidence about the relative damage that was caused by the ODC and Ocesa pipelines respectively is fatally undermined by his inability to give any reliable evidence about the state of his property before Ocesa works started. This does not entail wholesale rejection of his account of how the Ocesa works were carried out, but it means that I place no weight on generalised assertions from Snr Velez about the relative damage caused by the two sets of pipeline works.

1191. The evidence of the various negotiations and settlements with ODC taken in conjunction with Dr Savigny's analysis of the pre-Ocesa position as I have summarised it above leads me to conclude and find that, before the Ocesa works were carried out, LC74 was seriously compromised in a number of respects. In particular, there had been substantial erosion damage to both the North Slope and the South Slope and protracted and serious sedimentation from those slopes which had compromised the land in the area of the crossing of W1 and the area identified by Dr Savigny as disturbed in 1995 for about 100 m below the crossing. I find that the sedimentation was sufficient not only to block the flow of the stream so that a huge (if temporary) puddle was created upstream from the crossing but also to cause chronic

sedimentation of the area downstream which would in turn have caused or contributed to overflowing. To this extent I find that both Dr Savigny and Dr Obando were partially correct in their analysis of what was shown by Dr Savigny's figure LC74-11: although that photograph post-dates the Ocesa works, I am satisfied and find that the stream at and below the crossing was subject to repeated sedimentation and flooding in the period before Ocesa started its works.

1192. I find on the basis of Dr Savigny's analysis that neither the North Slope, the South Slope, the cut and damaged areas adjacent to them, nor the area of the crossing had recovered by the end of 1995. On the contrary, the ROW and adjacent damaged areas still had substantially exposed soil. Erosion from those steep slopes would have been and was continuing (despite the water bars that had been placed on the South Slope) adding to the problems in and adjacent to W1.
1193. I will return to the springs SP1-SP4 later when considering the impact of the Ocesa works. For present purposes I find that significant sedimentation from the North Slope would have flowed over field AF1 in the direction of the springs as a result of the damage caused by the ODC works. In addition they were situated in an area of relatively flat topography, low permeability and thick vegetation and would have been subject to the flooding caused or contributed to by the ODC works {H2.4/4/933}. Whether or not the springs had been completely submerged by sediment, they were in an area that was significantly compromised regardless of any additional impact from the Ocesa works.
1194. I have made my findings about the state of the Ridge and field AF3. Dr Savigny's analysis and the other available evidence from the pre-Ocesa period does not provide evidence of substantial sedimentation flowing from the Ridge onto the slopes to its west. Specifically, his analysis does not provide direct evidence of any damage to SP5 or the streams W1 and W2 in the vicinity of Snr Velez's house. I have already described the pre-Ocesa areas of severe erosion above his house and generally on those slopes.

The Relevant Factual Background: Pre-construction Period

1195. The First Letter from the Defendant to Snr Velez giving notice of intention to carry out the works on LC74 was dated 11 August 1994 {M/171T/593.1}. I have set it out in detail at [368] above. It was given to Snr Velez by a representative of the Defendant who visited LC74 on 19 August 1994. Snr Velez signed a copy of the letter by applying his fingerprint {B1.4/8/692}.
1196. On 23 March 1995 Snr Velez entered into the ROW Agreement with the Defendant {M/172T/602.1}. I have set out the ROW Agreement at [369] above and commented on it at [370] above. It was signed by Snr Rojas on behalf of the Defendant. I add the additional observation at this stage that, while the ROW Agreement referred to damage to the land and 200 metres of fencing, it made no reference to any trees. The first payment due under the ROW Agreement was paid on 9 September 1995 {M/177T/651.1}. The second payment was paid on 12 February 1996 {M/179T/682.1}. Snr Velez received an additional payment of COP 1,220,000 on 2 March 1996 {M/180T/683.1}. The reason for this additional payment is not known.

1197. The ROW Easement was executed on 10 November 1995 {M/178T/681.1}: see [371] above. It was signed before a notary, who was the same as had signed the ODC ROW Deed with Snr Velez. It was also signed by Snr Velez, the notary and Snr Alfonso Medina.
1198. In his witness statement at [82] {D8/125/1496} Snr Velez maintained that he never went to a notary to sign documents. That was wrong, as he accepted in his oral evidence {Day4/98:7} and as is supported by documents he signed which were notarised. It is also apparent from the documents and from his evidence that he had considerable dealings with Snr Alfonso Medina from the time of the Ocesa ROW Easement to when negotiating settlements with Ocesa (as outlined later). Snr Medina was described in a letter from Snr Velez to Ocesa in September 1998 {M/186T/747.1} as the Land Negotiation Engineer of Ocesa in the municipality of Puerto Berrio, which explains why he would have been the person dealing with Snr Velez. I accept that description as accurate. Snr Velez described him as “very correct in his dealings” and said he had no complaints about him {Day4/98:9}. Attachment A to the PCMA {J13/52/49} lists a Carlos Alfonso Medina as a member of the Defendant’s staff who was to be assigned 100% to the Ocesa Project, under the heading “Land, ROW & Legal”. That is consistent with the Snr Carlos Alfonso Medina listed in the Attachment to the PCMA being the Snr Alfonso Medina who had dealings with Snr Velez for Ocesa, and I find that they are one and the same. I have seen nothing to suggest either that Snr Velez would have been or was overawed or intimidated in his negotiations with others or that Snr Medina acted other than properly in his dealings with Snr Velez. I accept and adopt Snr Velez’ description of Snr Medina as very correct in his dealings; and I find that (making all allowance for his inability to read or write) Snr Velez would have been able to hold his own in negotiations Snr Medina and others, just as he was able to hold his own in cross-examination.
1199. Snr Velez said that, before the Ocesa pipeline was laid, he was told that “the pipeline wasn’t going to affect anything, that they would be doing maintenance work all the time and that any damage, for example if an animal died, would be paid for” [55]; and that “they said that the land wasn’t going to be damaged” [60] {D8/125/1496} and that it was on this basis that he was happy for them to build the pipeline on his farm. I am confident that, if anyone had said this to Snr Velez after the ODC works had been carried out, he would not have believed them because of the damage he had already suffered and was suffering. It is therefore possible that he is entirely confused and that this conversation, if it happened at all, was with representatives of ODC before the ODC works were carried out. However, Snr Medina is recorded as having said in an interview that “one tells the owner that it will recuperate, but it’s impossible; it’s impossible to do it 100%. The mark left by the pipeline when it is laid [interruption] is permanent damage; meaning, you sell the idea, speaking with owners, telling them about the revegetation techniques. But, if I was an owner I would kick up a fuss because one knows what it implies” {L1/229.5T/2}. There is also a strand of consistency in the evidence of the Lead Claimants that they were given comforting assurances in the course of negotiations that all damage would be made good. This evidence is consistent with what Snr Medina is reported to have said and with the tone of the negotiators’ manual which required negotiators to maintain good relations with affected landowners, declared that the philosophy of the Legal Department was that of

paying fairly for any damages that were caused on the properties, and contemplated separate payment for any damage out of the area of the ROW: see [362]ff above.

1200. On the basis of this evidence I reject Snr Velez' account of what he was told as set out in [55] and [60] of his witness statement. But I find that the negotiators would have given him generalised assurances that damage would be made good, in accordance with the normal practice as identified by Snr Medina and the negotiators' manual. I do not accept that the assurances were the basis upon which Snr Velez was happy for the Ocesa pipeline to be laid. After his ODC experience he would have known or at least assumed that the pipeline was going to come whether he liked it or not, that it was likely to cause additional damage to his land, and that he would have the ability to claim if that damage went beyond what he was to be compensated for under his ROW Agreement. Some or all of this may have been said to him at some stage, but I make no further findings of fact about what precisely was said to him or whether it was said by representatives of ODC before the initial pipeline or by those negotiating with him before the Ocesa pipeline or by both.

The Relevant Factual Background: Construction Period

1201. Snr Velez started entering into settlement agreements with Ocesa and Saipem during the course of the works. For convenience I have considered all of his Settlement Agreements together in the next section: see [1314]ff below. In this section I shall merely put the first two in their chronological place.
1202. The ROW opening on LC74 took place between 23-25 May 1996. The trench was excavated after 9 June 1996. On 15 June 1996 Snr Velez and Ocesa had the meeting which led to the First Ocesa Settlement being signed on 3 July 1996 {M/181/684}. The trench was backfilled during the week of 16 to 22 June 1996. There is no evidence that enables the precise dates of excavation and backfilling to be identified or from which it could be concluded that there was delay in backfilling the trench.
1203. On or about 3 July 1996 the reconfiguration spread (i.e. the front where reconfiguration work was being carried out) was moved from Km 417 to Km 422, which had the effect of skipping over LC74. This was done to reduce to 12 km the distance between the reconfiguration front and the opening front that it was following. The intention was to subcontract the reconfiguration of the 5 km that had been omitted to a local firm who would not require special army protection for machinery and personnel. {K35/345T/2}.
1204. On 16 August 1996 Snr Velez entered into the Second Ocesa Settlement with Ocesa and Saipem {M/182T/689b}.
1205. After the omission of the 5 km stretch it was reported in early August 1996 that the stretch was suffering from erosion, with gullies forming, excavated material flowing towards streams, the pipeline being uncovered in several places and property owners frequently complaining of water contamination and of materials falling on to the hillside {K36/357T/7}; and see {K36/363T/2}. The following week it was reported that proprietors in the omitted stretch "have been making constant complaints about the damage caused in this sector by the continual accumulation of excavated material in streams and slopes in pasture fields" {K36/360T/7}. The following week's report referred to the poor condition of the ROW due to strong rains {K36/361T/2}. The

report for 25-31 August recorded that “it is important to implement an additional contractor for geotechnical works, since rainfall means that the re-established [ROW] deteriorates due to not carrying out geotechnical works in time. This has caused environmental problems and also has caused the pipe to become uncovered in five places.” The same entry recorded that the development of the works had been affected by security problems, by the kidnapping of a Saipem foreman and by heavy rains which made the ROW impassable {K36/363T/3}. The difficulties that were being experienced on Stretch B at about this time were confirmed by an Ocesa Audit for June-August 1996 which reported for the omitted stretch that “delicate situations continued in this segment and the rainy season has created the following problems: gullies and contribution of sediments to the springs and watercourses near the ROW, deterioration of preventive protection works provoking saturation, colmatation and overflow of the trenches, erosion and undercutting in the crossings of watercourses both in the beds and in the lateral slopes” {K36/366T/35}.

1206. The report for 15-21 September 1996 stated that “continuation of work on Spread B ... [is] uncertain due to concerns over physical security. By order of Bogota, Spread B was effectively suspended during the week and also because of the public demonstrations in Remedios, toward the end of the week. The military and the heads of the Ocesa and Saipem camp suggest work should continue on spread B and that it would not [sic] be advisable to suspend work opposite Remedios because of both the topography of the area, and the danger of having machinery and army personnel concentrated in this area” {K37/370T/2}. In relation to the omitted stretch it said that “all damage caused by the sediment discharge, erosion and excavation of the ROW must be corrected and repaired as these continue to deteriorate as a result of the hard rain falling in the area” {K37/370T/9}. There was more the next week. The report for 22-28 September 1996 reported that “the project’s situation has greatly deteriorated due to public order problems (strike in Remedios), which is a general issue across the country due to the terrorist crisis during the week. There is some uncertainty from Saipem-Ocesa regarding the continuation of the work on spread B, which must be determined quickly” {K37/377.01T/2}. The following week’s report indicated that Saipem were reluctant to restart works because it would be on a short stretch and then they may be put on indefinite standby. It noted that “performance has not been good due to public order and physical security issues” {K38/381T/2}. Security problems continued to be reported for 6-13 October 1996: “Separately the army is very concerned about the elevated exposure of troops to a guerrilla attack. According to Ocesa security personnel, risks to troops looking after the trap equipment are much higher, and they are more vulnerable to attack, than if they were constantly moving. This gives guerrillas more time to carefully plan an attack” {K38/386T/2}. It recorded that the week’s (limited) progress had included some final geotechnical works and final cleaning.
1207. Reinstatement works were carried out on LC74 on approximately 1 November 1996. Mr Allison accepted that in normal circumstances reconfirmation of the stretch should have been done by 4-10 August 1996 {Day15/116:1}; but it appears that no local firm was engaged until much later. Mr Allison did not know why no one was engaged sooner {Day15/120:7}, save to point out that it appeared that the whole job had been shut down because of security concerns {Day15/111:15} {Day15/124:9} and that concerns such as those referred to in the reports to which he was taken would seriously restrict their ability to work in the area {Day15/118:5}. I accept Mr

Allison's evidence that LC74 was in a "hot" area where they had security problems which required them to helicopter in foremen and others each day because they could not otherwise get access {Day15/111:24}; his evidence on this point is consistent with that of Snr Velez (which I also accept on this point) who said that workers were escorted by the army and didn't let him come close to the construction area {D8/125/1498} and with various photographs showing that, much later, expert inspections were undertaken under armed guard on LC74. The heightened level of security risk evidenced by the contemporaneous reports would provide an explanation of the need to keep the opening and reformation fronts close together. More generally, I accept Mr Allison's interpretation of the reports that were put to him and his explanation of the impact of the security concerns identified in the various reports.

1208. Final geotechnical works were concluded by about 8 December 1996. There was then a period of about three months until the end of February 1997 when revegetation works were undertaken. The weekly reports between December 1996 and February 1997 indicate that revegetation was suspended because it was the dry season {K40/421T/6} {K41/425T/6} {K41/427T/6} {K42/439T/6}. The daily work report for 28 February to 1 March 1997 indicates that revegetation was complete, but a later report from June 1997 suggests that it was not {K45/476T/38} {K46/482/1}. Snr Cardenas' suggestion was that, although revegetation had taken place at the end of February, further works remained necessary either as maintenance or otherwise {Day19/157:1}. There is no direct evidence about the period of revegetation. On this limited material I find that revegetation works were carried out on LC74 at the end of February 1997 but that some maintenance was subsequently required up to and including June 1997 in the section of which LC74 formed part. In the absence of further evidence I am not able to make any further finding save that not all of the maintenance or all of the period would necessarily have involved LC74 though some may have done.
1209. The records at Palma de Coco, which Professor Monsalve considers and I find to be the appropriate reference weather station for LC74, provide the following information (summarised at {C4/3.7/1111}):

Month (96/97)	Month's Rainfall	Max (24 Hours)	Days with Rainfall
May	391	80	17
June	626	80	17
July	253	63	15
August	542	60	20
September	314	50	17
October	341	58	22
November	67	54	13
December	130	25	15
January	60	20	7
February	286	120	14
March	26	7	5
April	202	71	10
May	365	84	18
June	337	77	16

1210. By way of reference, the 626 mm recorded in June 1996 represents about 75% of the average annual rainfall for the South East of England, while the 120 mm recorded as the maximum in 24 hours (in February 1997) represents just over 14%. LC74 is 93 km south of the Zaragoza camp and 175 km south of the Caucasia camp. These

distances mean that their readings cannot be taken as reliable evidence of what happened at LC74. The geographical variations are shown by the fact that the (incomplete) records from Zaragoza show 310 mm falling on 7 days in April 1997 on and after 18 April, with the heaviest daily fall being 115 mm at night on 19 April: this compares with 202 for the whole month and 71 being the maximum for April 1997 as recorded at Palma de Coco.

1211. There is support for Snr Velez' evidence that there was heavy rain during the time that the ROW was open and exposed, that soil was carried downhill by rainwater, and that "on certain days they couldn't work because it had been raining a lot and the ground was very slippery. Several times they had to stop the work for one or two days because the condition of the land prevented them working" {D8/125/1500}. First is the rainfall of over 1000 mm in May and June 1996 as recorded at Palma de Coco. Second, Snr Gasca had a memory that it rained so much that they had to stop the works and set up a group putting in more works because the terrain in the stretch of LC74 was complicated and they had to stop more frequently. He also remembered that the steepness of the terrain in that area meant that they had to take out an increased amount of material and that the amount of work required of their machinery was greater {Day16/17:21}. He also accepted that, on the assumption being put to him that it was raining in the days before and during opening, there was a risk that protection measures that had been installed might be destroyed {Day16/19:20}. He had a recollection that there were cases in which part of the *trinchos* or protection barriers failed, though this was not specific to LC74 {Day16/19:25}. His willingness to accept that, if it rained on the exposed surface after it had been opened up, material would be washed from the surface and from stockpiles and fall into watercourses was refreshing and entirely realistic when talking about slopes such as the North and South Slopes with watercourses running through their valleys {Day19/22:5}.
1212. Third, the Weekly Reports for Spread B contain numerous references to work being interrupted by rain and wet conditions on the spread between June and September 1996 and more sporadic references thereafter up to and including November 1996, which are collated at {C4/3.7/1105} ff: and see [1205] above. These references extend beyond the times when actual work was being done on LC74 and are in any event seldom, if ever, specific enough to enable the conclusion to be drawn that they are referring to interruptions of work on LC74 itself. But they contribute to the evidence that leads me to find that the ROW on LC74 was subjected to heavy rainfall on many occasions between when the ROW was opened in late May 1996 and the onset of the dry season. Even during the dry season there would have been (and I find that there were) occasions of heavy rainfall on the ROW on LC74, continuing on to June 1997 when heavy rains would have fallen on the newly recomposed ROW.
1213. I have outlined the construction process at [301]ff above. In its submissions on LC74 the Defendant places emphasis on the managerial and reporting structure that was meant to identify problems and lead to their resolution: see {C4/4.9/1029} at [97] ff. I accept the general submission that Ocesa had in place managerial and reporting structures to identify where problems occurred and to remedy them promptly when possible. It is, however, clear that there were delays in proceeding to re-conformation on the stretch including LC74 and subsequently in proceeding to re-vegetation and that difficulties affecting the state of the works along the stretch were being reported in the second half of 1996 but were not swiftly addressed: see [1203]ff above. One

knock-on effect of those delays is that, by the time of reformation, it was the dry season and revegetation was suspended.

1214. The gradients and challenges involved in laying the pipeline on the Ridge were generally comparable to the relatively benign topography of LC54, and would not have presented particular difficulties. The same cannot be said for the gradients and challenges on the North and South Slopes. I accept that the stills from video footage taken between the Rio San Bartolomé and the Rio Nechi at {C6/20} and {C6/21} provide an indication of the challenges presented by steep slopes such as the North and South Slopes and the impracticability of maintaining the same level of order and tidiness that would be possible on easier terrain. Those stills show heavy machinery working on what appears to be dry ground and illustrate the inevitability of some mixing and possible inversion on such terrain, over and above what will happen on the flat {Day42/3:12}. The difficulties of working on steep slopes would be compounded when the ground was wet to the extent that sometimes work was impossible and had to be halted, as happened on LC74 during the Ocesa works.
1215. Over and above the generalised evidence as to system there is little evidence about the actual carrying out of the works on LC74. Snr Velez was frank in accepting that his memory of the process was not very good, although he had watched what the workers were doing as closely as he could {D8/125/1498}. For the reasons I have already outlined, I have treated his evidence about what he says happened on the Ocesa works with caution; but some of his evidence I find to be reliable, even though it may in parts have been equally true of the ODC works. Some of his evidence I will consider in relation to specific allegations, but I deal with some here. I accept that the trench digger came at almost the same time as but after the bulldozers that had cleared the ROW [65]; while I do not accept that no efforts were made to segregate topsoil and other soil (e.g. trench spoil) I accept that soil was stored on both sides of the ROW, that it was not protected or covered, and that when it rained, earth was carried downhill by the rain [65]. After the trench was backfilled, the soil for reformation was left uncovered and on both sides of the ROW [66]. At some point (to which I will return) gabions were installed on the North Side of the Quebrada crossing, as if to form a barrier between AF1 and the springs and stream below, but by then a lot of earth had already been washed downhill (I add, as a result of the ODC works and, subsequently, as a result of the Ocesa works) [67]. During the time the earth was left exposed next to the ROW it was carried down directly by the rainwater to the water sources. The earth at the sides had been left without any protection, and therefore it was washed straight down to the streams [69]. After reformation of the ROW and before sowing grass on it they built the cortacorrientes made of sacks filled with soil [75]. When they revegetated they used figue matting on the steeper slopes (which I take to be the North and South Slopes) [77]. The ROW was fenced off to enable the grass to grow. Snr Velez removed the fence and gave his cattle access to the ROW when he saw that the grass had grown evenly [80]. Machinery was stored on his neighbour's land and not on La Nieve [81] (though this did not prevent him finding some machinery to impound when he was in dispute about payment: see [1322] below).
1216. Two features need to be placed more firmly in the construction chronology.
1217. At some stage a longitudinal drain down the east side of the South Slope was installed as part of or after the Ocesa Works. Snr Velez' oral evidence was that it was built a

long time after the Ocesa pipeline was laid {Day4/106:23}. I do not accept his evidence of timing as precise or reliable and there is no other evidence that clearly establishes when it was installed. ODC had provided a longitudinal channel on the east side of the South Slope, which is visible in the 1995 aerial photograph: see [1160.iii)] above; and Dr Savigny accepts that it was appropriate to install one there because of the cut slope above it {H2.4/4/952}. There is one other potentially relevant reference to placing a concrete channel: that is in Snr Velez' account of negotiations occurring at about the same time as an episode with a lost cheque, which I consider at [1327]. However, in that evidence Snr Velez asserts that it was Snr Vargas (who represented ODC) who had said, in response to Snr Velez' complaints that his land was going down the hillside, that "they" (unspecified) would come back to make a channel with cement in that area. So it is not clear that he is there reliably referring to the need for Ocesa to install a channel at all; and if Snr Velez is right in his reference to Snr Vargas, ODC installed its channel in or before September 1995. Though the aerial image does not show that it was lined with concrete at that stage, that would have been a normal method of construction. I am not aware of any photograph taken between about late 1996 and mid-1998 that shows the South Slope without a longitudinal drain: the 1998 overflight video is of insufficient quality to tell one way or the other.

1218. Snr Velez gave other oral evidence about the laying of the longitudinal drain which he attributed to Ocesa: see, for example {Day4/108:14} {Day5/111:14}. I am far from convinced that he was able to distinguish between the need for a longitudinal drain after the ODC works or the after the Ocesa works when giving this evidence. What his evidence does reinforce, in my judgment, is the evidence to which I have referred elsewhere that there was a serious problem of erosion and sedimentation from the South Slope from the time of the ODC works onwards. I accept that the provision of a longitudinal drain became a bone of contention for Snr Velez. I find that it was a bone of contention between Snr Velez and ODC; and that he is now confused and unable to give reliable evidence about whether, when or with what results it was also a problem with Ocesa.
1219. It seems strange (though undoubtedly possible) that Ocesa would have omitted a longitudinal drain on a slope where ODC had installed one previously and where it is now common ground that one was required when carrying out long term protection works. On the findings I have made above, the long term protection works were six months after the Ocesa pipeline was laid, which could be consistent with Snr Velez' evidence to which I have referred above that the drain was installed a long time after the Ocesa pipeline was laid.
1220. In re-examination {Day27/111:16} Dr Card gave as his opinion that the longitudinal drain was installed "as maintenance" at the same time as additional ditch diverters were installed. In doing so, he aligned himself with Dr Savigny's first report, where Dr Savigny had said that the longitudinal drain was "in all likelihood constructed as part of maintenance" {H2.4/4/950}, an opinion expressed on the basis of his assessment of Snr Velez' evidence rather than any specifically engineering expertise {H2.3/3/899}. The basis for Dr Card's revised opinion (which he had apparently formed overnight) was that, because there was a lack of erosion control matting, the originally installed ditch diverters (which he suggested were installed to the wider spacing appropriate to be used in combination with erosion matting) failed, causing

Saipem to go back and install ditch diverters to the narrower spacing that can now be observed. He added that he thought the longitudinal drain was installed at the same time as those maintenance works. I am unable to place weight on this revised opinion. First, there is no evidence that the ditch diverters were originally installed at a wider spacing and then replaced with others at a narrower spacing, and I do not accept that they were. Second, I reject the suggestion that no erosion control matting was used on the North and South Slopes, though I accept that it was not installed until revegetation: see [1237]ff below. Third, it remains inherently unlikely that Saipem would have omitted the longitudinal drain as part of the original works when ODC had already placed one on the South Slope in at least roughly the same position as the one installed by Saipem.

1221. The evidence as a whole does not enable me to make a precise finding as to when Ocesa installed its longitudinal drain. Specifically, the evidence does not justify a finding that it was long after the installation of long term geotechnical works. To my mind it seems most likely that Ocesa installed its longitudinal drain to the east of the South Slope at about the same time as the long term protection works and I find that is what happened, without putting any more precise date on it.
1222. Gabions and a sack wall were installed in the lower reaches of AF1. They are shown in detail by Dr Velez' photographs 4-LC74 and 5-LC74 at {H5.4/5/951}. It seems probable, and I find, that their installation was related to the Second Ocesa Settlement, which was dated 16 August 1996 and was between Snr Velez, Ocesa and Saipem: see [388] above where it is set out in detail and [1322] below. There is no document evidencing precisely when they were installed, and I bear in mind that no reformation works were carried out before November/December 1996. In his witness statement Snr Velez says that the gabions were installed "during the filling of the trench and afterwards" {D8/125/1499}. Later, he says that "concrete steps" were installed 8 or 10 years after the construction of the pipeline, but does not make clear whether this is referring to the same structures {D8/125/1516}. In 2010 he told Dr Savigny that the gabion and sack walls were constructed about 6 months after the Ocesa construction spread had passed due to complaints from Snr Velez that sediment had infilled his ponds and the creek channel on the floodplain {H2.4/4/939}. Given the history of his complaints to both ODC and Ocesa as set out elsewhere, and the terms of the Second Ocesa Settlement, I think it very unlikely that he allowed 8 or 10 years to pass; and I conclude that his reference to concrete steps being installed that long after is wrong if it is intended to be a reference to the gabions. I find that his estimate (as given to Dr Savigny) of about 6 months after the work front had passed is likely to be nearer the mark. However, I think that the most natural meaning of the Second Ocesa Settlement is that the dump and gabions have already been placed and that the Settlement is in relation to their installation and (at least in the case of the gabions) continued presence. The precise principles underlying the detailed design is not entirely clear, but I accept Snr Velez' evidence that the gabions were installed at or about the time of the backfilling of the trench (i.e. c.16-22 June 1996) though their installation may have continued for a short while after that, and that they were meant to prevent excavated earth from falling down. I find that the problem being addressed affected land off the ROW (hence the involvement of Saipem in the Second Ocesa Settlement) and that, given the position of the gabion walls, they were intended to prevent the flow of eroded material to the east of the ROW on the North Slope, across

field AF1 and to the area that had already been disturbed before the Ocesa works, on the North side of the Quebrada Crossing.

1223. In their closing submissions the Claimants' criticisms of the carrying out of the works on LC74 are divided into four categories: (1) Soil piles; (2) Erosion on the ROW/Long Term Measures/Revegetation; (3) soil mixing and inversion and (4) failure to protect watercourses. They follow much the same course as for LC54 and, once again, I shall broadly follow it.

1224. **Soil piles:** the findings for which the Claimants contend {C4/3.7/1112}ff are:

- i) Retention structures were not installed prior to or during ROW opening, or Trench Excavation in May/June 1996 in circumstances that amounted to negligence;
- ii) Further or alternatively, any retention structures that were provided failed or were inadequate in circumstances that amounted to negligence;
- iii) Stockpiles were not covered in circumstances that amounted to negligence;
- iv) Stockpiles were left exposed from the end of May 1996 until early November 1996 in circumstances that amount to negligence;
- v) There was a failure to review or maintain so that the failure to install or the inadequacy of the retention structures was not rectified in circumstances that amount to negligence;
- vi) Stockpiles were not placed and shaped at suitable locations and in particular were placed (i) outside the 25m ROW width, (ii) on or next to sloping ground (iii) above and/or close to watercourses; and/or (iv) built too high and/or of too large volume in circumstances that amount to negligence;
- vii) There was soil loss from piles of topsoil and/or subsoil and/or trench spoil (i) during ROW opening in May 1996; (ii) during and after trench excavation in June 1996 and (iii) at all times from ROW opening until ROW recomposition in early November 1996.

1225. *Retention structures:* the Claimants' case is summarised at [1224](i)(ii) and (iv). Snr Velez gave evidence that earth that had been stripped was not protected and was carried down the hill {D8/125/1498}. This evidence does not identify what sort of protection is being spoken of but, taken at its most general, is consistent with the allegation that no retention structures were installed. Snr Velez was more specific in his oral evidence in saying that earth was left on the side of the Ridge unprotected so that sediment came down to SP5 {Day4/41:13}. Although Snr Gasca was not able to remember specifics, his evidence was clear that Ocesa put in barriers, retaining walls, ditches and walls and that, if that was not done, then the work was corrected {Day19/19:1}. This evidence is acceptable in general but not during the period of security-induced inactivity affecting LC74. The installation of the gabions to which the Second Ocesa Settlement refers is evidence that remedial measures were taken to prevent the escape of soil on the North Slope but, once again, there is a lack of specific evidence about the precise circumstances in which the decision to install them

was taken. The terms of the Second Ocesa Settlement suggests that they were necessary because of the creation of a large dump, and the fact that they were included in the Settlement suggests that their installation was not routine.

1226. As an alternative the Claimants contend that any retention structures that were installed were inadequate. Once again there is no specific evidence as to time or place. This is important for two reasons. First, the Claimants have not been able to specify precisely where it is said that retention structures should have been installed; and, second, there was a risk, which Snr Gasca acknowledged, that retention structures that were initially adequate may have been destroyed – and that risk would have increased because of the undoubted delay with associated heavy rain between the opening of the ROW and reconfiguration {Day16/19:15}. In addition, I accept and bear in mind Snr Gasca’s evidence that it is impossible in times of heavy rain to guarantee that no material will enter streams {Day14/127:13}.
1227. If I had found Snr Velez to be generally an accurate and reliable witness, his evidence that “the earth was not protected” might have been sufficient to support a finding in general terms that retention structures were not installed. However, given the limitations in his evidence generally, I am not satisfied that there was a wholesale failure to provide retention structures. For reasons that I will return to later, I consider that his specific evidence about soil on the Ridge not being retained or protected on the side nearer to SP5 and AF2 is probably right, at least to some extent. What is not so clear, however, is whether or where there was a substantial stockpile in that area which should have been retained where the relatively flat Ridge gave way to the steeper slopes of AF2 and above Snr Velez’ old house. Turning to the allegation of inadequacy, for reasons to which I will return, I am satisfied that substantial quantities of eroded materials came from the North Slope, across AF1 and were deposited in the area referred to as SW1-SW3. Some of that will have come over or through the gabions. To that extent the gabions may be said to have been ineffective. However, there is no expert evidence that would justify a finding that the design of the gabions (or the sack wall near them) was negligent; and I do not accept that Snr Velez’ criticisms are a sufficient basis to find that their inadequacy involved negligence {Day4/111:18} {Day5/27:8}. As will appear, I am satisfied that there was erosion from the ROW on both the North and the South Slopes, but the evidence does not show that, as a general proposition, the erosion from the ROW (as opposed to erosion from collections of soil) was caused or materially contributed to by either the absence or the inadequacy of retention structures.
1228. *Stockpiles*: the Claimants’ case is summarised at [1224](iii)(iv)(vi) and (vii). The Ridge presented no unusual difficulties, but the North and South Slopes were much more challenging: see [1214] above. Snr Velez’ witness statement said nothing about the presence, size or placing of stockpiles. He merely said that “they placed the earth [that had been stripped] on both sides of the [ROW], with the vegetation they had removed earlier” {D8/125/1498}: that evidence was essentially repeated again on the following page. This is a surprising omission given the centrality of stockpiles to the case as pleaded and as now developed by the Claimants and their experts. In cross-examination Snr Velez said, referring to the mention of the dump of 2500 m² in the Second Ocesa Settlement, that he did not remember where they were going to put the soil {Day4/113:20} though he remembered the gabions being put in after soil had “accumulated”. It is of more than passing interest that he did not use the word “pile”

or “piled” at any stage in his evidence until it was fed to him in re-examination {Day5/110:4}. Snr Velez then took the opportunity to say that there were big piles put on the hillside above the watercourses. “It was a big pile of earth, 3 metres, 2.5 metres in some parts” {Day5/110:12}. He then said that it had been placed on the side away from the ODC pipeline and gave further evidence about the hillside being covered with sediment and passing by the gabions, which makes plain that he was talking about a pile on the east side of the North Slope near to the top of the slope {Day5/113:1}. He was then taken to {L7/851/866} and was pointed to the area of brown close to the gate from the Ridge above his old house but did not initially identify that as a place where soil had been piled {Day5/113:18}. After more general evidence he said that soil had been placed on the Ridge and affected SP6 {Day5/114:19}. In a passage of evidence that was not easy to follow, his evidence was that sediment that had affected his house was basically from (a) the brown gash (caused by cattle trail erosion) which ran down from the gate on the Ridge, passed to the left (as depicted on the photograph) of a tree and then broadened out and (b) from the edge of the Ridge for a distance to the south of the gate {Day5/119:7}.

1229. The most notable thing about this evidence, to my mind, was its weakness in terms of the circumstances and manner in which it was elicited, its lack of clarity and its apparent lack of precision or certainty. The lack of clarity, precision and certainty could in part have been because of the need to try to elicit it for the first time in re-examination, by which time Snr Velez had been giving evidence for the best part of two days. But if, in addition to the pile on the North Slope, there had been the other huge stockpiles that the Claimants (and Dr Card in particular) have been suggesting, I find it almost inconceivable that Snr Velez would not have remembered them and been able to give clear evidence about their position and size. His evidence about what was or was not stored on the Ridge does not give much support to an allegation that there was a substantial pile of soil on the West of the Ridge near to the gate.
1230. His evidence, however, does not stand alone. On the North Slope, there is the evidence of the Second Ocesa Settlement of a dump “of 2500 m²”. The terms of the Second Ocesa Settlement support his evidence that it was on the North Slope; and the fact that Saipem were involved in the settlement suggests that the dump was off the ROW. His evidence is also consistent with that of Dr Savigny at {Day37/88:17} ff that a wedge of soil would have been cut from the west side of the Ocesa ROW and the soil used to even the gradient across the ROW by filling, with the excess being deposited to its eastern side. Taking this evidence and the evidence of Snr Velez together, I find that there was a substantial stockpile on the North Slope as a result of the Ocesa works, which was the subject of the Second Ocesa Settlement. It was off the ROW to the east and affected an area of about 2500 m². The dimensions of the dump are otherwise unclear. There is no evidence that it was more than 3 meters high apart from Dr Card’s calculations, which I reject. I find that there was no other substantial stockpile on the North Slope during the Ocesa works.
1231. What happened to soil from the South Slope?
- i) It is common ground that it would have been normal practice when working in steep terrain such as presented by the South Slope for Ocesa to store soil in stockpiles on ridges, such as those at the top of the South Slope {Day16/24:14};

- ii) Dr Savigny identified an elliptical area on the Ridge where in his opinion “excess cut material was disposed of on the Ocesa ROW and over an unknown amount of the ODC ROW. The material was placed between ~KP 428+140 and ~KP 428+195 as shown in Figure LC74-4” {H2.4/4/913}. His figure LC74-4 indicates where he considers the area of possible construction fill across the two ROWs would have been;
- iii) The Claimants’ experts provide little or no assistance in determining whether, where and in what dimensions there may have been deposits of excess soil on the Ridge. Of most potential relevance, to my mind, is Dr Obando’s reported finding illustrated by photographs LC74.14 and LC74.15 at {H3.5/5/1121}, which he described as showing “Horizon A buried by mixed materials from the excavation and piling up of the soil in areas adjacent to the ROW.” There is conflicting evidence about where these photographs were taken. Despite the reference to piling up of soil “in areas adjacent to the ROW”, Dr Obando’s first report identified photograph LC74.14 as being taken at point 102 on the CAI and also as being taken on the ROW {H3.4/4/781}. Point 102 is off the ROW, though its precise position is not clear from the CAI. The Claimants have marked it on {C6/27} at a point about 50 metres South West of the gate from the Ridge {Day41/80:23} {Day60/75:21}, though that is not where it is shown on the CAI. On this conflicting evidence I accept that the photographs were taken a short distance from the ROW and to the South West of the gate on the Ridge. The significance of the photographs is that (despite Ms Thornton’s best efforts in cross-examining Professor Montenegro) they show 2 inches or 5-6 centimetres of excavated soil deposits {H3.10/20/2324} {H3.10/20/2326}. Professor Montenegro accepted that they were consistent with “the location of a construction pile at about that location on the property” {Day41/82:17} though he pointed out that it was the ODC Row that had run closest to the western edge of the Ridge;
- iv) Dr Obando’s evidence, which I accept, was that his two photographs showed deposits of excavated soil {H3.10/20/2326}. He drew the distinction, which I also accept, between soil covered with sediment and soil on which excavated soil has been deposited during construction, which in his view would have been moved by machinery or have fallen from stockpiles. Although I reject without hesitation his almost formulaic assertion that the deposits of soil he saw on LC74 were consistent with the calculations of stockpile losses in Dr Card’s Fourth Report, I accept and find that the photographs show deposits of excavated soil about 5-6 cms or 2 inches deep at a point just off the west side of the ROW a short way south west of the gate off the Ridge. I am not satisfied that they were as far as 50 metres from the Ridge, since that would be about level with SP5: the mark on {C6/27/1} is at a higher level than the level of SP5.

1232. I shall return to the question of erosion and sedimentation in various parts of LC74 later. Both then and in the present context, I bear in mind that Dr Obando’s evidence provides no scientific basis for discriminating between soil that was deposited during the ODC works and soil that was deposited during the Ocesa works. That is important because the same engineering and construction principles that would have caused Ocesa to store excess soil at or near the top of slopes or on ridges would have

applied equally to ODC on LC74 where ODC had to cope with the soils from the cut on the western side towards the top of the North Slope and the cut on the eastern side towards the top of the South Slope. And there is force in Professor Montenegro's observation that the ODC ROW was the one that was closer to the slopes falling from the west of the Ridge. This is not simply a question of physical proximity: Ocesa would, where practicable, avoid direct trafficking of heavy machinery over the ODC pipeline. Dr Card's fourth report included his new analysis of disclosed documents to which I have referred at [513] above. Amongst the documents he highlighted were some which identified the line of the ODC pipeline as a high risk area for Ocesa. Although there are references which suggest that on occasions machinery did cross the line of the ODC pipeline (see for example Weekly report for 1-8 June 1996, 9-15 June 1996 {H1.6/24/1382}) other entries suggest that a consequence of this was that (in one case 50% of) excavation soil was being used to increase the thickness of the cushion between the ODC tube and the surface transit area (16-22 June 1996 {H1.6/24/1383}). Dr Savigny referred to this as padding, which might be 0.5-1.5 metres deep; and his expectation was that extra care would be taken in its management {Day37/150:17} ff. Although I accept that as a reasonable expectation, there are references in the weekly reports (not specific to LC74) to procedures not being followed. However, it is not clear why Ocesa would have wanted to transit extensively on or near the line of the ODC pipeline on the Ridge, given the availability of ample space to the east, which contrasts with the falling away of the slopes to the west. Nor has any reason been advanced to explain why they would have wished to transport excess soil from the cut to the *east* of the ROW on the South Slope to the *west* of the Ocesa/ODC ROW on the Ridge; and there is no direct evidence that they did so.

1233. The factual evidence from Snr Velez and Dr Obando's photographs does not justify a finding that there were substantial stockpiles of soil on the Ridge near to the western slopes above Snr Velez' house. I find that excess soil was stored on the Ridge roughly in the area of the ellipse shown by Dr Savigny; but that was generally at a distance from the western edge of the Ridge. I accept that there may have been some soil stacked in the area near to the gate from the Ridge, but am not satisfied that it was in anything like the volumes for which the Claimants contend. If there had been a dump like the one on the North Slope, Snr Velez would have remembered it but, on his evidence, I am not satisfied that he has any such recollection that could safely be attributed to the Ocesa works. I conclude that some excess soil is likely to have been spread in the direction of the western edge of the Ridge in the manner described by Dr Savigny in his oral evidence, thereby reducing the amount remaining to be stockpiled. Any stockpiles, properly so called, on the Ridge that were formed by Ocesa were generally some way from the western edge of the Ridge.
1234. With these preliminary findings I address the criticisms set out at [1224] above as follows:
- i) I am not satisfied that there was a generalised failure to install retention structures prior to or during ROW Opening or Trench Excavation in May/June 1996. On the basis of Snr Velez' evidence and the evidence of the Second Ocesa Settlement I find that the dump on the North Slope was either not protected by retention structures or that the retention structures that were installed proved to be inadequate: hence the decision to install the gabions.

Given the position and size of the North Slope dump, I think it unlikely that no retention structures were placed around it. It is in my view much more likely that the retention structures that were put in place proved to be inadequate. I am not satisfied that Ocesa erected any substantial stockpiles near to the western edge of the Ridge that called for retention structures. There is no evidence that would justify a finding that there was a general or specific failure to provide retention structures that was negligent;

- ii) I have accepted that the original retention structures for the big dump on the North Slope proved to be inadequate. There is no evidence that would justify a finding that there was a negligent failure of design: see [546] above. On the evidence that I have outlined above, the Ocesa works were subjected to protracted exposure and to heavy rainfall from the time of opening the ROW. However, it should have been obvious to Ocesa and Saipem that (a) any substantial stockpile on the North Slope would need significant protection to prevent the escape of soils down the slope, (b) the North Slope had already been subject to serious erosion as a result of the ODC works and was therefore fragile, (c) the area near and just below the Quebrada crossing on the north side of the stream was already seriously compromised and would be liable to be affected by further escapes of soil from a large stockpile on the North Slope to the east of the ROW. In these circumstances there was a clear need to take particular care to prevent the escape of soils. The fact of the Second Ocesa Settlement suggests that the need for additional works (in the form of the gabions) was a response to the failure of any original retention structures to retain the soils. So far so good. But there is no evidence at all about what actually went wrong. Although the failure to retain soil appears to have been substantial it does not seem to me to be appropriate to make a finding of negligence on such inadequate evidence;
- iii) I find that there was a substantial stockpile to the east of the ROW near the top of the North Slope. I am not satisfied that there were any other substantial stockpiles as contended for by the Claimants on LC74 and find that there were none;
- iv) At the northern end of the Ridge, excess soil from the South Slope was stored in the area of the ellipse indicated by Dr Savigny. Although there may have been some soil stored near to the western edge of the Ridge it was not a substantial stockpile as contended for by the Claimants. Most of the soil was deposited in the watershed for AF3 and SP6 {Day37/154:7} though some would have been on land that sloped towards AF2. It is possible that some material was deposited during the Ocesa works so that it fell down the slope to the west of the Ridge, but it is just as likely that some soil deposited off the Ridge on that side was deposited there during the ODC works. It is not possible to tell whether the deposit identified by Dr Obando in his photographs LC74-14 and LC74-15 was the product of the ODC works or of the Ocesa works. It is theoretically possible that the deposits (or any similar deposits nearby) came partly from each set of works. It is, however, impossible to discriminate further. The deposits there shown are likely to have been deposited mechanically, either accidentally or on purpose, rather than having eroded in the course of rainfall, though it is possible that they rolled down in

the course of operations. There was probably no retention structure on or below the western edge of the Ridge if this happened during the Ocesa works because there was no substantial stockpile being placed at or near the western edge;

- v) For the avoidance of doubt, if the intended meaning of Snr Velez' evidence was that the Ocesa works caused there to be one or more substantial stockpiles of soil on the Ridge close to its western side, I reject that evidence as unreliable and not based on actual recollection of what happened during the Ocesa works. I have reached and reviewed this conclusion in the light of and taking into account the matters to which I will refer later when considering the allegations of damage to the west of the Ridge, including damage to AF2 and to Snr Velez' old house;
- vi) While I accept Snr Velez' evidence in the most general of terms that soil was placed on both sides of the Ocesa ROW, I find that most soil would have been stored to the east of the ODC ROW so as to minimise transiting or working over the ODC pipeline. On the North Slope this means that most soil not placed in the big dump would have been and was stored on the east side of the ROW, which was the side adjacent to AF1. On the South Slope, because of the constriction imposed by the cut to the east on the upper part of the slope, a greater proportion of the soil that was not moved to the Ridge would have been and was placed on the ROW at or beyond the western side of the Ocesa ROW. However, these collections of soil would not have been significant stockpiles. The Ridge itself, with its more benign terrain, would not have generated substantial stockpiles of soil;
- vii) The position of the stockpile on the North Slope and the stored soil from the South Slope was not inappropriate. The stockpile on the North Slope was on sloping ground and above W1 and the Quebrada crossing, but that did not of itself make its position either inappropriate or negligent. The Claimants have not advanced any rational case supported by expert evidence about where else the soil should have been stored. The soil from the South Slope was in an area that was not subject to steep slopes and had a tendency to slope towards AF3, in which SP6 was positioned. Neither the North Slope stockpile nor the storage of the South Slope soil exceeded 4 metres, or was inappropriately too high or of too large volume; nor are there any grounds for finding that their height or volume were the result of negligence. The Claimants have not advanced any rational case supported by expert evidence that would justify findings of negligence given my findings of size, volume and position;
- viii) Ocesa did not cover its substantial stockpile on the North Slope or the stored soil from the South Slope that was kept on the Ridge. The ROW and the stored soil were left exposed from May/June to November 1996;
- ix) The works on LC74 stalled from the week of 16-22 June 1996. That was longer than desirable, as both Mr Allison and Dr Savigny acknowledged. I find that they stalled initially because the reconfiguration spread had got behind and was more than 12 kms behind the pipeline laying front. There has been no analysis by the Claimants of why that happened, either from Dr Card {Day27/55:21} or any other expert, and it is far from self-evident that the

slippage of the reconfiguration spread was due to negligence. As a matter of fact, it seems likely (and I find) that security problems held up the reconfiguration spread and caused the initial intention to engage a local firm, as appears from the reference to the need to get a local firm who did not require special army protection. The available documentary evidence shows that the security situation remained extremely difficult from then until November 1996: see [1205]ff above. On the basis of the available evidence I find that Ocesa was well aware of the detrimental effects of the delays in carrying out reconfiguration and final geotechnical works. There is no evidence to suggest that the detrimental effects were a matter of indifference to them. I find that there was a shut-down of the works in the area because of the security situation and that the effective reason why nothing was done to progress the works with a local firm until November 1996 was the security situation, which caused the direct involvement of Bogota and liaison between Saipem and Ocesa and the taking of advice from the army in the decision making process;

- x) The Claimants submit {C4/3.7/1118} that the delay that occurred was negligent because (a) the initial decision to omit the 5 km stretch was not caused by security concerns, (b) the delay was not caused by security considerations but by the Defendant's failure to engage a local sub-contractor in time to prevent the delay, and (c) because problems caused by security were entirely foreseeable and do not come within any relevant Colombian law doctrine. I reject that submission for the following reasons:
- a) As a matter of fact the need to operate over a narrow front between opening and reconfiguration was reasonable given the security situation. Extending the front would make the provision of protection yet more difficult. It is for the Claimant to prove that the extension of the spread beyond 12 kms (which led to the decision to skip LC74) was negligent, which the Claimant has not even attempted to do: as I have already indicated elsewhere in this judgment the fact that a major civil engineering project (or a part of it) experiences slippage is not proof or even indicative of negligence (though it may put the contractor in breach of contract with his employer). In other words, the mere fact that the reconfiguration spread had slipped is not of itself evidence of negligence vis-à-vis affected landowners or other interested parties. There is no evidence that the reconfiguration spread had been carried out incompetently so as to cause the problem of slippage that occurred;
 - b) There is no evidence to suggest and no reason to assume that the failure to engage a local contractor who might have finished the works earlier was caused by inactivity on the part of Ocesa or Saipem rather than non-availability of a suitable firm to do the work sooner;
 - c) While I accept that problems caused by security are foreseeable, it does not follow that a failure to proceed with the works when they occur is negligent. It is apparent from the evidence I have summarised above that the security situation was very difficult. The Claimants' submission entails the proposition that, in order not to be negligent in their conduct of the works, Ocesa or Saipem were required to put the

lives of workers at increased risk and, if necessary, go against the advice of security advisers and the army. That is, to my mind, an unreasonable proposition and I reject it. Similarly, the Claimants' submission that because security problems were foreseeable they "do not come within any relevant Colombian law doctrine" reverses the proper approach to the issue. The question is whether the Claimants have proved that Ocesa was negligent in failing to overcome the security problems so as to finish the works on LC74 sooner. In my judgment they have not done so;

- xi) Accordingly I reject the submission that the delays in completing the reconfirmation works before November 1996 were caused or contributed to by negligence on the part of Ocesa, Saipem or the Defendant;
- xii) There is no evidence of retention structures actually failing during the period, though the prolonged period between trench backfilling and reconfirmation increased the risk of failure of retention structures. In the light of my finding that there was no negligent failure to provide adequate retention structures and the reasons for the stoppage of work, there is no basis for a finding that there was a subsequent negligent failure to review the adequacy of the structures that were in place;
- xiii) The delay meant that the ROW and the collected soils were uncovered for longer than was desirable. I have at [550] rejected the general proposition that stockpiles and other exposed earth should always or usually be covered as a matter of routine practice. So the fact that the soils on LC74 were not initially covered was not of itself negligent. I would accept that circumstances could arise where the contractor knows that there will be a substantial delay so as to give rise to the need to take special precautions before the delay occurs. Here, however, although security problems were foreseeable, it has not been shown that Ocesa or Saipem should have known or anticipated when doing the stripping and pipe laying that there would then be a long gap before reconfirmation. Thereafter the adverse security position provides a reasonable explanation for not deploying workers to cover the soil where that would otherwise have been feasible. I therefore reject the submission that it was negligent to leave the ROW and collections of soil exposed for the period to November 1996.

1235. It follows that I reject the criticisms and allegations of negligence set out at [1224] above. However, I accept that there would have been soil loss from the exposed soils between ROW opening in May 1996 and ROW recomposition in November 1996; the contrary is not seriously argued by the Defendant. The real issues are (a) how much soil was lost, (b) where it went, and (c) what effect it had on Snr Velez' land. I address those questions below.

1236. **Erosion on the ROW/Long Term Measures/Revegetation:** the findings for which the Claimants contend {C4/3.7/1121}ff are:

- i) There was no erosion matting on the ROW between long term works (about 15-21 December 1996) and Revegetation (sometime after May 1997) in circumstances which amount to negligence;

- ii) If any erosion matting was installed, it was installed on the basis of TQ21 (dispensing with matting from slopes of 10 to 20%) in circumstances which amount to negligence;
- iii) If any erosion matting was installed, it was not consistently provided at all or provided between ditch diverters across the full width and length of the ROW in circumstances which amount to negligence;
- iv) No longitudinal drains were installed on the North Slope in circumstances which amount to negligence;
- v) No longitudinal drains were installed on the South Slope during the construction works in circumstances which amount to negligence and the longitudinal drain which was subsequently installed was inadequate, in circumstances that amount to negligence;
- vi) The energy dissipation structures installed on the South Slope were inadequate and otherwise no EDS were installed where they should have been in circumstances which amount to negligence;
- vii) There was a significant delay between ROW opening (May 1996) and recomposition/long term works (early November-early December 1996) in circumstances which amount to negligence;
- viii) There was a significant delay between Long Term Works (early December 1996) until the revegetation works, after May 1996 in circumstances which amount to negligence;
- ix) There was a failure properly to review and maintain the ROW throughout the periods cited above including a failure to maintain and replace long term measures which became ineffective and/or failed in circumstances that amount to negligence;
- x) There was increased erosion on the ROW at all times (i) from ROW opening in May 1996 until ROW recomposition/long term works (early November - early December 1996) (iii) from December 1996 until revegetation works, after May 1996 (iv) from the time of the revegetation works and thereafter.

1237. *Erosion matting*: The Claimants' case is summarised at [1236](i)-(iii). Snr Velez' evidence was that a layer of matting was laid on top of grass seed on the steeper slopes, which implies that it was laid during the process of revegetation {D8/125/1501}. Snr Gasca agreed that erosion matting would not have been laid until revegetation works were undertaken {Day16/27:13}. I accept the evidence of both witnesses on this point. It follows that there was no erosion matting laid between the carrying out of the long term works on or about 8 December 1996 and when the revegetation works were carried out at about the end of February 1997.

1238. The laying of erosion matting would not have been affected by TQ61 because North and South Slopes both had gradients of well over 20% while the Ridge had a gradient of up to about 10%. There were no material lengths of the ROW on LC74 having a

gradient of 10<20%. There were therefore no material lengths of the ROW to which TQ61's omission of matting for slopes of 10<20% would have applied.

1239. I have referred elsewhere to Snr Gasca's evidence about the interpretation of the GDS at [574] above. The GDS for LC74 is not available and it is therefore necessary to look for other evidence about whether the provisions of the RECS were complied with, generally or specifically in relation to erosion matting. Dr Card accepted that the spacing of the ditch diverters on the North and South Slopes complied both with the RECS and (albeit rather equivocally) with the more demanding requirements of the EMP/ODC curve, which required smaller spacings if no erosion control matting was used {Day26/98:2}. In his first report Dr Card said "there is evidence of the use of black plastic erosion matting and also fibre matting in parts but it has not been placed over the full width of the ROW or the length of the [South] slope" {H1.1/1/213}. Snr Velez' evidence, to which I have referred above, did not say or suggest that matting was only put on part of the steeper slopes. Bearing in mind the bio-degradable nature of fique matting, the fact that Dr Card did not find it over the full width of the South Slope does not mean that it was not laid. In the absence of any suggestion from Snr Velez that significant portions of the steep slopes were omitted, there is no evidence that they were; and there is no obvious reason why Ocesa should have omitted some material parts of the slope while placing matting on others. While accepting that it is possible that there were areas of omission, I am not satisfied on this evidence that material areas of the North and South Slopes were omitted, and I find that they were not.
1240. Delay between the completion of long term protection works and revegetation is undesirable because the soil lacks the protection afforded by the erosion matting. For that reason, Snr Gasca was correct to agree that it was very important to ensure that revegetation took place at the same time as (or, I would add, soon after) the installation of the long term geotechnical works {Day14/53:19}. In times of rain between December 1996 and February 1997 the absence of erosion matting will have led to increased erosion from the surfaces of the North and South Slopes, which will only have been impeded by the ditch diverters. The Claimants submit that the failure to lay erosion matting sooner took place "in circumstances which amounted to negligence" based upon Snr Gasca's acceptance of the need for prompt installation and the consequences of a lack of matting {C4/3.7/1122}.
1241. The delay requires justification, and the justification is apparent from the weekly reports to which I have already referred: see [1208]. It is evident that there is a trade-off between the possible benefits of attempting immediate revegetation and the disbenefits of revegetating during the dry season. It is also evident that there was a deliberate decision to suspend revegetation during the summer season. To characterise that as negligent requires appropriate expert evidence on the pros and cons of the decision and general standards of good practice in such circumstances, which is absent either generally in this litigation or specifically in relation to LC74. If I had held that the delay in the period to November/December 1996 had been negligent, that might have laid the foundation for an argument that the delay between December and February was a consequence of that negligence. Even so, reliable evidence about the consequences of the delay (both as to the pros and to the cons) would have been required before a proper decision could have been made about whether the non-completion of the revegetation works before the onset of the dry

season was detrimental overall. The Court could make a guess, but that is no basis for a finding. As it is, the Claimant's allegation is directed to the period of delay between the long term works and revegetation which itself is alleged to have been negligent. In my judgement, that allegation is not properly supported and is not made out.

1242. It follows that I reject the Claimant's criticisms alleging the absence of erosion matting on LC74.
1243. *Longitudinal drains and Energy Dissipation Structures*: the Claimant's case is summarised at [1236](iv)-(vi). I have found that Saipem installed a longitudinal drain on the east side of the South Slope at about the time of the long term protection works. It was in at least roughly the same position as the longitudinal drain that had previously been installed by ODC and was well engineered {Day27/114:6}. There was no diffusion mechanism at its base, as a result of which there has been severe localised erosion at the discharge point, with the depth of the erosion scour being 0.9 metres when measured by Dr Card {H1.1/1/213}. Neither ODC nor Ocesa installed other longitudinal drains on the North or South Slopes.
1244. I have reviewed the circumstances in which longitudinal drains should be employed at [578]ff above. The Claimants submit that the absence of longitudinal drains on the North Slope and the absence of a second longitudinal drain to the west of the South Slope is attributable to negligence. They rely upon Dr Savigny's statement in his first report that "longitudinal drains are used in high relief settings involving steep terrain where runoff flow velocities and volumes are much greater" {H2.1/1/169} (although Dr Savigny made clear that he did not regard the Lead Claimants' properties as falling within his use of that phrase).
1245. Dealing with the South Slope first, the experts are agreed that it was appropriate for there to be a longitudinal drain down the East side of the South Slope. Dr Savigny's reason was that the existence of the cut to the East side of the slope prevented water from the ROW being distributed widely across natural terrain. There was no such restriction to the west of the slope and water from the ROW that has been diverted off the west side of the ROW has passed onto the adjacent slopes. I find that to be a reasonable distinction and prefer Dr Savigny's evidence that the west side of the South Slope did not require a longitudinal drain. It is notable that the slopes immediately to the west of the ROW on the South Slope have not suffered substantial damage, which provides a measure of retrospective support for the decision not to install a longitudinal drain there. I accept the general thrust of Snr Velez' evidence that, until the longitudinal drain was installed, there was uncontrolled passage of water and materials from the ROW down the east side of the ROW towards W1. In the absence of the concrete channel I accept that the passage of water would itself have caused erosion and scour. I also accept that the absence of any diffusion mechanism at the bottom of the longitudinal drain has caused or contributed to a concentration of water with scouring effect as noted by Dr Card. On the basis of Dr Card's evidence, once the longitudinal drain was installed there should also have been silt retention fences or sediment traps would have been required to prevent the passage of eroded materials into W1 until the revegetation of the ROW restored its condition and reduced run off and erosion from it to acceptable levels. None was provided by Ocesa. There is no evidence that any such precautions had been taken by ODC either.

1246. On the North Slope it is common ground that water from the east side of the slope would flow in a direction that took it generally over AF1 down into the valley. On Dr Savigny's analysis, there was room for diffusion onto a broad area of natural vegetation. To the west, there was the ODC cut at the top of the hill; but otherwise there was similarly scope for diffusion onto the natural vegetation beyond the ROW.
1247. When assessing the Claimants' criticisms and allegations of negligence, I take into account the fact that (as I have found) when Ocesa came to work on the North and South Slopes, they were still extremely vulnerable as a result of the ODC works, as demonstrated by Dr Savigny's assessment of exposed soil in September 1995 when the aerial photograph was taken. Furthermore, on the findings I have made about the consequences of the ODC works, both the North and the South Slopes had been subject to substantial erosion with protracted and serious sedimentation from those slopes that had compromised the land in the valley below. Of all the areas that the Court has considered in the course of this trial, the steep slopes on LC74 and the valley below were as vulnerable and as much in need of protection as any. The existing state of the slopes should have been obvious to Ocesa and Saipem. It is possible that Ocesa left some limited areas of the ODC ROW undisturbed; but it is probable that it used most of the ODC ROW and extended it to the east to accommodate its works. In those circumstances the lessons from the ODC works should have been clear.
1248. Even so, I consider that the decision not to place longitudinal drains on the North Slope and on the west side of the South Slope was justifiable, accepting Dr Savigny's approach. It was not without problems: for example, the absence of a longitudinal drain on the east side of the North Slope meant that eroded materials would flow onto and across AF1. But the installation of a longitudinal drain, while it may have minimised or prevented the diffused flow of materials onto AF1, would have concentrated them into the drain and carried them directly into the valley through which W1 flowed. Diffusing materials onto a wider expanse of natural vegetation could reasonably be thought to have been a better option, particularly given the already compromised state of the area downstream of the Quebrada crossing. I prefer the opinion of Dr Savigny on this issue for the reasons he gave and for the reasons explored with Dr Card in cross-examination and am therefore not satisfied that the decision to omit additional longitudinal drains was negligent.
1249. Turning to the longitudinal drain that was installed, on the findings I have made about when it was installed, I reject the submission that it was negligent not to install it sooner. I also find that it was well engineered, including the energy dissipation structures that were installed in it and which are illustrated in Dr Card's first report {H1.1/1/214}. However, I accept Dr Card's criticism of the failure to make provision at the bottom of the drain to prevent scouring by further energy dissipation measures. Given the sensitivity of the slope both generally and in the compromised and fragile state in which it had been left by ODC, I am unable to see any reasonable justification for not protecting the area below the drain. The area of damage was limited and the consequences of the erosion were not very great when viewed in the context of all else that happened in the valley; but it was avoidable and no real explanation for the absence of further protective works has been provided.
1250. *Delay*: The Claimant's case is summarised at [1236](vii)-(ix). I have already considered the reasons for the time taken between opening the ROW and its

revegetation. For the reasons I have given, I reject the Claimants' allegations of negligence.

1251. **Increased erosion and its causes:** The Claimant's case is summarised at [1236](x). The evidence points to there having been substantial problems with erosion from the works on the steep slopes making its way to the valley between. First, all the conditions were ripe for erosion: the soil was left exposed for months including during periods of heavy rainfall before the installation of long term geotechnical works or revegetation; and the steeper slopes had already been damaged by the ODC works. Second, the weekly reports for spread B provide evidence of seriously detrimental consequences flowing from the delay in completing the works. There is no reason to think that LC74 was immune from those consequences and good reason (namely the fragile state of the slopes) to support a finding that it was not. Third, the First to Fourth Ocesa Settlements provide compelling corroboration for Snr Velez' evidence that the Ocesa works caused substantial damage to his land over and above what had been contemplated or comprehended in his ROW Agreement with Ocesa. In particular, they provide corroboration for his descriptions of soil that had been left by the ROW being carried down by rainwater to water sources {D8/125/1498}. Third, although I have found that it was compromised in 1995 as a consequence of the ODC works, the state of the area below the Quebrada crossing is now significantly worse than it was then, which I find is best explained by further sedimentation generated in the course of and since the period of the Ocesa works. The precise extent and implications of the damage caused by the Ocesa works is difficult and remains to be worked through in the rest of this section of the judgment; but there can be no doubt that the delay in bringing the works on LC74 to a conclusion caused an increase in erosion and sedimentation on the steeper slopes that was substantial and was the subject of complaint from Snr Velez both in 1996 and thereafter.
1252. I record in passing that, as elsewhere, I reject Dr Card's estimates of soil loss as set out in his Fourth and Fifth Reports. They provide no assistance, for the reasons I have already given. In his first report he identified only three "notable areas" of soil erosion. Two were associated with cuts at the top of the North Slope (Points 1 and 2 on the CAI). Point 1 was described as "patchy erosion features at 5 m² to 10 m² and about 0.5m deep exposing the underlying weathered rockhead" having an aggregate area of 150 m². Point 2 was described as a near vertical cut on the western margin, some 2m in height and was illustrated at {H1.1/1/212}. The third was an area of soil erosion of about 50 m² and about 0.5m deep on the South Slope, as shown at {H1.1/1/212} (Point 99 on the CAI).
1253. I find it convenient to work from South to North, starting with the effect of the ROW and works on the Ridge on the slopes to its east and west before considering what happened on the South and North Slopes.

The Ridge, AF3 and SP6

1254. There is no evidence of extensive erosion from the Ridge itself, which is in good condition and does not show eroded patches. Dr Card gave no evidence specific to this area in his First Report. In that report he made the entirely general statement that "a significant volume of soil was lost from the stockpiles to the extent that additional soil needed to be brought in to make up for loss and complete backfilling" {H1.1/1/216}. He said in evidence that this was based upon a conversation with the

Claimant during a field inspection {Day26/102:17}. No such evidence appears in Snr Velez' witness statement. The only documentary reference to taking additional soil is in the First ODC Settlement. I do not believe that Dr Card simply made up the statement in his First Report and I accept that Snr Velez may have said something of the kind to him during a field inspection. If he did, however, I infer and find that it was an example of Snr Velez referring to something which was in fact attributable to the ODC works but which has been recycled to form part of the case against the Ocesa works. As I have not seen any contemporaneous note or other record of the conversation and Dr Card's reference in his report is so short, it would be wrong to infer too much on the basis of what is reported to have been said. However, in the light of the First ODC Settlement and the complete absence of any properly evidenced reference to a need to import additional soil to make good the Ocesa works, I take the reported conversation as some additional evidence of the problems that occurred with the ODC works. The reported conversation and the First ODC Agreement are consistent with ODC having suffered soil losses, though the duration of the *force majeure* delay and the overall time taken to complete the works and the precise scale of the soil losses cannot be known.

1255. Snr Velez' evidence that SP6 became blocked by sediments from excavated soil {D8/125/1500} also needs to be seen in the light of what is now known about the ODC works. There are two possible times when the damage to the spring that he alleges might have occurred: the first is the stripping of the ROW and processes that were undertaken during the ODC works, to which I have just referred; the second is the stripping of the Ocesa ROW (which was wider and will have passed closer to SP6) and the placing of soil from the South Slope in the watershed of SP6 and AF3. I am satisfied that Snr Velez has no accurate memory that would enable him accurately to attribute what happened overall to one set of works or the other.
1256. Dr Tobon's evidence does not materially support the Claimants' case because he found that the ROW on the Ridge (which he referred to as the ROW which crossed over SP5) was not severely eroded {H7.4/4/998}; and that the area between the ROW and the source of SP6 was in good condition with no current signs of erosion or signs of severe erosion to the sides of the stream except where cattle paths are found {H7.4/4/1005}. He referred to an accumulation of sediment and the formation of SW4, but gave no evidence that addressed either the possibility that the ODC works might have been implicated or the relative contributions of the ODC and Ocesa works. Instead, he relied upon his interpretation of witness evidence from Snr Perez and from Snr Jhon Clavijo, whose evidence was not specific to LC74 and was very general.
1257. Dr Obando's first report barely mentioned AF3. At {H3.5/5/1114} he listed AF3 in his summary table as a damaged area and recorded as an observation "Proliferation of weeds. Grasses of poor quality"; and as a finding "Soil buried by deposits of excavated soil materials". He made identical entries for AF2. In the same table, SP6 was noted as "not seen". Referring back to this table he said "I observed areas off the ROW affected by deposits of soil. I consider that the deposits of soil came from the ROW, due to their colour and the presence of rock fragments that correspond to deeper horizons." He took no samples from the areas he said were affected {H3.5/5/1127}. He exhibited three images (LC74.14-LC74.16) which he identified as "Horizon A buried by mixed materials from the excavation and piling up of the soil in

areas adjacent to the ROW” and “Fragments of rock ... in a mixed soil matrix, deposited off the ROW during the excavation and piling up of the soil...”, but did not otherwise identify the location at which the images were taken or even the “areas adjacent to the ROW” to which he was referring. In his Fourth Report he referred back to his findings for AF2 and AF3 in the table in his First Report and identified photographs LC74.14 and LC74.15 as being taken at point 102. As found at [1231](iii) above, point 102 is off the Ridge to the west of the ROW.

1258. There are a number of points about Dr Obando’s evidence on AF3, of which the most important are:

- i) He has no samples or photographic record to support his recorded finding in relation to AF3;
- ii) There is no reason to assume that what was found off and to the west of the Ridge would be replicated to its east. On the contrary, accepting Dr Obando’s evidence that what he found at point 102 was a deposit of excavated soil (rather than sedimentation that had travelled after being eroded from its source), the findings on AF3 would be likely to be different if his general thesis of sedimentation leached from stockpiles was correct;
- iii) His observation of a proliferation of weeds and grasses of poor quality contradicts Dr Tobon’s assessment of the state of the field in AF3. While Dr Obando’s expertise concerning prevalence of weeds or the quality of grasses would normally be expected to trump Dr Tobon’s, in this case Dr Tobon’s evidence is supported by the photographic evidence of vegetation on the ROW: see [1154] above;
- iv) He did not address (or appear to contemplate) the possible contribution of the ODC ROW to what he said he observed;
- v) His assertion in his fourth report that the deposits of soil he saw on LC74 were consistent with the stockpile soil loss described in Dr Card’s fourth report was unjustifiable to such an extent as to cast doubt upon whether he had considered the question at all. If he had, it casts doubt upon his expertise or his objectivity as an expert.

1259. For these reasons, I find myself unable to place reliance upon Dr Obando’s evidence about what he observed or found on AF3 and do not accept that he gives any useful evidence on whether any sedimentation on AF3 or of SP6 was caused by the Ocesa works.

1260. Viewed overall, the most favourable expert evidence for the Claimants on the state of AF3 comes from Dr Savigny and his evidence about where soil from the South Slope was stored: see [1231](ii) and [1234](iii) above. On the basis of his evidence that much of it would have been stored in the watershed of AF3 and SP6, I accept that some may have found its way down the relatively gentle slope onto AF3 or to SP6, as may some from the ROW in its exposed condition. However, the evidence does not satisfy me that the Ocesa works made a material difference to AF3 or to SP6. First, the relative gentleness of the slopes from the Ridge to AF3 and SP6 mean that they were less vulnerable to a substantial flow of sediment than would be, for example, the

North and South Slopes or the slope to the west of the Ridge. Second, any contribution of the Ocesa works must be balanced against the drastic action of stripping a substantial part of the field for the ODC works, which will have left the field exposed and vulnerable to erosive forces. Third, not least because the Claimants' experts did not address the possibility of a contribution from the ODC works (and because of the unreliability of Dr Card's Fourth Report calculations) there is no expert evidence on which to found a finding that any damage caused by the Ocesa works made a material difference to AF3 or SP6. The assertions by the Claimants' experts that the Ocesa works caused substantial damage are not founded on reliable supportive observation, sampling or other evidence and are undermined by their failure to contemplate any contribution from the ODC works.

1261. I therefore reject the Claimants' allegation that AF3 or SP6 were materially adversely affected by the Ocesa works.

AF2 and the Old House

1262. The argument about the state of AF2 and its causes has been dominated by a dispute about when and why Snr Velez moved from his old house to his new one. The Claimants submit that he moved in 1998 because of an intolerable flow of invasive sediment that made living in the old house and reliance upon his old source of water impossible. The Defendant submits that he moved in or about 2008 to go to a better position and larger establishment for reasons that were not attributable to pipeline works. While the house move is important evidence, I shall look at the witness and expert evidence about alleged sedimentation first.

1263. I have already identified that:

- i) Snr Velez in his oral evidence identified the source of the sediment that affected his house were (a) the brown gash (caused by cattle trail erosion) which ran down from the gate on the Ridge, and (b) the edge of the Ridge for a distance to the south of the gate: see [1228];
- ii) There were no substantial stockpiles at or towards the western edge of the Ridge during the Ocesa works and excess soil from the South Slope was placed mainly in the watershed of AF3 and SP6: see [1234](v);
- iii) Dr Obando's photographs LC74.14 and LC74.15 were taken a short way to the south west of the gate, less than 50 metres below the Ridge, and showed about 5-6 cms or 2 inches of excavated soil deposits that could have resulted from the ODC or the Ocesa works: see [1231] and [1234].

1264. Snr Velez' evidence in his witness statement was that "shortly after the construction of the pipeline, the mud that came down from the [ROW], with the water of a creek, began to enter my house. Each time when it rained, I had about 4 inches of mud in the rooms of my house..." About a year after the pipeline he decided to build walls about 8 cms high around the house so that the mud would not come into the house, which helped for a few months, "but the pasture began to be filled with mud and then much more mud started to come down and went over the small wall and came into the rooms [of the old house] again." After the construction of the pipeline, the water source, at the point where we used to take our drinking water, became contaminated

by the mud that come down from the [ROW]” so he started to take water from about 50 metres higher up the stream, at the point where he still draws the water that is pumped to the new house {D8/125/1510}. This account is not specific about the route of travel of the sediment that affected his house other than saying that the mud came down with water from the creek (meaning SP5’s creek). This is a different emphasis from the route(s) he identified in oral evidence, which concentrated more on the area of the gash. If the account in the witness statement were correct, there would be widespread and severe sedimentation of AF2 with materials from the ROW, at least down the channel of the creek and in the area around the old house.

1265. Dr Card’s first report did not identify significant erosion from the Ridge and did not refer to AF2 or the old house {H1.1/1/210}. When giving his opinion on sedimentation he concentrated on sedimentation from the steep slopes into SW1-SW3 and did not mention sedimentation onto AF2 {H1.1/1/216}. His second report at {H1.4/22/1001} responded to Dr Savigny’s observations on AF2 {H2.4/4/912} in which Dr Savigny had given as his opinion that there was a trend of deterioration before and after the Ocesa works and that sediment from the eroded livestock trail (i.e. the gash) is directed straight at the old house. Dr Card challenged Dr Savigny’s opinion that cattle were the cause of the erosion on the gash. He then reviewed Dr Savigny’s LC74-15 (the diagram of the ROW on the North Slope) and LC74-16 and LC74 – 17 (which showed erosion on the steep slopes) and challenged Dr Savigny’s interpretation. He then referred to the First, Second and Third Ocesa Settlements and other documents which he said recorded the movement of considerable quantities of soil downhill due to the delay in completion of reinstatement and re-vegetation works on the property. Apart from his expression of opinion on the cause of the gash, this either referred to slopes other than AF2, or was his interpretation of Settlement Agreements and other documents which (as I find) did not relate to AF2. His second report is therefore of very limited relevance to AF2. It does not provide any objective scientific evidence of sedimentation; nor do his subsequent reports.
1266. Dr Tobon gave limited evidence about sedimentation that could be relevant to AF2 in his first report. At {H7.4/4/976} he recorded that, above the Quebrada crossing, W1 has a well-formed canal free from sediment except that the normal flow of water is interrupted where it joins W2 and the waters of SP5, “where there appears to be some accumulation of sediment on the stream bed.” At {H7.4/4/978} he recorded as a personal communication from Snr Velez in November 2011 that the old source of water had to be abandoned in favour of the new “due to the heavy load of sediment originating from the [ROW], brought down by spring SP5.” His photograph at {H7.4/4/967} shows the gash directly above the old house and identifies the course of SP5 as going well to the south of the old house; and his photograph at {H7.4/4/1000} shows the steeply sloped bank and relatively deep channel down which the waters from SP5 flow. It also shows that the channel is sedimented, with sediment from the left (northern) side of the picture flowing in a southerly direction to reach the channel (as shown by the two left-hand arrows).
1267. Dr Tobon’s analysis of spring SP5 starts at {H7.4/4/997}. I accept his evidence that SP5 has a low discharge rate and dries up completely during the dry season but that there is a small hole or dip where rainwater accumulates, which is there permanently: its position is shown in his photograph at {H7.4/4/1000}. In his record of observations he states (at {H7.4/4/998}) that “along the bank, between the right of

way and the source of spring SP5, signs of soil movement were observed; namely, sediment dispersed along the bank can be observed which seems to be moving down from the right of way towards the slope and the source of spring SP5. *See the reports by Geoff Card and Franco Obando on the damage to Farm LC74*” (Emphasis added). There is no evidence in Dr Card’s report of sediment moving down from the ROW towards the source of spring SP5; and I have identified the limited nature of what Dr Obando said at [1231], [1257], and below. Neither expert’s report justifies or materially supports Dr Tobon’s statement of so-called observation. Nor, in the case of Dr Card’s report could it have done so as Dr Tobon did not see it before writing his own: see [499](ii). It is with considerable regret, but equal certainty, that I conclude that this is an example of Dr Tobon accepting material that was fed to him without verifying it for himself. That, combined with the clear evidence of bias in his compilation of his report on LC74 leads me to conclude that I cannot safely place any reliance upon Dr Tobon’s stated opinion about the source of sedimentation in SP5 or W1 after they had merged: see [644]ff.

1268. Dr Obando’s first report identified “soil buried by deposits of excavated soil materials”, which he distinguished from soil covered by sediment and illustrated with his photographs LC74.14 and LC74.15, to which I have already referred. His subjective evidence was that he observed a proliferation of weeds and grasses of poor quality. He made no direct observation of sedimentation in the field of AF2.
1269. Dr Velez’ first report concentrated mainly on the area of and affected by the steep slopes. He visited AF1 and took photographs. His evidence was that on his field visits it was not possible to observe pastures affected by sedimentation because it was no possible to identify sediments at a glance and required test pits to examine the soil profiles {H5.4/5/970}. He said very little about AF2 but said that “it was possible to observe the type of vegetation and the state of growth and development of the grasses located in AF1, AF2 and AF3 that were affected by the flow of sediments from the ROW. Currently the areas where the flow of sediments may have been more intense by virtue of the steep gradient of the plots, such as AF1 and AF2, with gradients of 25-50% and above in some sectors, is found under predominantly low barbecho coverage (see Photo 5-LC74), where there is grass it is of poor quality and development, and in some areas there is no coverage due to the damage caused to the soil’s chemical physical and biological fertility” {H5.4/5/970}. His Photo 5-LC74 was taken on AF1. Although the slope immediately to the west of the Ridge exceeded 25% in places, the area above and in the region of the old house has not been shown to be that steep; and the vegetation shown in photo 5-LC54 looks markedly different from that shown in Dr Velez’ photos and the dry season video of AF2. He reported seeing sediment in the streams from which the old house had taken its water, which he attributed to sedimentation from the ROW {H5.4/5/974}. Once again the major problem of sedimentation that he identified was in the area between the steep slopes. He deferred expressly to Dr Obando for “current evidence of sedimentation off the ROW” {H5.4/5/983}. And he supported Snr Velez’ decision to build the new house on “Dr Conrado Tobon’s evidence of the damage to the availability and quality of water in stream W1, which would have been worse in the period during and just after pipeline construction” {H5.4/5/983}. I have considered Dr Tobon’s evidence, including his evidence about water quality, already and, specifically, in relation to LC74 at [644]ff .

1270. Dr Savigny, while disputing the causes, accepted that “the sources of sediment are such that much deposition occurred in the vicinity of [Snr Velez’] old home ... and [Snr Velez’] water source for the old home” {H2.4/4/930}. The impact of this statement is substantially reduced by the fact that he did not inspect the area before writing that comment {H2.3/3/881}{H2.4/4/928}. This appears to be an uncharacteristic example of Dr Savigny accepting a statement in the Claimants’ allegations or evidence without applying his normal rigour to the question whether it is right or not.
1271. Overall, there is an almost complete lack of any objective or expert evidence of the presence of sediment on AF2 apart from the evidence from Dr Tobon and Dr Velez of observed sedimentation in the channel of SP5 and the upper reaches of W1.
1272. The Claimants’ dry season video {H7.5/36/1250} spends some time on AF2 and I derive the following points from it (while noting that the accompanying description notes are not formally in evidence and are not agreed):
- i) At c. 0:12 seconds it shows deeply etched erosion above the new corral which cannot be attributable to pipeline works, the significantly damaged east side of the top of the South Slope and the gouge around the gate on the Ridge;
 - ii) At c. 0:19 seconds it shows the emergence of the gash at a point that is directly above the old house. To its south the land falls away quite steeply into AF2;
 - iii) From c. 2:18 is taken on the slope to the west of the Ridge. From c.2:24 is a view east towards the Ridge from south of the old house with Snr Velez’ old chicken shed to the right of the image.
 - iv) From c.2:32 is a picture of a small hole in the ground. The notes state that it shows “sediments, consisting of material excavated most likely from the OcenSA ROW during construction, flowed downhill because the material consists of mixed soil sediments which is a feature of the soils on the ROW. 02:43 to 02:52²⁹: in this area, at the end of the slope from the OcenSA Row and near to the old house, laminar sediment can be seen to a depth of approximately 8cm.” The video then pulls back to look up the slope of AF2 again at c. 2:40, of which the notes say “there are many weeds, typical of degraded soils, growing up among the grasses.”
 - v) The video then shows (at c. 2:51) a close up of another hole before progressing further up AF2 towards the Ridge from c. 3:05, to the south of the slope up to the ridge on which the gash is to be found. The notes say that “Stream 5” (which I take to be the stream from SP5) once flowed along the base of the v-shaped valley that is shown. That is consistent with my assessment of what the video shows. It is also consistent with the evidence of Professor Monsalve that the old house was not in the line of SP5 and that water or sediment would have had to flow uphill and over a ridge to get from SP5 and its channel to the old house. It therefore supports the view that for water or the sediment that water might be carrying to get from SP5 to the old house it would have to take

²⁹ The timings in the notes do not quite match the timings that appear on the video provided to the Court.

the roundabout route to join W1 before getting to where Snr Velez drew his water for the old house by gravity;

- vi) A further hole is shown at c. 3:07. The notes say that “at this point, located approximately 50 metres downhill of the ROW, it is possible to see the darker horizons lower down, which is characteristic of mixing, as the lower horizons are closer to the top. At this point it is still not possible to see the original soils, which are buried in at least 15 to 20cm of sediment of mixed soils from the ROW.”

1273. The evidence of the video is tantalising. The exact positions of the holes are not identified; no analysis of the holes has been presented by the experts; and without expert assistance it is not possible for the Court to reach a conclusion on, for example, the depth of the holes (as neither a measure nor a dagger are shown) or what they show or, for example, whether the last hole shows something significantly different from the previous ones, as suggested by the notes. All that can be said is that, to the untrained eye, it is not obvious that any of the holes show a discernible differentiation between Horizon A (if it is there) and other horizons. The experience of this case is that the untrained eye normally needs and benefits from expert assistance - a view presumably shared by the parties given the resources that have been deployed to that end. I accept entirely Dr Velez’ evidence, to which I have referred above, that one cannot identify sedimentation simply by observation.
1274. While keeping Dr Velez’ warning in mind, I have searched the photographs for evidence that might assist in determining whether and when large volumes of sedimentation may have affected AF2 in general and the old house in particular. Dr Velez’ photographs R2-LC74 and R3-LC74 {H5.4/5/980}, which were taken during the dry season in February 2011, show the remains of the old house. One can see the division of rooms, marked by very low walls, and the cement floor of the house is visible. Although the old house is evidently abandoned, the photographs do not show (and Dr Velez does not evidence) the floor being submerged by sediment. This is of limited value, though it provides slight support for the Defendant’s case that the reason why Snr Velez moved out was not that his house was then being submerged with mud. Photographs of the area around the house (such as N2-LC74 {H5.4/5/962}) do not assist in identifying sedimentation of the area. Those photographs do, however, show fruit trees growing close by the old chicken pen, which itself was close to the old house.
1275. Pausing to take stock: the Claimants’ expert evidence does not provide objective evidence of sedimentation over AF2 or in the vicinity of the old house, save for the observations of sedimentation in the channel of SP5 and the upper reaches of W1. Dr Obando’s evidence of observed proliferation of weeds and poor grasses supports the Claimants’ case but no comparison has been made between the quality of the vegetation in the area alleged to have been affected (AF2) and an equivalent area that is said to be outside the area of influence. In addition there is his evidence based on his photographs LC74.14 and LC74.15 to which I have already referred. In the light of my finding that there was no major stockpiling to the western side of the Ridge by Ocesa there is nothing in the carrying out of the works themselves to suggest that there should have been major sedimentation flowing from the relatively flat and uncomplicated Ridge, though whatever potential for sedimentation existed as a result

of the Ocesa works would have been prolonged by the delay in bringing the works to completion.

1276. The reliability of Snr Velez' account is therefore critical to any assessment of the strength of the Claimants' case in relation to AF2. And critical to any assessment of the reliability of his account is his evidence about when and why he moved his house.
1277. The pleaded case in relation to the house shifted to some extent in documents which incorporated Statements of Truth. I do not consider these minor differences to be significant:
- i) In Further Information provided in June 2011 it was said that "the Claimant started building the new house approximately 1 year after the construction of the pipeline. This process took him approximately 1.5 years, so it was around 2.5 years after the construction of the pipeline until he moved into the new house" {B2.1/23/180};
 - ii) In Further Information provided in February 2012, it was said that "The Claimant was forced to relocate his house as a result of damage to Spring 5... . The Claimant relocated approximately 2 years after the construction works" {B2.2/33/427}.
1278. Snr Velez said in his witness statement that about two years after the construction of the pipeline he decided to build a new house {D8/125/1511}. In describing the conditions around the house he said that young chickens became trapped in the mud {D8/125/1511}, that it was uncomfortable and unpleasant for his young daughter who was crawling around in the mud {Day5/94:1} and that his children were treading in the swamp created by the mud {Day4/41:11}.
1279. The Defendant challenges the Claimants' case on four main grounds:
- i) Inconsistent statements made by Snr Velez about when he moved house: see [1280] below;
 - ii) The available documents do not support the alleged timing of the move: see [1281] below;
 - iii) Documents that could have supported (or disproved) Snr Velez' version have not been disclosed: see [1289] below; and
 - iv) Snr Velez' oral evidence: see [1290] below.
1280. *Inconsistent statements*: in an interview on 29 January 2012³⁰ (shortly before the delivery of the February 2012 Further Information) Snr Velez told Dr Velez that he had lived in his new house for about 3 years. A little later, when asked if he had stayed in the old house from 1996/1997 to 2007, he agreed that he had and agreed

³⁰ The Claimants says in their closing submissions that the recording was in 2011 {C4/3.7/1227}, though Leading Counsel for the Claimants said in oral submissions that it was January or February 2012 {Day57/59:16}. The precise date does not matter greatly for present purposes. Whether it was in 2011 or early 2012 it can be said to have been about 3-3 ¼ years after April 2008.

with the suggestion that he had stayed in the old house until about 10 years after the construction of the pipeline {H24.2/298/1339}. His explanation for the delay was that he could not afford the move with the money he got from the pipeline and had to get a loan from the bank, which took time. As set out below, the Third and Fourth Ocesa Settlements were in 1998. The evidence about getting a loan because the monies from Ocesa were insufficient therefore supports the house move being at a later date, in addition to which is the clear acceptance that it happened in about 2007/2008. The Claimants' response to this is that (as I have found) Snr Velez had difficulty in recalling dates and was suggestible. That said, the difference between the case that has been advanced that the move happened within one or two years of the Ocesa pipeline works and the *much* more recent time indicated in interview is troubling: it is not suggested that Snr Velez has no understanding at all of time or lengths of time. Furthermore, the effect of the Claimants' submission is that, without more, I can place no more reliance upon Snr Velez' assertion that he moved house 2 years after the pipeline than upon his statement to Dr Velez that he moved in about 2008.

1281. *Available documents:* like many campesinos, Snr Velez does not keep many documents and would not normally get receipts unless he asks for them {Day5/100:10}. However, he has produced two documents in support of his claim for the house move. The following points emerge:

- i) The documents are described in the trial bundle as quotations for construction materials. They are addressed to Snr Velez. The Spanish originals are at {M/189.1/771.1} and {M/189.2/771.3}. The translated versions are at {M/189.1T/771.2} and {M/189.2T/771.4};
- ii) Each appears to be on a pre-printed document from a hardware store;
- iii) {M/189.1T/771.2} bears the name of Nelson Restrepo as the supplier. It is dated 15 April 2008. It is for materials that were used for the new house and for putting a roof on the new corral {Day4/32:22}. It is signed (on the Spanish original) as "Settled delivered";
- iv) {M/189.2T/771.4} bears the name of Joaquin Restrepo as the supplier. It is dated 26 April 2008. It is for planks and other materials that were used for the new house {Day4/34:4};
- v) Leading Counsel for the Claimants said that the two documents were from the same firm {Day57/65:22}, but this is not apparent from the documents themselves, which have different names and other details.

1282. The potential significance of these documents is obvious. In order to address it, Leigh Day wrote to Freshfields on 14 January 2015, nearly three months after Snr Velez had been cross-examined, to explain how the documents came about, as follows:

"We have established that the documents referred to were documents sent to us by the Claimant's daughter in around March-April 2011 in response to a specific request to the Claimant for documents he might have or could obtain which would provide prices of items used in constructing his new house."

1283. It will immediately be noted that this explanation does not address the questions (a) whether the documents were created at the time stated on their face, or (b) whether the documents were created in response to the request to the Claimant for documents he might have or could obtain, or (c) whether the dates on the documents were intended to reflect the date of the transactions to which they appear to refer.
1284. Further information was provided by Leading Counsel at {Day57/58:5} about the documents and the process of compilation of Snr Velez' witness statement about the house move. This information and the submission that followed were made four months after the cross-examination of Snr Velez. The Court was told that:
- i) Leigh Day had the invoices but overlooked them when Snr Velez' witness statement was prepared;
 - ii) The significance of the invoices was not appreciated by those involved in taking the statements;
 - iii) Leigh Day did not have the tape or a transcript of the interview with Snr Velez when the witness statement was prepared and were not aware that he had agreed with a suggestion put to him in the interview about the date of the house move;
 - iv) The dates on the invoices were reviewed and the tapes of the interview were reviewed during preparation for trial. The tapes of the interviews were reviewed by Spanish speaking solicitors for purposes of privilege;
 - v) Leading Counsel realised the significance of the materials in question for the first time during cross-examination of Snr Velez and no member of his team had drawn it to his attention before then, from which I infer that no other member of his team had appreciated their significance before then.
1285. The Claimants invited the Court to accept as a plausible explanation that the invoice dated 26 April 2008 {M/189.2T/771.4} actually came into existence at a later date than the document dated 15 April 2008 {M/189.1T/771.2}, meaning that the 15 April 2008 document was a true document in stating when it was made but that the 26 April 2008 document was not a true document and was made at a significantly later date. The Claimants made this submission by reference to a third document, which had a serial number one away from the 26 April 2008 document but carries the date 13 February 1998, which it is common ground is a false date {M/183.1/726.1}. On that basis they submitted that the documents (or at least the 26 April 2008) document were made up in response to Leigh Day's request that documentation be provided.
1286. I accept what I was told by Leading Counsel about the failure to recognise the significance of the documents or the interview with Dr Velez until Day 4 of the trial. While that failure is regrettable and raises questions about the processes by which witness statements and expert reports were compiled, for present purposes I will take that day as my starting point. Even so, it is profoundly unsatisfactory that no proper evidence about or explanation of the provenance of the documents was given once their significance to LC74's case was appreciated; and that, four months later, the party which had disclosed them without any qualification or explanation other than the limited information subsequently provided in Leigh Day's letter, should ask the

Court to speculate that one or other of the documents is or may be false and decide so important an issue on the basis of such a speculation. Starting on Day 4, it was open to the Claimants' lawyers (to put it at its lowest) to go back to Snr Velez' daughter or even the suppliers for an explanation and, if necessary, a statement. I do not underestimate the difficulties of communication and evidence gathering in this case; but the Court has made very considerable efforts to accommodate real difficulties and would have done so if real difficulties had been experienced on this point. As it is, the Court has no evidence or information to suggest that any steps at all were taken to try to clarify the position in relation to the documents, let alone any information that steps were taken and difficulties encountered. In the absence of any such evidence or information, I do not consider it to be either proper or possible for the Court to assume that steps were taken or that difficulties were encountered.

1287. The reason why this is so profoundly unsatisfactory is that I can conceive of a way in which the documents could honestly have been produced even if the house move took place in or about 1998. Given the possibility that Snr Velez would default to "three years", it is conceivable that he might have gone to his old suppliers in 2011 and that the dates may have come about because the suppliers asked him how long before he had moved house, to which it is conceivable that he could have replied that it was three years before. However, I cannot proceed on the basis that that is what happened for a number of reasons. First, there is no evidence to support it. Second, all that is known about the documents is that Snr Velez' daughter (who has an education {Day5/98:2}) was involved in their production to Leigh Day and there is no reason to suppose that (if Snr Velez moved in 1998) she would either have allowed the 2008 date to be written in the first place or would not have noticed it. Third, if the providers of the documents were the people who had provided the materials, there is no reason to believe that they too would default to "three years" or would have been unaware that Snr Velez had built his house long before. If they had no memory or record of the transactions, there is no reason to suppose that the documents represent an accurate or reliable record of what Snr Velez bought in the first place: at best they would represent what Snr Velez said he had used, which adds nothing to his other evidence on the point. Fourth, it was not being suggested as even plausible that the document dated 15 April 2008 was not created on that date.
1288. It would still be open to me to find that the documents did not refer to 2008 transactions if there was compelling evidence to that effect. Before reaching a final conclusion, therefore, I review the rest of the available evidence before pulling the strands together.
1289. *Missing documents:* the point here is a short one. Snr Velez said both to Dr Velez and in his oral evidence that he could not initially afford to move house and could only do so with the benefit of a bank loan {Day4/45:9}. If that is right, the loan documentation would demonstrate when it was taken out. No loan documentation has been provided.
1290. *Snr Velez' evidence:* having initially confirmed that the evidence in his witness statement was true, Snr Velez later gave oral evidence that was inconsistent with that position. Leaving aside the question of the invoices, he said repeatedly that he did not know when he built the new house {Day4/39:17}. Later in cross-examination the suggestive question was asked "Is it your case that you stayed in your house for many years, 11 years, until 2008, while this mud was coming down into it?" he replied:

“Yes, that is my case. But I had to leave that house because of the sedimentation, and because this was affecting my wife’s animals, the livestock that my wife was looking after. I really couldn’t stand it anymore and we couldn’t stay there. I went and got a loan from the bank to build my new house. I don’t have a great deal of income. I couldn’t leave before, because I couldn’t afford it, really.”

1291. When in re-examination he was again taken to the interview with Dr Velez, he responded to the reading of the interview question “why did it take you so long [i.e. 10 years] to move to the new house?”:

“Because I had - I didn’t have the funds to do that. I had to take a loan out from the bank, and then - I had to do that, and I had to wait for it and I had to do that in order to build the house. So I had to make a great effort, so I couldn’t move immediately. I couldn’t do it before. I wasn’t able to. I wasn’t able to go to the bank to ask for a loan,…”

Even allowing for the suggestive nature of the question in cross-examination, the effect of these passages of evidence is that Snr Velez was accepting that he did not move for a significant period after the pipeline works.

1292. One detail about the sediment pouring into the old house which Snr Velez gave in evidence was that his daughter was still crawling when the mud started to come into the old house {Day5/96:10}. His daughter was born in 1992 and so would have been at least three by the time of the Ocesa works in 1996. Crawling at that age is of course not impossible, and mud in the house would have been very unpleasant for a young child of any age; but I am not satisfied that this detail, provided for the first time in re-examination, was based on true recollection, particularly when he said that he was unable to say how big his daughter was when they moved into the new house.
1293. Viewed more generally, there are a number of points to be taken into account when considering Snr Velez’ description of sedimentation of his house:
- i) Both SP5 and W2 were and are streams of low capacity. SP5 is ephemeral {H7.4/4/965} even though there is some water in what Dr Tobon described as the well in the dry season. W2 has a very low discharge rate which disappears almost completely in the dry season {H7.4/4/993}. While both could be swollen in times of heavy rain, their carrying capacity for sediment is limited;
 - ii) The ROW above SP5 is in good condition and has not suffered extensive erosion to feed sediment onto AF2 and to the old house;
 - iii) The route down from the gate on the Ridge to the old house includes the gash, sediment from which would have made its way to the old house. I have found that there was no substantial stockpile of soil on the western side of the north end of the Ridge and I am not satisfied that there was substantial erosion of that part of the Ridge as a result of the Ocesa works. Although not entirely clear, only a small part (at most) of the slope below and in the region of the gate is alleged on the CAI to be damaged by the Ocesa works. While I accept

that the hole at point 102 evidenced the deposit of 5-6 cms or 2 inches of excavated soil, there is no satisfactory evidence of widespread sedimentation off the western side of the northern end of the Ridge, and I find that none has been proved. More positively, I accept the evidence of Dr Savigny that the state of the gash is attributable to cattle and not to the Ocesa works {H2.4/4/908}. If, as Snr Velez indicated in his oral evidence, sedimentation came from that area, it was not attributable to the Ocesa works;

- iv) The steep sided channel down which SP5 flows does not give direct access to the old house: {Day40/71:21}. I reject the evidence of Dr Tobon to the contrary. It follows that the path of sediment would have had to be the more roundabout route down to beyond the merger with W1. Since water from the old source fed the house by gravity, there must have been a gravitational route downhill, but it was neither steep nor direct;
- v) If it were right that the streams from SP5 and W2 or W1 carried the mud into the old house both before and after low walls were erected around it, that suggests massive overflowing of the banks of the streams which would have been highly invasive even if not carrying sediment;
- vi) There is no expert evidence (properly so called) of extensive deposits of sediment around or on the site of the old house or on the Claimants' proposed route to it. Dr Velez' photographs show that the concrete floor and low walls are not submerged in soil.

1294. The second main reason given for moving house was the inadequacy of the old water supply because of sedimentation. I have accepted the evidence of sedimentation in SP5 and, to a lesser extent in the upper reaches of W1. I reject the evidence of Dr Tobon that the water supply was of better quality from the new source than the old when he tested it: see [644] and {C6/17/1}. However, I accept Snr Velez' evidence that there was a time when his original point of collection was affected by sediment and he started taking water from further upstream, initially by collecting it in large containers. This is consistent with there having been some sedimentation ultimately coming from the ROW, but does not require the quantities of sedimentation that are now alleged. It is also consistent with sedimentation from other causes over time, as evidence by the opinions of Dr Savigny and Professor Monsalve. I also accept that, whenever he moved from the old house, he continued to take water from the new source, even though it is further from the new house than the old source. I do not find this persuasive one way or the other, as it is consistent with Snr Velez having lost confidence in his old source even though it was in fact providing just as good quality water as the new; and the additional distance to the new source is not great.

1295. Drawing all these strands together, I am not satisfied that Snr Velez moved house in or about 1998 or that his decision to move house was caused by sedimentation or other damage caused by the Ocesa works. The reasons that influence me most in reaching this conclusion are:

- i) I find Snr Velez' evidence that he moved about two years after the Ocesa works to be unreliable and I reject it in the light of his subsequent evidence that he moved much later and the disclosed documents which appear to have

been prepared before the request for relevant documents was made by the Claimants' solicitors in 2011.

- ii) On the basis that they are genuine documents, there being no evidence or compelling reason to find that they are not, the invoices are strongly supportive of the Defendant's case that the move took place in 2008. They are also consistent with Snr Velez' evidence that it took him some time before he got a loan from his bank and those statements he has made, both to Dr Velez and in evidence, which (without attaching particular dates) indicate that he stayed in the old house for a much longer time than two years after the Ocesa works;
 - iii) At the same time, I do not accept his evidence about the scale of the sedimentation that affected the old house. There is no expert evidence to support it and no objective evidence of very heavy sedimentation in and around the old house;
 - iv) I accept that sediment has affected the channel of SP5 but there is no expert evidence to support the conclusion that it happened within a particular time frame. Given my finding that there were no substantial stockpiles on the western side of the Ridge, the gentle slope of the Ridge itself, and the lack of serious erosion on the Ridge, I do not accept that there was substantial erosion that would have fed sedimentation flowing down to the old house in the period of or shortly after the Ocesa works via SP5 or the more southerly slopes of AF2, though there may have been a modest increase;
 - v) I accept Snr Velez' evidence that at least part of any sediment that came to the old house came down the route of the gash. That sediment was not caused by the Ocesa works but largely or completely by cattle trails and congregation. Whatever its cause, it existed and would have been a source of sediment before the Ocesa works: see [1187](ii) above;
 - vi) I do not accept that difficulties with getting water from his new source was a substantial reason for moving house. It would have been easier to get the water from the new source to the old house, which was much closer, than to the new;
 - vii) If Snr Velez had been compelled, or thought he was compelled, to move house by the consequences of the Ocesa works in or about 1998, he would have complained about the effect on his old house at the time, not least when making the claims that led to the Third and Fourth Ocesa Settlements in April and October 1998. There is no evidence to suggest that those Settlements were a response to a complaint about the impact of the works on his home, and no evidence that he did so otherwise.
1296. I conclude that the real reason for the move to the new house was that it was an opportunity to move to larger house in a position that was better in a number of respects despite the need to pump water to it.
1297. For similar reasons but more generally, I am not satisfied that the Ocesa works caused substantial sedimentation over the area alleged as AF2. The sedimentation

that occurred was contributed to by the erosive impact of cattle and general erosion after deforestation. There may have been some erosion from the Ridge generally, but it was not excessive. The excess soil from the South Slope may have contributed some additional sediment, but the evidence does not establish that it was substantial.

1298. I therefore reject the Claimants' allegation that AF2 was materially adversely affected by the Ocesa works.

The North and South Slopes and the valley below and between

1299. There is overwhelming evidence that there was serious erosion from the North and South Slopes which adversely affected the Quebrada Crossing and the area downstream of it. I can summarise it fairly briefly:

- i) Snr Velez' evidence that large quantities of soil was carried down the steeper slopes to the stream below, which evidence I accept: see [1215] above;
- ii) The terms of the First Ocesa Settlement: see [1317] below;
- iii) The terms of the Second Ocesa Settlement, which indicates substantial removal of soil with the consequential vulnerability of the steep North Slope to erosive rain and the existence of the large and exposed dump to its east: see [1322] below;
- iv) The terms of the Third and Fourth Ocesa Settlements, which are much more likely to relate to damage suffered as a consequence of the steep North and South Slopes, particularly in the light of my findings that material damage to AF2 and AF3 have not been made out: see [1323] below;
- v) The fact that Ocesa had to work on slopes that were already fragile and, years after the ODC works, still had large areas of exposed soil: see [1187];
- vi) Dr Savigny's implicit acceptance of at least the potential impact of the Ocesa pipeline works on the valley and W1 as he (rightly) attributes the disturbance seen in the 1995 aerial photograph to the ODC pipeline works {Day37/112:14};
- vii) The evidence that the heavy rains during the period that of the Ocesa works caused serious damage to exposed works, combined with my finding that the ROW on LC74 was exposed to heavy rainfall on many occasions between when it was opened in late May 1996 and the early stages of post-revegetation works up to about June 1997: see [1205] and [1212] above;
- viii) The photographic evidence which shows that the general state of the North and South Slopes was still fragile and with exposed soils when the experts arrived to take their photographs: see, for example, the photographs referred to at [1156]ff above;
- ix) Dr Savigny's acceptance that erosion from the ROW on the North Slope would flow over AF1 to the area SW1-SW3 {H2.7/9/1797} {Day27/84:20};

- x) The progression of the area SW1-SW3 so that it has become a swamp, which represents a material deterioration consistent with further sedimentation, the condition of the stream and the surrounding area at and below the Quebrada Crossing, and my acceptance of Dr Obando's evidence that this is (at least) in part a consequence of material coming down the hillside combined with Snr Velez' evidence of substantial quantities doing so: see [1188] above.
1300. In his original report Dr Savigny dismissed (with very few exceptions) the 1998 Overflight Video as a reliable source of evidence on the basis that it was of too poor quality {H2.4/4/921}. In cross-examination he attempted to rely upon it as the principal plank of evidence on which he would rely as being inconsistent with the damage alleged by the Claimant having occurred after Ocesa as opposed to after ODC's work {Day5/121L:24}. He was rightly taken to task on this point and his evidence in the following pages of transcript was as unconvincing as any that he gave (not least in identifying the wrong property on the image as the basis of his new opinion) during what was otherwise generally an impressive display of expertise and thoroughness. For the reasons I have given elsewhere, I am satisfied that the ODC works did substantial damage to Snr Velez' land; but reliance on the 1998 Overflight Video is not one of them.
1301. The more difficult question is how much damage the Ocesa works did over and above what had already been done by the ODC works. I will return to that question after considering soil mixing, inversion and compaction and failure to protect watercourses.
1302. **Soil mixing, inversion and compaction:** the findings for which the Claimants contend {C4/3.7/1129} are that:
- i) Soil mixing and/or inversion occurred.
 - ii) Soil compaction occurred on the ROW.
 - iii) Topsoil was not properly and carefully removed and stored and preserved separately from other soil in circumstances which amount to negligence.
 - iv) Topsoil was not returned onto the ROW after all other soils had been placed back in circumstances which amount to negligence.
1303. The experts found clear evidence of mixing of horizons on the North and South Slopes which was caused by the laying of a pipeline or pipelines {Day41/45:3}. Professor Montenegro's sample locations A1 and B1 are to the eastern side of the ROW at the top of the North Slope, but it is not possible to conclude that they were taken from an area that had not been affected by ODC's works, given the expanded width of the ODC ROW at the top of the North Slope: see [1187](iv) above. Dr Savigny accepted that construction practices in all likelihood accounted for some or all of the Claimants' observations of mixed soil horizons on the Ocesa and ODC ROWs {H2.4/4/913}. Although he was not specifically referring to the steeper slopes, his evidence is particularly applicable to those slopes because of the greater technical demands and the need to shift larger quantities of earth that they presented. Similarly, Professor Montenegro's acceptance that the activities shown in the slides at {C6/20} and {C6/21} were consistent with work disturbing the lower horizons was

realistic and correct. Making all allowances for the slightly different alignment of the ODC ROW but taking into account its extent as shown by the 1995 aerial photograph, the activities necessary to create the ODC ROW would have had similar effects, as discussed elsewhere. The Claimants placed reliance upon Professor Montenegro's agreement with Dr Obando that "immediately prior to construction, the sequence of horizons [on LC74] was, in general A-B-C" {H23.1/2/158}. However, in the light of the works that had already been carried out by ODC, Professor Montenegro was correct to add the qualification that "in some areas Horizons A and B had also been already lost."

1304. Dr Obando stated that there was inversion and mixing of soil horizons for the entire length of the ROW on LC74 {H3.5/5/1113}. The objective evidence does not support that statement:

- i) The organic matter % from the on ROW sampling site from his first inspection showed a higher % from the lower horizon sample than from the higher one (2.76/0.78), but Dr Obando's evidence about the position of the sampling site was inconsistent {Day32/24:14} and included that he might have taken it intentionally near stream W1, which could not be taken as representative of conditions on the ROW;
- ii) Professor Montenegro found no evidence of inversion inside or outside the ROW, though he found evidence of mixing inside the ROW;
- iii) Dr Obando's sampling sites from his second inspection (TP1 and TP2) showed identical organic content (2.4%) in the upper layer sample both on and off the ROW. His on ROW sample (TP1) showed organic matter, CIC, magnesium and potassium decreasing with depth and exchangeable aluminium increasing with depth, which contraindicates inversion or mixing of soil horizons {H3.5/5/1123};
- iv) Dr Obando found Horizon A to be present in places though he described it as thin and discontinuous {H3.5/5/1118}. Professor Montenegro found a shallow Horizon A in the first 5cms of soil in his sampling location {H4.5/5/1143};
- v) The good condition of the ROW as shown in photographs led Dr Obando to concede that the mixing and inversion for which he had contended did not happen, at least in parts {Day32/32:3}.

1305. The Defendant submits at {C4/4.7/494} that the objective evidence supports a finding that there has been a loss of Horizon A in places but does not establish widespread mixing or inversion, for the reasons set out in detail in their submissions at {C4/4.7/486}ff. I accept that submission for the reasons it gives. I also accept Professor Montenegro's evidence that Horizon A has disappeared in some areas of LC74 but that this phenomenon is not confined to the area of the ROW.

1306. Turning to the allegation of over-compaction:

- i) I refer to [737]-[738] where I criticise Dr Obando's approach to over-compaction on LC74. Once his figures from his first inspection were corrected, they showed that the level of compaction was higher off the ROW

than on it. When confronted by this fact, Dr Obando sought to downplay the significance of compaction results in a way that he had not done in producing his report: see {Day32/46:18} cf {H3.5/5/1120};

- ii) The results from his second inspection, when his misleading rounding was removed, showed that the on ROW sample was more compacted than the off ROW sample, falling within Lal's "moderate" category;
- iii) For the reasons set out at [741]ff I am unable to place any weight upon Dr Obando's assessment of sustainability;
- iv) Professor Montenegro's sampling did not evidence elevated levels of compaction on the ROW {H4.5/5/1130}.

1307. In summary, while I accept that pipeline laying works are likely to lead to compaction of soils and that there were some instances of over-compacted soil, they are not widespread. They have not adversely affected the condition of the ROW on the Ridge, which is generally in good condition. They may have contributed to the deterioration of the steeper slopes.

1308. It is, in any event, important to bear in mind the prior influence of the ODC pipeline works, which will have reduced the supply of topsoil available by the time that Ocesa came to do its works, and which will have caused some mixing and compaction as well as erosion from the steeper slopes into W1 and the stripping of soil from AF3 to which I have already referred. These are all confounding factors when trying to determine whether and to what extent the evidence of mixing or compaction discovered by the experts was caused by Ocesa as opposed to ODC.

1309. I accept and find that some further mixing will have occurred and that some further topsoil will have been lost as a result of the Ocesa works and the protracted period from May 1996 to the carrying out of revegetation. I also accept and find that areas on the west side of the combined ROW may have been relatively more affected by ODC than those to its east, though the evidence does not enable precise findings to be made about the extent to which the Ocesa ROW overlapped the ODC ROW or went beyond it (particularly to the east). Over much of LC74 this does not matter because the ROW on the Ridge is in good condition and the Claimants have not established that there was material damage to the adjoining land in AF2 or AF3 that was attributable to the Ocesa pipeline works. Where it does matter is in relation to the state of the North and South Slopes and the valley between. I will consider the relative contributions of the two sets of works further when considering the heads of damage alleged by the Claimants.

1310. **Failure to protect watercourses:** the findings for which the Claimants contend {C4/3.7/1130} are:

- i) There was no proper investigation of watercourses on this property prior to construction in circumstances which amount to negligence;
- ii) There was no proper sampling of watercourses on this property before during or after construction in circumstances which amount to negligence;

- iii) There was no proper protection of watercourses to protect from the ingress of soil, in particular to protect from stockpiles and soil erosion from the ROW and/or having regard to the practice in relation to flume pipes and/or in that there were no sediment traps in circumstances which amount to negligence;
 - iv) Following ROW recomposition soils which escaped into water sources during construction were not removed and flow conditions were not reinstated to their pre-construction condition in circumstances which amount to negligence.
1311. Because the Claimants have failed to prove substantial or lasting damage to AF3 or SP6 these allegations fail in respect of that area.
1312. I have accepted that SP5 and its channel were sedimented and that there was some sedimentation of the upper reaches of W1. This was not caused by any failure to investigate or sample them as they were not crossed by the ROW. I have rejected the allegation that sedimentation from the ROW caused Snr Velez to move house. My reasons for doing so have included the absence of objective evidence of substantial sedimentation. That absence of evidence also tells against a finding that the sedimentation of SP5 or the upper reaches of W1 was caused by any substantial erosion from stockpiles or from the ROW. I do not exclude the possibility that some sediment from the ROW found its way to SP5 or the upper reaches of W1, but it was not of the order of magnitude alleged by the Claimants.
1313. The position on the steep slopes is quite different. Any failure to investigate or sample pales into insignificance in comparison with the problems of sedimentation from the ROW on the North and South Slopes down into W1 at and below the Quebrada crossing. The reasons for this sedimentation have been considered above: overwhelmingly they were the consequence of the delays which I have held were attributable to the security situation and not to negligence on the part of Ocesa. The scale and duration of that sedimentation would have overwhelmed any sediment traps; and soils which escaped into W1 during construction were not removed, nor were flow conditions reinstated to their pre-construction condition. There is no evidence that either ODC or Ocesa took any steps to reinstate the affected area of and around W1. Instead they entered into agreements for compensation with Snr Velez. I will return to consider the relative contributions of the ODC and Ocesa works when considering the heads of damage below. I will also consider the impact of the settlement agreements elsewhere.

The Factual Background – Post-construction

1314. Snr Velez first claimed and obtained additional payment from Ocesa before the works on the Ocesa ROW were completed. It is convenient to take all of his known claims and settlements together in this section.
1315. Snr Velez' witness statement {D8/125/1504} ff refers to three additional payments which he attributes to Ocesa. He gives the impression that (a) the first additional payment he received from Ocesa was a sobranchos payment after Ocesa's revegetation: see his [88]-[90]. That is chronologically incorrect. He also refers to (b) a payment where a cheque made out to him was wrongly cashed after which he got a further cheque for COP 5.5 million: see his [91]-[93]; and (c) another payment of about COP 5million for land that had been washed towards the pasture fields next to

the ROW by the rain during the pipeline construction and which had damaged those fields: see his [94]. His written evidence is very short on detail. It is therefore necessary to trace the additional payments through the documents that have been disclosed.

1316. The documents show that Snr Velez entered into five settlements with Ocesa. They were on 3 July 1996 (“the First Ocesa Settlement”), 16 August 1996 (“the Second Ocesa Settlement”), 4 April 1998 (“the Third Ocesa Settlement”), 30 October 1998 (“the Fourth Ocesa Settlement”), and 19 December 2003 (“the Fifth Ocesa Settlement”).
1317. *The First Ocesa Settlement* {M/181/684} stated on its face that the parties met on 15 June 1996 and that it was signed on 3 July 1996. On 15 June the ROW had been stripped but the trench for the pipe had not been dug. I have already set out the terms of the settlement in detail at [387]. It was in the form commonly used by Ocesa when settling claims without involving Saipem. As set out above, it recorded that Snr Velez was claiming in respect of 1.5 hectares which he considered to have been rendered permanently unfit for cattle breeding and raising activities. He claimed COP 8million. The agreement recorded that the commercial price of the land in that area was COP 4million and that, there being no agreement between the parties, and to avoid any conflict between them, they had agreed to settle the claim for \$5,150,000.
1318. It seems probable (and I find) that Snr Velez is referring to the First Ocesa Settlement at [94] of his witness statement {D8/125/1506} where he says that he complained to Snr Alfonso Medina that land “had been washed towards the pasture fields next to the right of way by the rain during the pipeline construction and had damaged those fields.” Snr Velez says that, after consulting “the company, [Snr Medina] told [him] they were going to give [him] another \$5m. pesos, on top of what they already had paid for the right of way. They told [him] that they wouldn’t pay more than that. That payment wasn’t fair, because that value doesn’t take into account the area of land that was damaged and the time [he] couldn’t use the area.” The alternative explanation is that [94] of Snr Velez’ statement refers to the Third Ocesa Settlement, described below. That explanation has the advantage that the settlement consideration was stated to be COP 5million; but I have no confidence that Snr Velez has an accurate recollection of the exact amount to which he was referring in [94]. In the end, it may not matter whether Snr Velez was referring to the First or the Third Ocesa Settlements at [94] as his description in his witness statement provides no further detail of the damage being described.
1319. In cross-examination, Snr Velez professed difficulty in orientating himself on photographs, but the gist of his evidence was tolerably clear: it was that the First Ocesa Settlement came about because substantial quantities of land and sedimentation came down the west side of the South Slope (that being the side down which the concrete channel was later placed) into the Quebrada Crossing causing sedimentation {Day4/102:2}-{Day4/112:5}. He confirmed that the Settlement was in respect of 1.5 hectares and said that he did not consider the compensation to be a fair price {Day4/110:6}. On the basis of his evidence I find that the First Ocesa Settlement was in relation to the flow of land and sediment down (predominantly) the western side of the South Slope into W1 at and about the Quebrada Crossing and that the area affected (which was approximately 1.5 hectares) included the area on the northern side of the stream, which in turn included the area described as SW1-SW3.

SW1-SW3 is very considerably less than 1.5 hectares. I therefore infer that the 1.5 hectares for which Snr Velez was being compensated included the affected area of the South Slope. I find that he knew the essential terms of the Settlement, including that it was for rendering that area permanently unfit for cattle breeding and raising activities and the amount of compensation he was to receive. I also accept his evidence that he thought at the time that the compensation was not fair because of the area of land involved.

1320. One of the most remarkable features of the First Ocesa Settlement is the speed with which it came about. The meeting that led to its conclusion occurred within a week of the opening of the ROW. That of itself suggests three things of which the third is evidentially the most important. First, Ocesa had people and systems in place to deal with damages claims and they were on LC74 or at least accessible to Snr Velez very soon after the works commenced. Second, Snr Velez made a claim very soon after the Ocesa works started. Third, the terms of the Settlement suggest that something dramatic had happened within a week of the Ocesa works starting, because Snr Velez was complaining that 1.5 hectares of his land had been rendered permanently unfit for cattle breeding and raising activities, for which he was claiming COP 8million. While the Settlement records that his assessment was disputed, the fact remains that Ocesa agreed to pay him nearly 65% of what he was claiming. Another indicator of the magnitude of the problem is that the sum paid by Ocesa (COP 5,150million) was 20% more than the payment it made to Snr Velez under his original ROW Agreement (COP 4,285million). If the agreement had come about because Ocesa had gone beyond the previously agreed ROW, Saipem would have been involved and a sobreanchos payment made, as happened with the Second Ocesa Settlement. The non-involvement of Saipem supports the view that the First Ocesa Settlement came about because something happened on the ROW which caused serious problems for Snr Velez.
1321. The second notable feature about the First Ocesa Settlement is the relative coincidence in timing between it and the Second ODC Settlement, which arose out of the complaint made in January 1996 and was concluded in May of that year. On the findings I have made, the two settlements were related by more than just the timing of their conclusion: each concerned the damage to the area at and downstream of the Quebrada crossing and Snr Velez' complaint in relation to each was that significant quantities of soil had come from the South Slope and into the stream affecting an area which included SW1-SW3. One interesting and potentially material difference between the two sets of works is that, by mid-1996, the ODC works had long been completed, but the Ocesa works were still unfinished. I return to the significance of these features when considering the relative impact of the ODC and Ocesa works elsewhere.
1322. *The Second Ocesa Settlement* {M/182T/689b) was dated 16 August 1996 and was between Snr Velez, Ocesa and Saipem. It has been set out in detail at [388] above and was a sobreanchos agreement that also provided compensation for a dump of 2,500 m² and the installation of gabions. The compensation payable under the agreement was COP 2,066,410, roughly 50% of the amount paid under the original Ocesa ROW Agreement. Although dated 16 August 1996, the document and the detailed calculations of the sobreanchos are marked as being received on 12 September 1996. The settlement was therefore concluded before revegetation took

place. An interesting insight into Snr Velez' toughness is given by [89] of his statement which, in relation to the *sobreanchos* agreement, says that when he had signed a document he was told there was no money. So he erected a fence around some of the machinery still on LC74 and said he was going to stop the machines until he was paid. He was paid in cash the next day {D8/125/1504}. I accept that evidence. Quite when that happened is not clear (and does not matter), but his evidence of delay in payment (which I accept) is supported by a letter sent on 9 October 1996 from Snr Bartolucci of Saipem to Snr Daza of Ocesa {M/192T/778.1} in which Snr Bartolucci said that Snr Velez was claiming for payment for certain rocks used in the construction of gabions. It was said that this payment had been taken into account when discussing *sobreanchos* and damages outside the ROW and that "the payment of this negotiation is being processed by Ocesa."

1323. *The Third Ocesa Settlement* {M/185T.1/730.3.1} was dated 4 April 1998 and was between Snr Velez, Ocesa and Saipem. It was in the same form as set out at [388] above. The same person witnessed Snr Velez' signature as had witnessed his signature for the Second Ocesa Settlement. The description of the damage in the Fifth Recital was "Damages and losses off the right of way in the adjacent plot totalling \$15,000,000. The Sixth Recital stated that Sn Velez had claimed \$15,000,000 from Saipem as payment for those damages. The Seventh Recital stated that Saipem assessed the real value of the damage as \$5,000,000. In the light of the parties' inability to agree the real value of the damage caused, Clause 1 recorded that the settlement sum was \$5,000,000. The Settlement document gives no further details of the damage to which it relates. There is no witness evidence about what this settlement covered.
1324. *The Fourth Ocesa Settlement* {M/187T.1/750.3.1} was an agreement between Snr Velez and Ocesa made on 30 October 1998. Although on a pro-forma typed form, it was a different format from that used for the First Ocesa Settlement. The recitals recorded that Snr Velez was the owner and possessor of La Nieve, that by reason of the construction of the Ocesa pipeline La Nieve was affected in a strip of land (the dimensions of which were not stated) and that "in addition, and in relation to the construction, [Snr Velez] filed a claim for damages caused outside the strip negotiated and paid for by [Ocesa], namely: Payment of damages in a rill that formed and affects 1.5 ha of pastures planted with *Brachiaria* grass. The claim and notarized statement are in the central file in Bogota." The recitals also recorded that the facts were verified by officers of Ocesa on 30 October 1998. The relevant provisions of the settlement agreement were:

FIRST CLAUSE: OBJECT OF THE SETTLEMENT.- The parties agree, by this agreement, to put an end and to prevent any controversy that may arise in connection with the construction of the ... pipeline in relation to the damages and losses caused outside the right of way, other than the additional lands ("*sobreanchos*"), as negotiated in the property. The settlement shall include specifically the damages claimed in relation with the property LA NIEVE, namely:

1.5 Ha. of grass for geotechnical works (\$5,500,000)

SECOND CLAUSE: AMOUNT OF THE AGREEMENT.- The amount of this agreement is ...\$5,500,000 broken down as follows:

[\$5,500,000] on account of Payment of 1.5 Ha. of Brachiaria grass (Permanent geotechnical works remain at the site.)

PARAGRAPH. The contracting parties understand that the amount paid by [Ocensa] is a sole and full payment which includes not only physical damages but also the losses caused by the alteration of the normal economic exploitation of the property, including loss of profits and direct damages which are included in this compensation.

...

CLAUSE FOURTH.- By virtue of this SETTLEMENT, which produces the effect of a final judgment, [Snr Velez] expressly declares that [Ocensa] is cleared and released in respect to any economic compensation related to the negotiation which is dealt with in this contract and that consequently, in the future, he will not file any judicial or extrajudicial claim originated in the construction of the ... pipeline in the mentioned property

THE OWNER

[OCENSA]

(Signed) Rogelio Velez

WITNESS

WITNESS

(Signed illegible)

(Signed) Juan Carlos Herrera

1325. Snr Velez was unable to give any useful evidence about this agreement {Day4/145:2}. All that can be derived from the agreement itself is that it related to a rill that formed and affected 1.5 Ha of grass which was in some way related to geotechnical works. The Claimants submit that the reference to damage to a pasture field in the First Ocensa Settlement and to 1.5 hectares of Brachiaria grass in the Fourth Ocensa Settlement (a) are evidence that sediment from the ROW for which Ocensa was responsible caused damage to pasture and (b) Snr Velez' claims that the impact was on Field AF1 and AF3 {C4/3.7/1184} at [3344], {C4/3.7/1201} at [3412]. I accept submission (a) but not submission (b). The reference to 1.5 hectares of Brachiaria grass in the Fourth Ocensa Settlement is unspecific as to the location of the damaged grass, as was the reference in the First Ocensa Settlement to permanent damage having been caused to 1.5 hectares of used for cattle farming. The most that can be said is that (assuming he did not claim twice in respect of damage to the same area) Snr Velez made claims in respect of 3 hectares of land said to have been damaged, 1.5 hectares of which was the subject of the First Ocensa Settlement and the rest of which was the subject of the Fourth.

1326. Otherwise the Claimants make no submissions as to the location of the damage being referred to other than to submit that, if the settlement evidences damage corresponding to items of damage alleged in this litigation, that must affect the Court's assessment of the evidence of the experts called on behalf of the Defendant when considering whether the Ocesa pipeline works caused any damage at all {C4/3.7/1253}ff.
1327. The Defendant submits that this settlement is related in some way to an episode where Snr Medina assisted Snr Velez in relation to an ODC cheque for COP 5million that had been cashed without going into his account. There is no doubt that such an episode occurred and that Snr Medina assisted Snr Velez, although even in 1998 Snr Velez appears to have been confused in thinking that the cheque was from Ocesa (rather than ODC): {M/186T/747.3}, {M/186T/747.1}. The documents show a confusing involvement of both Ocesa and ODC in the episode, which is not clarified by witness evidence.
1328. According to Snr Velez' witness statement at [91]-[92] {D8/125/1505} the lost cheque episode was connected with a need to carry out further works "to stop the sloped land from sliding down further." He says he initially negotiated with Ricardo Vargas, who I take to be the same Snr Vargas as referred to previously. At some stage (presumably mid-1998) Snr Velez complained to Snr Vargas that a piece of land was being carried downhill to the stream. Snr Vargas said that "they wouldn't pay for the damage, and that they would come back to make a channel with cement in that area." According to Snr Velez, Snr Vargas said that if he would not let "them" carry out the work, he would bring in the army. "Then he went to his helicopter and left." Snr Velez refused to let "them" come and repair anything without paying him. His account is that Snr Medina told him he had been compensated already, which led to enquiries being made that showed the cheque had been cashed but that the signature had been forged and the name on the cheque was Ricardo Vargas. The cheque itself is at {M/186/737} and was apparently originally drawn on 24 November 1997 {M/186T/747.7}. The main area of clarification achieved during his oral evidence was that the cheque was in respect of compensation for earth being washed downhill and that he thought COP 5million was fair compensation for that {Day5/140:5}.
1329. On this evidence, I make the following findings:
- i) The ODC cheque episode related to the cheque paid by ODC in payment of the Second ODC Settlement. I reach this conclusion because it was an ODC cheque and the amount (COP 5 million) matches that of the Second ODC Settlement but no other ODC Settlement. It also chimes with Snr Velez' evidence that Snr Vargas' arrival in his helicopter (which I infer was on behalf of ODC as before) provoked the start of the episode and Snr Medina's subsequent involvement, and that it related to land being carried downhill to the stream and a large amount of mud having come down;
 - ii) While it is possible that the Fourth Ocesa Settlement also related to the same area of hillside and the need for geotechnical works (possibly in the form of a concrete channel), it is not possible to locate the area with sufficient certainty to make a positive finding of fact. What can be said is that Ocesa settled a claim being made by Snr Velez without involving Saipem, which is evidence of acceptance of responsibility for an adverse state of affairs not previously

covered by their ROW Agreement or the previous Ocesa Settlement Agreements. Whether or not that acceptance of responsibility would have been acceptance of sole responsibility for an area of damage or acceptance of having made a contribution to an area also affected by the ODC works cannot be determined from the Settlement or the evidence relating to it. The reference to the permanent geotechnical works being present reinforces the impression that the settlement related to a stretch of the ROW. On all of this evidence I conclude and find that it related to damage to one or both of the steeper slopes.

1330. *The Fifth Ocesa Settlement* {M/188.1T/754.3} states that it was for “damage to fences due to a helicopter landing and frightening livestock. Damage to 25 wood posts. Transfer of livestock to another pasture plot.” The compensation was COP 3 million (c.£1,000-1,250). It related to damage caused during an inspection years after the conclusion of the works. It is not informative except as to Snr Velez’ continuing willingness and ability to pursue successful claims for damage which, when compared with what is claimed in this action, was modest.
1331. Snr Velez’ witness statement said “I remember that I signed a *Paz y Salvo*, but I don’t remember with whom nor where I signed. I think it was with Alfonso Medina. What I understood of that document was that the company would be in *Paz y Salvo* from the payment of the right of way, but not with respect to the damages that might occur” {D8/125/1506}. The only *Paz y Salvo* that has been identified as such in the trial bundle in relation to LC74 is the Saipem *Paz y Salvo* that I have set out in detail at [391]. It referred to damage caused outside the ROW. It was dated 4 April 1998, the same date as the Third Ocesa Settlement (which also referred to damage caused outside the ROW). It was signed by Snr Herrera for Saipem, as was the Third Ocesa Settlement; and Snr Velez’ signature was witnessed by the same person as witnessed his signature for the Second and the Third Ocesa Settlement Agreements. On its terms it is a *Paz y Salvo* that is general in referring to damage caused by Saipem without limitation. It is therefore wide enough to cover damage that had been the subject of the Second Ocesa Settlement as well as the Third Ocesa Settlement. On the documentary evidence, Snr Medina had no involvement with it.
1332. Snr Velez signed three receipts for payment:
- i) A receipt for a cheque for COP 5,150,000 dated 16 August 1996 {M/189/765}. This receipt relates to the First Ocesa Settlement. It states “I [Snr Velez] hereby state that I have received from [Ocesa] the amount of \$5,150,000 as payment of 100% of the accidental damage over [La Nieve], and that I have been fully paid in all respects”;
 - ii) A receipt for a cheque for COP 5,335,000 dated December 1998 {M/189/758}. This receipt relates to the Fourth Ocesa Settlement. It states “I have received from [Ocesa] the amount of [COP 5,335,000 minus 3%] as payment of ___ at [La Nieve] as per contract signed on date ___ when it was notarized. As a result of the above I freely and spontaneously state that I have been fully paid by OCENSA in all respects in relation to the aforementioned contract.”;
 - iii) A receipt for a cheque for COP 2,895,000, which refers to a contract dated 19 December 2003 {M/189/755}. This receipt relates to the Fifth Ocesa Settlement. It states “I declare that I have received from [Ocesa] the amount

of [COP 3,000,000 less 3% as retention of taxes] for a total of ___ ... \$2,895,000. Contract signed on 19 December 2003. As a result of the above I freely and spontaneously state that I have been fully paid by Ocesa in all respects in relation to the aforementioned contract.”

1333. Snr Velez’ evidence on the existence of a Paz y Salvo relating to damage *inside* the ROW is hesitant and is not supported by a disclosed document. It is possible that it is the product of reconstruction rather than true memory at a time when it suited him to limit the scope of any Paz y Salvo to damage on the ROW but not off it. But the general prevalence of Ocesa (as opposed to Saipem) Paz y Salvos suggests that Ocesa would have wanted to conclude one with Snr Velez who was a determined and persistent claimant from the very early stages of Ocesa’s involvement with LC74. His evidence is also consistent with his remark elsewhere that Snr Medina was very correct in his dealings. I therefore conclude and find that his evidence is probably correct and that, separately, he concluded a Paz y Salvo with Ocesa, which would have been in its standard form. I find that it is most likely to have been concluded in 1998, by which time he had entered into four settlement agreements with Ocesa and, on the evidence, was not pursuing any further complaints.
1334. Snr Perez kept cattle on La Nieve from about 2000 to 2010. When he started keeping his cattle on La Nieve it had good pasture and the water sources were good for his cattle {Day5/131:15}. He started to experience problems in about 2009. He says he lost six cows that got stuck in the mud around the Quebrada crossing, which caused him to stop using La Nieve.

The Impact of the Ocesa Pipeline

1335. For the reasons set out above, I am not satisfied that the Ocesa pipeline works made any material difference to the state of the ROW on the Ridge or fields AF2 and AF3. The works will have contributed some additional sedimentation to SP5, the upper reaches of W1 and SP6, but I find that that the contribution was modest and did not materially alter the underlying state of those watercourses save to contribute to Snr Velez’ initial decision to switch his source of water. It did not cause and does not justify his decision to move from his old house to his new one.
1336. The situation on the North and South Slopes is much more serious and complicated. I have held that both slopes and the area around and downstream of the Quebrada crossing were already seriously compromised when the Ocesa works started: see [1190]ff. Despite the great weight of expert evidence devoted to LC74, neither side’s experts provided a reasoned critique of the incremental contribution of the Ocesa works on the basis that the ODC works had already caused substantial damage to the slopes and the valley beneath. It is therefore necessary to resort to non-expert evidence for indications of the likely severity of damage that was happening from time to time. Among those indications are:
- i) The ODC works were underway but not completed in January 1991. Their exact state is not known but I infer that the ROW had not been reconformed or, if it had, long term protection works had not been carried out, so that it was vulnerable to erosion and damage during the period of suspension just as the Ocesa ROW was vulnerable when works were stopped in 1996;

- ii) The overall period of the ODC ROW's exposure is not known but was likely to have been at least six months (i.e. from before 18 January 1991 to sometime around or after the conclusion of the addendum to the ROW Agreement in May 1991) and the period from opening to revegetation may have been longer than that;
- iii) Dr Savigny's analysis of the position in late 1995 satisfies me that, despite the presence of protection works on the North and South Slopes, they were still largely exposed and would still have been causing sediment to flow down into the valley down the sides of the slopes and, from the North Slope, across what later became known as AF1. The evidence does not establish that SP1-SP4 were by then completely submerged, though the disturbance identified by Dr Savigny may have been at least in part contributed to by sedimentation which affected those springs as well as the wider area;
- iv) The state of the slopes in September 1995 raises the question whether any further improvement would have occurred if the ODC works had not been disturbed by the Ocesa works and, if further improvement would have occurred, how long it would have taken or what its end point would have been;
- v) It has not been shown that the state of the North and South Slopes when photographed by the experts was substantially worse than the state shown in the 1995 aerial image;
- vi) The sum paid under the Second ODC settlement was COP 5million. The sum paid under the First Ocesa Settlement was COP 5,150million;
- vii) The timing of the First Ocesa Settlement suggests that there were significant problems immediately upon the commencement of the Ocesa works;
- viii) The timing and the content of the Second Ocesa Settlement suggests that the Ocesa works caused significant flows of sediment across AF1 towards the disturbed area and W1;
- ix) The state of W1 and its surrounding areas was worse when visited by the experts than it had been in 1995. Snr Velez gives evidence, which I accept, that the water in the stream overflows its banks to the sides;
- x) The fact that Snr Perez kept cattle on La Nieve from 2000 but only started having problems and losing cattle in about 2009 suggests continuing progressive deterioration over time.

1337. I find that the effect of the Ocesa works was to set the North and South Slopes back about four years. In addition, the Ocesa works will have meant that there was rather less topsoil spread on reformation than would have been there immediately before Ocesa started its works, as would also have been the case when ODC carried out its reformation. I refer to the Ocesa works setting the slopes back because they had not recovered from the ODC works, so that the impact of the Ocesa works was to increase the flow of sediment from the ROW beyond the flow that would still have been happening in any event as a result of the ODC works. In addition, there is evidence that Ocesa extended the ROW to the east at the top of the North Slope

(hence the Second Ocesa Settlement) and caused an increased flow over AF1, which necessitated the placing of the gabions (although they were not in the event successful in stopping the flow). Ocesa probably also extended the area of operations to some extent on the east near the top of the South Slope where ODC had already left a cut face. It is likely that the Ocesa ROW generally extended onto new ground to the east of the ODC ROW as well as using some or all of the width of the ODC ROW as necessary for its works. Comparison of the 1995 aerial image with later photographs does not demonstrate that this extension to the east was substantial.

1338. The evidence does not permit a quantitative assessment of the volumes of erosion from the ROW or the volumes of sedimentation that found its way into W1 that are attributable to the ODC and Ocesa works respectively. By the time of the Ocesa works, the ODC works had already caused the damage that I have described and, because the ROW had not recovered, was a continuing source of erosion and damage. The contribution of the Ocesa works was two-fold. First, the works re-disturbed parts of the already damaged and fragile ODC ROW, setting them back and increasing the amount of erosion from the area of what had been the ODC ROW to the extent that I have described. Second, they caused new damage such as, for example, where the Ocesa Works extended beyond the area of the ODC ROW. It is not possible to measure the incremental effect of the Ocesa works on particular slopes or overall with greater precision.
1339. As time has passed, the slopes have shown some recovery and the impact of the pipeline works has tailed off. But the slopes continued to provide sediment into W1 over and above what would have been the consequences of natural erosion or cattle trails if no pipeline works had ever been carried out.
1340. I find that the area of SW1-SW3 ceased to be usefully productive pasture from an early stage (due to the combined effects of the ODC and Ocesa works) but that it did not become a swamp that was a danger to cattle until 2009 or shortly before.
1341. I have not yet addressed the question of the alleged existence and destruction of fish ponds. I deal with that when dealing with specific heads of claim: see [1366] below.

The Claimant's Heads of Claim

1342. When introducing their submissions on quantum the Claimants recognised “the difficulties they face in proving the quantum of their claims: that is inevitable given (a) the distance in time since the events complained of, and (b) the social, educational and cultural characteristics of the Claimants” {C4/3.7/1284}. I accept that both of these are important features to bear in mind at all times, and I have attempted to do so. But, as I have explained above, the difficulties run much deeper than those identified by the Claimants in their submission. The Court has ample material on which to assess losses if they are proved to have occurred as a matter of fact; and the Court is always determined to find a kernel of truth buried within unreliable evidence if it is there to be found. The real difficulty in the case of LC74 is the fundamental failure on the part of Snr Velez and those assisting him in the formulation of his claim to recognise the importance of the ODC works. His assertion that no real damage was caused by the ODC works was accepted with far too little professional rigour and reproduced by his experts time and again as if it were established fact. The extreme time pressures of the trial process meant that, even at the end of the trial, the

importance of the ODC works had not been fully analysed either by those who were presenting the claim for Snr Velez or the Court. It was apparent at the end of the trial that Snr Velez could not be relied upon to discriminate between what happened during the ODC and Ocesa works respectively, but the full implications of that unreliability and the failure to recognise it by the Claimants' expert advisers have been profound and largely account for the length of this section of the judgment. While it is essential that the Court looks for kernels of truth, it is no part of the Court's function to sanction claims which are not justified on the evidence.

1343. As a second preliminary point of general relevance, I do not accept that Snr Velez was in a position to give evidence as he did in his witness statement that his Schedule of Loss had been read to him and that it was an accurate description of his losses. He did not understand it and, although he came to court with an idea of what losses he wanted to claim for, I do not accept that he had understood his Schedule of Loss even if it had been read to him: see [411] above.

The House Move and associated costs – COP 46,850,300 (c. £17,386)

1344. These are the costs of moving house and building the new corral and pig sty; and the costs associated with purchasing and maintaining the pump to pump water to the new house. In the light of my findings above, these heads of claim fail irrespective of any further legal arguments as the move was not caused by the Ocesa works.

Pigs – COP 103,473,230 (c. £38,396)

1345. The Claim as advanced in the RARSL {B4.4/4/182} was that until August 1996 Snr Velez kept 10 pigs including 3 sows on the property, which were kept in a pig sty near to his old house and supplied with water from SP5. It is alleged that SP5 became completely sedimented, making the water unsuitable for consumption. "The lack of available water prevented Snr Velez from keeping pigs on the property and his herd had to be sold in large part. As a result of damage to his house and water source described above, Snr Velez had to build a new house and water supply system. However, the new water supply was insufficient to meet the needs of the same number of pigs. Snr Velez has since maintained only 1 or 2 pigs"

1346. In his witness statement Snr Velez said:

"I started to build the new house when I was living in the old house. It took me about two months to build the new house. We had to sell the pigs before we moved to the new house, because I didn't have a pig sty next to the new house and I couldn't build it earlier; I couldn't do everything at once. First I built the house, then the corral for the cattle and finally the pig sty... . The water I have in the new house is not enough to keep a lot of pigs. Now I can only keep one or two." {D8/125/1512}

1347. My finding that Snr Velez did not move house until 2008 fatally undermines this claim. Snr Velez' evidence is that he kept pigs until he built the new house. The water supply at the old house must therefore have been sufficient for however many pigs he was keeping. Second, if (which I do not accept) the sedimentation of SP5 meant that there was insufficient water for Snr Velez' pigs, that sedimentation and

any consequential lack of water was not caused or materially contributed to by the Ocesa works. Third, the Claimants have not shown that there is inadequate water on the property to support his 3 sows and other animals; nor have they shown why the pigs could not still be kept down near the old house. There are no access roads through or by La Nieve {H5.4/5/964} so that large-scale theft of animals by humans is unlikely. Although Dr Delgado suggested that there was a risk of predators or flash floods {H20.6/23/1414}, this was not a reason relied upon by Snr Velez. Dr Delgado's suggestion was also weakened by his saying in oral evidence that the ocelots he had identified in his report as potential predators did not exist in Colombia and offering tigrillos as a substitute {Day49/164:5}. His suggestion that there may have been flash floods, though not taken up by Snr Velez, would have been applicable before and after the various pipeline works. I was not convinced by this additional line of suggestions from Dr Delgado.

1348. The only reason given by Snr Velez to explain why he could not keep pigs up near the new house (where he has built a new pig sty) is unreliability of the pumped water supply. However, since his relocation to the new house is not caused by the Ocesa works and no good reason has been given to explain why the pigs could not be kept a short distance away near the old house, it does not justify the claim against the Defendant.
1349. In summary, the sale of the pigs when Snr Velez moved house and any reduction in pig numbers since then is not attributable to the Ocesa works. It follows that, irrespective of any further legal arguments, the claim for pigs fails.

Pasture rental and Reduced capacity for cattle - COP 19,641,893 (c.£7,288)

1350. Snr Velez says that he had to place 40 cattle off La Nieve during the works because of contamination of the water and because people working the machines opened fences to let the machines in and cattle escaped {D8/125/1507}. I accept his evidence that he moved some cattle off the property, though I do not accept that his recollection of numbers is accurate; but there is no evidence from Snr Velez about where he moved them or to substantiate a claim that he paid for the pasture. In the absence of any such evidence, I am not satisfied that he made any payment. The RARSL alleges that he lost dairy produce from the 40 cows that he moved to rented pasture. This claim is not evidenced in his witness statement and I am not satisfied that it is validly endorsed by his general statement about his Schedule of Loss, for the reasons given previously. Furthermore, for the same reasons as applied to a similar claim for LC54, I reject the suggestion that Snr Velez would have moved 40 (or any) cows that were in milk to a place where they could not be milked: see [1095].
1351. The Claimant claims that there has been reduced capacity for maintaining cattle on the property for approximately two head of cattle, and relies upon:
- i) The formation of SW1-SW4;
 - ii) Areas of erosion including those identified by Dr Card (Points 1, 2 and 3 on the CAI);

- iii) Reduction in the availability of water because of damage to his springs, supported by Dr Delgado's evidence in relation to SW1-SW3/SP1-SP4 and SW4/SP6.

1352. I accept that the area of SW1-SW3 is unfit for cattle. I also accept that the area on the ROW on the North and South Slopes is less productive than it would have been if no pipelines had been laid and that the quality of pasture on the steep slopes of the ROW is less good than on the more benign slopes of the Ridge. It remains fragile and susceptible to erosion by cattle, as Dr Savigny's photographs demonstrate. Both the ODC and the Ocesa pipeline works contributed to this state of affairs on slopes that were already fragile before any disruption occurred. The period of exclusive contribution from the ODC works was from late 1990/early 1991 to May 1996, which included the prolonged period of the ROW opening and which had only recovered to the extent identified by Dr Savigny by September 1995. The period of maximum exacerbation by the Ocesa works was from May 1996 until revegetation took hold. By the time of the 1998 DVD the prominent cut at the east side of the South Slope still had 90-100% exposed soil {H2.4/4/901}. By the time the experts visited, the steep slopes were still not fully recovered. On all the evidence it is probable that the Ocesa works inflicted further damage to the already compromised and fragile steep slopes, but there is no reliable evidence on the basis of which I could conclude that they were generally in a much worse state than they would have been as the result of the ODC works alone.

1353. On this rather unsatisfactory state of the evidence, I am not able to conclude that the Ocesa works reduced the carrying capacity of LC74 by 2 cows. More to the point, I am not satisfied that Snr Velez has kept 2 fewer cows on LC74 than he would have done if the Ocesa works had not happened, for two reasons. First, except in the early stages after the Ocesa works, I am not satisfied that there has been a reduction in theoretical carrying capacity that can be quantified in this way as a result of the Ocesa works. Second, the evidence does not satisfy me that the numbers of cattle on LC74 (or, more generally, La Nieve) have been determined by carrying capacity. The observation made by Dr Velez about LC54 is equally apposite here: the Claimants' management practices have been done without technical criteria and without regard to the loading capacity of each paddock and the farm: see [1024] above. For these reasons, I am not satisfied that the incremental damage to AF1, the North and South Slopes and the valley in between has caused any actual reduction in the number of cattle that Snr Velez has kept on his farm proportionate to any notional reduction in capacity.

1354. On my findings, the Ocesa pipeline works made no material difference to SW4/SP6.

1355. It follows that, irrespective of any further legal arguments, the claims for pasture rental and reduced carrying capacity fails.

Dead cattle – COP 5,337,172 (c.£1,981)

1356. The claim in respect of dead cattle has developed significantly with time.

1357. The original Schedule of Loss {B4.1/16/146} alleged that, "following [the Ocesa] construction, a ridge measuring approximately 5 metres high was formed ... in the area around the [ROW]. Some of the Claimant's cattle died as a result of falling from

this ridge.” It included a claim for COP 3,750,000 for the death of 5 cattle {B4.1/16/152} and a continuing loss of 10 cows and 10 calves per annum, which was otherwise unexplained.

1358. Apart from its endorsement of the Original Schedule of Loss, Snr Velez’ statement said little about the death of cattle. He said that one of his cattle died after eating the geotextile layer that had been laid {D8/125/1503} (for which there is no present claim) and that “in one of the pasture fields, the construction workers made some cuts in the land, which have left a slope; this creates a risk for my cattle. Some animals have fallen from the slope and have died. ... In the rainy season I have to take the animals out of that field because they can get trapped on the banks of the stream where there is a lot of mud” {D8/125/1503}. He said that he could not use “several hectares of pasture because the cattle get stuck in the mud”, which was also an apparent reference to the area near the Quebrada crossing {D8/125/1507}. He also referred to Snr Mesa “who kept his cattle on my farm before the construction of the pipeline” and who “decided to take them out, due to the problems with the deaths of animals in the swamp and the risk of cattle of falling from the slope” {D8/125/1509}.
1359. The RARSL alleges {B4.4/4/180} that:
- i) 3 cattle died as a result of getting stuck in the mud at or near the Quebrada Crossing;
 - ii) 2 cattle died in sedimented or waterlogged areas near the old house;
 - iii) 2 cows fell of the ridge created on the ROW at the top of the North Slope at point 33 on the CAI;
 - iv) Half of the cows that died belonged to Snr Velez and half belonged to other owners and were kept a utilidad.

Continuing losses are claimed from 1996, indicating that the cows are alleged to have died that year. The Claimant claims sums for calves and dairy produce from the dead cows.

1360. I have referred to the evidence of Snr Perez already: see [1139] and [1334].
1361. I find that no cattle died at the Quebrada crossing until 2009. I accept that 3 of Snr Perez’ cattle then got stuck and died. No cattle got stuck and died before then because the area was not so dangerous for cattle and Snr Velez kept cattle out of the area in the wet season, as he said in his statement. The removal of the temporal link asserted as part of the basis of the claim for loss of cattle raises considerable difficulties of causation which, in my judgment, the Claimants have not overcome. Although I have accepted that the OcenSA works contributed to the state of the area near to the Quebrada crossing, the long gap between the works and the first death provided the occasion for additional incremental sedimentation that was not attributable to the OcenSA works (from unaffected steep slopes above the crossing) and repeated flooding of the area, which had first occurred before the OcenSA works, as evidenced by the Second ODC Settlement. I am unable to conclude that the overall state of the area or the precise position (which has not been identified or established) where the three cows died would have been materially different but for the OcenSA

works. That being so, the claim for the cattle that got stuck in the mud and died near the Quebrada crossing in 2009 (or possibly 2010) fails.

1362. Snr Velez gave no specific evidence about cattle becoming stuck and dying near the old house. I am not satisfied that it occurred. Even if it did, the claim is so vaguely sketched that I am unable to conclude that any deaths in that area were attributable to the Ocesa works. Point 10A, which is where this death (or deaths) is said to have occurred is not identified as a swampy area and there is no evidence of conditions that could have caused the death of a cow.
1363. When asked about cattle falling from a ridge, Snr Velez identified the cut at the western side of the North Slope, namely the ODC Cut. I accept that evidence. There is no evidence that Ocesa interfered with or exacerbated that cut in a way that might have affected the outcome for the cow (or cows) that fell. Consequently the claim for the death of the cow (or cows) that fell must fail as it is attributable to the ODC works and not the Ocesa works.
1364. If I had held that any or all of the deaths were caused by the Ocesa works, I would still have rejected the claims for calves and dairy produce from the cows that died as double recovery: see [908] above.
1365. It follows that, irrespective of any further legal arguments, the claim for loss of cattle and associated claims fails.

Produce from fish pools – COP 15,014,756 (c.£5,751)

1366. The claim is for 172 kg of fish per year, being the product of 2 small fish pools that are said to have been somewhere to the north of W1 just downstream of the Quebrada crossing. The Defendant disputes that there were any operative pools in existence at the time of the Ocesa works.
1367. The original Schedule of Loss said that there were 2 fish pools which produced fish for domestic consumption, which became filled up with earth and sediments during the construction process and were consequently rendered unusable {B4.1/16/144}- {B4.1/16/145}.
1368. Snr Velez' statement said that he built "the fish pool" a few years after the construction of the (old) house. He says he constructed it to have fish to eat at home and to sell to neighbours {D8/125/1487}. Later he says he had two pools and would sell the fish to neighbours to help with household expenses {D8/125/1513}. He sold fish when there was demand or when he saw that the fish were ready to be taken out {D8/125/1514}.
1369. The RARSL {B4.4/5/183} alleged that Snr Velez reared 172 kgs of fish annually in two production cycles of which he kept 40% and sold 60%. (His witness statement said he did not know how many cycles he produced.)
1370. Dr Atencio said that he could discern the perimeter of the ponds where they were indicated to him by Snr Velez because the limits of the ponds were demarcated by a difference in the density of vegetation between the area of the ponds and the adjacent area. He identified the ponds as being located on a relatively flat area 5 or 10 metres

from stream W1 and 60 metres from the ROW and was sure that there had been a fish pond in that place based on the topography, the difference of vegetation, and the apparent authority with which Snr Velez answered questions {H11/2/239}. No other expert expressed such confidence. Snr Velez told Dr Atencio that the ponds were fed with a hose from stream W1. The same hose was used to fill whichever pond required filling. The ponds were drained back to W1 using an overflow with a fine mesh.

1371. In his oral evidence Snr Velez said that he dug the two holes just over a metre deep, that he brought the water by a hose from above the old house and that the ponds were in an area with a lot of trees {Day5/79:5}. He did not use sediment traps. It was Dr Atencio's evidence that the use of sediment traps for artisanal Colombian fish farming was not normal.
1372. The 1995 aerial photograph does not show fish ponds in the area identified by photograph which it would have done if they were there and had either water or exposed earth {Day48/106:2}.
1373. I accept that Snr Velez had one or two fish ponds at some stage. I find that they were roughly in the area identified and that their combined size was something approaching 160 m². However, I find that the reason why there is no sign of them on the 1995 aerial photograph is that Snr Velez had stopped using them by then, so that they had neither water nor exposed earth to show up on the image. I make no finding as to precisely when he stopped using the fish ponds. Snr Velez was adamant that the reason why he stopped using the fish ponds was because of sedimentation caused by the pipeline works, which he attributed to Ocesa. Assuming in his favour that he has a genuine recollection of sedimentation affecting his fish ponds during or after pipeline works, I find that he is confused and has muddled up the Ocesa and the ODC works. Whether I am right about that or not, the fish ponds had gone before September 1995 and were not operational at the time of, or affected by, the Ocesa works.
1374. The fish claim therefore fails. It is therefore not necessary to say anything further about the formulation of the claim and the numbers of fish claimed save to say that Snr Velez did not at any stage get 172 kgs of fish (or anything approaching that amount) per annum from his ponds because (a) his pond and methods were rudimentary and would not have supported that number of fish if he had put that many in and (b) he did not put in the numbers of fish alleged in his claim.
1375. It follows that, irrespective of any further legal arguments, the claim for loss of fish production fails.

Trees – COP 133,083,875 (c.£39,383)

1376. There are two separate claims for trees, one for fruit trees and one for cedar trees.
1377. *Fruit trees:* Early formulations of the claim for fruit trees alleged that fruit trees were destroyed during the process of construction:

- i) “A number of the Claimant’s fruit trees were destroyed by the heavy machinery used during the construction process” – Original SOL {B4.1/16/145};
 - ii) “A number of the Claimant’s fruit trees were destroyed by the heavy machinery used during the construction process” – SOCI {B4.1/15/142};
 - iii) “There were also fruit trees, including approximately 5 guamo, 5 mango trees, 6 avocado trees and some sour-sop trees on the ROW which were planted two years prior to construction and removed by machinery during construction ... Cedar trees and some fruit trees were destroyed during construction. These trees were located on the ROW, mainly in the same area mentioned [previously]” – 2011 Further Information {B2.1/23/177}.
1378. The ARSL and, subsequently, the RARSL expanded the basis of the claim {B4.4/4/184}. It is now alleged that several fruit trees were destroyed in the area of AF2: trees were destroyed by movement and/or deposit of sediment from excavated and/or eroded material from the ROW or from near to the ROW. A further number of fruit trees in and about the ROW were cut down and/or damaged by machinery on and off the ROW during construction and/or were damaged by sedimentation and/or water logging such as on AF1 and Point 2 on the CAI (the western side of the top of the North Slope).
1379. As opened, the claim was that some fruit trees were cut down, others became water logged and sedimented leading to their death: the affected areas were now said to be AF1 and AF2 {C4/3/304}.
1380. The Claimants’ closing submissions withdraws the claim for fruit trees on AF1 {C4/3.7/1249} footnote 249. The claim is now pursued for fruit trees on the ROW and in the area of AF2 near to the old house.
1381. Snr Velez’ statement said that “some fruit trees were destroyed by the machinery during the construction and others dried up because they stood in an area which became a swamp” {D8/125/1510}.
1382. There are a number of difficulties with the claim for fruit trees:
- i) The ODC works would have destroyed any fruit trees on the ODC ROW.
 - ii) There is no clear evidence about the additional width of the Ocesa ROW (confirmed at {Day56/39:24}) and the photographic evidence does not suggest that there were significant numbers of trees adjacent to the ODC ROW;
 - iii) The 1995 aerial image shows no sign of significant numbers of fruit trees in the areas alleged by Snr Velez: see {C4/4.9/1048} at [131];
 - iv) The Ocesa ROW Agreement made no mention of damage to trees, in contrast to other cases where it did;
 - v) There are surviving fruit trees in the area said to have been affected, such as near the old house {H5.4/5/962};

- vi) For the reasons already given, the allegations of excessive sedimentation across AF2 are not made out;
 - vii) There is no significant area of swamp on AF2. I reject Snr Velez' evidence as put forward in his witness statement that significant numbers of trees died in a swamp (either on AF2 or elsewhere);
 - viii) Snr Velez had no real recollection of the number of trees that may have been affected, as he had not counted them {H24.2/298/1364};
 - ix) Snr Velez did not complain about damage to trees during the works {Day5/67:16}. His explanation was that he did not think that they were "all going to dry out and die", which does not explain the uncharacteristic failure to complain if trees were destroyed by bulldozers on the ROW; and there is no record of him complaining at any time before the 1998 Ocesa Settlements or thereafter;
 - x) So far as fruit trees are concerned, Snr Velez said that he now has 4 or 5 trees less than before the works as a result of replanting {Day5/74:6}. Any loss of production would therefore now be minimal at best;
 - xi) Snr Velez confirmed that he has enough fruit for domestic consumption and also that he could not sell much fruit because he was dependent on passing trade and "when the road is in bad condition, then nobody comes looking for fruit so you can't really sell that much fruit" {Day5/74:3}.
 - xii) Snr Velez agreed with Dr Velez that, if he sold his harvest, he used to get COP 150,000 (c.£45) a year {H24.2/301.2/1438}. The losses alleged would, if proved, have been a small proportion of that harvest.
1383. On this evidence I am not satisfied that any significant number of fruit trees were destroyed on the ROW. One or two may have been, but that caused no real loss to Snr Velez as he was producing more fruit than required for domestic consumption and I do not accept that the reduction made a material difference to his occasional sales of fruit to outsiders. I accept that some fruit trees on AF2 may have died since the ODC and Ocesa works, but I am not satisfied that they were in significant numbers or that they were caused by the Ocesa works. If a significant number of his trees had been destroyed, Snr Velez would have complained, which he did not do. I reject the numbers alleged and the projected financial losses: the financial losses are calculated on a theoretical basis assuming numbers of trees that I reject, for the reasons set out above. Viewed overall, I do not accept that Snr Velez has at any stage been short of fruit for domestic consumption or that his sales to outsiders have been materially affected.
1384. *Timber trees:* The original Schedule of Loss claimed a loss of 15 cedar trees {B4.1/16/144}, though Snr Velez was adamant in evidence that he had always said he had 60 cedar trees {Day5/65:24}.
1385. The 2011 Further Information identified 60 trees on or near the area of the ROW, many of which were alleged to have been destroyed during construction {B2.1/23/160}.

1386. The ARSL introduced a more detailed claim for timber trees, introducing the allegation of sedimentation for the first time {B4.2/8/363}. It alleged that up until August 1996 Snr Velez had “several timber trees on the Property. These were felled occasionally for the needs of the farm, such as to build and maintain fences, corrals or other structures. During and following the construction of the pipeline, several timber trees were damaged or destroyed.” The trees were destroyed on AF2 and the ROW by the same mechanisms as the fruit trees as set out above. “Snr Velez lost 60 cedar trees as a result of the construction of the pipeline. Each timber tree would have produced an estimated 6 rastras of timber” {B4.2/8/363}.
1387. The claim advanced in the ARSL is withdrawn by the RARSL {B4.4/4/160}. Instead, it is reformulated as a claim for future loss on the same factual basis but now alleging that each timber tree would have produced an estimated 4.5 rastras of timber {B4.4/4/173}.
1388. Snr Velez’ witness statement described the bulldozers destroying timber trees on the ROW. “About 60 cedar trees on the [ROW] were damaged: about 25 or 30 of them were destroyed during the construction works with the bulldozer. These trees were very thin and were not ready for timber production. The other trees stood in an area that became a swamp, and they dried up little by little” {D8/125/1510}. This is more consistent with the claim as pleaded in the 2011 RFI than any other version, saying that he had 60 cedar trees in all on the ROW of which some but not all were damaged and that the ones that were damaged were very thin.
1389. In oral evidence Snr Velez was hopelessly vague about what trees had been cut down by ODC (though he acknowledged that some had been), where he had trees after the ODC works and how many had been destroyed or damaged. I formed the clear view at the time, which re-reading the transcript has reinforced, that he had no real idea of how many trees had been affected, where or how old they were, or what difference it had made to his property {Day5/63:5} ff.
1390. Most of the features that I have outlined in respect of the claim for fruit trees apply also to the claim for timber trees, in any of its formulations. In particular:
- i) The ODC works would have destroyed any timber trees on the ODC ROW.
 - ii) There is no clear evidence about the additional width of the Ocesa ROW and the photographic evidence does not suggest that there were significant numbers of trees adjacent to the ODC ROW;
 - iii) The 1995 aerial image shows no sign of significant numbers of timber trees in the areas alleged by Snr Velez: see {C4/4.9/1048} at [131];
 - iv) The Ocesa ROW Agreement made no mention of damage to trees;
 - v) There is no significant area of swamp on AF2 and, for the reasons already given, the allegations of excessive sedimentation across AF2 are not made out;
 - vi) Snr Velez had no real recollection of the number of trees that may have been affected, as he had not counted them {H24.2/298/1364};

vii) Snr Velez did not complain about damage to trees during the works {Day5/67:16} and there is no record of him complaining at any time before the 1998 Ocesa Settlements or thereafter;

1391. For these reasons and on this evidence I am not satisfied that any significant number of timber trees were destroyed by the Ocesa works, though it is possible that a small number were on the fringes of the ROW. If they were, they were small and of little current value as it would have taken many years to develop to a size where they could be used. They were and are readily replaced on unaffected areas of La Nieve. Accordingly I am not satisfied that Snr Velez has suffered any material reduction in the timber available for his use because of the Ocesa works, either past or future.

1392. It follows that, irrespective of any further legal arguments, the claim for loss of trees fails.

Moral Damages

1393. I have set out the principles applicable to the awarding of moral damages at [194] above. The Claimants do not summarise or set out the basis of Snr Velez' claim for moral damages in their closing submissions. I therefore take the formulation of the Claim as set out in the RARSL {B4.4/4/163} as representing Snr Velez' case, as follows:

“Snr Velez has suffered emotional distress, pain and suffering due to:

1. The anguish and uncertainty caused by the damage to the soil on pasture fields and water sources on the property, which occurred all at once over a short period of time, and the damages attendant thereon which have immediately affected a number of activities which the claimant relied on for his livelihood (notably, loss of livestock, fruit trees, and fish);
2. In particular, the uncertainty is the availability of drinking water due to damage caused to the water source used by himself and his family. ...;
3. His inability to provide adequate food and/or food security for himself and his family;
4. The anguish and uncertainty as to the general lack of availability and accessibility of suitable water on the property upon which the various farm activities depended (in particular cattle, fishing and crop irrigation). These activities provided food security to Snr Velez and his family. The management of the property was very much dependent upon the water sources which were damaged by substantial sedimentation of the stream beds all at once and over a very short period of time. This caused a situation of real anxiety and insecurity for Snr Velez in circumstances

where his family members and the main farming activities depended upon these sources and suitable alternatives are limited for a number of reasons, not least because they are located at great distances which are inconvenient.”

1394. My findings as set out above are at odds with this portrayal of what has happened. While I accept that there was both an immediate and continuing impact of the Ocenca works, particularly on the steeper slopes and about the Quebrada crossing, I have rejected the claims based upon the alleged impact on livestock, fruit trees and fish. Nor am I satisfied that there has been real uncertainty about availability of sufficient water that is attributable to the Ocenca works. The main uncertainty derives from the unreliability of the pump, which has been necessitated by the decision to move house, and the damage to the area below the Quebrada crossing which has been caused in part by the consequences of the Ocenca works but also in part by the ODC works and the processes of sedimentation and overflowing with time. I reject the allegation that the Ocenca works have caused real food insecurity.
1395. Although I accept that the overall deterioration of LC74, which has multiple causes, will be a matter of dismay and concern for Snr Velez, I do not consider that the findings that I have made satisfy the stringent requirements for an award of moral damages in this case: it cannot be said that the Ocenca works have affected Snr Velez’ feelings to a high degree in the sense explained at [194] above.

Damages for loss of amenities of life

1396. I have set out the principles applicable to the awarding of damages for loss of amenities of life at [198] above. The Claimants do not summarise the basis of Snr Velez’ claim for damages for loss of amenities of life in their closing submissions. I therefore take the formulation of the Claim as set out in the RARSL {B4.4/4/165} as representing Snr Velez’ case. After summarising the nature of subsistence farming and stating that farming one’s own land and ownership of property gives increased social status, it alleges that Snr Velez is no longer able to carry on his traditional way of life and/or is unable to carry on such a way of life without considerably increased difficulties and gives the following instances:

- “Damage to the soil, pasture fields and water courses caused by the Ocenca pipeline simultaneously affected a number of the farming activities on which Snr Velez and his family depended as a source of livelihood and sustenance (e.g. fishing, fruit trees, livestock). Such effects were very acute especially during the initial years during and post the construction of the pipeline and caused considerable anxiety and distress for him and his family.
- Snr Velez now has to expend extra time and labour in order to secure his maximum level productivity from the property. However, such levels are still lower than productivity levels before the construction of the pipeline. Extra work is required to achieve a lesser result;

- Snr Velez now has to spend extra time to acquire suitable water for his family. He has to transport water in containers from further up the affected water source for his domestic supply. He invested in a water pump and pumps water to his new house. However, his domestic water supply is not as good quality as the water in the previous water source and he regularly has to carry out maintenance works on the water pump currently used.
- Snr Velez had to build a new house because his previous house was affected by sedimentation especially during the rainy season which at times entered his house....
- There are extensive swampy areas on the property caused by the pipeline. Snr Velez has to be significantly more vigilant in order to ensure that he does not lose cattle and that his cattle do not become stuck in the swampy areas.
- Due to the aforesaid increased labour time, attributable to the damage caused by the pipeline, Snr Velez has less time to pursue such leisure and social activities as he previously enjoyed;
- The loss of productivity on the property has led to the increased impoverishment of Snr Velez and his immediate family. This has led to a consequent loss of social status of Snr Velez and his immediate family.
- As the property is no longer as productive as it was before the construction of the pipeline, Snr Velez is no longer able to provide suitable food security for himself/and/or his immediate family. This has resulted in situations where Snr Velez has suffered from lower and/or less nutritionally balanced or varied food resources than before the construction of the pipeline. Snr Velez and his family have therefore been obliged to go hungry and/or forego key nutritional elements of their diet, if they have been unable to source elements by other means (e.g. purchase, bartering);
- As the productivity of the property has reduced, Snr Velez has no longer been able to generate the same surplus of products as previously could have been achieved. Further, Snr Velez is having to allocate more of his own and his own family's labour time to the property. This means that Snr Velez and his family are unable to provide surplus products and labour time for

barter to the level that they would have achieved before the construction of the pipeline. This has resulted in their inability to source items and labour necessary for their property, which previously they could have obtained through barter;

- Inability to participate in the barter economy has lowered the social status and reputation of Snr Velez.

1397. Once again, my findings are at odds with this portrayal. LC74 has suffered some damage as a result of pipeline works and has deteriorated in other respects which are not attributable to either pipeline (e.g. the deep cattle trails below the gate from the ridge and to the east of Snr Velez' new house); but the RARSL portrayal makes no concession to the contribution of the ODC pipeline or other causes of deterioration. The evidence given at trial does not establish that Snr Velez or other members of his family have gone hungry, nor is there evidence that they suffered significant adverse changes in their diet. As I have noted at [1136] Snr Velez is a man who has the respect of his community: there is no evidence that he has suffered any actual loss of status or respect as a result of the Ocesa pipeline works.
1398. Applying the principles I have set out to the facts as I have found them to be in this judgment, I do not accept that the Ocesa works have prevented Snr Velez from being able to enjoy the normal amenities of life in such a way or to such an extent as to justify an award of damages for loss of amenity.
1399. In summary, I reject Snr Velez' claims that he has suffered loss or damage as a consequence of the Ocesa pipeline works that justifies an award of damages applying the principles of Colombian law that I have set out earlier in this judgment.

Bases of Claim

1400. Snr Velez included claims for damage on and off the ROW. The damage alleged on the ROW was for fruit and timber trees and for cows that got stuck at the Quebrada crossing. The balance of his claims (i.e. for the house move, pigs, pasture rental, reduced capacity for maintaining cattle, death of other cattle and loss of fish pools) relate to damage off the ROW.
1401. The ROW Agreement calculated the compensation payable by reference simply to the area of the ROW, without specifying what was on it and would be damaged. Despite the absence of mention of trees, I would hold that they were within the contemplation of the ROW Agreement because their presence would have been known to both parties and it would have been known that they would be destroyed by the works. The cattle getting stuck in the Quebrada crossing is different for two reasons: first, although it was inevitable that the ROW would cross it, it was not inevitable that it would be turned into something capable of causing the death of cattle; and, second, the claim is for the death of the cows not the state of the crossing itself. I would treat the death of cattle at the Quebrada crossing in the same way as it appears that the death of the cow on the ROW in LC39 was treated. It was an additional incident which was not either expressly or by implication in the contemplation of the ROW Agreement. Not only was it not mentioned but it formed no part of the calculation of compensation in the ROW Agreement (for obvious reasons). I would therefore

conclude that the invoking of Article 5 did not cover the death of cattle that died at the Quebrada crossing. For reasons given earlier, it did not cover damage suffered off the ROW.

1402. On my findings, the Defendant was subject to the dangerous activities doctrine as guardian. Accordingly, if the Ocesa works had caused material damage it would be liable to Snr Velez unless that liability were excluded or extinguished. He entered into the five settlements with Ocesa that are listed at [1316] and discussed at [1317] ff above. For convenience I summarise them here as follows:
- i) The First Ocesa Settlement: signed on 3 July 1996 and made between Snr Velez and Ocesa. Compensation for the flow of sediment down the South Slope into the Quebrada Crossing rendering 1.5 hectares of SW1-SW3 and the South Slope unfit for cattle breeding and raising activities;
 - ii) The Second Ocesa Settlement: dated 16 August 1996 and made between Snr Velez, Ocesa and Saipem. Compensation for a dump and the installation of gabions;
 - iii) The Third Ocesa Settlement: dated 4 April 1998 and made between Snr Velez, Ocesa and Saipem. Compensation for damages and losses off the ROW in the adjacent plot;
 - iv) The Fourth Ocesa Settlement: made on 30 October 1998 between Snr Velez and Ocesa. Compensation relating to a rill and affecting 1.5 Ha of grass related to geotechnical works;
 - v) The Fifth Ocesa Settlement: made on 19 December 2003 between Snr Velez and Ocesa. Compensation for damage to fences when a helicopter landed and frightened livestock.
1403. The trial documentation includes a Paz y Salvo with Saipem in standard form executed in April 1998. In addition, I have found that he concluded a Paz y Salvo with Ocesa at some point, probably also in 1998. There are also receipts for payments made by Ocesa pursuant to the First, Fourth and Fifth Ocesa Settlements.
1404. The ROW was opened between 23 – 24 May 1996. Revegetation works were carried out by the end of February 1997 with the possibility of some further works being done in the period to June 1997. The First and Second Ocesa Settlements were therefore concluded before the works were completed. They did not purport to settle claims arising out of damage caused by the works that had not yet been done and could not do so. That said, the First Ocesa Settlement arose out of serious damage in the vulnerable areas of the South Slope and at or near the Quebrada crossing. The Third to Fifth Ocesa Settlements were concluded after the works were completed. The Fifth Ocesa Settlement is, however, a special case as it relates to a specific incident of damage caused when a helicopter spooked Snr Velez' cattle.
1405. There is no evidence that Snr Velez ever attempted to pursue a claim against the Defendant. Instead, from the earliest possible moment, Snr Velez pursued claims consistently against Ocesa and Saipem. In addition, he accepted the second payment under the ROW Agreement from Ocesa rather than the Defendant {M/179T/682.1}.

Applying the principles identified in Sections 3 and 7 above, this course of conduct amounted to tacit acceptance of the assignment of the ROW Agreement from the Defendant as assignor to Ocesa as assignee. The immediate consequence of his acceptance of the assignment is that the Defendant would no longer be entitled to rely upon the protection afforded by Article 5 in respect of damage on the ROW, which was in any event limited as I have indicated in [1401] above.

1406. Viewed objectively, the terms of the First Ocesa Settlement were clear and included the waiver and mutual release of the parties. At the same time, it could only operate in relation to what had been done by Ocesa up to that date. Its effect was therefore to compromise any claim that Snr Velez might have in relation to the flow of sediment down the South Slope and its impact on the Quebrada crossing and the 1.5 hectares which was the subject of the claim. If, therefore, subsequent damage was caused by later Ocesa pipeline works (whether in the form of subsequent erosion from the South Slope into the Quebrada crossing or more generally), it would become necessary to identify whether those later works caused material further damage (whether by making the condition of the Quebrada crossing, the area around and the 1.5 hectares which was the subject of the First Ocesa Settlement materially worse or more generally). The First Ocesa Settlement could not and did not settle future disputes that might arise out of works which had not yet been carried out when it was concluded.
1407. The same approach would apply to the Second, Third and Fourth Ocesa Settlements. The Third Ocesa Settlement and the Second or Fourth Ocesa Settlements were accompanied by Paz y Salvos but, as I have made clear earlier, the existence of the Paz y Salvo confirms but is not necessary to the decision that the Settlements had general settling effects. It is worth noting, however, that Snr Velez knew that Paz y Salvos meant that the agreements into which he was entering were his final opportunity to claim in respect of damage from the construction {Day4/134:24}. As the experienced claimer that he was, and one who had and made use of access to legal advice when he felt necessary, I would have been extremely sceptical if he had said otherwise {M/186T/747.9}.
1408. By April 1998 the Ocesa works were complete. The effect of the 1998 Ocesa Settlements with Ocesa and Saipem was to settle all claims (present and future) arising from damage on or off the ROW caused by the Ocesa works. In doing so, they also effected a novation by substituting the new contractual rights and obligations under the settlement in place of any existing or future obligation in tort. As a result, any liability which the Defendant might otherwise have had to Snr Velez for the damage which he alleges was attributable to the Ocesa works was extinguished by novation.

Conclusion

1409. The claim of Snr Velez fails.

14. LC39 in Detail

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Introduction

1411. The Claimant is Snr Jose Francisco Sequeda Tirado. He has been married to his wife, Inés, for over fifty years. The Court was told that he is now in his 80s {C4/3.6/771}. It is therefore understandable that, after a long and hard-working life, he is of an age where manual labour is becoming more difficult for him. He lives on his farm, La Gloria, with his wife and other members of his family, though they have other children who are fully independent of them and have moved away. The Court was told that he is well respected in his community and I accept that evidence {D4/83/872}.

1412. Snr Sequeda learnt to read and write fairly recently, and his reading and writing skills are limited: he would certainly require assistance if attempting to read and understand a complicated commercial contract. He gave evidence with dignity and showed real emotional attachment to his land and way of life, as well as real concern for his livestock as a result of having to leave his farm to make his statement or to travel to Medellin to give evidence. As will appear, there are a number of factual issues in this case that have to be decided, and Snr Sequeda was cross-examined thoroughly, properly and at length. He had difficulty at times in understanding the questions that were being put to him: sometimes that could be put down to the formulation of the questions, but on other occasions it was evidently a difficulty on his part that more sophisticated or better-educated (and, possibly, younger) witnesses would not have experienced. To that extent he was undoubtedly a witness who was in danger of being at a disadvantage and vulnerable in the trial process. In other respects he showed considerable determination in resisting the suggestions that were being put to him.
1413. In many important respects I am not able to accept that Snr Sequeda's evidence is reliable. It was, however, a considerable and unwelcome surprise when the Defendant's closing submissions on LC39 opened with the assertion that his only vulnerability was "the vulnerability of a witness who came to court ready to lie in order to advance a claim, and whose lies are slowly and surely exposed through the forensic process" {C4/4.8/615}. This allegation had not been put to him, as it should have been if it was to be made or pursued, and it was a grave error of judgment on the part of the Defendant to advance and develop it without having done so. On being required to review the terms of its closing submissions generally the Defendant has withdrawn the allegation of lying, though it maintains the submission that Snr Sequeda's evidence was unreliable and wrong in a number of respects. The allegation of lying was one that should not have been made in the original closing submissions and which was rightly withdrawn. For the avoidance of any doubt, had I been required to rule on the point, I would have rejected any suggestion that Snr Sequeda was dishonest in the giving of his evidence.
1414. Other witnesses gave evidence in support of Snr Sequeda's claim. I shall consider their evidence when addressing the issues to which it is relevant.
1415. Approximately 80% of the value of Snr Sequeda's claim is comprised in his claim for damage to and continuing losses of crops of cassava, rice and maize, which amounts to over COP 219 million (c. £81,000). Ancillary claims for loss of pig and egg production, which are largely premised on the lack of crops on which to feed them, add another COP 30 million (c. £11,000). Claims relating to the lack of pasture during and after the works (including pasture rental, loss of milk products while cattle were off La Gloria, loss of calves, the cost of a new herd and losses associated with recuperation of pastures) amount to approximately COP 9 million (c. £3,300). Claims from lost or sick cattle amount to approximately COP 13 million (c. £5,000). The costs of establishing and maintaining fencing are claimed at approximately COP 1.5 million (c. £550). Costs associated with moving Snr Sequeda's house and corral and establishing a new well are claimed at approximately COP 3.6 million (c. £1,350). Loss of fish from the fish pool is claimed in the sum of approximately COP 1.4 million (£526); and the loss of fish from La Enix is claimed at approximately COP

1.77 million (c. £656). The claim amounts in all to approximately COP 280 million (c. £104,000).

Description of the Property

1416. La Gloria, which is the property through which the ODC and Ocesa pipelines run, is approximately 46 hectares. The pipelines ran roughly from south to north, the distance from the Ocesa pipeline's entry to its exit at the other end of LC39 being about 725 metres. The property is roughly rectangular in shape and is rather less broad (from east to west) than it is long (from north to south). It is on Spread A and is about 66kms south of Caucasia and 15kms north of Zaragoza in the municipality of Zaragoza. It is situated on and immediately to the west of the main Zaragoza to Caucasia road. The Ocesa pipeline followed the same route as the ODC one until the northern end of La Gloria, where their routes bifurcate: the ODC pipeline continues north after passing out of the northern boundary of LC39 but the Ocesa pipeline kinks to the right and passes under the road. The gap between the two pipelines where they follow the same route is between 19.65 and 23.15 metres {K58/564/1}. It appears from the photographs that the Ocesa ROW extended slightly to the east of the ODC ROW, but the extent to which it did so cannot be determined with accuracy. There are no significant areas of cutting or filling.
1417. When Snr Sequeda bought the farm he applied to Incora, which allocated 142 hectares divided into three adjacent plots of similar size. La Gloria is the most easterly of the three; then comes El Consuelo to its west; and then Villa Rosa. Incora granted El Consuelo to Snr Sequeda's wife. Much later, in 2009 Snr Sequeda sold the 49 hectares of Villa Rosa to one of his sons for COP 9,000,000 (c. £3,500). As with La Gloria and El Consuelo, Villa Rosa is largely forest and pasture land {Day10/12:2}. The overall area of the farm and its division into the three plots is shown at {H2.9/12/2331}. At all material times La Gloria, El Consuelo and Villa Rosa have been available and used as one family farm and resource.
1418. The area has been affected by violence for many years. Some years are worse than others. During a particularly bad period recently Snr Sequeda's son-in-law, who lived in front of Snr Sequeda's house, was killed for no apparent reason. It was impossible to go from Zaragoza to El Bagre. Snr Sequeda lived in fear and tried not to leave the farm. Many people left the area. Snr Sequeda and his family "felt unprotected because at any moment one could be killed." Snr Sequeda speaks eloquently of the dangers of not knowing who the bad people are and says "if somebody owes me money and doesn't pay me, I prefer to keep quiet, because if someone makes trouble, you never know what will happen to you" {D4/71/792}. This evidence is not directly relevant to the damage that Snr Sequeda says he has suffered; but it is relevant background evidence in giving an English court insight into the land and social environment in which the Claimants live and those laying the pipelines had to work.
1419. The land is undulating with rounded hills and shallow valley features with natural drainage to the valley floors between the undulations and hills {H1.1/1/155}. The soils are a heterogeneous mixture of silt, sand and clay. There is no area imposing demands upon those laying the pipelines similar to the steep North and South Slopes on LC74. There are, however, many undulations and slopes that are potentially relevant to Snr Sequeda's claims.

1420. There are four streams on LC39. Working from the southern boundary:
- i) W3 flows down the middle of La Gloria from the area of forest on its north-western side to the southern boundary. There are trees and other vegetation along most of its way, which can readily be seen in aerial photographs. It crosses the ROW about halfway up La Gloria. As well as being joined by W4 it has a small tributary which runs north south and another small spur which flows into it from the east;
 - ii) W4 flows generally from west to east, joining W3 about one third of the way up La Gloria and shortly after it has crossed the ROW;
 - iii) W2 flows in a north-easterly direction towards the north east corner of La Gloria. It is a very small stream with a low discharge rate that converges with W1 shortly before they flow out of La Gloria through a culvert beneath the Zaragoza-Caucasia road;
 - iv) W1, also known as La Enix, is the most substantial stream on La Gloria. It rises outside the northern boundary and flows generally eastwards to the culvert.
1421. The better copy of the Claimants' CAI in the trial bundle is at {C4/3/352} with a key at {C4/3/353}. The chainages that I shall use when describing points along the ROW are those attributed by Dr Savigny at {H2.2/2/581}. The ROW enters LC39 at the south at 538+310 and leaves at the north at 539+027, after a distance of 717 metres – though the Ocesa ROW Agreement recorded that the length of pipeline through Snr Sequeda's land was 727 m.
1422. Aerial photographs give the best introduction to Snr Sequeda's land. {L8/10/883} looks east across the property to the road, which runs from right (south) to left (north). Snr Sequeda's new house (of which more later) can be seen by the road. The undulating nature of the land is clear. The vegetation about the banks of W3 appears to snake from the middle of the photograph to the right (south). At the bottom left corner of the photograph is the edge of the forest that covers part of La Gloria, El Consuelo and Villa Rosa. El Consuelo is in the foreground of the picture, showing pasture that is evidently less extensively grazed than La Gloria. {L8/9/882} is a similar view but taken from further to the north. It shows W3 emerging from the forest and what looks like a horizontal belt of erosion on the slopes between the ROW and the road. {L8/8/881} is taken from the east side of the road looking west (i.e. in the opposite direction to the previous two photographs) and shows (at bottom right) the exit point for W1 and W2 at the culvert under the main road. These photographs were taken in September 2010 and show some ponding just to the west of the culvert. {L4/816/831} shows most of La Gloria and part of El Consuelo looking north-east. At the right-hand side is a clear view of Snr Sequeda's new house by the road. The photograph shows the snaking vegetation of W3 flowing down to the bottom right-hand corner. It also shows numerous well-defined cattle trails and signs of erosion on slopes above the route of the ROW in about the middle of the photograph. {L4/817/832} shows a similar view but from a slightly different angle. These two photographs were taken in June 2012.

1423. The Claimants group the areas alleged to have been most affected by the Ocesa pipeline into three. Working roughly from south to north, they are:

- i) Field 3: the Claimants include in this designation Affected Fields (AF) 3 and 4 which are generally to the west of W3. The area broadly takes in the Ocesa ROW's passage from 538+420 to 538+630 where the ROW crosses W3. W4 flows through and between AF3 and AF4 and is crossed by the ROW at about 538+535. To the north of AF3 and AF4 is SW2. The area can be seen in {L8/9/882}. Dr Savigny has marked AF3 and AF4 on {L4/830.1/847} which gives a clearer impression than the CAI. The same underlying image has been annotated by Dr Savigny at {H2.3/3/607} showing the route of the pipelines. Taking his two annotated images together shows that W4 flows downhill (but up from the bottom of the image) to where it crosses the ROW before joining W3. W3 is downhill from the ROW in this area, including the point of confluence of W3 and W4. {H2.3/3/614} shows the same area (but now looking from south to north along the pipelines). It can be seen that both pipelines run along the slope above W3, with the Ocesa pipeline being closer to W3 than the ODC one. At the top of the image, the pipelines curve to the right towards where they cross W3;
- ii) Water Source W3: the Claimants describe this as where W3 flows through the middle of La Gloria and as including Point 11 on the CAI (which is said to be the position of a former fish pool) and Point 267 (which is said to be near the position of a former well). It covers the passage of the ROW from the crossing of W3 (538+630) to the top of the slope that climbs away from the crossing (538+750). Much of this area can be seen in two images from Dr Savigny which show Point 11. In {H2.3/3/625} the ROWs pass from right (south) to left (north) crossing W3 and then passing above Point 11 and, further north (in the area described as Fields 1 and 2), below eroded areas of hill identified by Dr Savigny as a cattle trail. In {H2.3/3/627} the ROWs pass from top centre (south) to bottom right (north) and point 11 can again be seen. {H7.3/3/855} shows Point 11 to be at a lower level than the ROW, which passes above it. As marked on the CAI, Point 267 was on or close to the banks of W3 just downstream of where the ROWs crossed it. The route and an indication of the slopes affecting the ROW from south (bottom right) to north (top left) in this section of the pipelines are also shown on {L4/830/845}, starting with the pipelines to the west side of (and above) W3, then crossing it and going up the hill (above the stretch of W3 including Point 11) to an apparent ridge where it then heads north above the headwaters of W2 and to the northern section of LC39. Dr Savigny agreed, and I find, that from the ROW in the area of the ellipse marked on {H2.3/3/625} there would have been a downhill slope along the ROW back towards the crossing of W3 and a component consisting of a cross-gradient downhill slope to the side of the ROW in the direction of the well at Point 11 and to the stretch of W3 on either side of it {Day36/74:6}. In other words, there was a cross slope as the pipelines climbed away from their crossing of W3 so that eroded material would flow towards the crossing and towards the stretch of W3 to its north. Precisely where the cross-gradient ceases to be effective as the pipelines go up the hill is not clear: but I find that soil from about the area of the ellipse on {H2.3/3/625} could find its way to Point 11 and, more generally, that eroded

material from the ROW as it climbed away northwards from its crossing of W3 could find its way to Point 11 and the stretch of W3 on either side of it. There are now two fences in this area. One runs from W3 westwards crossing the ROW at about 538+600. The other, known as Fenceline B, runs more or less parallel with the ROW going south from the first fence and crossing W4. The purpose of these two fences appears to be to delimit the area for cattle to graze west of W3 and north of W4. Its southern limit is not clearly established and cattle trails run to the west of it, the main one being what Dr Savigny has described as Trail 4 {H2.3/3/607};

- iii) Fields 1 and 2: this is described by the Claimants as including AF1(a) and (b) and AF2, W1 (La Enix) and W2, SW1 and Flooded Area FL1. It broadly equates to the passage of the ROW from the hilltop at 538+750 to the exit from LC39 at 539+027. AF1(b) spans the ROW to east and west with gradients that fall away from the ROW on each side and lies to the north of what has been described as Fenceline A. Fenceline A crosses the ROW at about 538+835, generally at or near the top of a ridge. AF2 lies immediately to the south of Fenceline A, to the east of the ROW and slopes downhill from the ROW towards the road. W2 gradually converges on the ROW and is below it, with the ROW sloping downhill to the point where it crosses the stream. AF1(a) is to the north-west of W2, in the area bounded by W2 and La Enix. SW1 and FL1 are in AF1(a). The southern end of this general area is shown in {H2.3/3/625} with the route of the pipelines added. The central area of AF1(b) is shown on {H2.3/3/638} with the pipeline running from top right (south) to bottom left (north) and shows the basin for W2. The entire area is shown on {L4/816/831}. It is also shown with the various fields that are alleged to be affected and the pipelines usefully annotated at {L4/830.1/846}. The northern end of the passage of the ROWs on LC39 is roughly illustrated at {H2.6/8/1627}, though the annotation is incorrect in suggesting that the Ocesa ROW went through the culvert: in fact it crossed to the north of W1 before diverting off to the east to cross the line of the road. As the pipelines approach W2 and La Enix, they are on a downhill slope towards the area of the streams. The gradient of the ROWs down to the streams and the state of vegetation (including vegetation barriers) on and off the ROWs is shown by {L4/820/835}, which is taken from the west and has the road visible in the distance. So it is alleged that erosion from the ROW travelled down the slope into W2 and La Enix as well as passing to east and west across AF1(b). A similar mechanism is alleged to have affected AF2, largely to the east of the ROW. Field AF1(a) is not now alleged to have been directly sedimented in the same way, but it is said that Snr Sequeda's ability to rotate crops in the northern area was removed by the damage to AF1(b), which left barely enough land on AF1(a) for Snr Sequeda to cultivate for his own domestic consumption {Day2/89:2} {H5.7/12/1745}.

1424. Very many other photographs have been taken, both from the air and the ground. I have looked at them all and tried to take them all into account. For present purposes I identify very few:

- i) Photographs at {H10.7/7/1854} show Snr Sequeda's new well and the pipe that takes water up to his new house:

- ii) {H4.12/12/2829} shows a part of the northern stretch of the ROW and provides a useful idea of the topography. It also shows an area of the ROW with good vegetation cover when the image was taken. There are others which show places that are less well covered when photographed;
 - iii) {H8.11/11/2731} shows what looks like a beaver dam across La Enix. It is in fact the result of wood being brought downhill by natural conditions and is an example of the erosive and general ferocity of the climate both for LC39 and more generally.
1425. For present purposes the historical photographs can be shortly summarised. In 1961 LC39 was completely covered by forest {L1/33/33}. By 1976 land clearance had begun at the southwest end of La Gloria. The route subsequently taken by the ODC and OcenSA pipelines was still under forest. The modern Caucasia-Zaragoza road had not been built {L1/78/78} {H2.2/2/592}. By 1995 La Gloria was largely cleared, the road had been built and the ODC pipeline had been laid. Its path is clearly visible {L1/169/169}.
1426. The 1998 overflight DVD {L1/234/234} is taken from the west. It is of moderate quality compared with some of the aerial photographs. Parts of the ROW look quite well covered, but towards the northern end there are areas that look more like exposed soil. Dr Savigny agreed (and I find) that the slope immediately to the south of Fenceline A was virtually bare of vegetation; immediately north of Fenceline A is better covered {Day35/149:18}. The ROW looks even more raw on the other side of the road beyond LC39's northern boundaries {L1/234/234}. Stills are at {L3/809/816};
1427. The 2002 air photo is at {L1/250/250}. The 2009 air photo is at {L2/516/516}. A 2010 satellite image is at {L2/767/767}. Each has been referred to extensively in evidence but does not require further comment at this stage.

The Pleaded Case on the Impact of the OcenSA Pipeline

1428. The original Schedule of Loss {B4.1/8/71} alleged that the OcenSA pipeline was constructed across the water sources on LC39, disrupting them completely. They were previously channelled by Snr Sequeda to feed his fish pool, which was alleged to be no longer useable. It alleged that Snr Sequeda was left without a domestic water supply and had to build a well to ensure a continuous supply of water for his home. Six of his cows ate though synthetic sacks of soil-cement which affected their health. As a result the cows had to be sold at a price significantly below their market value. As a consequence of the destruction of the water sources and the erosion caused by the movement of earth during construction, Snr Sequeda's land is alleged to have become unsuitable for growing crops and the pastures dried up. The large volumes of soft earth that were created during the pipeline construction process were carried towards Snr Sequeda's trees by rainwater. It alleged that the trees became suffocated by the earth and that the majority of them died, and that Snr Sequeda lost five cows that were buried in the soft earth. The overall claim was for COP 414,313,924 (c.£125,000) of which approximately half was for past losses and half for the future, based on a continuing annual loss of COP 25,248,115 (c.£7,600).

1429. The Particulars of Claim (which incorporated the original Schedule of Loss) alleged that the construction of the pipeline caused extensive damage as set out at {B1.2/4/374}ff. In briefest summary, the damage alleged in the body of the Particulars of Claim (which was in similar terms to the damage alleged in relation to LC54 and LC74 as summarised at [946] and [1161] above) was:
- i) Removal of “the extensive, thick, natural vegetation, which had covered the ROW” and revegetation that was “thin and sporadic” with some parts of the ROW not being revegetated at all. This was caused by the use of inappropriate or inadequate techniques and methodology and species of vegetation. The vegetation deteriorated or failed to develop adequately and the soil on the ROW has been left exposed to the elements;
 - ii) The exposure of soil to the elements, the decrease in the water retention capacity and the use of heavy machinery during the construction caused significant soil erosion. This in turn caused substantial amounts of sediment (from soil erosion and from excavated soil and soil created by cutting into the hills) to move outside the ROW to various parts of the Property;
 - iii) Water sources were destroyed, with sedimentation causing water sources to dry up or very significantly reduce in volume. They became unfit for human or animal consumption;
 - iv) The passage of sediment downhill caused landslides which destroyed trees;
 - v) The reduction in the quantity and quality of water made fish pools unusable;
 - vi) The quality of soil on the property was adversely affected by the reduction in the quantity of water and widespread erosion;
 - vii) Synthetic sacks of soil and cement that were laid across the ROW burst and spilled their contents, causing more erosion;
 - viii) Six of the Claimant’s cattle became ill after eating material from synthetic sacks. Five cows were lost after getting trapped in the soft earth;
 - ix) As a result of the lack of water and the extensive soil erosion and landslides, the quality of pasture was adversely affected and the property became unsuitable for crops.
1430. Neither the original SOCI nor the POC mentioned the need for Snr Sequeda to move house as a result of the OcenSA works.
1431. The 2012 Further Information on LC39 alleged damage as set out at {B2.2/33/357}ff. The Claimants’ case was updated by successive versions of the Revised Schedules of Loss, most recently on 23 January 2015 {B4.4/1/1}. Again, I provide a brief summary of the case as set out in the 2012 Further Information, with interpolations from the 2015 Re-Amended Revised Schedule of Loss (“RARSL”). The damage alleged included the following:
- i) Erosion “caused in and along the entire length of the ROW”, which is to be inferred from (a) erosion currently present in the ROW; (b) the condition of

the soil and vegetation there; and (c) the inadequate measures said to have been taken in relation to erosion prevention and control and in relation to soil and vegetation. The Claimant identifies:

- a) In or around Field 3:
 - i) an area of erosion measuring 225 m² at the end of drains, caused by a cross drain on the ROW at CAI Point 1;
 - ii) an area of soil erosion measuring 400 m² at CAI Point 2;
 - iii) an area of soil erosion measuring 200 m² at CAI Point 3;
 - iv) an area of erosion on the side of the ROW, where surface water flows across the ROW causing widespread sheet erosion of soil and sedimentation downslope at CAI Point 53;
 - v) an area of failed erosion control works at CAI Point 82;
 - vi) an area of erosion along the side of the ROW at CAI Point 79 and AF3 in close proximity to the area of waterlogged ground on the ROW measuring approximately 2650 m² which was caused by sediment;
- b) In or around Water Source W3:
 - i) An area of failed erosion control works evident at CAI Point 76 where there are gaps in the vetiver sown along ditch diverters resulting in sediment flows;
- c) In or around Fields 1 and 2:
 - i) an area of soil erosion measuring about 1,230 m² at CAI Points 4 and E2;
 - ii) an area of sheet soil erosion measuring 150 m² at CAI Points 47 and 48;
 - iii) an area of eroded ditch diverters at CAI Point 49. It is alleged that there is no evidence of use of erosion mats in the construction of the ditch diverters;
 - iv) an area of erosion and gabion structure on a ROW slope of 22° at CAI Point 51;
 - v) an area of superficial erosion on the North Slope of La Enix at CAI Point 423;
 - vi) an area of erosion on the western slope off the ROW, 696 m², at CAI point E1 with severe erosion and landslides or movements of soil;

- ii) Mixing and inversion of soil horizons, loss of top soil and compaction along the entire area of the ROW;
- iii) Poor vegetation cover in the ROW, and poor quality of vegetation with weeds throughout the ROW;
- iv) In Field 1:
 - a) AF1(a) (alleged to be 23,302 m²) was affected by flooding and waterlogging caused by the sedimentation of La Enix and W2. AF1(b) (alleged to be 23,694 m²) was sedimented by movement from excavated or eroded material from the ROW. The sedimentation made it impossible to grow crops in the area. Trees on the ROW were cut down or damaged by the works or damaged or destroyed by sedimentation or waterlogging;
 - b) AF2 (alleged to be 7,227 m²) was sedimented by movement or deposit of excavated or eroded material from the ROW or near the ROW. It is alleged that Snr Sequeda sowed pasture when he considered that crops would no longer grow, but the quality of pasture has been affected. Trees were cut down or damaged during the works or were damaged or destroyed by sedimentation;
 - c) SW1 (alleged to be 1,809 m²) was caused by movement or deposit of eroded or excavated materials or by overflowing of and/or sediment carried in W2;
 - d) FL1 (alleged to be c.6,000 m²) is alleged to be a flooded area which merges with the swampy area surrounding SW2 and to be caused by sedimentation of La Enix and consequent overflowing (aggravated by the narrowing of the channel of La Enix);
- v) In or near Field 3:
 - a) There is said to be an area of 2,650 m² at CAI Point 196 and AF4, and an affected area along W4 of approximately 5,860 m² in AF3 which was sedimented or affected by movement or deposit of sediment from excavated or eroded material from the ROW and by the creation of SW2 and SW3;
 - b) The area of SW2 is fenced off to prevent cattle becoming trapped there and there are other areas where cattle have got stuck e.g. CAI Point 197, a point on W4 before it joins W3. SW2 was been caused by movement or deposit of eroded or excavated material from the ROW or by overflowing of or sediment carried in W3;
 - c) Along the banks of W4 there is a swampy area caused by movement or deposit of eroded or excavated material from the ROW or by overflowing of or sediment carried in W4;

- d) Soil was stripped from various places including CAI Point 85 for the purposes of construction works (in particular to fill sacks used in erosion control works).

- vi) Sedimentation of water sources:
 - a) The stream bed for the entire length of La Enix which flows over the ROW is subject to substantial sedimentation with an increase in sediment accumulation downstream near the location of the natural pond area close to the culvert. There was some sedimentation that would accumulate around the natural pond area before the Ocesa pipeline but that Snr Sequeda could easily clear it so as to continue fishing. After the Ocesa works the inundation was such that Snr Sequeda could not clear it on his own and it remained in place until a new culvert was installed in 2007; but the natural pond quickly became sedimented again. The effect of the sedimentation is to raise the stream bed of La Enix so that it overflows during rain fall events and the wet season. There was flooding before the pipeline but it affected an area of approximately 1,330 m². The affected area is now 6,165 m²;

 - b) There is substantial sedimentation of the stream bed of W2 and flooding on either side of its channel from a point above where it crosses the ROW to where it joins La Enix. The sedimentation raises the stream bed and causes overflowing of its banks in the wet season, creating the swampy zone SW1 along its banks;

 - c) W3 is described as a small stream with a low volume of water and a very tight channel. The fish pool was at the bottom of the slope down from the ROW at CAI Point 11 and it was fed from W3. There is substantial sedimentation of the bed of the stream from upstream close to the start of the stream until Well 1 (very close to CAI Point 267) and all along its southern flow which was caused by movement or deposit of excavated or eroded material from the ROW. Some came from CAI Point E1, which is directly above the stream. The sedimentation filled the small fish pool located on the western³¹ side of W3 at CAI Point 11 and did so very quickly during a single rainfall event where before sedimentation was gradual and Snr Sequeda's periodic maintenance was sufficient to keep it operational. It is now swampy and waterlogged throughout the year;

 - d) Well 1, at CAI Point 267, was located by W3 and was the source of water for the family's consumption before the pipeline. It has been substantially sedimented by movement or deposit of eroded or excavated material from the ROW or near the ROW or from sediment carried by W3 when W3 floods. Sediment rendered the well unusable during and in the immediate months following ROW construction;

³¹ See {B2.2/33/368}. On the CAI Point 11 appears on the eastern side of W3.

- e) W4 sustained significant sedimentation of its stream bed along the entire length of the stream until it flows into W3.
- vii) The entire area of LC39 suffered a reduction in productivity or fertility because of the damage to water sources. In particular:
 - a) There has been a substantial reduction in water availability for human and animal consumption;
 - b) The old house and Well 1 had to be abandoned;
 - c) It is no longer possible to fish in the fish pool and La Enix;
 - d) The entirety of the ROW is less productive and less fertile;
 - e) Fields 1, 2 and 3, the stripped areas, the swampy areas and the flooded areas are less productive and fertile;
- viii) Trees were destroyed in the north of the ROW in fields 1 and 2.
- ix) Five of the Claimant's cattle died as a result of getting stuck in swampy areas and soft mud at Points 27, 195 (in or near Field 3), Point 28 where a cow died in 2010, and Point 197 (also in Field 3) where a cow got stuck in February 2012. [Snr Sequeda has not lost any more cattle as a result of the swampy areas since the construction of a fence in 1998, though approximately one cow becomes stuck every year and Snr Sequeda incurs additional costs of medicines.] [One cow became ill after getting stuck and had to be sold cheaply.] 3 cattle died from ingesting synthetic sacks used by Ocesa for its works. [6 cattle became ill after ingesting bags and had to be sold at less than half the price of healthy animals];
- x) [Snr Sequeda erected about 100m of fence to fence off the most dangerous areas in an area overlapping AF4 and AF3. He has to maintain the fence annually.]
- xi) Snr Sequeda's ability to keep pigs and hens was reduced by the reduced availability of crops and damage to water sources in particular Well 1. [Snr Sequeda sold his pigs immediately after construction of the pipeline as he had no cassava on which to feed them. He has been unable to keep another herd of pigs.]
- xii) [During and immediately after the construction of the pipeline Snr Sequeda was not able to keep cattle on the property. He kept them for four months on El Consuelo and for one month on pasture rented from a neighbour and was not able to milk the cows during that time. He then sold his herd as he could not afford to rent pasture. For the following five[/nine] months he had no cattle. When he acquired a new herd of cattle he had lost a year's production.]
- xiii) Before the Ocesa works the Claimant fished in La Enix and in a fish pool at CAI Point 11. Due to sediments in La Enix fish no longer migrate upstream. The fish pool was sedimented and could no longer be used;

- xiv) Snr Sequeda was forced to relocate his house [about 1.5 years after the construction of the pipeline] as a result of an overall reduction in the availability of water on LC39, particularly Well 1. [While still at the old house, he used water from a well dug near a neighbour's stream but it was too far and too steep. Snr Sequeda built the new house in order to have better access to the water source on the neighbour's land]. During the first 5 years after the move to the new house he obtained water for domestic consumption from a neighbour's house. Later he dug a new well on his own land. The old house, former corral and former pig sty are at CAI Points 189, 188 and 190. Overflows from the former well are at CAI Points 266 and 267. The new house is at CAI Point 187 with the new corral and current well at CAI points 26 and 56, further south than the old establishment.

The State of the Property before Construction of the Ocesa Pipeline

1432. Much of Snr Sequeda's evidence about the years before the arrival of the pipelines is uncontroversial and I accept it {D4/71/783}ff. Having moved to the area of Pato in 1963, Snr Sequeda acquired his land, including La Gloria, in about 1966. He formally became owner of the property by virtue of Incora Resolution 13069 on 22 August 1969 {M/71/234}. There was a house on Villa Rosa but the land was covered by forest. From the outset, Snr Sequeda cleared areas of forest on which he would initially sow and plant crops. After about 15 years of this process of clearing and crop growing, he decided to move house after having problems with his neighbour, and built the old house on La Gloria at Point 189. It had a zinc plated roof, a wooden fence and an earth floor. It stood on an area of about 25 x 25 metres. The house occupied about 9x5 metres, and Snr Sequeda planted fruit trees around it.
1433. It is not clear when the Caucasia-Zaragoza road was extended to pass La Gloria. It was not there in 1976 and was there in 1995. I find that it was there before the ODC pipeline was laid (as it will have provided the main route for gaining access to farms through which the pipeline passed) and that a culvert through which La Enix passed was built at the same time as the road. The original culvert was replaced by the present culvert in about 2007 when the road was upgraded.
1434. Before he moved onto La Gloria he had at some stage rented 10 hectares of it to a neighbour who used it for crops. The exact position of this 10 hectares of rented land is not clear. I accept that, when he moved onto La Gloria (which would have been in about 1981 or soon thereafter) he cleared the natural vegetation from some of the land he had previously rented out, which had returned to fallow, built his old house and started growing crops there. He also planted some fruit trees near the old house. Snr Sequeda marked the area that he first cleared and built his old house on {C6/7/1}, and I accept his marking as being broadly accurate, though it suggests an area of rather less than the 4 hectares he said he had cleared.
1435. The 1995 aerial photograph shows that Snr Sequeda had cleared much of the rest of La Gloria, as well as areas on El Consuelo and Villa Rosa, in the intervening years. His evidence, to which I will return, was that he had a 9 hectare area on which he used to cultivate crops on a three year rotation, thus using 3 hectares each year. He cleared this area in the first years after moving onto La Gloria. He marked this area on {C6/7/1} in the north-eastern section of La Gloria, to the south of La Enix and roughly on the area now described by the Claimants as Fields 1 and 2, though the area

he indicated would have been less than 9 hectares. I accept that the area he indicated broadly represents an area where he cropped by rotation where it was north of Fenceline A. It had the advantage of being quite close to the old house.

1436. I accept that AF2 had been used for cropping at some stage; but it had been given over to pasture before 1995 and was within the area of the farm south of Fenceline A that Snr Sequeda was generally using for feeding his cattle. I make this finding on the basis of the opinions of Dr Savigny and Snr de los Rios that AF2 was laid to pasture by the time of the 1995 aerial photograph and Dr Savigny's opinion that the 1995 aerial photograph shows extensive sheet erosion and soil loss: see below. There is a dispute between the parties about whether he was still cropping north of Fenceline A when the Ocesa pipeline arrived, to which I will return.
1437. When rotating his crops, Snr Sequeda would leave the section that was not being cultivated to be fallow (barbecho). After being left fallow he would typically burn the field he was going to use for crops in December to March {Day11/72:2} {H5.3/4/582}. He would then plant 1 hectare of maize in April, 1.5 hectares of rice on a different part of the cropping land in May and cassava from June onwards, which he would plant between the maize and the rice {D4/71/786} {Day10/34:4}. He would harvest maize in July/August, rice in September and cassava from December onwards {Day10/35:10}. The pattern would be that one three-hectare field or section of his cropping area would be growing crops and the other two would be lying fallow {Day11/72:15}. His husbandry and cultivation were not mechanised.
1438. By the time of the arrival of the pipelines Snr Sequeda also kept some livestock, though his numbers were always quite modest. His written evidence was that by the time the pipelines arrived he had about 20 cows and a bull on La Gloria in an area of approximately 12 hectares which he had cleared gradually over a number of years. In his oral evidence he said that he first kept cattle after the first (ODC) pipeline {Day10/27:1} but this seems unlikely given his account of progressive clearance and the importance of livestock for his farming method. He would clear an area, take one year's crops from it, and then sow pasture. He milked the cows primarily for domestic consumption, selling the excess to a man who came past along the road to Zaragoza. He would also sell milk to neighbours who asked for it {D4/71/788}. He kept two breeding sows and various other pigs. The pigs were watered from a well near the old house and fed with cassava and maize which Snr Sequeda had grown {D4/71/789}. He had chickens, which he fed with maize that he grew. He would sell their eggs at El Bagre, keeping some for domestic consumption {D4/71/789}. I accept his evidence about his keeping of livestock, though I do not accept that his numbers are precisely accurate. I understand his evidence about pigs to mean that at any time he had two breeding sows and such of their offspring as had not yet been killed or sold. I accept that evidence though it would mean that his numbers fluctuated. I accept that he kept quite a large number of hens, though not precisely 60, at any one time.
1439. Shortly before the pipelines came, Snr Sequeda says he built himself a fish pool. He says it was 3 metres in diameter, though he intended to extend it. He says that he had added cachama fish to the pool twice before the pipeline came and that he had no fish in the pool when the pipeline was laid {D4/71/790}. He also used to fish in La Enix near to the culvert.

1440. The overall picture given by Snr Sequeda is of progressive clearance of La Gloria, which provided temporary additional cropping areas before the land was laid to pasture. This was a typical small-scale campesino farming operation, although Snr Sequeda had the benefit of more land than La Gloria, namely El Consuelo and Villa Rosa, which he could and did use as the need arose. As such, the success of the operation and its sustainability depend to a large extent on the way that the natural resources are managed {Day33/141:5}.
1441. Historically Snr Sequeda and his sons worked the land and took care of the cattle. His wife and daughters took care of the pigs and hens, though it was Snr Sequeda who would feed the pigs with the cassava he brought from the fields. When his sons worked for him, Snr Sequeda paid them as he would any other worker. As they grew up, they got jobs that took them away from the farm; and when his daughters grew up they got married and went to live with their husbands. Shortly before the pipelines were laid, the operation was supporting Snr Sequeda and his wife, two daughters, one son and a grandson {D4/71/793}, and there was some surplus production for other family members {D4/71/790}. On the basis that Snr Sequeda was 80 in March 2015 {Day56/48:19}, he would then have been approximately 60. The operation now supports Snr Sequeda, his wife, and three other family members. At one point he ran a shop out of his house, selling items of basic need. His evidence was that he is not selling anything at the moment as he barely has the money to buy things with {Day10/17:23}. I accept that evidence.
1442. Snr Sequeda gives virtually no evidence about the ODC pipeline. The gist of his evidence, and of the evidence of other witnesses called on his behalf, is that it caused him no problems or, on some occasions, that he could not remember it causing him any problems {Day10/48:19}. That is challenged by the Defendant largely on the basis of the documents and expert evidence.
1443. On or about 24 August 1988 Snr Sequeda signed a First Letter from ODC thereby indicating his consent for the commencement and performance of the ODC works {M/71.1T/234.2}. It was in standard form and was similar in terms to the later Ocesa First Letters, including a statement that “Ecopetrol guarantees you a fair and equitable compensation for the damages that [it] may cause you”: see [255] above for the full text and, for comparison, [368] above for the text of the standard Ocesa First Letter.
1444. On 28 August 1990 Snr Sequeda entered into a ROW Agreement with ODC in ODC’s standard form {M/71.2T/234.11}: see [256] above. The payment was to be COP 1,660,000 in total to be paid in the normal 2 instalments. The ODC pipeline was stated to affect 20 metres width and 752 metres length, a total area of 15,040 m². The description of the damages was “damages in carimagua pasture, damages in mahogany trees, damages in rice and manioc crops, damages caused by cuts” and there was an added note “the landowner requests the company to prevent blocking the main accesses to the property, since he uses these accesses to move his crops” {M/71.2T/234.18}. The agreed sum of COP1,660,000 represented a rate of just over COP 110 per m².
1445. On 16 October 1990 ODC authorised its contractors to carry out the work on LC39 {M/71.4T/234.22}. The date on which works were commenced is not in evidence, but it is apparent that (as with LC74) they were affected by a stoppage on and from 18

January 1991, since the adverse consequences of the stoppage were the subject of a settlement agreement on 7 July 1991 {M/72T/237.1}, which was in the same terms as the equivalent agreement entered into with Snr Velez: see [1167] above. The compensation under Snr Sequeda's *force majeure* settlement was COP 1,348,000. The nature of any additional damage over and above that contemplated by the original ROW Agreement is not stated. It represents an 80% uplift on the payment due under the original ROW Agreement. Snr Sequeda was unable to give any evidence about the circumstances of this settlement {Day10/46:1}.

1446. On 19 March 1992 Snr Sequeda signed what was described as a Paz y Salvo recording full payment of agreed compensation for damages caused *outside* of the area of land negotiated with ODC as an access easement {M/72.6T/237.15}. Although this is described in the bundle as a clearance certificate (i.e. Paz y Salvo) with ODC, it was in fact entered into with Consorcio de Obras de Ingenieria, who were the organisation that ODC had authorised to carry out the works on 16 October 1990. The underlying agreement to pay damages is not available and so there is no documentary evidence of what damage it covered or what money was paid to Snr Sequeda.
1447. On 2 April 1992 Snr Sequeda and ODC entered into a ROW Deed in respect of the ODC works {M/72.7T/237.25}. I infer from the fact of the Paz y Salvo in March 1992 that the works had been completed by then. There is otherwise no indication of the duration of the works. The second instalment of his payment under the ROW Agreement was made on or by 10 June 1992 {M/72.8T/237.34}.
1448. The 1995 aerial photograph was taken on 30 September 1995. That is almost five years after ODC authorised its contractors to start works, four years and nine months after the ODC works were suspended, and three and a half years after Snr Sequeda signed the Paz y Salvo with Consorcio de Obras de Ingenieria. I therefore take it as showing the state of the ODC ROW at least three and a half years after the ODC works were completed and roughly four and a half years after the ODC ROW would have been opened. The precise timings cannot be established and do not matter greatly. What matters is that the recovering ROW would have been exposed to the Colombian climate for a significant time.
1449. Dr Savigny provided a thorough analysis of the 1995 aerial photograph which, subject to some points well made in cross-examination, I find compelling and accept. Once again I bear in mind the limitations and imprecision of his exercise so that, for example, his assessments of percentage exposure are necessarily imprecise, at least at the margins. I summarise his opinion on the state of the ROW in September 1995 and find as follows:
 - i) Between the southern entry point at 538+310 and c. 538+421 the ODC ROW passed along a gentle south facing uphill slope, following the longitudinal slope. Its light brown tonal pattern indicates a graded and sparsely vegetated condition. At the southern end of this section it is between 50-90% exposed soil. Thereafter it is more variable, varying between 10 and 50% exposed soil and 50-90% exposed soil. Graded soil can be seen to have been pushed off the west and east sides of the ODC ROW although it is not possible to tell from the photograph whether this involved grading material or the locations of temporary stockpiles. Given the relatively benign topography I infer that there

would have been no need for substantial stockpiles either on or off the ROW in this area. Some areas of soil loss are seen on the future Ocesa ROW {H2.2/2/592};

- ii) From the hilltop at 538+421 to where the ODC ROW crosses W4 at 538+535 the ROW crosses a gentle downhill slope, running generally parallel to the longitudinal slope through a grazed field. Its light brown tonal pattern indicates a graded and sparsely vegetated condition with 50-90% exposed soil. Graded soil is pushed to varying extents off the west and east sides of the ROW but, as before, it is not possible to tell whether that involved graded material or the locations of temporary stockpiles. Given the relatively benign topography I infer that there would have been no need for substantial stockpiles either on or off the ROW in this area. Two waterbars are clearly visible at Point 82. I accept Dr Savigny's opinion that their white appearance suggests that the water bars are constructed of polypropylene sacks though I am not able to determine when they were placed. The area around them is 90-100% exposed soil. At Point 82 there is evidence of waterbars made of polypropylene sacks near to the right bank of W4. There is obstruction of W4 at the ODC crossing of W4 which is evidenced by what is either sedimentation or impoundment of water upstream and to the west of the ROW. In that area there is 90-100% soil exposure. To the east of the ODC ROW the area of the future Ocesa ROW is pasture land with 50-90% soil exposure, occasional patches of grass and/or low shrub vegetation {H2.2/2/599};
- iii) From the crossing of W4 at 538+535 to the crossing of W3 at 538+630 the ROW is gently sloping towards the streams, which means that the ROW has a gentle cross-gradient in their direction. The area through which the ROW passed was pasture. For the most part the ODC ROW shows a uniform, light-brown tonal pattern that indicates a graded and sparsely vegetated condition. Approach slopes to the two streams are graded. To the east of the ODC ROW the future Ocesa ROW comprises areas of sheet erosion juxtaposed with patches of grass and/or low shrub vegetation {H2.3/3/611};
- iv) From the crossing of W3 at 538+630 to the hilltop at 538+760 is the slope that I have already described in some detail at [1423](ii) above. The ODC ROW passes through grassland and other low vegetation. It shows a mottled, light brown tonal pattern, which indicates a graded and sparsely vegetated condition. It shows largely 50-90% soil exposure: see also {H2.8/10/2059}. A short way up the slope there is an area where the ROW has the appearance of extending to the east, marked with an ellipse on LC39-12 {H2.3/3/620}. I am not satisfied it is evidence of a landslide and consider it more likely that it was the site of a temporary store of graded material or an access point onto the ODC ROW. Eroded material from that part of the ROW would have tended to flow longitudinally down the ROW back towards the crossing with W3, but it would also be subject to the cross-gradient so that it would flow down the side slope toward Point 11 and the stretch of W3 to either side of it. There are signs of impoundment of water to the west of the ODC ROW along the tributary into W3: see LC39-12. Dr Savigny considered that there was evidence of remedial works to the western side of the ODC ROW within Area E2. I am not convinced, and it is not necessary to make a finding, that it is the

consequence of remedial works: I accept that it is correctly identified in the position stated by Dr Savigny and that it is 90-100% exposed soil at the time of the 1995 aerial photograph. At the top of the hill, an area that roughly equates to AF2 shows extensive sheet erosion and soil loss {H2.3/3/621}

- v) From the hilltop at 538+760 to the crossing of W2 and La Enix takes in the area I have already described in some detail at [1423](iii) above. The ODC ROW runs generally parallel to the longitudinal slope with AF1(b) sloping away on either side. There is a major dispute about whether the area north of Fenceline A was still being used for crops, to which I will return. The ODC ROW shows recovering vegetation with variable soil exposure ranging from 1-10%, 10-50% and minimal areas of 50-90%. This stretch of the ODC ROW has therefore recovered better than others. W2 and La Enix both flow freely across the ODC ROW {H2.3/3/630};
- vi) There is no evidence from Dr Savigny or other experts that ODC placed longitudinal drains to the sides of its ROW. There is no sign of longitudinal drains on the 1995 aerial photograph. I find that none was placed by ODC.
1450. Two issues dominated the broader question whether the ODC works caused damage or whether, as Snr Sequeda insisted, it caused no material damage and all his troubles (and claim) are attributable to the Ocesa pipeline. Those issues were, first, when he moved house and, second, whether he was still growing crops in the area at the north of La Gloria. The date of the house move is significant because Snr Sequeda says it was provoked by the sedimentation of his well so that he had to get and carry water from a neighbour's property. The question whether he was still cropping the northern 9 hectares is significant both because he says he was prevented from cropping by damage caused by the Ocesa pipeline and also because it forms the basis for far and away the largest part of his claim. Resolution of these two issues may also cast light upon the reliability or otherwise of Snr Sequeda's evidence and case that he suffered no material damage from the ODC ROW.
1451. I deal with the house move first. I then deal with the crops issue at [1459]ff before turning to other aspects of the condition of LC39 before the Ocesa works.
1452. Snr Sequeda's evidence in his witness statement was that he had to move his house as a result of damage caused to the water sources he used before the construction of the (Ocesa) pipeline, and that he constructed it about a year and a half after the laying of the (Ocesa) pipeline {D4/71/819}. He described noticing damage to his water sources and how his first concern was to obtain clean water for the family's consumption. He and his sons started to look for a water source and his sons found water on his neighbour's land where he dug a well. He found that well very quickly so that the family was never without water. With the permission of his neighbour's sister, Snra Inés Martinez, he made a very rudimentary well. However it took him and his wife the whole morning to carry water to their old house. The well on the neighbour's land was 200 metres away from the old house but the ground was steep, whereas the old well had been 80 metres away and the area was flat {D4/71/813}. He continued: "My wife carried a pot of water on her head and I carried 1 or 2 jerry cans of 20 litres each. However, it was very difficult because the way back to our house was uphill. We had to do this for about 3 years. This water was for our own consumption and for the chickens (I had already sold the pigs). The other animals

could drink from the streams but in the dry season the water was very limited. Because of the problem with the water supply, I had to move the house, so that it would be closer to the neighbour's well. Ever since the water source had been damaged, I thought of moving the house, but I couldn't do it immediately because I lacked the resources. I had to wait for a while and when I managed to get some money, I constructed the other house" {D4/71/813}. The divergence between the two time periods mentioned in his statement (one and a half years after the laying of the pipeline as opposed to carrying water for three years) was not explained.

1453. Witness statements were served from Snra Martinez, Snr Mendoza and Snr Vilaria in support of the house move claim. Snra Martinez said that Snr Sequeda came and asked if he could dig a well on her land "a few days after the (Ocensa) pipeline had been laid" {D4/83/872}. Snr Mendoza described how he helped carry parts of the old house to the site of the new house for them to be used when the new house was built {D4/80/860}. His witness statement said that Snr Sequeda had told them that the reason for moving the house was to be closer to the neighbour's well, that Snr Sequeda had been using the neighbour's water for some time, and that he (Snr Mendoza) knew that the well Snr Sequeda had previously used for drinking water before the construction of the (Ocensa) pipeline and that he (Snr Mendoza) had seen the old well had filled with mud {D4/80/861}. Snr Vilaria said that he knew that Snr Sequeda's old well filled with earth when the pipeline was laid and was totally damaged so that Snr Sequeda dug another well on his neighbour's farm; and that one day he came and asked Snr Vilaria to help change the location of the house to take it to a place that was closer to the well on Snra Martinez' property. He said he remembered Snr Sequeda saying to everyone that he had to change the site of his house because "after the pipeline was laid, his water had been damaged and he needed to be closer to the well on his neighbour's farm" {D4/74/835}. Both Snr Mendoza and Snr Vilaria mentioned taking the zinc roof from the old house up to be used on the new one.
1454. In addition to this supportive witness evidence, the Claimants rely upon two other pieces of evidence in support of the house move claim:
- i) When Snr Sequeda entered into a settlement agreement with Saipem after the Ocensa works, it included reference to a payment for "damage caused to a water pond which became silted and another was built for the amount of \$150,000" {M/83T/285.1}: see [1552] below. Elsewhere, the word "pozo" in the settlement has been translated as "well" (not "pond"). Snr Sequeda had no recollection of how this came to be entered in the settlement agreement and was adamant that no one had offered him COP 150,000 to build a well {Day10/60:16} ff;
 - ii) It is said that the old house can be seen on the 1995 image but not on the 2002 aerial photograph {C4/3.6/777}.
1455. The Defendant's case on the house move starts by highlighting the apparent confusion as to dates and shifting of the formulation of the claim since it was first advanced. These are not of themselves powerful points and, if they were all that the Defendant had, I would reject the Defendant's case on the house move and find that the inconsistencies are explicable in the light of Snr Sequeda's age and the passage of time. However, the Defendant has other points of much greater substance:

- i) Snr Sequeda said, and I accept, that until he built his new house there was nothing there {Day12/93:8}. The answer was given in re-examination. It was clear and was not undermined by any other evidence that he or others gave. It was supported by the evidence of Snr Vilaria who confirmed that there was nothing there apart from trees before the new house was built: see below. In closing, the Claimants suggest that he may have had a temporary structure such as a shop on the site before the house was moved there. There is no evidence to support that suggestion. The only reference to a shop in evidence was in a question where it was suggested that “you have a shop in your house ...”, to which Snr Sequeda replied “No, I don’t sell anything at the moment” {Day10/17:23}. A little further on, the questioner returned “I think you might have told [Dr Velez] I think you did tell him that you had a shop, so you did have a shop in the house a little time ago, did you?” To which Snr Sequeda replied “yes, yes, a while ago, yes. ...” {Day10/18:12}. The first of these answers implicitly, and the second answer explicitly, confirmed that the shop was in the house;
- ii) Snr Sequeda was shown the 1995 aerial photograph and readily identified his new house on the image, with its zinc roof; and he confirmed that at that point the corral had not been built because he built it about 10 years later {Day11/95:15}. His identification of his house was evidently and unequivocally of a structure in the position where his new house is now located. It was apparent as he gave his evidence (and review of the passage confirms) that he was confident in his orientation and identification of his new house. The Claimants’ first response is to say that the new house was not identified as such by Dr Savigny on the 1995 aerial photograph. That, to my mind, is a point of no substance given the clarity of the image showing a structure in the place pleaded as the location of the new house, the clarity of Snr Sequeda’s identification of his new house, and his evidence that there had been nothing there until he put the new house there. The Claimants’ second response is to say that the Claimants’ old house is still visible on the 1995 image but is no longer visible on the 2002 image. I accept that there is a mark on the 1995 image where the old house had been, but the removal of the old house would leave a mark, and the mark has not been identified by evidence as signifying a house. In the same way, the 1998 overflight DVD {L1/234/234} appears to show *something* at the location of the old house (as well as a structure in the position of the new house), but the evidence does not support (and I am unable unaided to make) a finding that it is the old house intact;
- iii) In an interview attended by Dr Velez, Dr Delgado and a representative of his solicitors, Snr Sequeda was asked the question “In other words, the tube came through in 1997, and how long after did you move to this house?” To which he answered “well, from 97 until 98, 96 I was already here” {H24.2/207.2/1015.120}. When it was pointed out to him in the interview that this meant that he had moved before the construction of the Ocesa pipeline he said he did not know which year he moved and, after further prompting by reference to the dates on which it was being said that his well had filled up with sediments (which was said to be January to March 1997) he said “alright. I have been here since 99. I was already here then.”

- iv) When Snr Sequeda was cross-examined he was played the relevant section of the audio recording of the interview and asked the question “And as you said in that interview, it is correct, isn’t it, that in 1997 and 1996 you were already in your new home, weren’t you?” to which he answered “Yes” {Day11/101:18}. He confirmed that evidence in answer to a follow up question from the Court {Day11/101:22}. The Claimants’ response that Snr Sequeda may have been confused about dates has some substance in the light of the ease with which Snr Sequeda shifted what he was saying during the interview in response to further prompting by reference to suggested dates of damage. It amounts to a submission that I should pay no attention to his evidence about dates at all and should rely instead on what the Claimants assert is the kernel of truth, namely that the ODC works caused no damage, the OcenSA works caused catastrophic damage, and Snr Sequeda has an accurate recollection that he moved after the damage inflicted by the OcenSA works. For reasons that will appear, I do not accept that the ODC works caused no damage, quite apart from the evidence relating to the house move;
- v) The evidence of the three supporting witnesses was not as clear or impressive as first appeared from their statements:
 - a) Snra Martinez was not a satisfactory witness. It was apparent even over a video link that she was looking to others during the course of her evidence, though the English end of the link could not see precisely what interaction was happening. Her evidence was diluted to the extent that she said both in cross-examination and in re-examination that she could not remember whether the house move was before or after the OcenSA pipeline {Day12/122:6} {Day12/123:5}. I am not satisfied that she had any genuine recollection of whether the house move was before or after the OcenSA pipeline;
 - b) Snr Mendoza, while confirming Snr Sequeda’s evidence that there was nothing but trees at the site of the new house before the move happened, said that he did not see the new house before the OcenSA pipeline was laid {Day11/155:13}. The Defendant submits that cannot be correct in the light of Snr Sequeda’s identification of his new house on the 1995 aerial photograph;
 - c) It became clear during the cross-examination of Snr Vilaria that he was largely dependent upon what Snr Sequeda had told him. I am not satisfied that he had any real recollection of when the house move came about in relation to the laying of the ODC or OcenSA pipelines.

1456. I remain troubled by the terms of the subsequent settlement with Saipem. However, not least because of the complete absence of any evidence about what was the “pozo” to which it referred, I am not convinced that it is inconsistent with the Defendant’s case. I bear in mind that the cost of the new well claimed by Snr Sequeda is COP 1,741,700 (c.£646) {B4.4/1/20} but the settlement sum with Saipem was COP 150,000 (c.£56). In the absence of any explanation at all from Snr Sequeda or others, the settlement sum with Saipem suggests something basic. It is possible that the installation of piped water from his new well explains some or all of the difference in cost; but I do not know.

1457. I come back to Snr Sequeda's evidence identifying his new house on the 1995 aerial photograph. Even making allowance for the fact that on some (but by no means all) other occasions he had difficulty in orienting himself by reference to aerial images, my impression at the time (which reviewing the evidence has confirmed) was that he was in no doubt about his identification; and no subsequent photographic evidence has cast doubt on the correctness of the position he was identifying as being the place where he could see his new house. Snr Sequeda was sure that he was looking at his new house, and so am I.
1458. On this evidence and for these reasons I find that Snr Sequeda moved to his new house before 30 September 1995. He is therefore wrong in identifying the move as being after the laying of the Ocenca pipeline. However, he has consistently said that he moved because of trouble with his existing water supply, and I believe and accept that evidence. Where he has gone wrong (in common with other witnesses affected by both pipelines) is in attributing the reason for his move to the Ocenca pipeline when he should have attributed it to the ODC pipeline.
1459. Turning to the question of crops, I have outlined the nature of Snr Sequeda's farming of crops and livestock at [1434]ff above. He grew rice, maize and cassava both for domestic consumption and for his pigs (who ate maize and cassava) and hens (who ate maize). Some of the produce he would keep as seed for the following year. His evidence is that he would sell most of his cassava and about half of the rice. A lot of the maize was kept for domestic consumption and what was left over was sold. He would transport the products he was going to sell on three mules to the River Nechi. From there they would be transported to El Bagre by river {D4/71/787}. The trip to sell produce would take a full day and would be done once a week from when he started at La Gloria until the coming of the pipelines, his evidence being that he continued until the Ocenca pipeline came, selling mainly cassava and rice {Day10/38:16}.
1460. On Snr Sequeda's evidence, he was cultivating the area at the top end of La Gloria when the Ocenca pipeline was laid. His witness statement said that when it rained for the first time after the pipe was covered on 13/14 January, the earth that the machines had dug "was carried downhill to where [he had] his maize, rice and cassava crops." He said it began to cover everything and that W2 was completely covered. The cassava turned yellow and hard and could not be eaten. "The only thing I thought then was that I had lost all the work I had put into these crops." His reaction was that nothing would grow in the affected area and that when he tried to cultivate an area between La Enix and W2 some years later, it didn't yield anything. His son tried to sow plantain between La Enix and the road, sowing about 50 plants. Those plants exist but produce little and what is produced is in small bunches and good for nothing. He was left without crops for a year and after that he started to cultivate them again on El Consuelo. He said that because El Consuelo is very far from his house and it is difficult to maintain the same level of crops there as he had before, he now only cultivates what is necessary for family consumption, about a hectare of cassava, rice and maize {D4/71/810}. He is now old and cannot work as he used to. For example, he has to go as far as El Consuelo to grow crops and that is why he only grows the minimum needed to support his family. His children are worried about him and want him to stop working, but he says he needs to be active {D4/71/821}.

1461. Snr Sequeda's evidence that there was immediate damage to his crops received some support from other witnesses:
- i) Snr Mendoza said that Snr Sequeda "has always had a few little plots where he grew cassava, rice and maize. Now he has the crops at the back part of the farm. Before the pipeline he had them close to the old house. At one point he told us he couldn't use the same land he used before to sow, and that was why he had to sow so far away" {D4/80/862}. He does not say that he witnessed the damage as it happened;
 - ii) Snr Navarro, a construction worker who spent some time on LC39, said that "on [LC39] I remember that a cassava crop on a lower part below the trench was affected. Due to the mud that ran downhill and built up around the plants, they shrivelled up and faded from green to yellow. The plants looked dead" {D11.1/153/1851}. His reference to plants shrivelling up and looking dead is inconsistent with the fact that he was probably on LC39 for two days or so. It is also contradicted by his oral evidence that "I couldn't say that during the time when I was working on the construction, that there was landslides, that there was bare earth or problems with landslides. Everything was normal. ..." {Day12/30:8}. I am not satisfied that he had any recollection of seeing what he described in his statement and reject his evidence that he saw mud running downhill to affect the cassava plants or that he saw shrivelled or faded or dead-looking cassava plants as he described;
 - iii) Snr Blanco, another construction worker who spent some time on LC39, said that he "saw during [his] work that [Snr Sequeda] had a cassava plantation next to the [ROW]. I saw that every time it rained, the loose soil was washed towards those crops" {D11.2/180/2145}. However, the accuracy of that evidence was successfully challenged during cross-examination when he accepted that perhaps this observation was not based on when he was working there but on some other time when he was in the area {Day11/54:24}. He too would have been on LC39 for no more than about two days and I have no confidence that he has any memory of seeing what he describes while he was working there. I had the clear impression at the time (which review of his evidence has confirmed) that his suggestion in cross-examination that he may have seen this happening at some other time when he was in the area was an immediate attempt to shore up his evidence and was not based on any actual memory. I reject his evidence that he saw what he described in his witness statement.
1462. One troubling aspect for the Court when trying to determine the truth of what happened about growing crops in the north of LC39 is the remarkable lack of precision about where crops were growing at the material time. I have accepted that at some point Snr Sequeda was cropping north of Fenceline A. He was operating on a rotation system, and on the northern section of La Gloria would plant one hectare of maize in April, 1 ½ hectares of rice on a different part of the cropping land in May and cassava from June, which he would plant between the maize and the rice. Accepting that the purpose of rotation was to leave the areas that were not being cropped fallow, it follows that there would have been more than one area in the northern section which would have been used in rotation for cropping. So, when the Ocesa pipeline came to be laid, only a proportion of the overall cropping area would

have been being used, with the rest being fallow. Yet Snr Sequeda has not identified the area where he was growing crops at the relevant time. The Court does not even know whether the cropping area in use at the relevant time was in Field 1(a) or 1(b). This is not an idle point as it is now common ground that sediment from the ROW would not have passed onto Field 1(a). This lack of precision would be a surprising omission in any event, but it is remarkable when the significance of this event for the claim overall is taken into account.

1463. There is a second consideration which I bear in mind in my approach to this claim. It has two elements. First, given the Defendant's case, I look for reasons why Snr Sequeda would have abandoned his northern cropping area before 1995. It was reasonably placed for his old house and, on his evidence, he had worked that piece of land for a number of years. One possible reason would be that, as part of the normal process of converting his land to pasture, he decided that it was time to move on and to lay the area down to pasture for the future. I have no reason to reject Snr Sequeda's evidence that AF2 was at some stage part of his cropping area to the north of La Gloria. I am also satisfied on the evidence of Dr Savigny and Snr de los Rios that he had given that field over to pasture by September 1995³²; but Fenceline A remained in place and I am not satisfied that Snr Sequeda was using the area north of it for pasturing his cattle before September 1995. That leads to the second element: if he was abandoning the northern cropping area (for whatever reason) why did he not lay down an equivalent area to crops elsewhere, whether on La Gloria or (to a greater extent than he did) on El Consuelo or Villa Rosa? On his case in this litigation, the reduction in cropping deprived him of his pigs and most of his hens, which were integral to his wellbeing and income, in addition to removing his ability to sell surplus crops. In short, on his case, it has reduced him to bare subsistence. Yet, on his case and evidence, he did not clear or start to use an equivalent area elsewhere on his three properties, even to replace AF2. Non-replacement of AF2 would suggest a decision to contract.
1464. The only reason that is put forward for not replacing cropping land is that it is a long way to El Consuelo or Villa Rosa and that it would be a long way to carry heavy loads. That is an understandable submission for Snr Sequeda now, in his eighties; but it requires further consideration when applied to the period of the arrival of the pipelines, when he was approximately sixty and had the assistance of at least one of his sons. The assertion in the Original Schedule of Loss that "the three male members of the family who previously lived on the farm now earn a living elsewhere as farm labourers in order to support their families" {B4.1/8/73} carried the implication that they had moved away because of the damage to La Gloria. That is not consistent with Snr Sequeda's evidence that "when [his] sons grew up, they got jobs outside the farm: in the army, in mines and in trade; ..." {D4/71/793}. I reject the implication of the Original Statement of Loss and accept Snr Sequeda's evidence on this point. It carries no implication that the sons left because of damage to La Gloria and contradicts the assertion that they left to become farm labourers elsewhere; to the contrary, it suggests the natural fragmentation of the family as sons made their own way in the world. The effect, though, would have been and was to reduce the supply of family labour available to Snr Sequeda on the farm.

³² This appeared at one point to be common ground {Day56/63:3}, but apparently is not {Day59/138:7}.

1465. The claim in respect of AF2 has a further significance. The 2012 Further Information alleged that Snr Sequeda sowed pasture in AF2 “once he considered that crops would no longer grow”, the case being that crops would no longer grow because of the effects of the Ocesa pipeline {B2.2/33/362}. The fact (as I have found) that he took AF2 out of crops and laid it to pasture before September 1995 means that *either* Snr Sequeda is completely wrong about the reasons for taking AF2 out of cropping *or* damage had been caused previously which caused him to take it out.
1466. The Defendant advances thirteen points on Snr Sequeda’s claim that he stopped cropping in the north of LC39 because of damage to his crops and land caused by the Ocesa pipeline. Some are more substantial than others. I consider them in relation to the area to the north of Fenceline A in the light of the findings I have already made about AF2:
- i) In their analyses of the 1995 aerial photograph Snr de los Rios identifies AF1(a) and AF1(b) as a mixture of pasture and rastrojo {H5.5/6/1159} while Dr Savigny identifies them as being a mixture of pasture, weedy pasture and weeds {H2.8/10/2071}. Both experts identify AF2 as pasture. There is reasonable consistency between the experts; and neither identifies the area as having crops. Dr Savigny was pressed hard in cross-examination about AF1(a) and AF1(b). He accepted that he would not be confident (“comfortable”) with the classification of land as cultivated unless it had a geometric pattern to it, and that he could not identify geometric patterns on the photograph; but he also maintained his evidence that he could see pasture-like signatures and evidence of land that was in transition to pasture. Although Snr Sequeda’s description of how he planted his crops does not refer to geometric patterns, it was Dr Velez’ evidence that rice, maize and cassava would be grown in patterns and at set intervals in a manner that would give rise to geometric patterns, and there is no evidence that Snr Sequeda did not act in that way. To the contrary, his evidence of interplanting (so far as it goes) is more consistent with regular patterns of planting than anything else. There is also force in the Defendant’s submission that there would have been up to 3 hectares of cassava in the cropped area (and nothing in the fallow areas): yet neither expert identified any discrete area as being different in appearance from the others;
 - ii) The Defendant relies upon Dr Savigny’s evidence that the area north of Fenceline A as shown in the 1998 overflight video shows “a continuation of a recovery from original pastureland” {Day38/13:22}. I do not find this persuasive for two reasons. First, the quality of the 1998 DVD is limited and does not afford the same degree of detail as the better aerial images. Second, his answer was premised on his previously expressed opinion that the 1995 aerial photograph showed recovering pastureland and does not of itself add substance to that opinion. While I accept Dr Savigny’s designation of the area north of Fenceline A in his 2002 Land Use Map as largely secondary forest {H2.8/10/2072}, I do not consider that helps determine retrospectively the proper interpretation of the 1995 aerial photograph, although it is consistent with it;
 - iii) Third, the Defendant relies upon the progression of Snr Sequeda’s attempts to mark the area of cropping on copies of aerial photographs: see {C4/4.8/672}.

It points to the fact that Snr Sequeda said in his witness statement that he understood the marked up image of his property and considered it useful to refer to it {D4/71/780} and to the fact that, as I have held, on some occasions he was able to use the photographs readily in the course of his oral evidence. My assessment is different. The paragraph in his statement was in more or less standard form for witness statements produced by the Claimants and I have no confidence that he would have used the same words or volunteered the same sentiments if left to his own devices; and I do not find it surprising that a campesino farmer of Snr Sequeda's age and upbringing should vary in his ability to deal with aerial images during the course of a long and trying period giving evidence. On a number of occasions he either put on, or took off, his glasses in an attempt to work out what was going on. Doing the best I could when viewing a witness over a videolink, I formed the view that his occasional difficulties were genuine. So, while his early attempts to identify the area of cropping were inconsistent with his final one, I do not hold that against him;

- iv) The Defendant submits that, if Snr Sequeda had been rotating his crops on a three-year cycle, that would have been very intensive, with a four to ten-year cycle being better. That was Dr Velez' evidence {Day33/77:8}, but he allowed that a three or four-year cycle was the most intensive that was available and, on any view of the evidence, Snr Sequeda had only been cropping the northern area for about 10-15 years, or a maximum of 3-5 uses of each section that he used. It has not been proved that to work the land over such a period would have caused deterioration that would necessitate abandoning cropping on the land, though it would have been intensive use of the land;
- v) Snr Sequeda's ODC ROW Agreement {M/71.2T/234.11} listed damage to rice and cassava crops in the Annex setting out the description of damages and recorded Snr Sequeda's request that ODC should not block the main accesses to the property as he used the accesses to move his crops. The Ocesa ROW Agreement {M/75T.1/251.10} simply referred to "trees, pastures and general vegetation" and a fence with three lines of barbed wire. The terms of the documents, taken on their own, are consistent with the Defendant's case, but no more than that. True, Snr Sequeda clearly identified not only that his crops were going to be affected by ODC but also the need to keep his accesses clear; but there is no satisfactory evidence about the formulation of the Ocesa ROW Agreement that would justify the finding that, if there were crops in the way of the ROW, they would have been mentioned: see [1486] below. None of the ROW Agreements for LC50, LC54 or LC74 mentions crops, and no analysis of those or other Ocesa ROW Agreements has been done to demonstrate that, where crops were affected, they were always mentioned. Thus, without more, the documents do not positively support the point. However, in cross-examination Snr Sequeda said that he didn't think that the works would damage the crops because he didn't think the ROW would go through where the crops were but would go by the side of where the crops were {Day10/55:6}. My initial reaction on hearing this evidence was that Snr Sequeda was making it up as he went along, under pressure from the cross-examiner. However, on reflection, it could be accurate evidence if the crops were not going to be planted on the ROW itself because of the effect of the

ODC ROW that had already been through or for some other reason. Because of the lack of precision about where he in fact was growing his crops, I am not able to tell whether in December 1994 he would have known precisely where he would be growing crops when the Ocesa works were being carried out; but he may have known that he would not be planting on the recently disturbed area of the ODC ROW. In this inconclusive state of the evidence, I do not consider it would be right to place weight on this point of the Defendant's submission;

- vi) The next point is more substantial and is that there was no complaint from Snr Sequeda when the damage was done. Snr Sequeda knew how to complain to those carrying out the works, and did so in respect of less serious occurrences than are now alleged to have happened to crops in the northern part of the property: see {D4/71/799}ff at [90], [96] and [106]. Even if the damage was not immediately apparent while the work was still continuing, he had subsequent dealings with Ocesa and Saipem as a result of which he entered into Paz y Salvos with each. I observed Snr Sequeda to be a man who appeared to be show gentleness and humility in his dealings with others. I have no doubt that he is tough and may be stubborn in many ways but, for example, I do not assess him as having the same willingness to complain and ability to press his case as Snr Velez of La Nieve. That assessment moderates the impact that this point would otherwise have; but it does not entirely remove it;
- vii) The Defendant's next point is that Snr Sequeda said in evidence that he saw damage to his maize crops, his rice crops and his cassava crops {Day10/65:14}. That must be wrong. On his account, the Ocesa works caused damage after Recomposition of the ROW in March 1997, and on any version of events they cannot have caused damage before January 1997, by which time his maize and rice had been harvested and were not there to be damaged. This is a fair point, but it does not seem to me that an exaggeration and inaccuracy of this character should weigh heavily in determining whether there were any crops present to be affected at all;
- viii) The Defendant next submits that it is not credible that Snr Sequeda gave up cultivating crops on the whole of La Gloria because of the damage to his crops on the northern section. Including AF2 the area alleged to be affected is 5.4 hectares; excluding it the area is 4.7 hectares: roughly 10% of La Gloria and 3% of the combined La Gloria, El Consuelo and Villa Rosa. Furthermore, the Claimant's pleaded case is that 3.6 (9-5.4) hectares in the northern block remained undamaged {B4.2/4/180}: that figure remains the same if AF2 is left out of account on both sides of the equation. No evidence has been put forward to explain why Snr Sequeda did not either (a) use the undamaged part of the northern block, or (b) use other land that had already been cleared or (c) clear more land. His only evidence in his witness statement is, as summarised above, that he cultivates sufficient land on El Consuelo to meet the family's needs, but no more. As I have already indicated, this lack of satisfactory explanation has caused me concern;
- ix) The Defendant's ninth point is to highlight the changes in the formulation of the claim with time. The Original Schedule of Loss said that "as a

consequence of the destruction of the water sources and the erosion caused by the movement of earth during construction, the Claimant's land became unsuitable for growing crops and the pastures dried up. The large volumes of soft earth that were created during the pipeline construction process were carried towards [the Claimant's trees by rainwater. The trees became suffocated by the earth and the majority of them died. ... The Claimant's farm is now completely dry and the few crops that are grown are solely for domestic consumption. The farm no longer produces sufficient crops to provide feed for livestock" {B4.1/8/72}. The general thrust of these passages is that trees were destroyed by movements of earth and that the loss of crops was because of destruction of watercourses. It is capable of being read as including the allegation that the land became unsuitable for growing crops because of the destruction of water sources and by erosion, but is not happily phrased if that was the intention. The 2011 Further Information pleaded that "during and immediately after the construction of the OcenSA pipeline [the cropping area of 4-6 hectares] was affected by the flow of sediments downhill from the ROW and was no longer suitable for growing crops. The Claimant harvested the crops the year of the construction and sowed yucca again. However, this did not grow properly and no crop was produced" {B2.1/11/88}. This is broadly consistent with the present case apart from the suggestion that Snr Sequeda replanted yucca, which is not. The February 2012 Further Information {B2.2/33/362} for the first time identified that AF1(a) was affected indirectly by the sedimentation of La Enix and W2, where previously it had been alleged that it had itself become sedimented. I accept that the technical case being advanced has changed; but the changes do not of themselves support a conclusion that no crops were being cultivated or that no damage was sustained north of Fenceline A;

- x) The Defendant's tenth point is the lack of expert evidence in support of this claim. I deal with aspects of this point later, but at this stage I note two aspects of Dr Velez' evidence. In his first report Dr Velez said that (a) where vegetation is on hillsides with gradients above 7.5% the impact of sediments is short term and lesser because the action of the rain drags sediments down toward the lower lying areas; and (b) if cassava plants were in the initial stages of growth the damage from sedimentation might be considerable, even affecting the leaves, but if they are in their productive stage, the effect might be smaller provided the flow of sediments does not occur as an avalanche {H5.3/4/611}. By January to March 1997 Snr Sequeda's cassava would have been ready for harvest. Its precise height is not known but Dr Velez accepted that cassava can grow to over a metre high {Day33/115:18}. When asked in his oral evidence about the possible impact of sedimentation on Snr Sequeda's crops, Dr Velez concentrated exclusively on the early stages of growth, concluding that when cassava is 4 or 5 centimetres high, the effect of sedimentation could affect even the leaf development of the crop {Day33/116:2}. That is a very far cry from what would have been the position with Snr Sequeda's cassava in January to March 1997. What is more, the general gradients around the ROW on AF1(b) were in excess of 7.5% except as they approached and crossed the streams. Taken in conjunction with Dr Uribe's evidence (which I accept) that, with cassava of 1 metre high, even 1-2 cms of soil from Horizon B would not adversely affect fertility or the

environment where the roots of the cassava were currently growing, Dr Velez' evidence does not support the proposition that sedimentation from the Ocesa ROW would have caused the sort of damage to an existing cassava crop so graphically described by Snr Sequeda. The Defendant's point is substantially reinforced when consideration is given to the amount of sediment that could have flowed from the ROW onto his crops in AF1(b). As a rough indication, even if I were to accept Dr Card's estimates of soil loss from his fifth report (which I do not, for reasons given elsewhere), his estimate for the whole of the LC39 ROW from completion of backfill to completion of reinstatement works was 134 tonnes/hectare, and from completion of reinstatement to 15% vegetation cover was 9 tonnes/hectare {H1.6/25/1519}. The stretch of the ROW that could have affected AF1(b) was 267 metres. Allowing for sobranchos of 9 metres, Dr Card's soil loss figure for this stretch between completion of backfill and completion of reinstatement works (taken by Dr Card as 15 January 1997-13 April 1997) would be of the order of 121.6 tonnes, or 76m³. If all of that quantity had been spread evenly over the 23,694m² of AF1(b) alleged to have been affected, it would have provided a layer of sediment 3.2mm deep. While recognising that (a) Dr Card's figures are unreliable for the reasons set out previously (b) not all of the amount would have gone onto AF1(b) and (c) it cannot be assumed that the sediment would in fact have spread itself evenly over AF1(b), these figures taken in conjunction with Dr Velez' evidence to which I have referred provide evidence that Snr Sequeda's account of what happened is unreliable;

- xi) Eleventh, the Defendant relies on the content of two passages of interview between Snr Sequeda, Dr Velez and his solicitor at {H24.2/207.2/1015.100} and {H24.2/207.2/1015.125} and submits that, not only does it make no sense for Snr Sequeda not to have cultivated elsewhere on his properties but that there is now no difference in the amount of crops he cultivates as before the pipelines. These points are important ones to which I shall return; but they do not directly affect the question whether Snr Sequeda was cropping north of Fenceline A before the pipelines came through. For the purposes of writing this judgment I have re-read the whole transcript of the interview. It is consistent with Snr Sequeda cropping in the northern section of La Gloria before the Ocesa pipeline came through: see, in particular, {H24.2/207.2/1015.79} to {H24.2/207.2/1015.94};
- xii) The Defendant's twelfth point is that the claim for loss of crops is exaggerated. If it had remained the Defendant's case that Snr Sequeda had been advancing his cropping claim dishonestly, the existence or scale of exaggeration might have been of value in deciding whether there was any substance at all in the claim. Now that the allegation of dishonesty is not pursued, I do not find this point persuasive on the question whether or not Snr Sequeda had been cropping north of Fenceline A at all;
- xiii) Finally, the Defendant makes the point that Snr Sequeda appeared not to know and said that he had not been told by Leigh Day what he was claiming in respect of crops or otherwise {Day11/85:8}. I have commented elsewhere on the formulaic assertion by Lead Claimants that their schedules of loss have been read to them and are accurate: see [411] above. In the light of my

findings there set out, I find this point to be of no assistance in the present context.

1467. I have referred above to the interview between Snr Sequeda, Dr Velez and Dr Delgado {H24.2/207.2/1015.61}. What emerges from that interview read as a whole is quite inconsistent with Snr Sequeda's case that being deprived of his cropping area in the north of La Gloria has caused him a permanent reduction in the crops that he has produced on his land. It suggests that the claim being advanced on his behalf that he has been unable to crop on La Gloria because it is too far away for him to manage is without foundation. I rely upon the following passages in particular:

- i) After describing the damage to his existing crops and area and to having conducted a trial with yucca at {H24.2/207.2/1015.97}ff, he was asked by his solicitor "What did you do to supplement the crops?" to which he answered "To continue farming, to keep working? What I did is move to that part and then back there ... to the other farm" {H24.2/207.2/1015.100};
- ii) After explaining that he did not have to pay rent for using the other farm (in terms which make clear that he was referring to El Consuelo and, possibly, Villa Rosa) he was asked by his solicitor "I am asking if you kept selling the same, the same amount of crops as before?" to which he answered "yes, after I kept doing the same thing." As a follow up his solicitor asked "And selling as well?" to which he replied "Selling the same." The solicitor then asked "and was it more difficult or the same?" to which he replied "No well on that side well, it was never the same on the flat bit, but I am not unhappy, I always had rice production, yucca, corn, as little as it was, but yes" {H24.2/207.2/1015.100};
- iii) Later in the interview he was asked by Dr Velez if there had been changes to the management of the farm. His response was that he had to keep more of an eye out for his cattle to see that they were not getting stuck and bogged {H24.2/207.2/1015.112}. He did not mention cropping;
- iv) He was later asked specifically whether his handling of the farm changed in relation to the production of crops. His answer was "Like I told you, I still had faith in that land there, but it didn't produce anything in 3 or 4 years as I said so I cleared it out again. There was some produce there, but over there, nothing. I have to go to the higher bit now." When asked the follow up question "then the pipeline's impact on La Gloria was that you could not plant agriculture any more", he answered "Exactly, not in that part, no." The implications of this answer were clearly apparent to the questioner who then asked "is it much farther to the other farm or is it roughly the same distance?" to which Snr Sequeda replied that it was further, half a kilometre, clarifying that "from here, this house, until over there where I work there are 500 meters, at least 500 meters" {H24.2/207.2/1015.117};
- v) In the following passage of question and answer, Snr Sequeda confirmed that he had to go that distance to take supplies and get the crops, that he could borrow or sometimes rent a mule and that he would pay others for working there. His solicitor then confirmed that transportation of crops was the same as before {H24.2/207.2/1015.118}. He was then asked what he would have

done if he had not had the other farm, the suggestion being that he would have had to buy food or cut down more forest on La Gloria, in answer to which Snr Sequeda said “I would not have that forest, I would have had to cut it” {H24.2/207.2/1015.119};

- vi) Snr Sequeda’s solicitor asked him “If it weren’t for the pipeline, what do you think this farm would be like now?” He replied “Well, maybe it would be in a better state. Why? Because of the water issues, there wouldn’t have been the sediments that there’ve been in the area.” After a suggestion that the farm has a bigger pasture area, the solicitor continues “more grass, you’ve got crops, ok you had the same amount of crops, so what do you mean, in practical terms, when you say the farm would be in a better state?” At no stage does Snr Sequeda either contradict the solicitor’s understanding that he has the same amount of crops or identify a shortage of crops as something that would have been different if it were not for the pipeline {H24.2/207.2/1015.125}.

1468. The cumulative effect of the interview is clear, although it is not always certain to what parts of his land he is referring: after experiencing damage to the northern section of La Gloria, he continued cropping on unaffected lands including land on El Consuelo and Villa Rosa as a result of which he was able to sell the same amount of crops. It was further away but it was managed and he was still managing. He said, and his solicitor understood him to say, that he had the same amount of crops as before. Though given the clear opportunity to say so, he was not saying that cropping on the further lands had caused him to have a shortage of crops.
1469. In cross-examination Snr Sequeda gave evidence, including evidence by reference to a 1996 aerial photograph {L1/221/221}, that he had been cropping on El Consuelo and Villa Rosa before the pipeline: see {Day10/80:22} {Day11/83:23} {Day11/78:1}. The evidence was sometimes self-contradictory, but I did not consider at the time (and, on review, do not consider now) that the answers he gave which accepted that he had been cropping on El Consuelo and Villa Rosa before 1996 were the result of confusion or misunderstanding. The interview with Dr Velez, Dr Delgado and his solicitor contains evidence relevant to this point too. It suggests that Snr Sequeda was cropping the northern area of La Gloria intermittently, using a three hectare area every five or six years: see {H24.2/207.2/1015.92}. This was not explored in evidence or closing submissions and I am therefore cautious about placing too much weight upon it. But it is consistent with and supports the answers that Snr Sequeda gave in cross-examination where he appeared to accept that he had been cropping on El Consuelo and Villa Rosa as well as La Gloria before 1996.
1470. The Claimants’ case as advanced in pleadings, witness statements and submissions is that the northern area of La Gloria was Snr Sequeda’s sole cropping area until the passage of the Ocesa pipeline, that a crop that was being grown in January to March 1997 was damaged, that Snr Sequeda then abandoned the northern area, and that he has suffered a continuing loss of crops that has prevented him from keeping pigs or a significant number of hens and has reduced him almost to destitution. The Defendant’s case is that the northern area of La Gloria, if and to the extent that it had ever been a cropping area, had been abandoned by September 1995, so that no damage was caused to crops in January to March 1997 and no loss of crops was suffered in the northern area in either the short or the long term. I am unable to accept either of these cases.

1471. I accept Snr Sequeda's evidence that the northern area was an area that he had used for cropping. I base my acceptance upon my assessment of his evidence as a whole, which leaves me confident that it is accurate and reliable at least to this extent, and upon the presence of Fenceline A, the obvious reason for which was to keep cattle from an area that was intended for cropping and not pasture. AF2 is south of the fenceline and had been abandoned as a cropping area before 1995. I do not know when it was abandoned. I accept that Snr Sequeda abandoned it because it had deteriorated; but that was not caused by the Ocesa pipeline and the evidence does not satisfy me that it was abandoned as a result of anything that happened relating to the ODC pipeline, though it could have been. I therefore make no positive finding on the cause of the deterioration that led him to abandon it.
1472. I find that the northern area of La Gloria was not the only area that Snr Sequeda was using for cropping, either before December 1996 or before September 1995. I accept the evidence to which I have referred above that he was cropping on El Consuelo and La Gloria before the Ocesa pipeline. I reject the evidence that Snr Sequeda was cropping the northern part of La Gloria on a three year rotation. That would have been at the limits of what was sustainable, and Snr Sequeda had no need to work his land so hard given the large area he had at his disposal. I find that, as evidenced by the interview, he was working on a five year rotation on the northern part of La Gloria. That explains why he was also using land on El Consuelo and Villa Rosa. Also, since he was using about three hectares at a time, it means that in some years there would be no crops on the northern area of La Gloria: this is consistent with the account he gave in the interview that he had had crops on the northern area about five years before the Ocesa pipeline went through and again at the time of the Ocesa works. It would also explain why neither Snr de los Rios nor Dr Savigny could identify the presence of crops north of Fenceline A in September 1995 and why that area provides a relatively homogenous appearance: there were, as I find, no crops on that area in October 1995.
1473. Once it is accepted that Snr Sequeda had other land that he was using for cropping, other pieces of the jigsaw on this issue begin to fall into place. There is no longer a contradiction between the absence of crops on the northern area in September 1995 and Snr Sequeda's evidence that he planted crops there the following year. Furthermore, it is consistent with and provides some explanation for the evidence that he waited a while before trying to use the northern area again for crops – he had other areas to use; and for why he did not complain about the damage in the northern area – although important, it was not the life threatening event that has been subsequently portrayed. The evidence from the interview (which I accept) that the loss of the northern area for cropping did not lead to a reduction in the amount of crops that he had before and after the pipeline (other than perhaps in the short term) provides the answer to the questions that I have posed earlier: he didn't abandon it before 1995, and he did not have to lay down an equivalent area to crops elsewhere immediately after any problems from the Ocesa pipeline because he already had other areas that he was cropping.
1474. A finding that Snr Sequeda was not consistently cropping the northern area or using it as his sole area of cropping could also help to explain why he did not specify damage to crops in his Ocesa ROW Agreement in the same way as he had in the ODC ROW Agreement. I do not know what his cropping pattern was when the ODC ROW

Agreement was executed or how its timing related to his decision to plant crops in a particular area, and therefore do not know why it was such a pressing concern for Snr Sequeda when he signed the ODC Agreement. I remain unable to place any weight upon the point made by the Defendant about the lack of mention of crops in the Ocesa ROW Agreement.

1475. I reject the evidence in Snr Sequeda's witness statement that the difficulties caused by the distance to El Consuelo and Villa Rosa meant either that he could not or that he did not (for that reason) maintain the same level of crops as before. I accept that he is now old and cannot work as he used to, to the extent that his children want him to stop working altogether. That would have affected his ability to work and caused a progressive reduction in the amount of crops he would have grown over time even if he was still using the northern section of La Gloria as part of his cropping area. On my finding that he used the northern area intermittently even before 1995, he would have been doing at least a large proportion of his cropping on the further fields in any event. I reject the suggestion that the additional distance in each direction to the further fields over and above the distance that he would have walked to the northern section of La Gloria was or is either the reason or a materially contributing reason for growing fewer crops than he would have done otherwise. I find that after the Ocesa pipeline he was selling as many crops as before.
1476. Snr Sequeda's cropping claim as presented in pleadings and evidence downplayed the availability of land on El Consuelo and Villa Rosa, as was to some extent foreshadowed in the interview. Where the experts and lawyers concentrated in the interview upon the possibility of building a case based on La Gloria, Snr Sequeda was frank about the availability of El Consuelo and Villa Rosa, as he was when pressed on their availability in cross-examination. It is not necessary for my ultimate decision, and I make no formal finding, but I do not presently have any reason to believe that Snr Sequeda had any active part in deciding or determining that the cropping claim would be advanced in the way it was.
1477. I now turn to set out my other findings on the state of La Gloria before the Ocesa Works were carried out, working from south to north. In general, the areas of La Gloria that were used for pasture were closely grazed, as identified by Dr Savigny in his interpretation of the 1995 aerial photograph.
1478. Field 3: I accept Dr Savigny's evidence that the 1995 aerial image shows an obstruction and either sedimentation or impoundment upstream of the ODC ROW on W4. Although the aerial image does not permit determination of precisely what is causing the sedimentation or impoundment, I accept that it is caused by the ODC ROW. I also accept his opinion that the area along the banks of W4 identified as SW3 was caused or contributed to by the effect of the ODC ROW {H2.3/3/616}. More generally, the ODC ROW was largely 50-90% exposed soil along the stretch above W3 and leading to the crossings of W3 and W4, with the area near the visible sedimentation or impoundment being 90-100% exposed soil. That exposed soil, together with background erosion from the W4 drainage basin will have contributed to sediment in W3 and W4 in this area. It is not possible to make more specific findings on the state of the water courses or fields on the basis of the historical photographs.

1479. Area W3: there are a number of strands of evidence that are relevant to the question whether the ODC ROW and works caused significant damage to Snr Sequeda's land:

- i) Snr Sequeda's evidence was that damage had been caused to his water sources which caused him to abandon his well and to find water on his neighbour's land and to move his house up the hill towards the new source. The precise position of the well was never satisfactorily established; and Snr Sequeda's evidence gave no detail about precisely what happened to his old well {D4/71/812}. The Claimants CAI identifies points 266 and 267 as being near to the well, but does not identify a position for the well itself. Dr Tobon asserted in his first report both that the well was on the streambed of W3 and (on the basis of a personal communication from Snr Sequeda) that it filled with sediment originating on the ROW and transported by W3 and that "this occurs especially during rainfall when stream water overflows from its bed due to silt and inundates the entire area around the well which consequently had to be abandoned" {H7.3/3/872}. Elsewhere, however, he said that at least part of the sediment came from above the well, from near point 266 {H7.3/3/872} {H7.3/3/855}. Dr Card identified Point 266 as being an area of soil sheet erosion which was causing widespread erosion of soil and sedimentation downslope into W3 {H1.1/1/158}. On Dr Savigny's understanding of the position of the old well, it was above the level of the stream and could not have been sedimented by waters from the stream: the cause of sedimentation would have been the headwaters of the tributary to W3 that are near to Point 266 {Day36/84:11};
- ii) In circumstances where, even at the end of the trial, the Claimants appeared to be unsure about where the old well was {Day59/178:17} and the absence of any clarity from Snr Sequeda about the mechanism or source of what is alleged to have caused him to abandon his old well, the only findings that I make with confidence at this stage are that he abandoned it before the Ocesa works were carried out and that some, at least, of any sedimentation that affected the well would have come from eroded slopes above it and not from W3. If and to the extent that there was also substantial sedimentation from W3 (which appears to be the Claimants' case on the basis of Dr Tobon's evidence) it suggests that the ODC ROW caused substantial sedimentation of W3 further upstream. I therefore look to see if there is evidence of that happening;
- iii) The condition of the ODC ROW in September 1995 provides all the necessary conditions for continued erosion from the exposed stretch of the ROW and sedimentation of the water course below. Although the ODC ROW was narrower than that subsequently used by Ocesa, there is no evidence to suggest that the differences in absolute volumes of soil that was stripped, stored and replaced would have rendered the ODC ROW immune from erosion on a similar scale when subjected to the rigours of the climate that subsequently affected Ocesa's works as well. Dr Savigny's opinion that there are signs of impoundment of water to the west of the ODC ROW along the tributary into W3 also supports a finding of sedimentation coming from the ODC ROW. On the basis of Dr Savigny's evidence I find that there had been and continued to be erosion and sedimentation from the ROW and that it was the cause of the impoundment that he suspected he could see;

- iv) The suspected impoundment of the tributary to W3 was not disputed by Dr Gundlach. It is consistent with the development of SW2 and I accept Dr Savigny's evidence that it caused it, though I am not satisfied that there was a landslide as such {H2.3/3/624};
- v) Snr Sequeda said that his fish pool became silted up before he moved his house {Day12/53:14}. As I have explained in [1423](ii), as it climbed away from the crossing of W3, there was a cross-gradient as a result of which soils being eroded from either the ODC ROW or the Ocesa ROW would have flowed to the place of the fish pool at point 11 and into W3 to either side. Snr Sequeda attributes the sedimentation of the fish pool to the Ocesa pipeline; but in September 1995 the ODC pipeline on the slope away from the crossing with W3 largely showed 50-90% soil exposure and there was suspected impoundment behind an obstruction in the unnamed reach of the westward tributary of W3 close to Point 11. There is no evidence of any longitudinal drains or other geotechnical devices to prevent sediment from the ROW entering W3 or a fish pool at Point 11. No fish pool can be seen on the 1995 aerial image to identify its position or condition with any greater certainty;
- vi) Snr Sequeda said that he had dug his simple pool "approximately one year before the pipeline was laid" and that he had added fish to the pool twice {D4/71/790}. I accept that he dug a fish pool at some point in the manner he describes, but am not confident that he has an actual recollection of when that was in relation to the arrival of the pipelines. If he had dug the pool approximately one year before the Ocesa pipeline works, that would have been approximately the end of 1995. In the light of Dr Savigny's evidence and my findings about the state of the ODC ROW and surrounding areas in September 1995, it would have been an odd time and place for Snr Sequeda to dig a pool, as it would have been obvious that it was liable to be affected by the sedimentation which had already happened and was continuing to happen from the ODC ROW. That suggests that he dug the pool before the ODC pipeline, which is consistent with his evidence that it became silted up before he moved his house.

1480. On the evidence and for the reasons that I have summarised above I make the following findings about the state of the area described as W3 by the Claimants:

- i) Snr Sequeda dug his fish pool before the ODC pipeline was laid;
- ii) There was erosion from the ODC ROW, which reduced in rate but was continuing in September 1995 and until the time that the Ocesa pipeline was laid. In particular there was erosion from the section of the ODC ROW as it climbed away from the crossing with W3 which affected Snr Sequeda's fish pool and the area of W3 to either side of it;
- iii) The impact of the ODC ROW in the period to September 1995 included:
 - a) Sediment reaching W3 from a point upstream of the fish pool to where the ODC ROW crossed W3;

- b) Impoundment of water in the tributary to W3 close to Snr Sequeda's fish pool, which caused the development of SW2;
 - c) Sedimentation of the fish pool over and above that which would have been anticipated from the slope above in any event;
 - d) The abandonment of the fish pool;
 - e) Sediment being carried downstream from the crossing with W3 in times of heavy rain and overflowing of the banks of W3;
 - f) Viewed overall, the ODC ROW had a significant adverse effect on W3 in the stretch between (roughly) the fish pool and the well;
- iv) In addition, I find that the land around point 266 was adversely affected by erosion from the land above it including, in particular, erosion from the area of the headwaters of the tributary to W3 that were positioned above it. Erosion from those slopes would have been capable of finding their way into W3 and did so;
- v) Whether Snr Sequeda's well was itself affected by sediment or whether Snr Sequeda's decision to look for a new well was caused by his general concern for his water sources, any sedimentation of the well (on the assumption that it was near point 266) was predominantly from the land above, though sediment carried by W3 in times of flood may well have contributed;
- vi) The creation of SW2 and the impoundment of water in the tributary to W3, together with the other impacts I have found, occurred because of substantial events which the streams could not purge. Erosion from the ODC ROW continued to the time of the Ocesa works, albeit at a reducing rate as the ROW continued to recover. It had not fully recovered by the time of the Ocesa works.
1481. Fields 1 and 2: I have already held that AF2 had been taken out of cropping and converted to pasture before 1995: see [1436] and [1471] above. By September 1995 it was subject to extensive sheet erosion and soil loss: see [1449](iv) above.
1482. North of Fenceline A, fields AF1(a) and AF1(b) continued to be used as previously in the way that I have described. The passage of the ODC ROW did not cause Snr Sequeda to stop cropping and I am satisfied that he did have crops on an (unspecified) part of the land north of Fenceline A when the Ocesa pipeline was laid. The most reliable direct evidence about the state of La Gloria in this area comes from Dr Savigny's analysis of the 1995 aerial photograph and his land use and land quality maps {H2.8/10/2065} {H2.8/10/2071}, but it is limited: see [1449](v). The significant features for present purposes are that the ODC ROW has recovered better than in much of its more southerly passage, that W2 and La Enix both flow freely across their junction with the ODC ROW and that both streams had areas of wetland, largely at some distance upstream from the ODC ROW.
1483. The Defendant advances three potential causes of sedimentation of the streams in this area: background erosion from the streams' basins, obstruction by debris and the

impact of a culvert under the road from an unknown date to 2007 (when the culvert was altered) and since. I shall consider the causes of change and make further findings when coming to consider the impact of the Ocesa pipeline.

The Relevant Factual Background: Pre-construction Period

1484. Snr Sequeda says that a man came to his farm to tell him that another pipeline was coming and that subsequently a negotiator came who said that the pipeline would cross his land and that there was a price which was not negotiable {D4/71/795}. He does not remember signing a document but he in fact signed three. The first was the First Letter, which was from the Defendant and dated 11 August 1994 {M/74T/242.1}. It was in the Defendant's standard form: see [368] above.
1485. The second was the ROW Agreement between the Defendant and Snr Sequeda, which was executed on 20 December 1994 {M/75T.1/251.10}. It was in the Defendant's standard form as set out at [369] above. Snr Rojas acted on behalf of the Defendant. La Gloria was declared to be 46 hectares. Clause 5 said that the pipeline and complementary works would pass through La Gloria "in a 25-meter wide by 727-meter long strip of land, for a total of 18,175 square meters ...". Under Clause 9, the price of the easement rights and the damages caused by the construction of the pipeline was COP 400 per square meter for a total of COP 7,270,000. The Annex described the damages recognised as "Trees, pastures and general vegetation. One fence with three barbed wire lines." The rate of COP 400 per m² paid by Ocesa compares with the rate of COP 110 per m² paid by ODC under its ROW Agreement. It was nearly 2 ½ times the sums paid by ODC under its ROW Agreement and the *force majeure* settlement combined. It is roughly 80% of the price paid by his son to Snr Sequeda in 2009 for the purchase of Villa Rosa. He was paid the first 70% under the ROW Agreement on or before 3 April 1995 {M/81T/281.1} and the second instalment on or before 19 August 1995 {M/82T/282.1}.
1486. Snr Sequeda's evidence in his witness statement was that not all of the ROW Agreement was read to him, that he was not told he could hire a lawyer, and that he did not try to find a lawyer because he trusted what the representatives were saying {D4/71/796}. There is no evidence to contradict him on these points and I find that his evidence on them is correct.
1487. The ROW Deed was also signed by Snr Sequeda and was executed on 1 March 1995 {M/78T/266.1}. It was in standard form and was notarised. The easement was registered with the Land Registry on 14 June 1995 {M/82.1/282.2}

The Relevant Factual Background: Construction Period

1488. The Ocesa ROW was opened during the first week of December 1996 {E3/9/557}. Pipe bending was complete during the week of 8-14 December 1996 {K30/291/1}. The trench was excavated on or about 7/8 January 1997 and backfilled on about 13/14 January 1997: the trench was therefore open for between 5 to 7 days. Recomposition of the ROW took place during the week of 9-15 March 1997 {K43/448/1}. The GDS for LC39 was compiled at the end of that week or a few days later, between 14-20 March 1997 {E3/9/545} {K44/455/178}.

1489. The long term geotechnical works were carried out by 6-13 April 1997 at the latest {E3/9/557}. Revegetation works were being carried out on a stretch that includes LC39 during May 1997 and were completed by the end of May {K45/471T/1} {K46/478T/3}. The Claimants submit that this indicates there was a delay between long-term geotechnical works and revegetation works. This cannot be resolved on the basis of the documentary records alone as they are insufficiently precise. However, there is also evidence from Snr Perez Bracamonte, of whom more later, which suggests that there was no significant gap between long term geotechnical works and revegetation. His evidence is that he worked on long term geotechnical works at the same time as the seed sowing team {D11.2/171/2070}. Taken together with the evidence of Snr Loeber about the lack of precision in the dates and descriptions in the weekly reports, this evidence suggests that they should be interpreted as meaning that revegetation on the stretch including LC39 was probably taking place in May 1997 but that they do not exclude some works being carried out before then. Equally, the evidence of Snr Perez should probably not be taken as meaning that long term geotechnical works and revegetation were always being carried out by the same people at the same place at the same time; but it does suggest that the same gangs of workers were working closely on long term geotechnical and revegetation works. Taken overall, the evidence does not require or justify a finding either that there was a gap of as much as a month between the conclusion of long term geotechnical works or that there was no gap at all. On the evidence, I find that revegetation works happened within about a month of the long term geotechnical works, on dates which I am unable to specify with any greater precision.
1490. A walk through took place either immediately or within a few weeks of revegetation {E2/7/346}. Records would have been kept as the walk throughs affected payments to Saipem; but no records are available to the Court {Day19/43:24}.
1491. The records at Zaragoza, which Professor Monsalve considers and I find to be the appropriate reference weather station for LC39, provide the following information (summarised at {C4/3.6/616}):

Month (96/97)	Month's Rainfall	Max (24 Hours)	Days with Rainfall
December	156	45	10
January	141	100	3
February	289	70	10
March	0.2	0.2	1
April	478	127	10
May	478	98	17

1492. The records from the Caucasia camp (some 69 kms to the north) for December 1996 are incomplete and uninformative {C6/24/7}. Some further information is provided by the records from the Zaragoza camp (some 12 kms to the south). The reports start on 12 January 1997 and are incomplete. In the period from 13/14 January, when the trench was backfilled, to the end of May there was one day with over 100 mm recorded in a day (115mm on 9 April), one with 75 mm (20 April), and one over 50mm (54 mm on 18 January). The lack of better coincidence with the results from the weather station is likely to be because the results are incomplete. It appears from the results from the Zaragoza camp that the majority of April's rain will have fallen in the second half of the month. Taken overall, with the exception of March 1997 which

was remarkably dry, the results are not out of line with average rainfall results for the time of year.

1493. Before coming to specific findings about the conduct of the works it is convenient to review the evidence given by Snr Sequeda and others who said that they saw the works in progress.
1494. Snr Sequeda gave little evidence about the manner in which the Ocesa works were carried out {D4/71/798}ff. He did not pay close attention when the bulldozer stripped the ROW but said that branches, stones and vegetation were dumped outside the ROW on his property. Once the pipe was brought onto La Gloria, it was left with gaps between sections so that cattle could pass through. He said that when the digger opened the trench “the excavated earth was thrown on to both sides of the trench on the [ROW]” [85]. He then says (at [86]) that “the excavated earth was being piled up on one side of the trench, at a certain distance so that the machines wouldn’t pass over it.” His statement that excavated earth from the trench was piled on one side of the trench is consistent with the normal procedure and there was nothing that required a different procedure to be adopted on La Gloria: see [308]-[310] above. I find that trench spoil was placed on one side of the trench for the short time that it was out of it; but either topsoil or graded material could have been placed on either side of the ROW as he describes. He did not describe substantial stockpiles of soil either in his witness statement or in his oral evidence. Apart from costales, he said that he did not see any other type of land protection [111]. He did not see how the pipeline was constructed across the streams [113].
1495. Snr Sequeda’s evidence about lack of land protection was contradicted by Snr Perez Bracamonte, whose evidence was that his work included making cortacorrientes, gabions and barreras germinadoras for streams, and that he installed cortacorrientes and gabions and planted grass on La Gloria. His evidence was that “the stream” was badly damaged due to the earth that had been deposited in it, and he said that “this earth was either side of the [ROW] and ran down towards the stream” {D11.2/171/2071}. He said that when working on the farm he saw that the land and streams became more and more covered with the earth which had been moved by the machinery and which he said was deposited on the sides of the ROW and ran into the streams which became blocked {D11.2/171/2072}. However, when cross-examined he gave contradictory evidence, first accepting that there were no mounds of earth at the side of the ROW {Day11/20:5}, then saying that he had seen that earth deposited on the sides of the ROW ran into the streams which became blocked {Day11/20:14}, then suggesting that maybe because it was a harsh winter the earth had already gone into the stream by the time he got there {Day11/20:20}, and in re-examination saying that there was a little bit of earth at the sides {Day11/29:1}. The nature of his work means that the ROW had already been recomposed by the time he got there, as he confirmed {Day 11/15:6}. While it is possible that he might have seen after-effects of soil making its way into streams, I reject his evidence that he actually saw soil from the sides of the ROW running into the streams on La Gloria. He referred to two streams on La Gloria, one of which he identified as La Enix and the other as being in the middle of the farm (which suggests he was referring to W3). His evidence was that they built gabions and that one of the streams (which he thought was the smaller one) had a blockage cleared {Day11/23:1}, which involved removing a great deal of weed growth {Day11/31:3}. I had the impression at the time that his description of

clearing a stream on La Gloria of weeds at a blocked crossing was based on recollection and I find that what he described did happen, and happened at a crossing of W3.

1496. Snr Pedro Blanco was a pipebender who worked on the spread including LC39 and worked on LC39 for about a day and a half {Day11/41:21}. His witness statement contained a number of statements about the general conduct of the works {D11.2/180/2144}ff, but when cross-examined it became clear that he was not reliable as a witness and that his evidence had to be treated with considerable caution to determine whether, and if so where, it could be relied on and where it could not. Thus, for example, his evidence about what he said happened to Snr Sequeda's cassava crop was not based on recollection and I have rejected it: see [1461](iii) above. Similarly, I do not accept that his evidence about Snr Sequeda's fishpond at [25] of his witness statement was based on any actual recollection, and I reject it. There is, however, some of his evidence that I am able to accept. He clarified, and I accept, that it did not rain during the day while he was working on LC39 but said that it rained at night {Day11/53:7}. I accept that he saw costales installed, but not that he had any recollection of seeing them carried away by rain, on Snr Sequeda's farm. He gave evidence that he saw fique matting in some places on the ROW on Snr Sequeda's farm, which I accept; and I also accept that he did not see on LC39 pipes that were installed to reroute the flow of streams where the ROW crossed them. I do not find his evidence that "the streams no longer flowed along the original channels because of all the soil that had been stirred up" to be based on reliable recollection of what he saw on LC39. He did not see soil actually being carried down to the stream, as it was not raining when he was there; but, although I reject the evidence as given specifically in relation to LC39, I accept that there may have been times when he saw channels of streams that had been disturbed by the works. I also accept his evidence that, in general, topsoil and graded materials from lower levels were stored separately along the ROW. He did not remember seeing trinchos, but that may have been a failure of memory rather than because they were not there and I place no weight upon it. I reject his evidence that he saw earth that had been piled up on LC39 being washed downhill, but I felt at the time he gave his evidence and, having reviewed his written and oral evidence for the purposes of this judgment, I maintain the assessment (and find) that his evidence, though exaggerated and unreliable in the form in which he gave it, was based on a recollection that one or more stream crossings on Snr Sequeda's land showed signs of disturbance and of soil having made its way into the water at or near the crossings. His evidence was put into proper perspective in re-examination: when asked how much of the soil was carried away from the ROW by rain as he had been describing he said "I couldn't say exactly how much [soil] was taken when it rained", and on being further pressed as to whether it was a little bit, a lot, most of it, or none of it, replied "a little" {Day11/62:6}.
1497. Snr Antonio Navarro was a labourer who worked on lowering the pipe into the trench. Given the rate at which the front progressed, he too would have been working on LC39 for about 1 ½ days or so. His evidence confirms that the general practice was for soil from the trench to be placed to one side {D11.1/153/1851}. His witness statement stated that there would be collapses of soil into the excavated trench, which then had to be removed before the pipe could be laid in the trench. I do not accept that he has any recollection of this happening on LC39 or that it did so {Day12/29:24} {Day12/33:17}. The other aspect of his evidence on which the

Claimants rely on his general evidence that, on the properties where he worked, “especially when it rained soil ran downhill towards the lower parts where the streams were” and that it “eventually went into the water, which changed appearance; it became cloudy.” I do not accept that he had a specific recollection of that happening on LC39, though I accept that he had a general recollection of stream waters becoming cloudy where soil had gone into them. Similarly, I do not accept his evidence that there was too much soil in trinchos, with the result that they sometimes overflowed, was more than a general recollection of something that could happen. It is not a specific recollection of what happened on LC39, though I accept his evidence that there were trinchos installed on Snr Sequeda’s property {Day12/18:18}.

1498. Snr Alberto Antonio Perez did not give evidence but his witness statement was the subject of a Civil Evidence Act Notice {D11.1/156/1871}. He worked on the pipe before it was lowered into the ground, applying rubber after it had been soldered together. He says he worked on LC39. There are three reasons to treat his evidence with caution. First, it has not been tested in cross-examination. Second, where the statements of his fellow workers have been tested in cross-examination, it has been shown that the statements purport to go well beyond what the witness can and will say if the evidence is tested. Third, given the nature of the process on which Snr Perez was engaged, he would have been on La Gloria during the first half of January 1997, probably for a couple of days at most. January 1997 was at the height of the dry season and, as summarised above, the records at Zaragoza record rain on three days in January 1997. Yet Snr Perez asserts that “when [he] worked [on the Ocesa pipeline] it was the rainy season and it rained especially hard at night.” This error goes to the heart of the evidence on which the Claimants wish to rely, namely his statement that he “saw that a lot of earth ran into the small streams and this wasn’t a good sign, it occurred especially when it rained”; and also that La Enix, which he describes as a large stream, is “full of earth where the pipeline passes” and is “silted” {D11.1/156/1878}. He does not say expressly that he saw these things happening while he was working on LC39, but the Claimants wish to rely upon his statement in support of findings that they did. For the reasons I have set out, I do not consider that it would be right to place any weight at all on the evidence of Snr Perez in support of a finding about what happened on LC39. If he worked on LC39 at all (on which I make no finding one way or another) his statement indicates that he has no reliable memory of his time there or what happened while he was working on the property.
1499. The evidence of Snr Rafael Florez was largely uncontroversial and I shall refer to it later in the course of discussing particular findings. He worked with Dinosaurios making cortacorrientes, barreras germinadores, installing biomats, and doing some sowing between 12 February and 11 May 1997 {D2/45/460}.
1500. Taken overall, the evidence of the construction workers who spent time on LC39 confirmed some aspects of Ocesa’s general practice and that, in times of heavy rain, soil could be eroded from the ROW and could enter streams, which is not controversial: see, for example, the evidence of Snr Loeber at {Day19/55:15}. For the reasons I have outlined above, they provide limited reliable evidence about what actually happened on LC39.
1501. I now turn to the Claimants’ criticisms of the carrying out of the works on LC39 and the specific findings for which they contend. In their closing submissions the Claimants’ criticisms of the carrying out of the works on LC39 are divided into four

categories: (1) Soil piles; (2) Erosion on the ROW/Long Term Measures/Revegetation; (3) Soil mixing and Inversion and (4) Failure to protect watercourses. I shall follow broadly the same course.

1502. **Soil piles:** the findings for which the Claimants contend {C4/3.6/627}ff are:

- i) Retention structures were not installed prior to or during ROW opening (in or just before first week December 1996) or at all (save for certain structures provided only for trench spoil) in circumstances that amounted to negligence;
- ii) Further or alternatively, any retention structures that were provided failed or were inadequate in circumstances that amounted to negligence;
- iii) Stockpiles were not covered in circumstances that amounted to negligence;
- iv) Stockpiles were left standing from just before the first week of December 1996 until mid-March 1997 in circumstances that amount to negligence;
- v) There was a failure to review or maintain or replace such that the failure to install or the inadequacy of any retention structures was not rectified in circumstances that amount to negligence;
- vi) Stockpiles were not placed and shaped at suitable locations and in particular were placed (i) outside the 25m ROW width, (ii) on or next to sloping ground (iii) at locations above and/or close to watercourses; and/or (iv) built too high and/or of too large volume in circumstances that amount to negligence;
- vii) During or after trench excavation there was a partial collapse of the trench. This related to a length of about 20m. As a result the soil had to be removed from the trench and the resulting mixture was “thrown” to the edge of the ROW and sedimented water courses.
- viii) There was soil loss from piles of topsoil and/or subsoil and/or trenchspoil (i) during ROW opening in or just before the first week of December 1996; (ii) during and after trench excavation in early January 1997, and (iii) at all times from ROW opening until ROW recomposition in middle March 1997.

1503. *Stockpiles:* the Claimants’ case is summarised at [1502](iii) (iv) (vi) and (viii). There is no satisfactory evidence that there were substantial stockpiles on LC39 during the Ocesa works. Neither Snr Sequeda nor any of the witnesses who were on LC39 between the stripping of the ROW and recomposition describes substantial stockpiles. Had they been there I am confident that Snr Sequeda would have remembered them and given evidence about where they were; but he did not. The closest he came to describing substantial stockpiles was when he said in his evidence that when the trench was dug “they threw the earth to each side, mounted up, piled up, and then this machine came down to put the tube into the trench with a crane...” {Day10/69:19}. He later said that when or after covering up the pipeline they were “tossing earth all over the place, all over in the [ROW].” This is not an adequate evidential basis for a finding that there was a negligent placing or shaping of stockpiles or that they were too high or of too great volume. The topography of LC39 is less benign in places than that of LC54, at least in parts, but there is neither direct nor expert evidence to justify

a finding that there were substantial stockpiles or, equally important, where they might have been. I do not doubt that the diggers worked fast and that sometimes they will have seemed to be tipping soil rapidly; but that is in the nature of such projects and machinery and, to my mind, is quite different from what is required to prove the case being advanced by the Claimants, which is that there were substantial and inappropriately placed stockpiles from which came the erosion suggested by Dr Card and complained of by the Claimants. I note that Dr Savigny's analysis of the 1995 aerial photograph identified an elliptical area which could have been the position of a store of graded material during the ODC works: see [1449](iv) above. No such area has been identified in relation to the Ocesa works and, for the avoidance of doubt, I reject Dr Card's evidence about the existence and size of stockpiles, and their being the source of extensive erosion, as being both unscientific and wrong.

1504. I have accepted Snr Navarro's evidence that there were trinchos on LC39. That suggests a collection or collections of soil but gives no indication of whether it was one or more than one, gives no evidence of its size, and does not identify its location. Subject only to Snr Navarro's evidence about trinchos, I find that the Claimants have not established that there were substantial stockpiles on LC39. After the trench had been backfilled on or about 13/14 January 1997, there would have been relatively modest windrows of stripped earth. After recomposition between 9-15 March 1997 there would have been no significant piles of earth exposed to the elements.
1505. *Retention Structures*: the Claimants' case is summarised at [1502](i)(ii) and (v). The Claimants rely upon evidence from Snr Sequeda that he didn't see any protection other than costales, from Snr Blanco that he did not see trinchos and Snr Bracamonte that he saw soil that had run from the sides of the ROW to streams. I am unable to accept their evidence as reliable evidence of a lack of retention structures, for the reasons outlined earlier. Similarly, while I have accepted Snr Navarro's evidence that there were trinchos, I am unable to accept that he has a recollection of trinchos overflowing on LC39.
1506. Snr Loeber was unable to give positive evidence based on recollection that there were retention structures on LC39, but his acceptance that not all topsoil or excavated trench soil was protected with retention structures is inadequate for the Claimants' purposes as by no means all soil (either generally or on LC39) required the provision of retention structures in any event. The findings that the Claimants seek are that there were none, or that they were inadequate. In the light of my findings that there were some trinchos and that there were no substantial stockpiles on LC39, the evidence does not justify a finding that there should have been retention structures that were not provided. Equally, in the absence of any satisfactory evidence identifying where installed retention structures failed in their intended function, there is no basis for a finding that retention structures were inadequate or that there was a failure to review, maintain, replace or rectify retention structures on LC39.
1507. Snr Loeber's acceptance that Ocesa had troubles and faced problems on Spread A with erosion control in December 1996 does not demonstrate that those problems affected the works on LC39; still less would it prove that the difficulties on LC39 (if proved) were caused by negligence {Day18/58:15}. He was taken to three contemporaneous documents, none of which (either singly or cumulatively) proves or substantially advances the Claimants' case on LC39:

- i) The weekly construction report for Spread A for 17-23 November 1996 {K39/408.1.2T/1} referred to the subcontractor being asked to take action because problems had arisen with the bad condition of the works all along the line. But the ROW had not been opened on LC39 by then;
- ii) A report to Snr Loeber dated 6 December 1996 {K40/411T/2} referred to the maintenance crew being short staffed on a stretch remote from LC39. Its statement that there had been “a lot of excavated soil material rolling downhill without the adequate protection” therefore could not relate to LC39, quite apart from the fact that the letter was written before the ROW was opened on LC39. A letter at {K40/411T/1} shows that Snr Loeber sent the report to Saipem the same day “so the necessary corrective measures are taken”, which indicates an appropriate response by Ocesa rather than the opposite;
- iii) The weekly report for Spread A for 12-18 January 1997 (which covered the dates on which the LC39 trench was backfilled on 13/14 January) recorded “Geotechnical maintenance: works are expected to resume again in the course of next week” {K41/429T/3}. There is no evidence to establish for how long geotechnical maintenance works had been suspended. It was suggested to Snr Loeber that if there had been a suspension of geotechnical maintenance and if it was raining at the time then the *likely* (my emphasis) result would be that any temporary protection measure, such as a retention fence would be destroyed and soil stockpiles would roll down hills and/or into water sources. His response was to point out that it was the peak of the dry season and that temporary protection measures are meant to survive rainfall and temporary geotechnical retention work is meant to last as long as Ocesa needed it {Day18/61:16}. I accept that evidence and the entry provides no support for a finding that there was a failure to install or maintain temporary retention works on LC39.

1508. With these preliminary findings I address the Claimants’ criticisms set out at [1502] as follows:

- i) There is evidence from Snr Navarro, which I accept, that trinchos were installed on LC39. The Claimants have not established that there should have been additional retention fences;
- ii) The Claimants have not proved that any retention structures that were provided either failed or were inadequate or that any failure or inadequacy was the result of negligence;
- iii) There were no substantial stockpiles to be covered. The more modest piles of topsoil and trench spoil were not covered but that did not amount to negligence in the circumstances of LC39 because of the limited surface that was exposed and, in the case of the trench spoil, the limited time that it was out of the ground;
- iv) No substantial stockpiles were left standing from the first week of December 1996 until mid-March 1997. No analysis of the operative reasons why recomposition took place in mid-March (and not before) has been undertaken. There is no proper basis upon which it could be said that the period of

exposure was attributable to negligence on the part of Ocesa, particularly when the period during which the ROW was open was the dry season;

- v) There was no negligent failure to install retention structures and it has not been shown that those that were installed were inadequate. Consequently, there was no requirement to review, maintain or replace them;
- vi) Some soil was placed outside the 25m ROW originally agreed and the extended area was the subject of the sobreanchos agreement into which Snr Sequeda subsequently entered. It did not amount to substantial stockpiles and there is no evidence of stockpiles being built that were too high or of too large volume. There is no evidence to support a finding that placing the soil outside the 25m ROW was negligent, either generally or in specific cases. I will consider at a later point in the judgment whether there is evidence that soils made their way into the water courses or adjacent fields, but at this present point I reject the allegation that stockpiles were not placed and shaped at suitable locations;
- vii) The allegation of trench collapse is based upon Snr Navarro's statement {D11.1/153/1851} as substantially amplified by Snr Navarro in his oral evidence {Day12/15:14} {Day12/32:3}. I have rejected that section of his evidence because I have no confidence that he has any recollection of it having happened on LC39, as opposed to elsewhere: see [1497] above;

1509. It follows that I reject the criticisms and allegations of negligence set out at [1502] above. However, I accept that there would have been some soil loss from the exposed soils between ROW Opening in December 1996 and ROW Recomposition in March 1997. Despite it being the dry season there were heavy rains during the period and, on the evidence I have heard, the real issues are (a) how much soil was lost, (b) where it went, and (c) what effect it had on Snr Sequeda's land. I address those questions below.

1510. **Erosion on the ROW/Long Term Measures/Revegetation:** the findings for which the Claimants contend {C4/3.6/635}ff are:

- i) There was no erosion matting on the ROW between long term works (about 6-13 April 1997) and Revegetation (end of May 1997) in circumstances which amount to negligence;
- ii) No erosion matting at all was installed on LC39 in circumstances that amount to negligence;
- iii) If any erosion matting was installed, it was not provided on all slopes above 10%, in circumstances which amount to negligence;
- iv) If any erosion matting was installed, it was not consistently provided at all or provided between ditch diverters across the full width and length of the ROW in circumstances which amount to negligence;
- v) Ditch diverters were spaced too widely;

- vi) Ditch diverters failed and were themselves pulled out and transported into La Enix causing soil to enter La Enix and increasing the risk of erosion on the ROW in circumstances that amount to negligence;
 - vii) No longitudinal drains (or “channels”) were provided on LC39 in circumstances which amount to negligence;
 - viii) No sediment traps were provided at the discharge points of longitudinal drains in circumstances that amount to negligence;
 - ix) No EDS were installed on LC39 in circumstances which amount to negligence;
 - x) There was a significant delay between ROW opening (first week December 1996 or just before) and recomposition (9-15 March 1997). The ROW was naked during this period in circumstances which amount to negligence;
 - xi) There was a significant delay between ROW recomposition (9-15 March 1997) and Long Term Works (mid-April 1997). The ROW was naked during this period in circumstances which amount to negligence;
 - xii) There was a significant delay between Long Term Works (6-13 April 1997) and revegetation (end of May 1997) in circumstances which amount to negligence;
 - xiii) There was a failure properly to review and maintain the ROW throughout the periods cited above including a failure to maintain and replace long term measures which became ineffective and/or failed in circumstances that amount to negligence;
 - xiv) Fencing was not installed to protect the ROW from cattle. When it was installed, it was removed prematurely (on instructions from the Defendant and/or contractors);
 - xv) There was increased erosion on the ROW at all times (a) from ROW opening during or just before first week December 1996 until ROW reconstitution in 15-23 March 1997, (b) from then until the long term works in 6-13 April 1997, (c) from then until re-vegetation works at the end of May 1997, and (iv) after re-vegetation works from end of May 1996 onwards.
1511. *Erosion matting*: the Claimants’ case on erosion matting is summarised at [1510] (i)-(iv) above. I refer to the findings that I have made about the timing of the long term geotechnical works (6-13 April 1997 at the latest) and revegetation works (by May 1997, less than about a month after the long term geotechnical works, probably by gangs who worked closely on both geotechnical and revegetation works) at [1489] above.
1512. There is ample evidence that erosion matting was used on LC39. It was indicated on the GDS, to which I shall return; and Snr Rafael Florez gave evidence that his work included the installing of biomats. There is no reason to suppose that erosion matting was omitted when it was indicated on the GDS, and the fact that it was not found by

Dr Card many years later does not demonstrate or evidence that it was not used. Equally, the fact that Snr Perez and Snr Sequeda do not mention erosion matting in their witness statements does not persuade me that it was not used: the omission is as likely to be a result of failure of memory or compilation of the witness' statement as to be positive evidence of absence. The real disputes on the evidence are:

- i) Whether TQ61 applied;
- ii) How extensive was the GDS requirement for erosion control matting; and
- iii) Whether the provision in the GDS for erosion control matting was sufficient.

1513. The relevant background to the TQ61 issue is set out at [330]. It would not have applied to LC39 because Saipem was refused permission to implement the design change on Spread A on or about 27 January 1997, some three months before revegetation of LC39 took place. There is no evidence to suggest that it was implemented on Spread A in general or LC39 in particular after refusal.

1514. It is convenient to summarise the position in relation to ditch diverters and erosion control matting together. In his first report, Dr Card addressed erosion control and geotechnical matters together and limited his observations to the area north of Fenceline A {H1.1/1/156} {Day25/170:9}. By contrast, Dr Savigny conducted a detailed analysis along the entire length of the ROW on LC39. Except where I indicate to the contrary, I accept Dr Savigny's analysis, and summarise his analysis and my findings below:

- i) KP538+310 to Hilltop and Local Drainage Divide at KP538+421: as set out in detail at {H2.2/2/596} the spacing between three of the four identified ditch diverters is in accordance with the RECS, the last spacing is not. One of the spacings between two ditch diverters is closer than required by the RECS. Assuming that the GDS was followed, 63m of matting coverage was used, which is less than the 95m required on correct application of the RECS;
- ii) Hilltop and Local Drainage Divide (KP538+421) to W4 (KP538+535) and W4 (KP538+535) to W3 (KP538+630): Dr Savigny's original opinion was that the ditch diverters were properly spaced but that there was a deficiency in the amount of erosion matting shown on the GDS. However, he revised that opinion and, for the reasons set out in detail at {C4/4.8/657} I accept and find that, assuming the "additional" GDS provision was installed, there was no deficiency in the provision of ditch diverters or erosion matting in this section. Even if the "additional" erosion control matting was not installed, the deficiency was on slopes of limited gradient where the omission of erosion control matting would have been justifiable – though its absence would have increased the risk of erosion on and from the ROW;
- iii) W3 (KP538+630) to Hilltop and Local Drainage Divide (KP538+760): as with the previous sections, Dr Savigny's original opinion was that the ditch diverters were properly spaced but that there was a deficiency in the amount of erosion matting shown on the GDS. However, he revised that opinion and, for the reasons set out in detail at {C4/4.8/660} I accept and find that, assuming

the “additional” GDS provision was installed, there was no deficiency in the provision of ditch diverters or erosion matting in this section;

- iv) Hilltop and Local Drainage Divide (KP538+760) to La Enix, W1 (KP539+027):
 - a) Dr Card considered this stretch in his first report {H1.1/1/157} and concluded that the ditch diverters shown on the GDS conformed to the requirements of the RECS for the slope gradient shown on the GDS {H1.1/1/167}. He did not express an opinion on whether or not the provision for erosion matting shown in the GDS would comply with the requirements of the RECS. His table 13.3, which was said to be a summary of his findings, identifies that the slope gradients that he recorded were steeper (up to 48 or 49%) than those in the GDS, which would imply that there should have been reduced spacings between the ditch diverters. It was not at all clear by the end of trial whether Dr Card continued to rely upon his gradient measurements in this area. If he did, I reject them in favour of Dr Savigny’s much more modest measurements, which are more consistent with the state of the slopes as revealed by the photographs {H2.7/9/1766};
 - b) Dr Savigny’s findings, analysis and conclusions were set out in detail in his table LC39-5 at {H2.3/3/636} and summarised in his text at {H2.3/3/634} and {H2.3/3/637}. I prefer and accept his opinion that the ditch diverter spacings in this area conformed to the requirements of the RECS but that, on the assumption that the GDS requirements were followed, there was a deficiency in the provision of erosion matting which may have contributed to early and spotty sheet erosion within 12 months of reinstatement.

1515. There is a lack of any detailed analysis by Dr Card of the places and circumstances where it is alleged that erosion matting should have been used but was not, though it can be inferred that no substantial criticism is intended save north of Fenceline A. This is at least partially explained because Dr Card found no physical evidence of erosion matting and did not analyse the GDS requirements for its use. For reasons set out elsewhere, the absence of current evidence of erosion matting is not evidence that it was not used in the first place, because it is bio-degradable. However, I am left with the position that, for the reasons I outlined at [569]ff, the mere fact that matting was omitted on slopes between 10% and 20% (if proved) would not automatically negligent; and I have no evidence from Dr Card or elsewhere that satisfies me that any deficiency in the provision of erosion matting was on a slope with a gradient that made its omission negligent.

1516. *Ditch diverters*: the Claimants’ case on ditch diverters is summarised at [1510](v)-(vi) above. I have just dealt with the question of ditch diverter spacing.

1517. The Claimants’ allegation that ditch diverters failed rests upon the evidence of Snr Bracamonte and Dr Card:

- i) Snr Bracamonte gave general evidence in his witness statement that “the work I did was to avoid erosion and sedimentation but the works were not sufficient.

The erosion was very severe and the streams of water pulled out the cortacorrientes and the water filtered into the large stream” {D11.2/171/2070}. In his oral evidence he said that this evidence applied to LC39 and that the force of the water on the type 1 cortacorrientes (which were staked into the ground) took out the stakes or broke them and took the soil sacks down the slope to the larger stream on La Enix. His evidence was that his supervisors sometimes went back to do the works that were affected and that sometimes they were left as they were; and that sometimes he had to go back and re-do works where the cortacorrientes had been pulled out in the way he described. He did not remember how often that happened and was not involved in the work performed by Community Action about two or three months later {Day11/18:10}. His witness statement implied that the damage he was describing had happened while he was on site doing his work; but it later became clear that was not the case and that he was talking about something he said he had seen some two months later {Day11/35:10}, which would have been in about May/June 1997. His evidence on when he went back was inconsistent, because elsewhere he referred to going back about two weeks after he had first been there and that his return visit had been in December {Day11/24:9}. I am certain that he was confused about the months in which he was on LC39 and place no weight on his references to December. I accept that he went back to LC39 on maintenance work once, some months after he had first been there. I accept his evidence that he saw damage to one or more cortacorrientes, one or more of which had been displaced by severe weather conditions causing erosion; but I do not accept the general picture he gives of widespread failure of cortacorrientes or of multiple sacks rolling (or having rolled) into La Enix. Nor do I accept that some displaced sacks on LC39 were replaced or repaired in the course of his maintenance work but not others. His evidence about only some sacks being replaced or repaired seemed to me to be entirely general and not based upon recollection of actual events on LC39 and that is what I find it to have been;

- ii) Dr Card’s opinion that failure of the ditch diverters was due to a negligent failure to provide erosion matting. I have kept this opinion in mind when reaching the conclusions I set out above about erosion matting. I do not accept that erosion matting was omitted where it should have been installed. The premise for Dr Card’s opinion therefore falls away.

1518. In summary, although I accept that some cortacorrientes failed, they were repaired when the maintenance works were carried out some months later; and their failure was not caused by matting. Where they failed, the likelihood of water and sediment from the ROW reaching streams below was increased.

1519. I return to the question of cortacorrientes failing because of being trampled and grazed by cattle below.

1520. *Longitudinal drains, sediment traps and energy dissipation structures:* the Claimants’ case on longitudinal drains, sediment traps and energy dissipation structures is summarised at [1510](vii)-(ix) above. It is common ground that no longitudinal drains, sediment traps or energy dissipation structures were provided by Ocesa. There is no evidence (photographic or otherwise) that ODC installed them either. If longitudinal drains had been installed by ODC, some sign of them would have been

visible on the 1995 aerial photograph and, in the absence of any evidence that any was laid, I find that ODC did not employ longitudinal drains or energy dissipation structures either.

1521. I refer to the discussion of the circumstances in which longitudinal drains were required either by the terms of the contract or by good practice at [578]ff above. Applying the principles there set out, I do not accept that longitudinal drains were required either by contract or by the application of good practice on LC39. While positioning a longitudinal drain on, for example, the west side of the ROW as it climbed away to the north from W3 would have prevented the flow of water and any sediment onto the slope that ultimately went down to W3 on either side of the fish pool, it would have had the effect of concentrating the flow of run-off down towards where the ROW crossed W3, with the clear potential for exacerbating problems there. It was in my view a justifiable and correct decision to allow waters to flow relatively diffusely onto the vegetated slope rather than to concentrate its point of discharge lower down. Similarly, as a matter of engineering judgment, there was an obvious trade-off between allowing any water and sediment from the ROW to be dispersed onto AF1(b) rather than funnelling it all down to La Enix. I therefore reject the submission that longitudinal drains and associated energy dissipation structures and sediment traps were required on LC39 and prefer and adopt the opinion of Dr Savigny that they were not.
1522. *Delay*: the Claimants' case on delay is summarised at [1510](x)-(xii) above. I have made primary findings about when various events happened at [1488] above. As before, there is no expert analysis of the reasons why events took place when they did, and no analysis of any period that is alleged to involve culpable delay. The absence of such evidence is particularly telling in relation to LC39 where the longest period (December 1996 to March 1997), though it involved occasions of heavy rain, was during the dry season. March 1997 was remarkably dry. By the time that long term geotechnical works were carried out in early April 1997 the season was changing, though the majority of April's rain fell in the second half, and revegetation took place (as I have found) less than a month after the long term geotechnical works. In the absence of any analysis of the reasons for the execution of the works when they were done it is, in my judgment, insufficient to recount Snr Loeber's acceptance that soil in a naked condition is more likely to erode and that the consequences of erosion could be and sometimes were severe on stretch A {Day19/9:1}; and any reliance on that acceptance must in any event be tempered by the terms of his following evidence, which was that erosion was very unlikely because they were in the dry season {Day19/12:19}.
1523. It is common ground that the length of any gap between long term geotechnical works and revegetation increases the risk of erosion and that there were occasions of heavy rain between April and May 1997. It is also common ground that, as a general principle, revegetation should take place at the same time as or soon after long term geotechnical works; and I have made primary findings about when the works were carried out, including the finding that the revegetation works were carried out within about a month of the long term geotechnical works. These bare facts do not of themselves justify a finding that it was negligent not to have managed to carry out either long term geotechnical works or revegetation sooner than was done. Put

another way, the gap of less than about a month is not so long as to demonstrate that there was negligence in the planning or execution of the works.

1524. *Failure to review*: the Claimants' case on failure to review is at [1510](xiii) above. The Claimants rely upon (a) an alleged failure to review or maintain stockpiles, (b) an alleged failure to review or maintain ditch diverters, and (c) the absence of any direct evidence that measures were taken to review or maintain the ROW between December 1996 and May 1997. Taking each of these in turn:

- i) I have held that there were no substantial stockpiles and no significant problem of soil escaping from retention structures that may have needed maintenance or replacement;
- ii) I have accepted Snr Brocamonte's evidence that he went back and have found that ditch diverters that had come adrift were restored. This counters the Claimants' allegation that ditch diverters were not reviewed or maintained. The Claimants have not identified either extensive failures, or where any such failures occurred, or the length of any period during which any failures went unremedied. In the absence of any real precision it would, in my judgment, be unjustified to make a general finding of failure on the basis of the limited evidence that has been advanced;
- iii) Although there is little direct evidence of what steps were taken to review or maintain the ROW, the Defendant relies upon the various systems it had in place, which are summarised at {C4/4.8/645}. I do not suggest, still less find, that these systems were infallible and, for example, the experience on LC74 showed that they were not. However, comparison with LC74 is informative because of the contrast between the persistent background "noise" about substantial problems (which I have taken as important evidence in making findings in that case) and the lack of such "noise" at the relevant time and place for the case being advanced on behalf of LC39. I also take into account the lack of direct evidence from Snr Sequeda or others to support the allegation that there was a need for review and maintenance of the ROW (as opposed to evidence about the conduct of the works themselves) and a failure to provide it.

1525. On this evidence and for these reasons I reject the allegation that there was a (negligent) failure to review and maintain the ROW throughout the periods alleged by the Claimants. I will return to the state of the ROW during the relevant periods later when considering the Claimants' allegations of damage suffered by Snr Sequeda.

1526. *Fencing*: the Claimants' case on fencing is at [1510](xiv) above. His evidence, which I accept, was that he was told not to put cattle on the ROW until the revegetation took root and so he had to move his cattle to another field, which was on El Consuelo. He complained to Ocesa that his pasture on El Consuelo was not sufficient for his cows and that he was losing pasture on La Gloria that he could have used for his cattle. When he complained, the contractors told him that they were going to fence the areas where they had sown the grass and that they did so, telling him to collect (i.e. remove) the wire after the grass had taken root. He took the wire down about five months later. His cattle returned and started eating the grass, which then disappeared {D4/71/804} {Day11/109:1}. In his oral evidence he explained that grass had been

sown into the sacks that made up the cortacorrientes and that when the cattle came back they trampled over the sacks “and that was the end of that, there was no more grass, really. ... And those sacks then opened up, the cattle trampled on them and all that earth went into the water of the stream” {Day11/111:1}.

1527. I formed the view at the time that Snr Sequeda had a clear recollection of his cattle coming back onto the ROW, trampling on the cortacorrientes and causing them damage and I accept that is what happened. As with so much of the evidence in this case, it is very difficult to discern precisely where this happened or the extent to which it did. However, I find that he was not referring to land north of Fenceline A because that was still segregated off by the fence and was not being used for cattle in the time frame about which he was talking at this point of his evidence.
1528. I do not accept the allegation about fencing as it is framed by the Claimants. The ROW was fenced off before Snr Sequeda’s cattle returned from El Consuelo and it was his decision when to take down the wire. It is wrong to suggest that he was instructed to take down the wire when he did, though I accept that he waited until it seemed to him that the grass had taken root, which was in accordance with the advice he had been given. I also accept that by a combination of trampling and grazing, the cattle on their return caused damage to cortacorrientes in unspecified locations south of Fenceline A, which would have had the twin effects of reducing or preventing altogether the effectiveness of the cortacorrientes that were damaged and providing an additional source of (now) uncontained material from the sacks. There is no evidence to support a finding that the advice not to remove the wire until the grass had taken root was negligent.
1529. **Increased erosion and its causes:** the Claimants’ case on increased erosion and its causes is summarised at [1510](xv) above. In the course of proceedings erosion has been identified both on and off the ROW; and erosion attributable to the Ocenca works is alleged to have caused widespread damage to fields and watercourses. The pleaded case on erosion and sedimentation is summarised at [1429] (i), (iv) and (vi) above, though I bear in mind the actual terms of the pleadings, which are to be found at the references there set out.
1530. At this stage I shall refer to the evidence given about erosion on and off the ROW. I shall return to the impact of the Ocenca works later, at which point I will look more closely at the alleged effects of the erosion that has been identified. I do so taking into account the state of the ROW and the property before the Ocenca works were carried out, which I have addressed above. Where pathways for sediment flow existed on and from the ROW, the fact that there were incidents of heavy rainfall while the ROW was exposed and vulnerable provides support for the Claimant’s case that erosion occurred, as it would have done during the period of the ODC ROW’s exposure and vulnerability up to and including the time of the September 1995 aerial photograph and, I infer, thereafter.
1531. I have referred to the evidence of Snr Sequeda and others about the conduct of the works at [1494] ff. The evidence of Snr Bracamonte about clearing the crossing of W3 supports the Claimants’ case that there was sedimentation of W3 at the crossing and that it was caused by material from the ROW, though the presence of well-established weeds that Snr Bracamonte suggests that at least some of the sedimentation was of long standing. I have also accepted as being based on genuine

recollection the evidence of Snr Pedro Blanco that one or more stream crossings on Snr Sequeda's land showed signs of disturbance and of soil having made its way into the water at or near the crossings.

1532. Snr Bracamonte gave direct evidence of erosion from the ROW which caused damage to and displacement of cortacorrientes, which I have accepted: see [1517.i]1516] above. I have also accepted Snr Sequeda's evidence that his cattle caused damage to cortacorrientes south of Fenceline A: see [1526] above. There is no evidence to suggest that the cortacorrientes to which Snr Bracamonte was referring were those damaged by Snr Sequeda's cattle.
1533. Taken together, the body of evidence that I have found to be reliable supports the Claimants' case that there was erosion of and from the ROW caused by severe weather events and that sedimentation from the works affected stream crossings.
1534. The topography of the northern part of LC39 lent itself to a flow of sediment longitudinally down the ROW towards W2 and La Enix and off the ROW to the sides where the fields sloped away. Dr Savigny accepted that soil washed down the ROW during and after construction would have been a source of sediment flowing into La Enix and W2, recognising the gravitational pathway along the ROW and down the slope {Day36/30:20} {H2.3/3/641}. He also recognised that at the time of his inspections sediment from the northern slope was being carried downslope to W2, which implies acceptance that erosion generated on the ROW would find its way downhill towards W2 {H2.7/9/1769}. I agree. The tendency for any sediment to pass down the ROW towards the streams would have been reduced by the long term geotechnical works that were provided and by increasing vegetation; but in the absence of longitudinal drains, the ditch diverters would have diverted water and any sediment to the slopes on either side. Any damage which involved breaching of ditch diverters would increase the tendency of water and sediment to flow longitudinally downhill unless and until it reached an effective diverter lower down. In addition, water and sediment diverted to the side of the ROW would then be subject to the gradient down towards the streams. There are therefore pathways from the ROW to the slopes on either side and down into the streams.
1535. South of Fenceline A, Dr Savigny accepted that the topography of the AF2 to the east of the pipeline would enable sediment to flow onto it {H2.3/3/626} and that some sediment may well have rolled onto AF2 during Ocesa construction {Day36/58:12}. Further south, he accepted that there would be a flow of sediment longitudinally down the ROW towards the crossing with W3 {Day36/72:23} and, as I have already indicated, down the cross gradient towards the fish pool and the stretch of W3 on either side: see [1423](ii) above. It appears also to be common ground that erosion from E1 would have made its way to the fish pool {H2.3/3/624} {C4/3.24/1515}. I have previously described the topography of the stretch of the ROW south of the crossing of W3 at [1423](i) above. It is plausible that erosion from the ROW could have made its way downhill into streams W3 and W4, particularly at the points of crossing. It is also possible that sedimentation of AF3 and AF4 could have been caused by pipeline construction because of their proximity to the Ocesa ROW {H8.11/11/2756}.
1536. I have already referred to the witness evidence about the immediate effect of erosion from the Ocesa ROW on AF1(a) and AF1(b) when considering whether or not Snr

Sequeda was still cropping north of Fenceline 1 in 1997: see [1460]ff. Taken on its own, I would be inclined to accept Snr Sequeda's evidence that some sediment flowed to where he was cultivating his cassava, despite the lack of detail about where that was. What I would be less inclined to accept without support from other evidence is the picture that he gives of crops being completely covered, in particular for the reasons set out at [1466](x).

1537. In his first report, Dr Card identified the northern slope down La Enix and W2 as including an area of 1230 m² with an average measured depth of soil loss of 0.2 m and an estimated volume of soil loss of 246 m³ {H1.1/1/161}. South of Fenceline A he identified other areas of "significant erosion" as follows:
- i) Point E1, which is to the west of the Ocesa ROW {Day26/39:18};
 - ii) Point 3, which is between the line of the Ocesa and ODC pipelines but on Dr Savigny's cattle trail 4, which is one of the major routes across LC39 and is heavily eroded by cattle both on and off the ROW {H2.3/3/607}
 - iii) Point 2, which is on the ROW but was not discussed in the text of his first report;
 - iv) Point 1, which is off the ROW.
1538. In addition to the five areas of "significant erosion", the text of Dr Card's first report identified other areas of erosion including:
- i) Soil sheet erosion on the west facing slopes above the ROW near to Point 266. Dr Card's evidence is that water from this point would flow downslope across the ROW and on to cause sedimentation in W3 {H1.1/1/158};
 - ii) Soil erosion features on the side of the ROW with remnants of soil filled sacks at point 53. Dr Card's analysis was that the soil filled sacks may have formed part of a low height retaining structure to a shallow cut on the *upslope* side of the ROW but that, as a result of their destruction soil is transported as sediment downslope into W4.
1539. Dr Obando's first report was very short on detail but included the assertion that there was erosion on the entire length of the ROW and, separately, that there was erosion on the ROW in AF1 and AF2 {H3.4/4/935}. He relied upon soil samples as supporting his visual findings "in that they show that the properties of the soil have been altered on the ROW and on the areas adjacent to the ROW in comparison with the soil in natural forest and in areas of crops unaffected by the ROW" {H3.4/4/936}. In doing so he adopted the unrepresentative approach that I have previously described at [727] above. He based his view that there had been loss of topsoil along the whole length of the ROW on having found inversion and mixing, also along the whole length of the ROW {H3.4/4/941} and provided illustrations of erosion associated with cortacorrientes, costales and vetiver planting {H3.4/4/949}. He did not identify erosion off the ROW.
1540. Professor Montenegro's evidence was that there was moderate to severe erosion, which was intermittent but present both inside and outside of the ROW, with the

levels of erosion being broadly consistent inside and outside the ROW. In some places on LC39, Horizon A had disappeared {H4.4/4/987}. On his third visit he confirmed his previous evidence and identified levels of erosion on CF39, which he described as being (and I accept were) similar to levels inside and outside the ROW on LC39. He observed and photographed stony material and gravel on the surface both within and outside the ROW and evidence of plinthite, laterite and petroferric crusts found equally inside and outside the ROW {H4.12/12/2556} {H4.13/12.1/2846}- {H4.13/12.1/2851}. He also found stony material and gravel in the soil and plinthite, laterite and petroferric crusts on the surface of eroded areas of CF39 {H4.12/12/2557} {H4.13/12.1/3007}- {H4.13/12.1/3009}, {H4.13/12.1/3013}- {H4.13/12.1/3014} {H4.13/12.1/3023}- {H4.13/12.1/3036}.

1541. I will return to the question of when and where erosion occurred that may have contributed to the damage of which the Claimant complains, but at this stage I state my preference for the evidence of Professor Montenegro that there is evidence of erosion both on and off the ROW on LC39 and that there are similar levels of erosion in places on CF39, including the presence of plinthite, laterite and petroferric crusts on the surface of eroded areas. His evidence that there is erosion off the ROW is supported by Dr Card's finding of significant areas of erosion off the ROW; and his evidence of similar examples of erosion on CF39 is supported by a clear body of photographic evidence. I accept Professor Montenegro's evidence that the processes of deforestation and subsequent land use will have contributed to the erosive processes that Professor Montenegro identified on CF39 and off the ROW on LC39. I defer making further findings about the causes of erosion on and off the ROW until after reviewing the Claimants' allegations of mixing, inversion and compaction of soils.
1542. **Soil mixing, inversion and compaction:** the findings for which the Claimants contend {C4/3.6/647} are that:
- i) Soil mixing and/or inversion occurred.
 - ii) Topsoil was not properly and carefully removed and stored and preserved separately from other soil in circumstances which amount to negligence;
 - iii) Topsoil was not returned onto the ROW after all other soils had been placed back in circumstances which amount to negligence
 - iv) Soil suffered over-compaction {C4/3.6/678}.
1543. Dr Obando relied upon his image LC39-15 as evidence of inversion of soil horizons {H3.4/4/936}. The image {H3.4/4/940} shows a layer of organic material about 3 cms thick at a depth of 30-33 cms, below what appears to be horizons A and B above it. Professor Montenegro raised the question whether this was a case of inversion as such or of burying of soil. I am not sure that the distinction matters, given his acceptance that the layer at 30-33 cms depth is a layer of organic material that would normally be expected to be at or near the surface. What is more material, to my mind, is that this is the only example of such a phenomenon that has been found, and that it was found in an area where no material damage is alleged to have been suffered by Snr Sequeda. It is not evidence of soil inversion along the whole of the ROW. At best it is evidence that soil inversion or burying can happen, which I accept.

1544. I have elsewhere accepted that the segregation of topsoil and other soils would not be complete because of the nature of the operations being carried out and the machinery being used. Beyond that, however, the direct evidence of the conduct of the operations does not support a finding that topsoil was not separated and stored separately, and Snr Pedro Blanco's evidence, which I accept, is against such a general finding: see [1496] above. Professor Montenegro's evidence, which was supported by his data, was that he had found no evidence that Horizons A and B were mixed on the ROW. For the reasons I have given earlier, his site selection was no more representative overall than that of Dr Obando, but that is not unreasonable in the present context of an allegation that there was mixing along the entire length of the ROW. His evidence was supported by that of Dr Uribe, whose data did not support a finding of significant deterioration on the ROW as opposed to off it {H6.3/3/684}.
1545. For some reason which was not satisfactorily explained, Dr Obando did not present all of his relevant results in his first report, and those which he did present he presented selectively in a manner that did not compare like with like. Once his results are gathered together comprehensively {H4.13/17/4005} it can be seen that the chemical analyses do not support the contention that there was mixing or inversion along the entirety of the ROW. Organic matter decreases with depth on the ROW and does not show clear pattern of material deficiency when compared with off-ROW samples on a like-for-like basis. Adopting Dr Obando's approach to average Organic matter content on- and off-ROW {H3.10/20/2330} shows the smallest relative difference (4.11/5.2) of any of the Lead Claimant properties. His exchangeable aluminium and iron results demonstrated natural variability that preclude the drawing of reliable conclusions {H3.9/18/2141} {Day31/114:16}. It is neither necessary nor desirable to spend time on why he excluded from the discussion in his first report the iron result from his third inspection, which was clearly favourable to the Defendant's case, save to say that his suggestion that it was excluded because it might be anomalous is not one that I am able to accept: see [740] above. For the same reasons, the concern that I expressed at {Day31/116:10} at his omission of a manganese result that was clearly favourable to the Defendant's case was not resolved by Dr Obando's response {Day31/118:8}. It is sufficient for present purposes to record that his results when viewed fairly and in their totality support his assertion that the manganese results on the ROW are lower than off the ROW.
1546. The Claimant's case on over-compaction rested on Dr Obando's assertion that "the soil is over-compacted along the whole length of the ROW on this property" {H3.4/4/939}. Neither Dr Obando's density test results nor those of Professor Montenegro support or justify this assertion {H4.13/17/4007}. For reasons given elsewhere, I am unable to place reliance on Dr Obando's sustainability exercise: see [741] above. It is notable that, when Dr Obando's subjective criteria are rejected and Lal's remaining criteria are applied, there is no difference in result between on- and off-ROW: see [748] above.
1547. With these preliminary observations I respond to the findings requested by the Claimants as follows:
- i) Some mixing of soils was inevitable, but I find that there was no substantial mixing or inversion of soils over the length of the ROW;

- ii) Topsoil and other soils were separated and stored separately. While there may have been limited mixing thereafter, for example when heavy rain caused a mixing of eroded materials, it was not a particular problem on LC39;
 - iii) Topsoil was returned to the ROW after other soils. The amount of topsoil available would have been reduced by (a) the work on the ODC pipeline and (b) by the inevitable mixing during the Ocesa works. For that reason, the A Horizon would have been thinner after the Ocesa works than before. In some places the A horizon has now gone. That is a feature that occurs on LC39 both on and off the ROW;
 - iv) There was no material over-compaction of soils on the ROW.
1548. **Failure to protect watercourses:** the findings for which the Claimants contend {C4/3.6 /648} are:
- i) There was no proper investigation of watercourses on this property prior to construction in circumstances which amount to negligence;
 - ii) There was no proper monitoring of watercourses on this property before during or after construction in circumstances which amount to negligence;
 - iii) There was no proper protection of watercourses to protect from the ingress of soil, in particular to protect from stockpiles and soil erosion from the ROW and/or having regard to the practice in relation to flume pipes and/or in that there were no sediment traps in circumstances which amount to negligence;
 - iv) Proper long term protection works were not provided at water crossing points in circumstances that were negligent;
 - v) Following ROW recomposition soils which escaped into water sources during construction were not removed and flow conditions were not reinstated to their pre-construction condition in circumstances which amount to negligence.
1549. There is no evidence of specific investigation or monitoring of the watercourses on LC39.
1550. There is direct evidence of a failure to protect watercourses from the ingress of soil, which I accept, as follows:
- i) The GDS showed no works to protect the streams on LC39;
 - ii) Snr Loeber accepted that, in the absence of anything being shown on the GDS, no permanent protection works would have been installed in the course of the Ocesa works {Day18/87:20};
 - iii) There was no evidence of any permanent works having been taken to protect the streams;
 - iv) There should have been revetment or retaining gabions on the banks of La Enix because of the complexity of the north bank, which he regarded as a challenging construction area {Day35/113:18}. None was installed;

- v) On all streams there should have been extension of erosion control matting to the shoreline of W2, W3 and W4 where they were crossed by the ROW {Day35/113:14}. There is no evidence that this was done;
- vi) Snr Loeber's evidence was that they would (which I take also to mean should) probably have taken temporary measures for a short time to protect the streams {Day18/86:24}. There is no direct evidence that they did so;
- vii) Snr Bracamonte saw the crossing of W3 being cleared, which involved removing weed growth.

1551. The evidence that I have reviewed elsewhere about how streams were crossed led to the conclusion that there were times when inadequate precautions were taken so that it could not be assumed that proper precautions were taken in each case: see [552] above. On LC39 the absence of any proper protection of La Enix by revetment is established on the evidence. That suggests a failure to consider the stream crossings properly or, alternatively, to implement proper protection if it was considered. The evidence of Snr Bracamonte is to the same effect, in that the need to remove material from the crossing of W3 suggests a failure to protect it in the first place. The Defendant submits that his reference to well-established weeds indicates that this may have been a residual problem from ODC times. For reasons I will return to later, I think it likely that the ODC ROW had left residual problems; but, on the limited evidence I have outlined, I am left with the overriding impression of a lack of care being taken over the stream crossings on Snr Sequeda's land. I have expressed reservations about the reliability of much of the evidence from Snr Sequeda and from those who worked on LC39; but there is a recurring theme that the Ocesa works caused significant damage to his streams which, despite the reservations I have expressed, I find has some substance. It does not on its own enable me to make precise findings about where or when the damage occurred, and I bear well in mind the findings I have already made about the fish pool and the house move; but despite all reservations, I give it some weight as supporting evidence for my conclusion that, following recomposition, soils which had found their way into the streams were not removed and flow conditions were not reinstated to their pre-construction condition. Whether this resulted from failures of good practice in the original carrying out of the works or in a failure of good practice in making good is impossible to say with precision or confidence, but the end result was a consequence of a failure to protect the streams in accordance with good practice.

The Factual Background – Post-construction

1552. On 29 June 1997 Snr Sequeda entered into a settlement with Saipem which was a sobranchos agreement for an average of 9m additional width and which referred to "damage caused to a water pond which became silted and another was built for the amount of \$150,000" {M/83T/285.1}. The settlement sum was COP 1,458,600 which equates to COP 200 per m² for the sobranchos and COP 150,000 for the water pond.
1553. Snr Sequeda remembered helping to measure the sobranchos and said that there was no negotiation about how much he would be paid {Day10/59:14}. His evidence about the payment of the additional COP 150,000 was not easy to follow: but he was clear in saying that he did not remember a conversation where he was offered COP 150,000 for a pond that he had either made or was going to make {Day10/60:17}; and he was

certain that no one offered him COP 150,000 to build a new well {Day10/62:11}. The overall effect of his evidence was that he did not know what the COP 150,000 was for and did not remember any discussion about it.

1554. On 7 August 1997 Snr Sequeda signed a receipt for the COP 1,458,600 payable under the settlement with Saipem {M/85.1T/287.3} and a Paz y Salvo declaring that Saipem was cleared and released and that he waived any right to claim against Saipem or Ocesa for damage and losses caused to the pasture, crops or goods outside the ROW corridor {M/84T/286.1}. The Paz y Salvo was in the form set out at [391] above. On the same day he entered into a Paz y Salvo with Ocesa in the form set out at [392] above {M/85T/287.1} declaring that Ocesa was fully paid up and that he renounced the right to bring any type of claim regarding loss and damage to the pastures crops or moveable property inside the ROW. No separate settlement agreement or payment receipts have been disclosed that can be seen to tie in to this Paz y Salvo. I infer that, in the absence of any evidence of payment being made to Snr Sequeda other than those under the ROW Agreement and his settlement with Saipem, the Paz y Salvo related back to the ROW Agreement and the works done on the ROW pursuant to and after that agreement and the to the payments made under it.
1555. Snr Sequeda accepted that when signing the Paz y Salvos he knew it was his final opportunity to claim for damage, but he said he didn't know where to go and complain or before who, and nobody advised "us" that they could or should get a lawyer or someone to advise them {Day10/63:9}.

The Impact of the Ocesa Pipeline

1556. In the light of the findings I have made already, the most convenient way to address the impact of the Ocesa pipeline in detail is by reference to Snr Sequeda's heads of claim. In broad outline, however, I am satisfied that there would have been and was erosion on and from the Ocesa ROW which affected La Enix, W2 and W3. I reach this conclusion on the basis of the topography, the established pathways by which water and sediment could find their way downhill, my findings about lack of protection of streams, and the fact that the ROW was vulnerable and was exposed to heavy rainfall events. It was by no means the sole source of erosion or sedimentation in the short or the longer term. For similar reasons, I am satisfied that there would have been some flow of water and soil from the ROW onto AF1(b) and AF2, off the long uphill slope of the ROW from the crossing of W3 and, to a limited extent, further south. The consequences of these impacts from the Ocesa ROW fall to be considered in the context that there had already been an impact from the ODC ROW, as discussed above, and the other contributory causes to erosion and sedimentation.
1557. Rather than provide a general account of the impact of the whole ROW, I shall look at the damage that is alleged to have given rise to financial loss and the cause or causes of that alleged damage. As before, the expert evidence does not permit a quantitative assessment of the volumes of erosion from the Ocesa ROW or from the ODC ROW; nor does it permit a quantitative assessment of the incremental contribution that the Ocesa ROW may have made over and above what would have been the position if it had not been super-imposed on the ODC ROW. Even the historic photographic evidence requires caution and resort to generalities.
1558. I therefore turn to the claim advanced on behalf of Snr Sequeda.

The Claimant's Heads of Claim

1559. As in the case of Snr Velez and LC74 I make two preliminary points:

- i) When introducing their submissions on quantum the Claimants recognised “the difficulties they face in proving the quantum of their claims: that is inevitable given (a) the distance in time since the events complained of, and (b) the social, educational and cultural characteristics of the Claimants” {C4/3.6/797}. I accept that both of these are important features to bear in mind at all times, and I have attempted to do so. But, once again, there has been a fundamental failure to appreciate the importance of the ODC ROW or to investigate critically the condition of LC39 before the Ocesa pipeline was laid. I do not by this intend to be critical of Snr Sequeda himself. As the Claimants submit in the context of whether ODC carried out maintenance at or near W4, “if any maintenance occurred it would [have] happened 20 years ago. Snr Sequeda cannot reasonably be expected to recall events so far back in time” {C4/3.6/673}. I agree; but the implications (and the challenges for the Court) when so much hinges upon the accuracy of his recollection are obvious;
- ii) As a second preliminary point of general relevance, I do not accept that Snr Sequeda was in a position to give evidence as he did in his witness statement that his Schedule of Loss had been read to him and that it was an accurate description of his losses. I do not accept that he had understood his Schedule of Loss even if it had been read to him: see [411] above.

Damage to and loss of crops – COP 219,332,920 (c.£81,383)

1560. Snr Sequeda’s case is that excavated soil or stockpiled soil was deposited in fields AF1(b) and AF(2), including when being washed away by rainfall. He alleges that these sediments would have affected the crops by (i) a reduction in oxygen going to the roots due to being covered by wet sediments, and (ii) exposure to higher levels of iron and aluminium contained in the soils emanating from lower horizons on the ROW {C4/3.6/800}. In the longer term he alleges that there was long term loss of fertility of the soils in AF1(b) and AF(2) caused by (i) the continued erosion of infertile mixed soils from the ROW and sedimentation of surrounding areas due to the failure properly to reinstate that area and (ii) the continuing presence of excavated soils from the pipeline construction deposited outside of the ROW {C4/3.6/800}.

1561. I have found that AF2 had been taken out of cropping before the Ocesa pipeline was laid. The Ocesa works are therefore irrelevant to the decision to stop cropping on that field, which is this head of claim.

1562. I refer to the section relating to this head of claim at [1459]ff above, where I have made the following relevant findings:

- i) Snr Sequeda was growing crops north of Fenceline A when the Ocesa pipeline was laid, but the position where he was growing them has not been established;
- ii) His maize and rice north of Fenceline A had already been harvested when the Ocesa pipeline was laid;

- iii) His cassava was ready to harvest when the Ocesa pipeline was laid (though he would typically spread the harvesting of cassava over time);
 - iv) Snr Sequeda's sons did not move away from La Gloria because of damage caused by pipelines but because they got jobs outside the farm, in the army, in mines and in trade;
 - v) AF2 had been laid to pasture before September 1995 because it had deteriorated, by which time it was subject to extensive sheet erosion;
 - vi) Snr Sequeda had been cropping on El Consuelo and Vila Rosa before the alleged damage north of Fenceline A by the Ocesa pipeline;
 - vii) Snr Sequeda had been rotating his crops on a five year rotation cycle, which meant that he was growing crops north of Fenceline A approximately every five years;
 - viii) Snr Sequeda was not prevented from cultivating the same amount of crops as before the Ocesa pipeline by the distance to his cropping areas on El Consuelo and Villa Rosa;
 - ix) After the Ocesa pipeline he was selling the same number of crops as before.
1563. Snr Sequeda did not suggest in his interview that he was able to sell the same amount of crops as before because he was no longer feeding his pigs and hens so that a smaller crop sustained the same level of sales; nor is there any evidence to support such a finding. On the findings I have already made, the claim for a permanent loss of crops must fail. Whatever the reason for any permanent reduction in the amount of crops that he has since cultivated, it is not a consequence of having inadequate or inappropriate cropping land because of the Ocesa pipeline works. Even if I had found that he reduced his crops long term after abandoning the land north of Fenceline A, I would have held that the reduction in the long term would have been attributable to his decision not to use additional land that was always available to him. It might have required him to clear additional forest; but that remained part of his working life in any event and he continued to clear other lands after 1995, as is shown by the aerial photographs. It would not, in my judgment, have been reasonable to allow the sort of losses that are claimed to continue when additional land was readily available to make good the deficiency. As it is, my finding that he sold the same number of crops after abandoning the land north of Fenceline A carries with it a finding that he had sufficient land and used it.
1564. There remains his evidence that his standing cassava crop was ruined by sedimentation from the Ocesa pipeline and that he subsequently lost a crop which failed when he attempted to plant north of Fenceline A again.
1565. As I have already made clear, I consider the supporting evidence that was given about the sedimentation of the standing cassava crop to be unreliable: see [1461] above. I also consider Snr Sequeda's evidence about what happened to be unreliable. Without substantial backup, I would not accept that there was a flow affecting his cassava that was so massive that it covered everything and W2 was completely covered. There is no such backup:

- i) It is a very surprising feature of the expert evidence in support of Snr Sequeda's case that there is no objective evidence to support the claim of damaging levels of sedimentation covering all or part of AF1(b): there are no test pits or observation holes in AF1(b) {H3.8/16/1957}. The photographic evidence does not demonstrate widespread or deep sedimentation north of Fenceline A such as is suggested by Snr Sequeda's evidence;
- ii) The considerations I have set out at [1466](x) strongly suggest that Snr Sequeda's evidence is exaggerated. It may be added that, if all available sediment as calculated by Dr Card had gone onto AF1(b), the quantities available to cause sedimentation of W2 would have been reduced;
- iii) It is Snr Sequeda's evidence that he tried to sow a crop north of Fenceline A between W2 and La Enix on a later occasion, but that it failed: see [1460] above. Two points arise. First, it seems unlikely that Snr Sequeda would have even attempted to crop again if his field had been submerged in sediment in the way he describes. Second, he says that he tried cropping between La Enix and W2. That is an area which he alleges includes SW1 (1,809 m² alleged to have been rendered a swamp by movement or deposit of eroded or excavated materials or by overflowing or and/or sediment carried in W2) and FL1 (c. 6,000 m² alleged to be flooded and which merges with SW1 and to be caused by sedimentation of La Enix and consequent overflowing). This suggests either that his recollection about where he planted a crop is faulty or that the area between La Enix and W2 was not then so extensively in the condition of which he now complains. I prefer the latter explanation because I accept his evidence that he attempted to grow another crop north of Fenceline A. The crop may not have been successful but I am not persuaded that it failed because of the Ocesa works.

1566. I reject Snr Sequeda's evidence that there was a flow of sediment onto his cassava of the volume and intensity he describes. For the reasons I have given, I am not satisfied that his standing cassava crop was destroyed or rendered useless by a flow of sediment from the Ocesa ROW or works. Nor am I satisfied that the area north of Fenceline A became unsuitable for crops. AF1(a) is now said to be marooned so that its area of 2.3 hectares is not used; and there is photographic evidence of the continued cultivation of plantain between La Enix and the road, as mentioned by Snr Sequeda. For the balance, there is evidence of laminar erosion on the slopes, e.g. {H6.3/3/684}, but no satisfactory evidence of heavy sedimentation from the ROW on the surrounding slopes and no other satisfactory evidence that they had been rendered infertile for crops. In any event, the area has now been converted to pasture.

1567. I have already referred to Dr Obando's evidence about soil mixing, inversion and compaction at [1545] above. Because of my finding that AF2 was taken out of cropping before September 1995 and the absence of any other claim directly related to the condition of AF2, it is not necessary to provide here a detailed review of the evidence from Dr Obando's trial and observation pits on that field other than to comment on his photographs LC39.10 and LC39.11 {H3.4/4/938}. They are of observation holes dug at an unspecified location on AF2, which Dr Obando said was 50 metres from the ROW. They show 2 inches (or 5-6 cms) of "excavated soil deposits" on top of the pre-existing Horizon A. It is common ground that the photographs show original soil buried by soils that probably came from the ROW

{Day42/77:13} {Day42/80:1}. As happened in the case of LC74 Dr Obando drew a distinction between soil covered with sediment and soil on which excavated soil had been deposited during construction {H3.10/20/2323}. His description of what he found on AF2 as “excavated soil deposits” meant that excavated soil had been moved by machinery or fell from stockpiles rather than sedimentation being carried in suspension in water, which could travel further and would tend to end up in water sources. It follows that Dr Obando’s photographs LC39.10 and LC39.11 are not evidence of widespread covering of AF2 by sedimentation flowing over it from the ROW: it is consistent with a localised deposit of soils. I reject Dr Obando’s evidence that the deposits of soil he saw on L39 were consistent with the stockpile losses described in Dr Card’s Fourth Report {H3.10/20/2323}. In relation to that evidence, I refer to [735] above. It follows that the photographs provide no evidence in support of a case that the land north of Fenceline A was subject to extensive sedimentation either.

Pigs and Eggs – COP 30,070,103 (c. £11,158)

1568. Snr Sequeda’s claim for loss of egg production is advanced on the basis that his hens were dependent on his crops for food and required adequate water {C4/3.6/805}. The claim therefore falls with the claim for loss of crops and my finding that he moved his house (because of difficulties with water) before 30 September 1995. I do not accept that he had the large number of hens alleged (c. 60) when the Ocesa pipeline was laid or that any decision to reduce the number of hens he kept was due to the Ocesa works.
1569. His claim for loss of pigs is advanced on the basis that the rearing of pigs is dependent on crops for food and required adequate water and that when his crops failed Snr Sequeda was unable to provide food for his pigs {C4/3.6/805}. This claim also fails with the claim for loss of crops and my finding that he moved his house (because of difficulties with water) before 30 September 1995. I do not accept that he sold his pigs or reduced the size of his herd because of the Ocesa works.
1570. In his oral evidence Snr Sequeda said that he could not now keep pigs or larger numbers of hens because El Consuelo is a long way from La Gloria and he does not have the animals to bring food over to La Gloria {Day11/89:11}. If that is the real reason now (as to which I make no finding) it is a consequence of Snr Sequeda’s advancing years: as he said, his now old and gets tired carrying things on his back {Day11/87:16}. I do not accept that it would make a material difference if he was still cropping north of Fenceline A: he would still have to transport the same quantities of food, giving rise to a need for a mule or mules, and the shorter distance would not make the critical difference for a man of his advanced years between being able to manage and not. Equally, his oral answer does not provide a good reason for not keeping pigs in the past, when he was younger and could have transported foodstuffs for his pigs from El Consuelo without difficulty.

Renting Pasture for 20 cattle during construction – COP 189,000 (c. £70); Milk and calves from 20 cattle rented out and sold – COP 2,020,950 (c.£750), and the cost of a new herd of cattle – COP 6,120,000 (c. £2,771)

1571. There was no claim for renting additional pasture in the Original Schedule of Loss. As now formulated, the RARSL alleges that during and immediately following the

construction of the Ocesa pipeline, Snr Sequeda was not able to keep cattle on La Gloria as the pastures were affected by the construction works. It is alleged that he kept his cattle on El Consuelo for one month but that there was insufficient pasture there and so he had to rent pasture for approximately three months {B4.4/1/14} {B4.4/1/21}. After that it is alleged that he sold his herd because he could not afford to pay his neighbour's rent.

1572. Snr Sequeda's evidence was that when the pipe was on the right of way his animals were still on the property; that he was told to move them so that they did not fall into the trench of the pipeline; and that he moved them onto El Consuelo. The pleaded claim is that "from the onset of construction, Snr Sequeda was not able to accommodate his cattle on [La Gloria]" {B4.4/1/27} and that this was "during and immediately following" the construction works: see above. The claim in relation to the sale and repurchase of his herd is advanced on the basis that he sold his herd after renting pasture from his neighbour for three months and then acquired new cattle 9 months after the start of construction, which would be in about August/September 1997 {B4.4/1/27}. So it appears to be alleged that he was without cattle for about five months. However, elsewhere in his statement he says that he had to move his cattle to the back of El Consuelo after the installation of the cortacorrientes because they could not graze on the ROW while revegetation was taking hold {D4/71/803}. If that were right, he moved his cattle to El Consuelo in about April 1997. If he kept them there for one month and then on his neighbour's land for a further three months, he would have sold them in about August 1997, only a month before purchasing a new herd. I find that Snr Sequeda's evidence about timings as given in his witness statement cannot be treated as reliable. Further confusion is added by Snr Sequeda's evidence that, when he was told to take the cattle off La Gloria because of the re-vegetation of the ROW, it was fenced off and he later took the wire down to let his cattle back onto the area about five months later.
1573. Despite this confusion, and further points of inconsistency between the evidence of Snr Sequeda and Snr Quevedo, I accept Snr Sequeda's evidence that his cattle went onto his neighbour's land for a period. His neighbour was Snr Quevedo, whose evidence was that the cattle broke down the fence between El Consuelo and his land in their search for better forage {D4/77/848}. I accept that evidence. I am not satisfied that either Snr Sequeda or Snr Quevedo had a recollection of how long Snr Sequeda's cattle were on Snr Quevedo's land. Both men said in their evidence that Snr Sequeda had paid for the pasture but neither could remember how much he had paid: {Day12/76:21} {Day12/160:6}. Having heard them and having had the opportunity since trial to review their evidence, I am not satisfied that money changed hands. I am influenced in this conclusion by my view of the claim that Snr Sequeda sold his herd and then purchased a new herd soon after, to which I now turn.
1574. Snr Sequeda's case is that, after renting land from Snr Quevedo for three months, he could no longer afford to do so. The case is that, as a result, he sold his entire herd. The pleaded case is that he sold his old herd for COP 244,800 each and subsequently purchased a new herd (of younger cattle) for COP 612,000, giving him a shortfall between the sale proceeds and purchase price of COP 6,120,000 (c. £2,271) {B4.4/1/22}.
1575. I do not think that Snr Sequeda simply made up that he sold his herd and bought a new one a while later. The question therefore arises: why did he do so? I find it

incredible that he would sell his entire herd for want of rental money to pay to his neighbour for a relatively short time before he could put them back on La Gloria. I accept that the generosity of campesino neighbours is necessarily limited because of their need to protect their own interests, but the Claimants' version of events makes no sense. It is alleged that the cost of renting pasture from Snr Quevedo was COP 3,000 per head per month and that Snr Sequeda then had 10 adult cows, one bull and 10 calves. It is claimed that the overall rent was COP 63,000 (c. £23) per month. On this basis, the sale of one cow for COP 244,000 would have paid for almost four months pasture rental for the rest of the herd. Selling the entire herd requires a different explanation.

1576. To my mind the much more likely explanation is that Snr Quevedo didn't want Snr Sequeda's cattle on his land and that Snr Sequeda had nowhere to put them while the revegetation of the ROW was in its early stages. Since neither man volunteered this explanation, I approach it with some reticence: but it fits with Snr Quevedo's evidence that Snr Sequeda's cattle first came onto his land by breaking down a fence, rather than being admitted in the light of some agreement; and it fits with neither man having any recollection of what was paid; and it provides a credible explanation for why Snr Sequeda sold his cattle when he moved them off Snr Quevedo's land – he had no available pasture on La Gloria because of the ROW going through the middle of his land. To my mind, it also fits with Snr Sequeda taking down the wire around the ROW and putting cattle back on La Gloria when he thought the revegetation of the ROW was established.
1577. Whether this explanation is correct or not, I am not satisfied that money changed hands between Snr Sequeda and Snr Quevedo; and I reject as incredible the suggestion that Snr Sequeda sold his entire herd because he could no longer afford to rent Snr Quevedo's pasture.
1578. My finding of fact that no money passed hands between Snr Sequeda and Snr Quevedo means that the claim for pasture rental fails. If I concluded that the sale and repurchase of cattle had caused Snr Sequeda to suffer a financial loss, I would hold that the loss was caused by the OcenSA works because it was the works that prevented him from having his cattle on La Gloria. It is therefore necessary to look at the way in which the claim is constructed.
1579. In addition to the alleged shortfall between the sale proceeds and the purchase price, it is alleged that the new herd he purchased were young cows that would be able to calve within the following 1-2 years after their purchase. It is alleged that the disruption caused by the sale and purchase caused him to lose a year's production of four calves which are valued at COP 654,000 (c. £243). Loss of milk valued at COP 1,366,950 (c. £507) is also claimed, which covers the period when the cows are alleged to have been on rented pasture and after Snr Sequeda sold them.
1580. Snr Sequeda gave no evidence about the sale and purchase prices for his herd in his witness statement, but his evidence when giving his oral evidence did not support the claim as formulated in the RARSL (Sale price for old herd COP 4,896,000/ purchase price for new herd COP 11,016,000). While he confirmed the sale price for the old herd as being about COP 5 million, his evidence was that the cost of the new herd was probably about COP 3 million and he was evidently surprised by and rejected the suggestion that the new herd had cost him anything like COP 11 million

{Day11/120:9}. I accept that evidence. On that basis, even taking into account the loss of four calves during the period of disruption and the loss of milk production during the period he had not cows, the transactions by which he sold his old herd and later purchased a new herd were financially beneficial and caused him no loss.

1581. For these reasons, I reject the claims for pasture rental and arising out of the sale and purchase of herds of cattle.
1582. There was also a claim for lost milk production while pasture was being rented. I am not satisfied that any of the cows that were moved from La Gloria were being milked or, if they were, that they were not milked while on Snr Quevedo's land. Neither man gave evidence about this and, as in other cases, I am not prepared to find that Snr Sequeda forcibly dried off his cows in the absence of good evidence that he did. Even if I had been satisfied that the claim was good in principle, I would not have awarded the sum claimed as I have no confidence that Snr Sequeda's cattle were on Snr Quevedo's land for as long as three months or for any particular length of time: as I have indicated, Snr Sequeda's evidence about timings is unreliable. I am not able to make a finding about how long his cattle were on Snr Quevedo's land but consider it more likely to have been weeks rather than months.

Recuperation of pastures – COP 650,000 (c. £241)

1583. There was no claim for re-seeding of pasture in Snr Sequeda's SOCI or his original Schedule of Loss. The Further Information provided in June 2011 said that Snr Sequeda sowed "dominicula on the [ROW] approximately six months after construction of the pipeline" {B2.1/11/71}. The Further Information provided in February 2012 said that "some time after the construction the Claimant sowed Dominicula pasture on parts of the ROW using stolons rather than seed to ensure better cover" {B2.2/33/361}.
1584. The claim as now pursued was first formulated in the June 2012 Schedule of Loss {B4.1/21/219} and is now to be found in the 2015 RARSL {B4.4/1/22}. It includes the following elements:
- i) AF3 was damaged by sedimentation and/or the creation of swampy areas;
 - ii) In 1997 Snr Sequeda sowed fresh pasture grasses on 7 hectares of La Gloria. "This area included pasture fields along which the OcenSA ROW/pipeline corridor passes and which were affected by the pipeline construction so as to be able to accommodate his cattle again." Snr Sequeda spent COP 210,000 on this calculated as 5 days labour per hectare at the rate of COP 6,000 per day wage. This claim therefore does not include anything for the cost of seed;
 - iii) In or around 1999 Snr Sequeda sowed pasture grasses on 11 hectares of La Gloria. The areas sowed included AF1(a), AF1(b) and AF2, which could no longer accommodate crops; pasture fields between AF2 and AF3 including on and off the OcenSA ROW. Snr Sequeda spent COP 400,000 on this calculated as 5 days labour per hectare at the rate of COP 8,000 per day wage. Again the claim does not include anything for the cost of seed.
1585. Snr Sequeda's witness statement dealt with re-seeding in three places:

- i) At [91] ff {D4/71/800} he says that re-vegetation took 1-2 days, that the contractors used carimagua grasses and that the carimagua did not take hold. “So I sowed carimagua seeds and spread them out over the land.” He says that the pasture filled up with weeds and he had to spray the ROW with weed-killer twice. He says at the time that he queried the use of carimagua rather than dominicola by the contractors and that he did not agree with their use of stolons rather than seeds. He then decided to sow dominicola, which he regards as preferable. He says that he sowed the dominicola about 2 years after the laying of the pipeline. Apart from saying that he originally used weed-killer on the ROW, he does not say where or over what area he sowed either the carimagua or the later dominicola;
- ii) At [140] {D4/71/811} he says that he “later sowed dominicola grass in the areas [north of Fenceline A] where he previously had crops”;
- iii) At [156] {D4/71/815}, referring to the period shortly after the carrying out of the Ocesa works when he sold his cattle (of which more below), he says that with the money from the sale of the cattle he bought 12 cans of weed killer and sowed dominicola grass. He kept the rest of the money for when he had pasture again and could buy cattle. He continued “I had to sow pasture grass in the area where I previously had the crops and that is where I have the cattle now. Five months later I bought [the new herd].

1586. It is not at all clear from his witness statement how these episodes fit together; nor is it clear how the evidence about sowing dominicola grass bought with the proceeds of sale of his herd ties in with his evidence about being told to keep his cattle off the ROW until the revegetation had become re-established: see [1526] above. If it is his case that he sowed dominicola in 1997 on the area of the ROW which had been fenced off by the contractors to let the revegetation grow, it would appear that, when he took the wire down and put his cattle back onto the ROW, it would have had both the contractors’ grasses (of which he is critical as summarised at [1526] above) and his own grasses. It is also quite unclear what the impact of his 12 cans of weedkiller would have been on the grasses that had been sown, amongst which he says that weeds had sprouted. More troubling is the apparent assertion in [156] – [158] of his witness statement, as summarised above, that the sowing of dominicola in 1997 was north of Fenceline A in the area he had previously cropped. On all of the evidence, I am satisfied that he did sow pasture grasses in the area north of Fenceline A until after 2002: the 2002 aerial image shows that grazing was then going up to Fenceline A and not beyond and the land had the appearance of secondary forest, not pasture {H2.3/3/602} {H2.8/10/2072}.
1587. The Claimants’ case became no clearer with the benefit of oral evidence. When asked what area he had sowed with dominicola he said that he planted “including an area that wasn’t in the [ROW] I would say about 2 hectares, and then when I saw, because of the quality of the land, that there was damage caused by the pipeline, and that I had to plant more dominicola, that is about the time when I sowed the other 18 hectares in La Gloria”; and he confirmed that the 18 hectares to which he referred was the entirety of his pasture land {Day11/119:1}.
1588. So far as I can tell, no claim is advanced on the basis of Snr Sequeda’s evidence at [91] of his statement that he sowed carimagua seed. It is therefore not necessary to

make a finding about whether that evidence is accurate or not. I can pass on while noting that, according to his evidence, Snr Sequeda always thought that dominicola grass was preferable and told the contractors so when they were sowing carimagua on the ROW.

1589. The claim for sowing 7 hectares of dominicola in 1997 is not made out. On the basis of his oral evidence the area was only 2 hectares. If he had re-sown the entire area of the Ocesa ROW and sobreanchos, it would only have amounted to about 2.5 hectares (725 x 35 square metres) and his evidence does not suggest that he did anything like that amount of re-seeding. I am satisfied that he did not sow pasture grasses north of Fenceline A. I suspect that he may have sowed some dominicola grasses in or about 1997, since that was his preferred grass; but the evidence is inadequate to support a finding of where or over what area he sowed the seed. In particular, the evidence does not support a finding that he sowed seed inside the area that had been fenced off as he describes, or outside it, or partly in and partly outside it. The evidence is so inadequate that I cannot fairly make any estimate of the area that he may have sown. Snr Sequeda's evidence made no mention of hiring people or paying days wages to them and I am not satisfied that is what happened. In the result, although I suspect that he may have sowed some grass in 1997, I do not know where, when or at what cost he did so and the evidence does not justify my making a guess.
1590. The larger claim is for re-seeding almost the entire pasture area two years later, in 1999. By no stretch of the evidence was the whole of La Gloria's pasture affected by the Ocesa and ODC works. On the other hand, there is substantial evidence that, although La Gloria might in theory have supported a herd of about 20 cattle, Snr Sequeda was struggling on his existing pastures. In his interview with Dr Velez and Dr Delgado, his pattern of using and resting pasture gave his experts cause for concern that he was over-working his pastures {H24.2/207.2/1015.114} {Day11/126:7}. There is no reason to suppose that the answers he gave to his own experts and solicitor were not true and, if they were, he was overgrazing his fields and exercising very poor pasture management {Day49/85:21}.
1591. Support for the view that Snr Sequeda was overgrazing his fields also came from Snr Quevedo who said that Snr Sequeda's cows had eaten all the grass on La Gloria, Villa Rosa and El Consuelo because he had little grass, weedy pasture and was using carimagua rather than dominicola {Day12/169:25}.
1592. As can be seen from the CAI, only a proportion of La Gloria is alleged to have been affected by the Ocesa ROW. Yet, for perfectly sensible reasons, Snr Sequeda appears to have formed the view that dominicola would be preferable grass cover for all his pasture, whether it had been affected by the ROWs or not. (I refer to ROWs in the plural lest it be forgotten that, to the extent that pipeline works caused a deterioration on La Gloria, that deterioration was not attributable to the Ocesa works alone.) I strongly suspect that he would have formed this view at about the same time in any event, irrespective of the laying of the pipelines, and there is no good reason to find that he would not have done so. The scar left by the pipelines and continuing erosion from parts of the ROWs may have provided an added stimulus, but I am not satisfied that he has incurred additional expenditure in re-seeding that he would not have incurred anyway. The poor quality of the evidence in support of these claims is a major contributor to my decision, but it also rests on my assessment of Snr Sequeda

as a person who would have wanted to counter the deterioration that was occurring on his farm (quite apart from any impact of the ROW) by planting better grasses.

1593. For these reasons I am not satisfied that Snr Sequeda incurred additional expenditure in re-seeding his land that is attributable to the impact of the Ocesa works.

Construction of a fence and repairs to it – COP 1,491,126 (c. £553)

1594. The pleaded claim is for 100m of fence which was installed in an area overlapping AF4 and AF3 in 1998 {B4.4/1/24}. The original cost of the fence is claimed as COP 43,000 (c. £16). It is alleged that Snr Sequeda expends four days of labour maintaining the fence in good repair, which is claimed at COP 53,143 (c. £16.56) per annum {B4.4/1/24}. The suggestion that it takes four full days of labour to maintain 100m of post and wire fence is, to my mind, absurd, not least when the annual cost is set against the original cost of installing the fence. The most that would be required would be the occasional replacement of a failed fence post and possibly tacking or adding a stretch of wire where it has come loose. I am far from convinced by the evidence that Snr Sequeda would be required to spend more than half a day a year, which would be equivalent to about COP 6,650 (or c. £2); and I am not convinced that this is genuinely an annual cost.

1595. The Defendant makes the point that Snr Sequeda's evidence about where he put the fence is extremely vague. I agree. Dr Avila saw fencing round the largest swampy area near W3. It is clear from photographs that cattle graze on AF3 and AF4: see {H2.3/3/614}. In the 2012 Further Information it was pleaded that the fence was placed at Point 196, which is just to the north of AF3 and AF4. That is where it is shown on the CAI and indicated on the key at {C4/3/354}. However, it seemed reasonably clear from his re-examination that the fence to which Snr Sequeda was referring is some way north of AF4 and north of the intersection of the ROW with W3, running along or near the east bank of W3 {Day12/108:20}: his description was not consistent with the fence being at Point 196. Despite the uncertainties in the formulation and evidencing of this claim, I accept that Snr Sequeda installed a fence in about 1998 and that he did so to protect cattle from going into a swampy area or areas. His evidence was that since he had built the fence, no more animals have died {D4/71/816}. I accept that evidence.

1596. If satisfied that the need for the fence was attributable to the Ocesa works, I would adopt a round sum of COP 250,000 (c.£90) as my best assessment on the evidence of the original cost of the fence plus occasional maintenance when required. Whether it is attributable depends on whether the risk against which Snr Sequeda was fencing was itself caused by the Ocesa ROW works.

Lost income from 6 sick cattle, purchase of 6 replacement cattle for dead/sick cattle, lost milk and calves from 6 cattle not replaced, and medicine for sick cattle – COP 13,239,750 (c. £4,914)

1597. I refer to the summary of this claim as set out at [1429.ix)]. This claim, as pleaded in the RARSL in early 2015, has a number of elements, namely:

- i) The cost of purchasing 6 new cattle to replace dead, injured or sick cattle – COP 1,958,400 (c. £727). It is said {B4.4/1/23} that:

- a) In 1998, during the first winter following construction, 5 cattle became stuck in swampy areas and died while one was injured and had to be sold at less than half the price of a healthy animal. Points 195 and 27 are identified in the RARSL;
 - b) Polypropylene bags were used as part of the construction works for the Ocesa pipeline and approximately 6 cattle became ill after ingesting the polypropylene bags. They had to be sold at less than half the price of a healthy animal. Snr Sequeda limited the damage by clearing exposed polypropylene bags away;
 - c) In total Snr Sequeda received COP 1,713,600 for the injured or ill cows;
 - d) He could not afford to purchase replacements for all 12 cows (5 dead, 7 sold) but spent COP 3,672,000 in purchasing 6 new cows;
 - e) The first claim is therefore for COP (3,672,000 – 1,713,600) 1,958,400 (c. £727);
 - f) Snr Sequeda claims a further COP 2,808,000 which is said to be what he would have earned from selling at the end of their productive lives the six cows which he did not replace {B4.4/1/28};
 - g) In addition Snr Sequeda claims that he lost three calves from each of the 6 cattle that he did not replace and claims COP 4,734,000 (18 x 263,000) for the loss of the calves {B4.4/1/29};
 - h) Snr Sequeda claims for the loss of 9,072 litres of milk from each of the six cows which he did not replace, on the basis that their milk would all have been sold, the claim being for COP 4,082,400.
- ii) Medicine for cattle accruing at an average annual rate of COP 11,000 (c.£16.50) per annum – COP182,160 (c. £68). It is said that cattle continue to get stuck and have to be rescued quickly. “Approximately one cow becomes stuck every year and Snr Sequeda incurs an additional cost of medicines (such as vitamins, intravenous rehydration, nutritional supplements and/or antibiotics) for those cattle that become stuck” {B4.4/1/24};
1598. On the Claimants’ case, the six replacement cows that Snr Sequeda purchased cost COP 3,672,000 in total, which equates to COP 612,000 each. That provides a measure of the value of a lost cow. By contrast, the Claimants’ aggregation of residual value (COP 2,808,000) plus loss of calves (COP 4,734,000) plus loss of milk (COP 4,082,400) leads to an aggregate claim for six cows of COP 11,624,400, which is equivalent to COP 1,937,000 per cow. The disparity between the results of the two approaches is so extreme as to suggest that something has gone seriously wrong with the assumptions being made by the Claimants when advancing their claim on an aggregated basis. I refer to the discussion of double recovery at [908] above. For similar reasons, I consider that the Claimants’ aggregated basis is flawed: the cost of the replacement cow includes payment for the capital value of the future income

stream that it will provide. I reject the aggregated basis of calculation as wrong in principle.

1599. Turning to the substance of the claim, it is notable for its lack of clarity, even by the standards of this particular lead claim. The claim as advanced in the RARSL is that the cows that got stuck and died did so in the first winter and that after Snr Sequeda built a fence no more cows have died. The points identified for the deaths of the cattle in the RARSL are points 195 and 27, which are in Field 3 where the ROW crosses W3. Despite that, the 2012 Further Information stated that “5 of the Claimants’ cattle died as a result of getting stuck in swampy areas and soft mud on affected streams ... (see Image/27, 28, 195 and 197)” and the key to the CAI asserts that “cattle” died at point 28 in 2010 {C4/3/354}. Point 28 is on La Enix close to the culvert. The 2012 Further Information also asserts that “3 cattle died from ingesting the synthetic sacks used by the constructors for the Ocesa works” {B2.2/33/364}. There was no attempt in Snr Sequeda’s witness statement to clarify the points where his cattle got stuck; and he merely said that 6 cows got sick after eating the costales, without saying where that happened.
1600. The lack of clarity about where the cattle are alleged to have got stuck cannot be shrugged off as an irrelevance in circumstances where the complex topography and the history of the two pipelines denies the Court the easy route of simply accepting or rejecting the proposition that the Ocesa pipeline caused some sedimentation of Snr Sequeda’s land and watercourses and treating that as determinative of the issue. On the findings I have made so far, W3 and the land around it was already seriously compromised before the Ocesa pipeline was laid: see [1480] above. The combined effect of the ODC ROW and other sources of sedimentation from the slopes above W3 had been to cause sedimentation of the fish pool sufficient to cause it to be abandoned, impoundment of water in the tributary to W3 close to the fish pool, sedimentation of W3 from a point upstream of the fish pool down to point where the ODC ROW crossed it, and sediment being carried downstream from the crossing with W3 which added to sedimentation from the slopes to the east of W3 (above point 266) which made its way into the stream.
1601. I find that soil eroded from the Ocesa ROW passed longitudinally down the ROW to the crossing with W3 and followed the down gradient towards the stretch of W3 to its west, following the same general pathways as soil eroded from the ODC ROW had done previously. On the case being advanced by the Claimants, the relevant period is up until the winter and wet season of 1998. Irrespective of its quality, the 1998 overflight DVD shows that the soil on the ROW was clearly visible and is evidence (which I accept) that the ROW was not substantially or successfully revegetated by then. Dr Savigny’s estimate was that the light colour of the ROW included exposed soil and revegetation at about a 60:40 ratio {H2.2/2/594}. That implies, and I find, that the areas that are evidently least covered by vegetation would have a ratio of more than 60% soil. There is a consistent theme that emerges from the aerial photographs both before and after the Ocesa works, which is that the vegetation, including revegetation of the ROWs, is less abundant south of Fenceline A than it is to the north of it. I accept the submission that this is because the area south of Fenceline A was used by Snr Sequeda for pasturing his cattle, but the uncertainty about precisely when he returned cattle to La Gloria and when they caused damage to the geotechnical works makes it quite impossible to make more specific findings

about the extent to which ROW on the slopes above W3 were exposed soil in the period alleged to be relevant to the claim that cattle became stuck and lost.

1602. The pleaded claim is that 5 cattle got stuck and died. When cross-examined, Snr Sequeda said that he lost a cow and it died and that he then erected the fence so that it did not happen again {Day11/138:23}. I have no reason to think that answer was not true and every reason to think that it was. On my assessment of Snr Sequeda, it would be quite contrary to his concern for his livestock for him to have ignored a potentially fatal swampy area and to have left it unfenced after he had lost a cow there. General support for that view came from Snr Quevedo who agreed that an experienced farmer, such as Snr Sequeda or himself, would immediately fence off a swampy area so as to avoid risk to his cattle unless he did not have the materials with which to do so {Day12/164:12}.
1603. The Defendant submits that the evidence in support of this head of claim is so unsatisfactory that I should not find that any cows died after getting stuck. There is force in this submission but I reject it. My assessment of Snr Sequeda is that he would not make up entirely the event of a cow having got stuck and died. I find it much easier in the circumstances of this litigation and his case to envisage that this kernel of truth has become inflated into a claim for five cows, but I am not persuaded that this has been deliberate exaggeration by Snr Sequeda. On my assessment of him as a man and a witness and the processes by which his claim has been constructed, I think it possible either that he did not fully appreciate what was being claimed or did not understand that his original memory was becoming inflated and unreliable.
1604. I find that Snr Sequeda fenced off the swampy area after his first cow died, and that no cow subsequently got stuck and died. I have found that Snr Sequeda erected a fence around the swampy area near W3, not least because Dr Avila said that he saw it. The erection of the fence could, on Snr Quevedo's evidence, have been because Snr Sequeda saw a risk to his cattle before any had died, but it is consistent with Snr Sequeda's evidence that he erected it after a cow had got stuck and died. At the end, I am satisfied and find that a cow got stuck and died and that it was to prevent the risk of further deaths that Snr Sequeda erected the fence.
1605. The question remains whether the contribution of any erosion from the Ocesa ROW made a difference to the outcome. Applying the tests of causation that I have set out at [192] above, the critical question of fact to be determined is whether Snr Sequeda would have been in a better position if additional sedimentation attributable to the Ocesa works had not happened. In the light of my findings about the state of the area before the Ocesa works, it would be wrong to attribute the death of the cow solely to the effect of the increased erosion caused by the Ocesa works: other contributing causes were accumulated background erosion and the impact of the ODC ROW, which (with any other contributing causes) had already led to sedimentation and abandonment of the fish pool, sedimentation of W3, impoundment of water and the development of SW2. Those causes would all have continued to contribute to continuing deterioration even without the superimposition of the Ocesa ROW. For reasons discussed elsewhere in this judgment, there is no sound basis for making a quantitative assessment of the amount of sediment from the Ocesa ROW that would have reached the area where the cow died (wherever, precisely, that may have been), or of the amount by which it exceeded what would have come down in any event, or of the precise effect on the swampy area. Despite all of the lay and expert evidence

that has been devoted to this case, I am left in the position that any finding will be on the basis of evidence that is, at best, qualitative.

1606. I come back to my assessment of Snr Sequeda and my expectation that, if the area where the cow had died had been a long-standing risk to his cattle, he would have fenced it off sooner. The evidence is unsatisfactory for the reasons that I have already outlined, but it suggests that Snr Sequeda was caught out and taken unawares by a significant deterioration of the area where his cow died – otherwise he would have fenced it off sooner. I find some support for a finding that the OcenSA ROW made a material difference to the condition of the stream below in the evidence of Snr Bracamonte that he was engaged in clearing a blockage on W3. The fact that he had to clear a blockage does not of itself prove that the creation of a swamp was materially affected by erosion from the OcenSA ROW, but it is evidence that there was substantial erosion from the OcenSA ROW that the stream on its own could not purge. However, for the reasons I have set out, I conclude that the OcenSA ROW made a material contribution and difference to the formation of a swampy area which made it dangerous for cattle and that the state of the swampy area (to which the OcenSA ROW made a material contribution) was the direct cause of the death of the cow. On these findings of fact, the Colombian test for what in England might be called causation in fact is satisfied. I accept that, without the contribution of the OcenSA ROW, the area may subsequently have become a risk to cattle and might have led to a cow getting stuck if Snr Sequeda had not fenced it off in time. That, however, is not the question and it does not affect the application of the proper test at the time that the cow died.
1607. Turning to the claim for cattle that ate plastic sacks used for costales, I accept that there were such sacks on La Gloria after the OcenSA works and that cattle might ingest plastic from such sacks, but I have no confidence that it is well-founded for a number of reasons. First, my recent experience with the numbers claimed in respect of cows becoming stuck suggests a risk of numbers being inflated on this claim as well. Second, as outlined above, the claim has shifted between being that three cows died and that six cows became sick. Although Snr Sequeda in his witness statement specifically supported the claim that cows had become sick {D4/71/815} and confirmed his evidence at trial {Day11/139:5} I do not accept that his evidence of numbers as set out in his witness statement are based upon accurate recollection or that they are reliable. Third, there is little detail about when or where the cows are alleged to have eaten the costales or become sick. At [120] of his witness statement, Snr Sequeda said of the reinstatement works carried out by maintenance contractors at two yearly intervals “They [i.e. the maintenance contractors] would remove the remains of the costales that already had disintegrated and throw them away on my property. I had to collect them and burn them afterwards to prevent the cattle from eating them. Nevertheless, there were some cows that managed to eat these costales and they got sick. Some of them died or had to be sold at a bad price because they wouldn’t fatten up” {D4/71/806}. Snr Sequeda says that he now keeps a watch out to make sure his cattle do not eat plastic sacks; but he gives no evidence about whether this problem occurred once, or after successive visits from the maintenance contractors.
1608. As with the claim for cows getting stuck, I do not find that there is no substance at all in the factual basis for the claim: I do not think that Snr Sequeda would have made it up altogether. However, I am not satisfied that the problem affected six cows; nor am

I satisfied that any of the cows died; nor am I satisfied that the affected cow or cows were sold, rather than recovering on the farm; nor am I satisfied that the sums alleged in the various schedules of loss are more than notional sums that might have been paid if he had sold a cow that was ill. In these circumstances, and in the knowledge that Snr Sequeda keeps the same numbers of cattle on La Gloria now as he did before the pipeline, I am not satisfied and do not accept that any problem with cattle eating costales has caused Snr Sequeda to suffer financial loss.

1609. The Defendant takes the additional point that the plastic sacks about which Snr Sequeda complains were placed later by maintenance contractors and are therefore not the responsibility of the Defendant {C4/4.8/761}. The Claimants submitted that Snr Sequeda's evidence might have been mistaken or that he may have been misled by the form of the questions he had asked {Day56/116:21} ff. In his witness statement, Snr Sequeda drew a distinction between costales that were placed as part of the original works and those that were placed later by maintenance crews returning at two year intervals: see {D4/71/779} at [95] (original) and [119] (replacement during subsequent maintenance works). The maintenance contractors used nylon costales: see [119]; but so did those doing the original works: see [100]. However, the passage in his witness statement at [120] that I have just set out is clear in attributing his problem to sacks that were discarded by reinstatement contractors coming back later. When cross-examined he was asked whether the barriers with the nylon costales which his cattle had eaten had been "put in" by the maintenance contractors referred to at [119] of his statement. He agreed that they were, and also that they were the maintenance contractors who came back every two years or so {Day11/139:23}. That marked a departure from what he had originally said about sacks being discarded (to which he was not referred in cross-examination), which could if viewed in isolation be seen as a potential source of confusion for Snr Sequeda. But nothing that was said in oral evidence casts doubt on the evidence he originally gave at [120] of his witness statement that it was the actions of the maintenance contractors who caused his cattle to eat nylon sacks. I accept the general thrust of his evidence in [120] of his witness statement and find that, to the extent that there was a problem with a cow or cows eating plastic sacks, it was a problem created by the maintenance contractors and not the original carrying out of the Ocesa works. What is not clear is whether the maintenance contractors were Ocesa's maintenance contractors finishing off the construction works or maintenance contractors subsequently acting for Citcol as the operators of the pipeline, in which case the Defendant's involvement would have ceased.
1610. I reject the annual claim for medicines. First, I am not satisfied that cows continue to get stuck as alleged. Second, if they do, it has not been proved where they get stuck or that the fact that they get stuck is attributable as a matter of fact to any material difference being made by the Ocesa works. Third, although the claim is given an air of precision by referring to vitamins, intravenous rehydration, nutritional supplements and/or antibiotics, I am not satisfied that all or any of these are purchased on a regular basis or at all because of cows getting stuck for reasons attributable to the Ocesa works. While fully accepting the documentary limitations to be expected of a campesino farmer such as Snr Sequeda, it is surprising that no documentary support for this claim exists if it is real, given the involvement of solicitors for so long. The point is a small one, but contributes to the overall picture of a claim that is a construct rather than being real.

1611. It follows that, for the reasons set out above and subject to any further legal arguments, I accept that Snr Sequeda lost a cow that became stuck in a swamp in or near W3 in about 1998 to which the Ocesa works made a material causal contribution. On the basis of the Claimants' case about the cost to Snr Sequeda of replacing cattle, I assess the value of that cow as being COP 612,000. I also consider that the need to erect and maintain the fence (in the overall sum of COP 250,000) can properly be attributed to the Ocesa works.

New House, well and corral – COP 3,633,700 (c. £1,348)

1612. These claims fail because of my findings that Snr Sequeda moved his house, well and corral before the Ocesa works were undertaken: see [1452]ff above.

Loss of fish production from fish pool – COP 1,416,327 (c. £526)

1613. This claim fails because of my finding that Snr Sequeda abandoned his fish pool before the Ocesa works were undertaken: see [1479] above.

Loss of Fishing in La Enix – COP 1,768,020 (c. £656)

1614. I accept that, historically, Snr Sequeda would fish in La Enix on La Gloria and that, from time to time, he would catch a variety of fish there {D4/71/811}. The experts are agreed that bagre, bocachico, liso, morjarra, moncholo, viscaina and liseta are species which could occur in La Enix {H23.5/16/1295}. Snr Sequeda says he caught moncholo, mojarra amarilla and lisos {D4/71/811}. The RARSL claims what are generically described as river fish at a rate of 60 400g migratory fish per year caught during the four month migration season {B4.4/1/16}. Snr Sequeda's evidence does not support this number of fish being caught on a regular basis, and I take it as an estimate of what could have been caught with consistent fishing and good migration of fish stocks.

1615. I also accept that La Enix is no longer worth fishing as it runs through La Gloria. Its condition is such that the fish no longer migrate to the stretch of La Enix upstream of the culvert. The difficult questions are when it ceased to be worth fishing and why.

1616. Concerns were raised by the Ministry of Environment before the Ocesa pipeline was laid through La Gloria about the possible impact of pipeline works at stream crossings on the free passage of fish {K33/324T/8}. Snr Sequeda's case is that a combination of narrowing of the stream of La Enix caused by failure to provide revetment or other protective works and an accumulation of sediment from the ROW is what prevented the continued migration of fish. It is common ground that the size of a stream's channel and the flow rate of water influences migratory fish {H23.5/16/1292} {Day47/21:1}; and also that sedimentation of streams and, in particular, spawning beds may have an adverse impact on fish stocks and migration {H13/3/1}. A sudden increase in sediment which blocked the pores of the gravels and the sands, filled the leaf litter banks and smothered plants could give rise to a catastrophic fish loss {Day47/16:12}. While there had been a regional decline in fish stocks, it does not explain a complete and sudden loss of all fish stocks in La Enix {Day46/153:17}.

1617. Expert evidence about the state of La Enix before the Ocesa works is limited: see [1482] above. There is no evidence of narrowing of the stream at its junction with the

ROW: the only evidence is that La Enix was flowing freely across its junction with the ODC ROW in September 1995. There is no expert evidence of the existence of a swamp in what was the natural pond near to the culvert in September 1995. It is the Claimants' case that sedimentation of the natural pond upstream of the culvert used to accumulate gradually but that he could easily clear it to maintain his fishing before the Ocesa works.

1618. The topography of the slopes running down to W2 and La Enix provide a pathway for sediment from the ROW towards La Enix, albeit that W2 would be first in line from the main slopes and that it is the Claimants' case that W2 has absorbed sufficient sedimentation from the junction with the ROW and downstream to raise its stream bed, cause overflowing of its banks and create the swampy zone SW1. W2 is a very small stream having a low discharge rate even in the rainy season {H7.3/3/842}.
1619. Dr Card's first report gave no detailed evidence about the sedimentation of La Enix, deferring to Dr Tobon for a description of the nature and accumulation of sediment {H1.1/1/162} and for an estimate of the volume of sediment in the area of AF1(a). Dr Card's evidence was that all the streams on La Gloria had a significant depth of sediment with evidence of sediment transported into streams off the adjoining slopes to the ROW from erosion features {H1.1/1/162}. In his discussion of the slopes above La Enix he concentrated on sheet erosion which was being transported downslope and into the valley below at the time of his inspection {H1.1/1/157}. He did not give as his opinion that there had been a sudden or catastrophic event at the time of the Ocesa works; nor, in contrast to other cases, did he refer to sedimentation from stockpiles – stockpiles were not mentioned in his consideration of LC39.
1620. Dr Tobon's observations included that the areas bordering where La Enix crosses the ROW are not eroded and have good plant cover {H7.3/3/831} so that soil from those areas was not reaching the streambed {H7.3/3/833}. He took it that the narrowing of the channel had taken place during construction with the result that sediment would be washed away from that place and deposited downstream near the culvert {H7.3/3/833}. His opinion, based upon the lack of erosion around the ROW crossing of La Enix, was that the sediment accumulated downstream of the ROW crossing during the construction of the pipeline, carried by the water from the ROW {H7.3/3/839}. He repeated this opinion at {H7.3/3/840}: "due to the fact that no soil erosion is displayed in the areas adjacent to the stream, the [ROW] or outside in the fields, which have good grazing cover, the accumulation of sediment around 20m below the [ROW] in [La Enix] must be connected to the sediment deposited on the streambed during construction of the pipeline ... and them being dragged by the water Its accumulation at this point, at the bridge entrance, is due to the fact that water is dammed there, before entering the tunnel, so accumulation of the materials carried by the water is facilitated". He concluded that "most damages to this water source occurred at the time land was excavated and until pipeline works were buried in this part of the farm"; and that "another important aspect of this stream is that neighbouring areas, on either side of the stream, are flat areas, with very gentle slopes, which means there is no soil erosion, and there is good coverage (between streams W1 and W2). As a consequence there is no addition of fresh sediment to the streambed as occurs in other streams" {H7.3/3/841}.
1621. Dr Tobon's assessment of W2 was that it displays a low discharge rate during the rainy season and a minimal one during the dry season. The topography between W2

and La Enix is largely flat but AF1(b) to the south slopes down to W2, providing a pathway for sediment from eroded or exposed slopes. On Dr Tobon's findings, the course of W2 had effectively disappeared, being replaced by a swampy and sedimented strip that started 30m upstream of the ROW crossing and persisted downstream to the junction with La Enix {H7.3/3/844}. His stated opinion was that the cause of the damage to W2 that he observed was "related to removal or excavation of soil during construction of the pipeline and its disposition on the streambed, in addition to soil being eroded to the streambed... both during and after construction of the pipeline" {H7.3/3/848}. It is evident that Dr Tobon regards W2 as the main resting place for soil that may continue to erode from the slopes above it.

1622. Dr Tobon did not assert that the sedimentation of W2 was itself a significant source of the sedimentation of La Enix at or about the entrance to the culvert. He attributed the overflowing of La Enix's banks to the failure to restore the full width of the channel where it had been narrowed. He was told by Snr Sequeda that, during the rainy season, La Enix inundates the entire pasture area surrounding it and maintains it flooded for several days, preventing it from being used for livestock {H7.3/3/833}. There is a dispute about whether the culvert imposes a blockage that could contribute to this.
1623. In his first report Dr Tobon accepted that the culvert was acting as a dam which facilitated the accumulation of sediment to its west {H7.3/3/840}; in a later report he argued that it imposed no restriction {H7.7/52/1865}. Flooding of the areas surrounding W2 and La Enix to the west of the culvert are shown in Dr Savigny's image SR4-12 {H2.6/8/1627}. The Claimants submit, and I accept, that the exit point of the tunnel on the discharge side of the culvert is not filled completely by the water flowing through. That does not show that the culvert is not providing some blockage: it merely shows that water to the depth of the water standing to the west of the culvert does not generate a flow velocity or volume that completely fills the discharge points to their full height.
1624. I accept the evidence of Professor Monsalve that the natural bottom of the streambed is below the level of the surface of the passage provided through the culvert (by an unmeasured amount) {Day40/41:24}. I also accept the evidence of Dr Savigny that the culvert acts as an obstruction to the flow of water from the merged La Enix and W2, though this will be most noticeable in times of rain when waters back up on the western side of the culvert, and that this will cause a portion of the sediment being carried by either or both of W2 and La Enix to be deposited to the west of the culvert {H2.7/9/1770}.
1625. Although Snr Sequeda was asked about the differences between the old and the new bridge, his answer was not sufficiently clear to justify a finding that the culvert in place before 2007 had a lower flow capacity than the one that is now in place. Its design may well have been different and, on the basis of Professor Monsalve's evidence, the likelihood would be that the tendency would have been to increase the capacity of the culvert in 2007 rather than to reduce it {Day40/40:17}. This evidence does not justify a finding that the creation of the new culvert in 2007 made a material difference to the situation one way or another. That being so, the fact that the sediment was cleared out when the 2007 culvert was built but that "within months of the clear up the pond area quickly became sedimented again" {B2.2/33/366} {Day12/61:21} is important confirmatory evidence in support of the opinion of Dr

Savigny that the culvert obstructs the flow of the streams in such a way as to cause the deposition of sediment at its western side. I prefer Dr Tobon's original opinion (that the culvert acted as a dam) to his later one, for the reasons that he originally gave and those given by Dr Savigny and Professor Monsalve.

1626. The Defendant also draws attention, relying upon the evidence of Professor Monsalve, to the size of the drainage basin of La Enix (c. 214 hectares) and its progressive deforestation since 1961, which will have caused and continues to provide a background source of erosion and sedimentation {H8.22/26/5716}ff. Despite the attacks on Professor Monsalve's methodology and quantification, his evidence supports the conclusion (and I find) that there has been continuing background erosion throughout the period both before and since the laying of the Ocesa pipeline. If I had any residual doubt that there is continuing background erosion (which I do not) it would be dispelled by the photographs of the logjam carried downstream on La Enix {H2.3/3/640}. Log jams have been a repeated feature of life on La Gloria both before and since the Ocesa works {Day12/61:13}. Dr Atencio suggested that such log jams did not obstruct the stream {Day46/70:15}. That is contrary to the evidence of Snr Sequeda and Dr Savigny and I reject it, though I do not suggest that the obstruction of the stream is total. However, I refer to it and rely upon it as a marker of the ferocity of the climate and its ability to pull materials off the drainage basin and drag them to La Enix.
1627. Drawing these strands together, I accept that there would have been some erosion from the slopes of the ROW above La Enix when the Ocesa works were carried out, which would decrease as revegetation took hold. Even now there is evidence of continuing erosion from the slopes on and to either side of the ROW. However, sedimentation from such erosion went downhill until it encountered W2, which acted as a substantial sediment trap preventing its further passage into La Enix. The land between W2 and La Enix is essentially flat and would not itself have generated substantial quantities of erosion even during the period that the ROW was exposed; and, to the extent that there was erosion of its surface, the absence of slope means that there is no basis for a finding that substantial quantities flowed into La Enix during or in the vulnerable period after the construction works were carried out. I find that there was no substantial flow of eroded sediment from the ROW into La Enix during or in the period after the Ocesa construction works. By "substantial flow" I mean a flow that the stream was unable to accommodate or purge.
1628. However, a number of strands of evidence point to the conclusion that things went wrong where the Ocesa ROW crossed La Enix. First, there is no evidence of any narrowing of the stream before the works. Second, Ocesa omitted revetment or other protective works which should have been installed to protect the banks of the stream: see [1550] above. Third, the narrowing of the stream at the point of the ROW crossing is unlikely to be coincidental. On this issue, despite the substantial reservations that I have expressed about his evidence in other respects, I accept the opinion of Dr Tobon that the narrowing of the stream occurred at or about the time of the Ocesa works and was caused by them. The narrowing of the stream of itself does not prevent La Enix from purging sediment from the area of the ROW crossing, but it is indicative of a wider failure to protect the banks and of an incursion of foreign materials that caused the physical narrowing. I find that some sediment found its way into La Enix when the Ocesa works took place and that it contributed to the

sedimentation of the natural pond by the culvert. I also find that W2 did not materially contribute to the sedimentation of the natural pond or other parts of La Enix; and that the additional sedimentation of La Enix attributable to the Ocesa works was a one-off event. Specifically, erosion from the slopes above W2 did not cause continuing sedimentation of La Enix and the narrowed channel was not itself a material source of continuing sedimentation of the area downstream, though it continued to act effectively as a conduit for sediment that was in the stream from other sources.

1629. There were therefore two sources of sedimentation of La Enix. The first was background erosion. This had always been sufficient to require Snr Sequeda to clear it from the natural pool from time to time, at a frequency which is not established. It was also the cause of the wetlands identified by Dr Savigny upstream from the ROW crossing in 1995. There was also the one-off additional sedimentation caused by the failure to carry out protective works at the ROW crossing, which failure led to the narrowing of the stream at the crossing and the depositing of some sediment in La Enix. That sediment did not block the narrowed channel at the ROW crossing and the flow of La Enix carried it downstream as explained by Dr Tobon. The slopes above W2 have not contributed material quantities of further sedimentation of La Enix. Since well before 2007 the sediment load that has been in La Enix has been the background erosion load.
1630. What are the implications of these findings for the claim for wild fishing in La Enix? They are that the background erosion rate causes sedimentation which is sufficient to prevent the migration of fish within a few months of existing sedimentation being cleared, as shown by the experience of 2007. The claim for lost fishing is predicated on the assertion that it is not feasible or possible to clear the sedimentation to the west of the culvert sufficiently frequently to keep the wild fish migrating so that fishing can continue. Assuming that to be correct, it means that the background erosion rate combined with the damming effect of the culvert is the effective cause of the absence of wild fish to the west of the culvert. No mechanism has been offered which could link the one-off increase in sedimentation in 1997 to a continuing inability to clear the sedimentation attributable to background causes. I accept that Snr Sequeda may now believe that his fishing was unaffected by sedimentation before the Ocesa works and was gone thereafter, but the evidence as a whole persuades me that his periodic clearing of sedimentation was a sign of a battle that he was losing as the drainage basin was cleared and background erosion became established. It is *possible* that the battle had not been completely lost by the time of the Ocesa works, but the evidence does not satisfy me that there was a material period when fish were prevented from migrating by the deposit of sediment from the Ocesa works or the narrowing of the stream channel when otherwise they would have migrated in sufficient numbers for Snr Sequeda to catch them in any numbers.
1631. As I have just indicated, the Claimants rely upon the narrowing of the stream as a barrier to migrating fish. If that were the only problem, the channel could readily be widened; but it is not. The problem of sedimentation at the culvert would continue to prevent their migration. In other words, I prefer the opinions of the Defendant's experts that the effective cause of the loss of migratory fish on La Gloria is a combination of background erosion and the damming effect of the culvert, which causes sedimentation to accumulate on its west side.

1632. If I had concluded that the Ocesa works were an effective cause of the loss of wild fishing in La Enix, I would have made appropriate findings on the numbers of fish that Snr Sequeda would have caught over the years. Since it is not necessary for me to make such findings, I merely say that I am not satisfied that he regularly caught an average of 16 fish per annum.
1633. For these reasons, without reference to further legal arguments, the claim for wild fishing in La Enix fails.

Moral Damages

1634. I have set out the principles applicable to the awarding of moral damages at [194] above. The Claimants do not summarise or set out the basis of Snr Sequeda's claim for moral damages in their closing submissions. I therefore take the formulation of the Claim as set out in the RARSL {B4.4/1/7} as representing Snr Sequeda's case, as follows:

“Signor Sequeda has suffered emotional distress, pain and suffering due to:

5. The anguish and uncertainty caused by the damage to the soil on pasture fields and water sources on the Property, which occurred all at once over a short period of time, and the damages attendant thereon which had an immediately affected [sic] a number of activities which the claimant relied on for his livelihood (notably, loss of livestock, and fish);
6. In particular, the uncertainty is the availability of drinking water due to damage caused to the water source used by himself and his family. ... Snr Sequeda endured hardship in attempting to find new, safe source of water for the family. For a time, drinking water had to be boiled or purchased;
7. His inability to provide adequate food and/or food security for himself and his family;
8. The anguish caused from being dependant on others for the provision of food or from financial support from the children who were in employment, in the circumstances where Snr Sequeda had been the patriarch and provider of his household.
9. The anguish and uncertainty as to the general lack of availability and accessibility of suitable water on the Property upon which the various farm activities depended (in particular cattle, fishing and crop irrigation). These activities provided food security to the Claimant and his family members. The management of the Property was very much dependent upon the water sources which were

damaged by substantial sedimentation of the stream beds all at once and over a very short period of time. This caused a situation of real anxiety and insecurity for the Claimant in circumstances where his family members and the main farming activities depended upon these sources and suitable alternatives are limited for a number of reasons, not least because they are located at great distances which are inconvenient.”

1635. My findings as set out above are at odds with this portrayal of what has happened. Both the ODC and the Ocesa works had an impact on LC39, but this formulation of the claim for moral damages ignores the previous impact of the ODC ROW, particularly in the light of my findings that Snr Sequeda moved house and abandoned his old well before the Ocesa works took place. I have found that the Ocesa works made a difference to the quantity of sedimentation in both La Enix and W3, but the overall impact of those contributions was neither as sudden nor as catastrophic as the claim for moral damages portrays. The true picture is much more complicated and involves the progressive and cumulative impacts of deforestation, conversion of lands to pasture as they came to the end of their cropping life (as in the case of AF2), background erosion, cattle, the ODC ROW and the Ocesa works.
1636. Although I accept that the overall deterioration of La Gloria, which has multiple causes, is a matter of dismay and concern for Snr Sequeda, I do not consider that the findings that I have made satisfy the stringent requirements for an award of moral damages in this case: it cannot be said that the Ocesa works have affected Snr Sequeda’s feelings to a high degree in the sense explained at [194] above.

Damages for loss of amenities of life

1637. I have set out the principles applicable to the awarding of damages for loss of amenities of life at [198] above. The Claimants do not summarise the basis of Snr Sequeda’s claim for damages for loss of amenities of life in their closing submissions. I therefore take the formulation of the Claim as set out in the RARSL {B4.4/1/9} as representing Snr Sequeda’s case. After summarising the nature of subsistence farming and stating that farming one’s own land and ownership of property gives increased social status, it alleges that Snr Sequeda is no longer able to carry on his traditional way of life and/or is unable to carry on such a way of life without considerably increased difficulties and gives the following instances:
- Snr Sequeda now has to expend extra time and labour in order to secure his maximum level productivity from the property. However, such levels are still lower than productivity levels before the construction of the pipeline. Extra work is required to achieve a lesser result;
 - Snr Sequeda had to search for alternative pasture to maintain his cattle, due to the damage to the Property’s pastures and water sources. In order to maintain his cattle, he had to go to the additional effort of moving his herd and finding suitable alternative pastures for them,

before eventually having to sell his cattle. He then had to go to the effort of purchasing a new herd of cattle.

- Snr Sequeda has to spend extra time to acquire suitable water for his family and livestock;
- Snr Sequeda and his family members expended a considerable amount of their spare time in attempting to cope with the changed condition of the Property, such as attempting to restore pasture fields, areas of crops and finding new viable water sources;
- Greater vigilance is required to in minding the cattle to ensure that they do not become stuck in the mud in and around swampy areas;
- Due to the aforesaid increased labour time, attributable to the damage caused by the pipeline, Snr Sequeda has less time to pursue such leisure and social activities as he previously enjoyed;
- The loss of productivity on the property has led to the increased impoverishment of Snr Sequeda and his immediate family. This has led to a consequent loss of social status of Snr Sequeda and his immediate family.
- As the Property is no longer as productive as it was before the construction of the pipeline, Snr Sequeda is no longer able to provide suitable food security for himself/and/or his immediate family. This has resulted in situations where Snr Sequeda has suffered from lower and/or less nutritionally balanced or varied food resources than before the construction of the pipeline. Snr Sequeda and his family have therefore been obliged to go hungry and/or forego key nutritional elements of their diet, if they have been unable to source elements by other means (e.g. purchase, bartering);
- As the productivity of the property has reduced, Snr Sequeda has no longer been able to generate the same surplus of products as previously could have been achieved. Further, Snr Sequeda is having to allocate more of his own and his own family's labour time to the property this means that Snr Sequeda and his family are unable to provide surplus products and labour time for barter to the level that they would have achieved before the construction of the pipeline. This has resulted in their inability to source items and labour necessary for their property, which previously they could have obtained through barter;

- Inability to participate in the barter economy has lowered the social status and reputation of Snr Sequeda.

1638. Once again, my findings are at odds with this portrayal. La Gloria has suffered some damage as a result of pipeline works and has deteriorated in other respects which are not attributable to either pipeline (e.g. the deep cattle trails now evident on the property as on CF39); but the RARSL portrayal makes no concession to the contribution of the ODC pipeline or other causes of deterioration. The evidence given at trial does not establish that Snr Sequeda or other members of his family have gone hungry, nor is there evidence that they suffered significant adverse changes in their diet. As I have noted at [1411] Snr Sequeda is a man who is well respected in his community: there is no evidence that he has suffered any actual loss of status or respect as a result of the Ocesa pipeline works.
1639. Applying the principles I have set out to the facts as I have found them to be in this judgment, I do not accept that the Ocesa works have prevented Snr Sequeda from being able to enjoy the normal amenities of life in such a way or to such an extent as to justify an award of damages for loss of amenity.
1640. In summary, I reject Snr Sequeda's claims that he has suffered loss or damage as a consequence of the Ocesa pipeline works that justifies an award of damages applying the principles of Colombian law that I have set out earlier in this judgment.

Bases of Claim

1641. Snr Sequeda has proved that the loss of a cow and the cost of erecting a protective fence is attributable to the Ocesa works. If recoverable, the damages would be COP 612,000 for the cow and COP 250,000 for the fence, a combined total of COP 862,000. Although the place where the cow died is not precisely established, I take it for present purposes that it was off the ROW.
1642. Most of Snr Sequeda's heads of claim relate to damage alleged to have been suffered off the ROW. The claim for damage to and loss of crops, losses of cattle, recuperation of pastures and fishing in La Enix have at least an element which may have been on the ROW. I therefore deal with the position for damage suffered both on and off the ROW.
1643. The Annex to the ROW Agreement described the damage as including "trees, pastures and general vegetation." This in context means that the compensation includes for the destruction of those trees, pastures and other vegetation that are on the ROW when the pipeline works are carried out. To the extent that crops on the ROW were damaged and destroyed by the stripping of the surface, I would hold that they fall within the damage contemplated by the Annex and the ROW Agreement. They would therefore be covered by the invoking of Article 5 even though the ROW Agreement did not expressly mention the precise crops on the ROW when the Ocesa works were carried out. Damage necessarily caused to La Enix where the ROW crossed it would also be covered, but not damage caused elsewhere because of the carrying out of the Ocesa works in or near to that stream. Thus if the works (or lack of works) at or adjacent to La Enix had the effect of causing sediment to travel downstream clogging an area that was off the ROW, that off-ROW damage would not

be within the contemplation of the ROW Agreement or the ambit of protection afforded by its invoking of Article 5.

1644. On my findings, the Defendant was subject to the dangerous activities doctrine as guardian. Accordingly, it is liable to Snr Sequeda for the damage that has been proved and would have been liable in respect of the other heads of claim unless that liability was excluded by the ROW Agreement or had otherwise been extinguished.
1645. Snr Sequeda entered into a settlement agreement with Saipem on 29 June 1997: see [1552]. There is no evidence of a separate settlement with Ocesa but there are Paz y Salvos with Saipem and, separately, with Ocesa, each of which is dated 7 August 1997: see [1554]. Although at one point in his evidence Snr Sequeda said that he had not known who to go to in order to make a claim {Day10/63:13} he understood it was Ocesa that was carrying out the works {Day10/140:3} and went to the offices of Ocesa and Saipem when he entered into the settlement agreements {Day10/57:18}; and he knew in general terms that a Paz y Salvo meant that nothing more was owing {Day10/75:18}. Though he is uneducated, it would be wrong to portray him as lacking all understanding of what was going on.
1646. Viewed objectively, Snr Sequeda's conduct in claiming and receiving payment from Saipem and Ocesa and entering into the Paz y Salvos amounted to tacit acceptance of the assignment of the ROW Agreement by the Defendant as assignor to Ocesa as assignee. That has the effect that the Defendant could no longer rely upon the ROW Agreement as excluding liability by invoking Article 5: as in other cases of assignment it was then a stranger to the contract and, in relation to the Claimants, both a stranger and a tortfeasor by virtue of the dangerous activities doctrine. In any event, as the ROW Agreement was concerned with the area on the ROW, it would have provided no protection against claims for damage off the ROW, which make up the majority of Snr Sequeda's claims. The 29 June 1997 settlement with Ocesa and Saipem effected a settlement of all claims off the ROW (present and future) as between Snr Sequeda on the one hand and Ocesa and Saipem on the other. In doing so, it also effected a novation by substituting the new contractual rights and obligations under the settlement in place of any existing or future obligation in tort. As a result, any liability which the Defendant might otherwise have had to Snr Sequeda for damage off the ROW which is attributable to the Ocesa works was extinguished. That includes the claims for the loss of the cow and the protective fencing which I have found, as a matter of fact, to be attributable to the Ocesa works.
1647. In the absence of any settlement with Ocesa relating to damage on the ROW, extinction of liability would rest on the terms of the Paz y Salvo with Ocesa. It is specific and clear in renouncing "the right to present any type of reclamation, action or judicial or extrajudicial claim against the company, regarding their obligations, agreements, loss and damage to the pastures, crops or movable [property] inside the corridor of the line, or the alteration in the economic exploitation of the plot during the construction of the pipeline": see [392]. The applicable principles are set out at [190] above. The Paz y Salvos constitute clear expressions that Snr Sequeda no longer wants to pursue any rights he may have or bring actions with regard to such rights. Adopting Professor Castro's formulation, the renunciation is clear, unequivocal and precise. Snr Sequeda may not have contemplated that, at some later date, English lawyers would come and offer the prospect of bringing an action in this jurisdiction. That is not, in my judgment, a good reason not to give the Paz y Salvo

its clear meaning. Accordingly, had the issue arisen, I would have held that Snr Sequeda had renounced the right to bring an action in respect of damage on the ROW attributable to the Ocesa works.

Conclusion

1648. Snr Sequeda's claim fails.

15. LC50 in Detail

1649. Section Index:

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Introduction

1650. The Claimants are Snr Juan Buitrago and Snr Gildardo Manco. Snr Buitrago is now in his mid-seventies. He started his working life in Segovia as a day labourer. He was forced off the first land he bought by violence in the area and later was unable to make his second farm pay, due to economic difficulties. He then occupied an area of land which is now called La Alborada. He started by clearing a small area for crops and making a hut in which he lived with his wife and 10 children. By the time the pipelines came his four older children had left. Until he met Snr Manco, Snr Buitrago worked the farm on his own, occasionally with the help of a labourer. He is a campesino farmer who neither reads nor writes. Although now quite elderly, there is evidence that he was able to stand up for himself during the period when the pipelines were laid: he managed to negotiate a higher settlement sum than was originally offered to him by Saipem {D5/91/1032}. He was brought up working in the fields and lived off the land in an unsafe area until he finally felt he had to leave the countryside because of the violence in 2002. The violence had a direct impact on his ability to work on La Alborada. After the ODC pipeline was laid, guerrilla activity was rife and the army was active in hunting them down, including on La Alborada. At one point the army formed the view that Snr Buitrago was a friend of the guerrillas, which meant that he had to leave the farm for periods at a time and return to live in Segovia until things were calmer {D5/91/1024} {Day9/121:11}. I accept the evidence of Snr Manco that the violence is like an incurable disease. At the time of making his statement in 2012 Snr Manco had had to leave the area and was living in Medellin as he was being threatened {D5/88/948}.
1651. When Snr Buitrago came to give evidence via videolink the Claimants submitted that he would find it “challenging to give a chronological account of his evidence not having been used to thinking in linear fashion or recalling events in terms of dates or

periods of time such as months or years” {C7/4/1}. That submission was justified. It was also clear to see that the environment in which he was required to give evidence was alien to him. He did not, however, appear intimidated by the court room process and did not show particular deference to others.

1652. What did emerge and has to be borne in mind when assessing his evidence was that his memory for many things was very poor, as he said. The most graphic illustration of this was when he came to start his evidence and clearly had no recollection of having given a statement or telling his lawyers what had happened {Day9/82:19}. I do not have details of how the witness statement was taken, but I accept that it had been read to him shortly before he gave evidence. Despite that, it was necessary for it to be read to him again before he could start to give his evidence in chief at all. Although he then said that he remembered what happened during the building of the second pipeline, the episode demonstrated the difficulties that were likely to have been encountered in preparing a statement for Snr Buitrago and the caution which needs to be exercised by the Court when confronted by apparent certainty either in his statement or in his oral evidence.
1653. As with other witnesses, by the time he came to give evidence Snr Buitrago was convinced that all the troubles on La Alborada were attributable to the Ocesa pipeline. His witness statement says nothing about the ODC works or how they were carried out, except that they caused no damage {D5/91/1028}. When describing the Ocesa works his statement was clear in saying that “when the bulldozers came, they cut down the rastrojo and the trees...” {D5/91/1029}, evidence which he repeated orally and with equal certainty {Day9/98:20}. Yet it is common ground that any trees on the ROW had been cut down for the purposes of the ODC ROW {B2.1/14/92}, though I note that Snr Buitrago entered into a settlement agreement with Saipem in August 1997 that referred to cutting down timber trees: see [1744] below. A further example of his misplaced certainty was that he said in his witness statement that an army camp had been built after the Ocesa pipeline had been laid {D5/91/1031}. There is incontrovertible evidence that it was built well before the Ocesa works, as it is visible in the 1995 aerial photograph {L1/170/170}. A third was his evidence that the secondary road which now runs along the southern boundary of La Alborada had been built as part of the Ocesa works {D5/91/1034}. It was in fact built before or at the time of the ODC works. I mean no disrespect to Snr Buitrago in concluding that I can place no reliance upon his evidence about chronology.
1654. Snr Manco is not primarily a farmer. He is a miner who has been a partner in several mines {Day8/10:18}. I accept Dr Velez’ description that Snr Manco is someone who has invested his earnings from mining in order to purchase the farm and to pursue various production projects. Snr Manco’s evidence also indicates that he is not at heart or by upbringing and profession a campesino farmer looking to pursue a subsistence existence from farming the land: “Let’s see, how shall I put it, how can I put it. I like the farm. I don’t know if it is an investment, as such. I like the farm and I like animals, and in order to keep animals you need to have a farm. I think that is the way it should be, or it is” {Day8/14:11}. That supports Dr Velez’ view (which I accept) that Snr Manco “does not have a farmer and rancher history. His projects do not consider technical parameters. He does not receive technical consultations. He only plants popular crops, including cocoa and pineapple. He also practices fish farming. He has also cut down forests to create pasture in areas of the farm with

slopes greater than 75% and 100%, which has deteriorated soils, water supplies and drainage” {H5.3/4/580}. He has limited knowledge of farming, has never lived on the farm full-time and has never moved his family to the farm. To compensate for his lack of knowledge he employs a farming assistant {H5.4/5/850}. With the cost of the assistant (who Snr Manco describes as a foreman) the farm makes no profit {D5/88/961}.

1655. The Claimants submitted that Snr Manco was likely to feel intimidated by the Court process {C7/4/1}. He showed no signs of being intimidated and was well able to hold his own in giving his evidence. I do not accept all of his evidence, but will deal with particular matters as they arise.
1656. Snr Alberto Zapata gave evidence about buying cattle and fish from Snr Manco {D5/94/1045}. His evidence was relatively peripheral. Apart from saying that he did not appear intimidated and that the Claimants were probably correct to submit that he would find it challenging to give a chronological account of his evidence or to remember events in terms of dates or periods of time such as months or years {C7/3/1} it is not necessary to say anything more about his evidence at this stage.
1657. The evidence of Snr Arnulfo Echevarria was admitted pursuant to the provisions of the Civil Evidence Act, though in unsatisfactory circumstances. He is said to have worked for Snr Manco on the farm until 2011. He made his statement in 2012. The Civil Evidence Act Notice dated 1 August 2014 said that he “resides in a remote region of Colombia. Several attempts have been made to contact this witness through Mr Manco ... but such attempts have not proved successful. [Snr Manco] currently does not know Mr Echevarria’s whereabouts and has been unable to locate him or speak to him directly. It is not expected that he could be relied upon to give evidence” {C4/2.3/33.27}. Snr Manco’s evidence at trial, less than three months later, was that he had spoken to Snr Echevarria by telephone about twenty days before because Snr Echevarria had been ill and was in the city of Medellin and that he had a landline telephone number for Snr Echevarria which a neighbour had given him {Day8/74:10} {Day9/38:18}. His evidence is not strictly inconsistent with what had been stated in the Civil Evidence Act Notice, but it makes clear that contact had been made with the prospective witness. No further explanation was given of what steps, if any, had been taken to try to find him. On this evidence I am not in a position to make a finding that he could and should have been traced and called to give evidence or that he could not or should not. I give his evidence limited weight because it has not been tested by cross-examination and because in some respects it appears to be inconsistent with other evidence to an extent that suggests it is unreliable. I will refer to it if and to the extent it becomes necessary to do so later on.
1658. The overall claim is for COP 58,685,635 (c. £21,776). There are three heads of claim, of which the last two are related. The claims are for loss of fish, loss of cattle and the erection and maintenance of fencing:
- i) The claim for loss of fish is based upon the claim that two fish pools were sedimented by an avalanche of material coming down from the ROW after they had been dug and produced one harvest of fish. The Claim is for COP 36,302,627 (c. £13,471);

- ii) The claim for loss of cattle is divided into two periods. First, it is alleged that 2 cows became stuck and died in 1997 as a result of which the farmers' remaining 3 cows were sold. The dead cattle are claimed in the sum of COP 1,296,000 (c. £481); the lost calves and milk from the two dead cows and the three that were sold is claimed in the sum of COP 1,884,683 (c. £700). Second, it is alleged that 15 cows have become stuck and lost between 2002 and 2012. The lost cattle are claimed in the sum of COP 9,180,000 (c. £3,406). Their produce (milk and calves) are claimed in the sum of COP 9,528,125 (c. £3,535). The overall claim for lost cattle and produce is therefore COP 21,885,808 (c. £8,122);
- iii) The fencing claim comprises COP 110,000 (c. £40) for fence building and COP 384,200 (c. £140) for annual maintenance.

Description of the Property

- 1659. La Alborada is a farm of approximately 79 hectares in the mountainous region known as the Central Cordillera. It is on Spread B. The area consists of steeply undulating ground forming generally steep hills, ridges and steep narrow valley features. Natural drainage is to the valley floors and water courses between the hills. The farm is roughly rectangular in shape and is bounded on the southern side by a road known as the secondary road. La Alborada is about 16 kilometres from Remedios {C6/24/4}.
- 1660. The ROW, which accommodates both the ODC and the Ocesa pipelines, runs roughly from South to North along or adjacent to the western boundary of La Alborada. The Ocesa pipeline was laid immediately to the east of the ODC pipeline. The various agreements to which I shall refer later describe the relevant length of the ROW as 725 or 740 metres. By reference to the evidence of Snr Cardenas, Dr Savigny has allocated chainages from KP 475+078 to KP 476+100, an overall length of 1022 metres.
- 1661. For most of its relevant passage the ROW is on a ridge from which the land falls steeply on La Alborada to the east and onto a neighbour's property to the west. The longitudinal gradient of the ROW varies, becoming steeper as it gets further north. The land on La Alborada to the east of the ROW was mostly forested when the pipelines were laid. Within that forested area four streams rise (W1, W2, W3, W4) which flow down the hill until they converge to provide the main stream running down the centre of the property from west to east. There are other water sources that rise in the north-eastern quarter of the property. The ROW does not cross any of streams W1 – W4, but they rise a relatively short distance below it. Where they merge, there is an "alluvial fan" of sedimentation where the gradient of the slope decreases and sediment that has been transported downhill is deposited. About 30 metres downhill and downstream of the point of conflux is an area described as SW1, which is a swampy area alleged to be c. 26,800 m² {C4/3/361}. As will be described later, SW1 features large in the claim for lost cattle. On the northern boundary of SW1 is the place where it is alleged that the fish pools were dug, which form the basis of the loss of fish production claim. At the eastern end of SW1 the stream continues eastwards towards a bridge near to the house and on beyond, running roughly parallel to the secondary road. These features are conveniently marked on {L8/3/876}. There is an area of wetland near to the house which is not alleged to be caused by the Ocesa ROW. It is the evidence of Snr Manco and Snr Buitrago that in the period

before the Ocesa works they pastured cattle on land near to the house and that there was a natural pool in the stream about 20-30 metres from the house from which both people and cattle would drink {D5/88/955}.

1662. The Claimants' aerial image is at {C4/3/358}. It uses the 2009 aerial image. The historical photographs are important in providing snapshots of the progress of deforestation of the land carried out initially by Snr Buitrago alone, then by both Claimants together until Snr Buitrago left, and then by Snr Manco:
- i) The 1961 aerial photograph shows La Alborada largely forested, with small areas having been cleared. The ridge on which the ROW would go and the slopes to the east of the ROW ridge are forested. Dr Savigny interprets the photograph as showing an area of wetland near to the position of the house {H2.8/10/2087}. I accept that evidence. The secondary road has not yet been built;
 - ii) The 1987 aerial photograph at {L1/131/131} has the boundaries of the property in the wrong place. It shows a reduction in the primary forest but the property largely still under primary or secondary forest {H2.8/10/2088}. An area has been cleared on the slope below the ridge where the ROW would later pass. It is designated by Dr Savigny as pasture, though the evidence does not establish what animals, if any, Snr Buitrago had on the property at that time. The main interest in the area for present purposes is that it became covered by forest again over the next decade. There is no evidence about why, how or when it was allowed to revert. There has been some further clearing in the area of the farmer's house. The secondary road has not been built;
 - iii) The 1995 aerial photograph {L1/173/173} shows the secondary road and the ODC ROW. The west end of the property is still largely covered by primary or secondary forest. The area which had been cleared at the western end in 1987 has reverted so as to be described by Dr Savigny as weeds and weedy pasture {H2.8/10/2089}. The east end of the property is not included in the photograph, but the area near the house has an area described by Dr Savigny as pasture and a more diffuse area which he interprets as wetland near the house. Snr Buitrago's evidence, which I accept, is that he had 1-2 hectares of open field when the Ocesa pipeline was laid {D5/91/1022}. That is consistent with the 1995 aerial photograph and with his evidence that he only started keeping cows after the ODC pipeline paid him some money. As a generalisation, the area where the streams converge, SW1 and the continued passage of W3 to the east towards the house are all covered by primary or secondary forest such that it is not possible to the untrained eye to identify the course of W3 to the east of SW1. I find that Snr Buitrago's 1-2 hectares of open field were towards the east end of the property, near to the house. The location of the fish ponds (CAI Point 10) is under tree cover {H22/5/279};
 - iv) Stills from the 1998 overflight DVD are not of high resolution or quality but confirm that the slope down from the ROW to the east was still largely or completely covered in primary or secondary forest {L3/810/820} {C5/5.2/53};
 - v) The 2002 aerial photograph covers only the ROW and the western end of the property and is not informative;

- vi) The 2009 aerial photographs show that there has been extensive clearance of the eastern end of the property, making its way to the west so that it is now only about the western-most fifth of the property that is generally still covered by forest. There are exceptions, such as recent forest clearing near the secondary road in the south-west corner of the property {H2.7/9/1885}. What can be seen clearly even by the inexpert eye is that there has been general clearance of the area from the house to the west until it meets the remaining area of forest cover on the steep slopes below the ROW, except for the trees in and around W3 as it flows towards the house and SW1 {L2/417/417}. These wooded areas are identified by Dr Savigny as wetland {H2.8/10/2091}, which provides an explanation for why they have not been cleared of trees and converted to pasture. In addition, the aerial photographs show that the slopes to the north of SW1 and where the fish pools are said to have been located have been cleared, which they had not been in 1995. Roughly this state of affairs can be seen in {L8/3/876}, which was taken in 2014. The position as disclosed by the 2009 aerial photograph and subsequent photographs taken in the course of this litigation is consistent with Snr Manco's evidence (which I accept) that he expanded the areas that were cleared for pasture after the Ocesa pipeline was laid and put his larger herd of 25 cows on about 20 hectares of cleared land in 2002 and continued to clear more land thereafter {D5/88/942} {D5/88/946}.

1663. The steep slopes of La Alborada are best shown by aerial photographs taken after much of the property had been cleared, which was in the years after 1995:

- i) {H2.7/9/1780} looks east from above the ROW. It was taken in 2010 and shows slopes up towards the ridge that have been largely cleared and on which cattle are now grazing. The area of SW1, the fish ponds and W3 are shown, and the image gives a good visualisation of the general topography with steep slopes down to the valley floor. The image also shows examples of localised landslides on steep slopes;
- ii) {H2.7/9/1889} looks south across the valley that is immediately to the north of the valley down which W3 flows. It was taken in 2012 and shows the combined impact of deforestation and grazing on the land;
- iii) {H2.3/3/718} looks west towards the ROW. It was taken in July 2012 and shows the house, the wooded progress of W3 towards it and up towards SW1. It also shows the secondary road and clear signs of run-off or other deposits on and from the banks of the secondary road;
- iv) A similar view, annotated by the Claimants, is provided by {L8/4/877}, which was taken in 2014. It shows SW1 and the position of the fish pools and the wooded progress of W3 down towards the house and beyond. It also shows the state of the next valley/watershed to the north, which is not alleged to be affected by the ROW. The stretch of W3 downstream of SW1 is properly described as wetland. By reference to a differently annotated version of {H2.3/3/718} the Claimants made clear that they do not complain about the lower reaches of W3 or attribute its condition to the Ocesa pipeline {H2.6/8/1636} {Day36/171:15};

- v) Three general views show the aftermath of clearance of forested slopes. {H5.4/5/834} shows an area where grasses are becoming established but there are banana, cassava, pineapple and palm plants as well as a few trees from what used to be forest, together with patches of low barbechos. {H5.3/4/830} and {H5.3/4/831} provide good general impressions of the hilly landscape which illustrate Dr Velez' description of the farm being "composed of hills and canyons, in which wetlands are easily formed during the rainy season. The cover is composed of planted grasses (mainly Brachiaria). The forest can still be seen in the background, which [Snr Manco] had been progressively felling to establish grassland."
1664. The position of the fish pools was identified to Dr Rodriguez in 2010 as being at the bottom of a deforested slope near to the bed of stream W1. The bottom of the slope was, when he observed it, heavily sedimented {H12.4/4/882}. It was completely covered by forest in 1995 and would have required the felling of a number of trees to make the place for the ponds {H12.4/4/875}. The slopes above and to the north are steep, as shown at {H12.4/4/884}. Dr Rodriguez was shown the point in the stream from where it is said that water was taken for the fish ponds and found a piece of hose unconnected to a pipe nearby {H12.4/4/883} {H12.4/4/885}. Dr Atencio was shown and photographed the same location for the fish ponds {H11/2/221}. In 2010 Professor Monsalve observed evidence of the fish ponds, which he described as being "located on the bank of stream W1" {H8.11/11/2816}.
1665. The Claimants' dry season video {H7.5/25/1228} shows sediment collected within forested areas on the slopes below the ROW. It also shows (at 00:14) works on the slopes, apparently intended to obstruct the flow of sediment downhill by creating a form of gabion, as identified by Dr Velez at {H5.4/5/854}. At 02:13 there is a sequence which shows the slopes to the north of SW1. It is common ground that there is evidence of sedimentation from those slopes {H7.5/26/1229}, though the Claimants point out that there is no evidence in the video of deep erosive features on the slopes and they appear to be reasonably well covered. I agree that is a fair representation of what the video shows at that point.

The Pleaded Case on the Impact of the Ocesa Pipeline

1666. The original Schedule of Loss {B4.1/10/92} was expressed as being the claim of Snr Manco and said that the farm supported 4 members of his family. It alleged the farm had 2 fish pools each containing approximately 4000 cachama fish of which the Claimant would sell 2,600 cachama (65% of the production) a year; it also alleged that Snr Manco had 20 cows and 15 pigs and 400 chickens on the farm. It was said that Snr Manco would sell 31,200 eggs and 2,400 chickens per year³³. Two hectares

³³ These figures were wildly exaggerated. Snr Buitrago first bought cows with money he was paid by ODC, and he then bought five young cows {D5/91/1025}. It was Snr Buitrago's evidence that he had one pig {D5/91/1026}. That was Snr Manco's evidence too, though he had an unsuccessful venture buying piglets after the pipelines had been laid {D5/88/961}. Snr Buitrago said that he had 150 chickens at the time of the Ocesa works, eating their eggs and selling the surplus {D5/91/1026}. He said that he and Snr Manco thought about starting a chicken breeding business but it never happened {D5/91/1023}. Snr Manco's evidence was that at the start they reared broiler chickens which they sold to the supermarkets in Segovia {D5/88/946}. If they did, it is clear from his evidence that it did not last long. The Claimants' case as subsequently set out in the 2012 Further

were used for plantain and 2 hectares for cacao. There was widespread erosion. Loose earth and sand was left exposed to the elements and during the rainy season the sediments would be carried downhill by rainwater, which would in turn be channelled towards the streams, of which it was alleged that there were five. Sediments were carried down to the dam 800 metres from the house so that it now has to be cleaned every other day. The Claimants' crops were completely covered in earth and were destroyed. During the rainy season rainwater is no longer channelled through the streams but instead floods the surrounding area causing it to become very soft and swampy. "Some of the Claimants' animals have strayed into the soft earth and become buried. Since the pipeline was laid at a higher level than and close to the Claimants' fish pools, sediments washed down from the right of way were carried into the fish pools causing them to become silted. Both pools ultimately became completely filled up with sediments and were rendered unusable." "The Claimant's farming activities also suffered as a result of the construction of the OcenSA road. Since the Claimant is unable to distinguish between the damage caused by the road and that caused by the pipeline, for the purposes of this schedule all loss of income from farming activities has been reduced by 50% to reflect the damage caused by the construction of the road." The current position was said to be that the fish pools became completely silted and unusable. To compensate for the loss of income the Claimant was forced to sell all of his poultry and thereafter did not earn any income from poultry for approximately four years. In order to compensate for the loss of income from fishing the Claimant invested in the recuperation and improvement of his pastures so that he would maintain more cattle. This required him to employ additional labourers, purchase new pasture and construct a new dam to ensure an adequate supply of water for his animals. After allowing for a 50% reduction to account for the contribution of the secondary road, the claim amounted to COP 138,336,080 (c. £51,000), more than twice the sum now being claimed.

1667. The Particulars of Claim (which incorporated the original Schedule of Loss) alleged that the construction of the pipeline caused extensive damage as set out at {B1.3/5/462}. In briefest summary, the damage alleged in the body of the Particulars of Claim (which was in similar terms to the damage alleged in relation to LC54, LC74 and LC39 as summarised at [946], [1161] and [1429] above) was:

- i) Removal of "the extensive, thick, natural vegetation, which had covered the ROW" and revegetation that was "thin and sporadic" with some parts of the ROW not being revegetated at all. This is alleged to have been caused by the use of inappropriate or inadequate techniques and methodology and species of vegetation. The vegetation is alleged to have deteriorated or failed to develop adequately and the soil on the ROW has been left exposed to the elements;
- ii) The exposure of soil to the elements, the decrease in the water retention capacity and the use of heavy machinery during the construction are alleged to have caused significant soil erosion. This in turn is alleged to have caused substantial amounts of sediment (from soil erosion and from excavated soil) to move outside the ROW to various parts of the Property;

information was that the fish pools took 1,000 fish (after wastage) with two cycles per year: see [1668](viii)(c) below.

- iii) Water sources are alleged to have been destroyed, with sedimentation causing water sources to dry up or very significantly reduce in volume. They are alleged to have become unfit for human or animal consumption;
- iv) Crops have been covered in earth and destroyed;
- v) Parts of the property have experienced flooding. In particular, during the rainy season, rainwater is no longer channelled through the streams but floods the surrounding area causing it to become very soft and swampy;
- vi) Sedimentation is alleged to have made fish pools become completely silted up and unusable and to have caused a dam, used for storage of water, to become filled with earth and sand requiring frequent cleaning;
- vii) Animals became trapped in the muddy/swampy areas of the Property leading to loss of livestock;
- viii) An access road was constructed for the purposes of the pipeline, causing damage to a large number of fruit trees and also causing damage to a stream which dried up as a result of being filled up with earth generated during the construction process. During construction a stream on the property was destroyed by heavy machinery.

1668. The 2012 Further Information on LC50 alleged damage as set out at {B2.2/33/377}ff. The Claimants' case was updated by successive versions of the Revised Schedules of Loss, most recently on 23 January 2015 {B4.4/2/65}. Again, I provide a brief summary of the case as set out in the 2012 Further Information, with interpolations from the 2015 Re-Amended Revised Schedule of Loss ("RARSL"). The damage alleged included the following:

- i) Erosion "caused in and along the entire length of the ROW", which is to be inferred from (a) erosion currently present in the ROW; (b) the condition of the soil and vegetation there; and (c) the inadequate measures said to have been taken in relation to erosion prevention and control and in relation to soil and vegetation. It is alleged that the ROW remains subject to and/or susceptible to ongoing erosion. Significant areas of erosion are identified as:
 - a) An area of landslip failure on the side of the ROW measuring in excess of 250 m² (CAI Point 2);
 - b) An area of gully erosion on the ROW measuring 200 m² (CAI Points 3 and 7);
 - c) An area of gully erosion and failed ditch diverters on the ROW measuring 400 m² (CAI Points 4 and 5);
 - d) An area of gully erosion on the ROW measuring 50 m² (CAI Point 6);
 - e) An area of gully erosion and failed ditch diverters on the ROW measuring 200 m² (CAI Point 8);

- f) An area of gully erosion on the ROW and general erosion along the hill crest ridge system, lime deposits also evident (CAI Point 100);
- g) An area of severe erosion on the ROW (CAI Point 695) with evidence of decomposed sacks (both plastic and fibre) in this area;
- h) A large area of erosion running downhill along the ROW between CAI Points 698 and 699. Sediments from this area of erosion would wash downhill along the ROW towards the flatter land on the ROW before flowing east down the natural drainage path at CAI Point 700 towards water sources and lower lying parts of the property. Erosion from CAI Point 695 would wash sediments downhill via this natural drainage path;
- i) Deterioration of erosion control works has contributed to erosion at the edge of the forest (CAI Point 706);
- j) Natural drainage paths down off the ROW where erosion is evident downhill of trees which display exposed roots (CAI Points 702, 703, 704);
- ii) There is alleged to be erosion outside the ROW, on the sides, caused by run off, dragging and in areas where sediment moved from the ROW (or from near the ROW);
- iii) An access road was built as part of the construction works, which at least in part follows the route of the ROW and is parallel to it. Large sections of the access road are badly eroded (CAI Point 694), which adds to the quantity of sediments generated in the area of the ROW. Landslides have occurred on the sides of the access road where cuts were made into the hillside (CAI Points 694 and 708). There are very high gullies where the earth has slipped. Sediments would have been washed downhill to the east of the ROW and toward the water sources and lower lying land on the property, contributing to the further damage outlined below;
- iv) Sedimentation of water sources;
- v) Damage was suffered in other areas of the property caused by sedimentation, or by becoming swampy, or by suffering secondary erosion;
- vi) There was mixing and inversion of soil horizons along the entire area of the ROW. Where Horizon A is present it is a very thin layer and is mixed with gravel or small fragments or rock. Soil is over-compacted along the entire area of the ROW;
- vii) Vegetation cover in the ROW is approximately 50%. At best there is 80% cover in places. The quality of cover is poor.
- viii) Away from the ROW;
 - a) Swampy Area 1 (SW1) is located in the lower lying areas to the east of the ROW where each of the 4 streams on the Property converge,

leading to overflowing and water logging of the surrounding area and resultant deposit of sediment in what is now the swamp area SW1. The area is a permanent swamp which has been created as a result of movement and/or deposit of eroded and/or excavated material from the ROW (or from near the ROW) and/or from the access road, and/or from sediment carried in the channel of the streams;

- b) The ability to keep cattle in the 4 pasture fields around SW1 is restricted by the creation of the swamp and 17 cattle have become stuck in mud in SW1 since the construction of the Ocesa pipeline (see CAI points 92 and 107). [2 of Snr Buitrago's 5 young cows got stuck in SW1 in 1997 and died at CAI Points 107 (described in the key as "Area where cattle stuck in swamp") and 92 (described as "bodies of cattle that got stuck in swamp"). The Claimants sold the remaining 3 young cows in 1997. The Claimants opened new pasture areas "in areas unaffected by the construction of the pipeline, in the hope of keeping cattle away from the swamp area" and erected the fencing referred to below. Snr Manco purchased a new herd of 25 cattle in 2002. However SW1 "continued to prove a danger to cattle. Fences erected by the Claimants were not always sufficient to keep cattle safe as they occasionally pushed fences down to access further pasture areas and strayed into swampy areas. A further 15 cattle became stuck in the mud and died during the period of 2002 to 2012 (CAI Points 107 and 92) despite the measures taken by the Claimants to prevent this.];
- c) Fish ponds had been located in SW1 at CAI Point 10 at the foot of the steep slope that would have carried sediment from the ROW. They have been destroyed by movement and/or deposit of excavated and/or eroded material from the ROW or the access road or by the creation of SW1. [Shortly after the construction of the pipeline, in the summer season of 1997, the Claimants dug out two fish pools on the property (CAI Point 10). The fish pools were built near to the main stream, which supplied water to the fish pools by means of a hose. "The Claimants stocked the fish pools with 1100 fingerlings of tilapia and cachama per cycle. The Claimants expected to sell their production of fish when they were fully grown within 4 to 6 months. The fish pools produced 300 kgs of tilapia and cachama per production cycle, there being two production cycles in one year. The Claimants sold 90% of their production and kept 10% for domestic consumption. With the onset of the first wet season following the construction of the pipeline, the fish pools began filling up with sediment carried down a steep slope from the ROW. They were eventually destroyed by movement and/or deposit of excavated and/or eroded material from the ROW (or from near the ROW) and/or from the access road and/or by the creation of [SW1]. The Claimants were able to obtain one cycle of production of fish before the fish pools were destroyed and they were unable to resume this activity."];
- d) The streams W1, W2, W3 and W4 all have a low discharge capacity during the wet season and would have an even lower discharge

capacity during the dry season. Sedimentation of the stream beds has been caused at various points along the length of each stream. Due to the very steep incline of the stream beds of W1-W4 sediment originating from the ROW and access road area which entered the channels of the streams would have been transported rapidly and deposited in flatter areas along the channel lengths with the greatest amount of sediment deposited in the flattest terrain downstream, where SW1 is located;

- e) Examples of areas of sedimentation are:
 - i) A sediment fan (CAI Point SF1) measuring c. 45 m² with approximate sediment depth averaging 40 cms (see CAI Point S1);
 - ii) SW1, where sediment depth ranges from 30 cm to greater than 1.25 m;
 - iii) An area further downstream of CAI Point 197 within SW1 where a sheet of sediment is deposited where a significant proportion of the rocks in the sediment bed have a smooth surface indicating that they have been transported within the stream channel from a considerable distance away;
- f) A dam (from which water was previously taken from the house) had been at CAI Point 84. Movement or deposit of eroded and excavated material down the very steep slope from the ROW or from near the ROW led to accumulation of sediment behind the dam, requiring it to be moved further upstream in W1;
- ix) The entire property has been adversely affected and is in effect less productive or fertile due to the damage to water sources. In particular:
 - a) There has been a reduction in water availability for human and animal consumption and fishing resources on the property have been affected;
 - b) SW1 cannot be used for pasture or crops. It is deep mud during the dry season and waterlogged during the wet season and creates problems of access to water for animals during both wet and dry seasons. [In about 2001 the Claimants erected approximately 250 metres of fencing on a number of pastures on the Property in order to keep cattle away from dangerous areas. The materials for the fencing are costed at COP 10,000 (c. £3.70). The Claimants' labour in erecting them is costed at COP 100,000 (c. £37)];
 - c) The entirety of the ROW is less productive and fertile and is of less use as pasture and large parts of the access road and its immediately surrounding area are eroded.

1669. The following points should be noted at this stage:

- i) The references to the “Ocensa road” in the Original Schedule of Loss and to the “access road” in the Particulars of Claim were references to the secondary road: see {B4.1/10/93} and {B2.1/14/110}. They are not to be confused with the access road off the ROW which was alleged to be a source of damage in the 2012 Further Information: see [1668947](iii) above. When he made his statement in July 2012 Snr Buitrago was still maintaining that the secondary road, which he considered to be part of or associated with the Ocensa works, had caused his land to suffer substantial damage. It is now common ground that it was not associated with the Ocensa works and the Claimants now say that it was not a source of damage;
- ii) As I have outlined, the claims for damages that are now being advanced are in relation to fish cultivation, cattle that got stuck and died, and fencing. Despite what is said in the various iterations of the pleaded case, there is no claim for damage to crops, recuperation of pastures or for reduced fertility as such. The state of the ROW and other parts of the property are therefore of primary interest as a source of sedimentation contributing to the loss of the fish ponds or the creation of SW1 and I will concentrate on them as such.

The State of the Property before Construction of the Ocensa Pipeline

1670. Snr Buitrago moved onto La Alborada in about 1980-1982, at a time when the farm was almost entirely forest {D5/91/1021} {D5/91/1025}. To begin with he grew crops and cut wood. It is a measure of the limited nature of his operation that he did not buy a chain saw until after the ODC pipeline was laid {D5/91/1025}. There is a dispute about when Snr Manco first came on the scene, to which I will return after tracing the documentary trail of Snr Buitrago’s dealings with ODC.
1671. Snr Buitrago gives virtually no evidence about the ODC pipeline works. Where he does give evidence about the carrying out of works for either pipeline his evidence is generally vague and is in places demonstrably unreliable. For example, he associated the building of the secondary road with the Ocensa works, which is wrong as the road was built before or at about the same time as the ODC works {D5/91/1034}. It is therefore necessary to look to the documentary evidence as the primary source for what happened when.
1672. On or about 24 August 1988 ODC sent Snr Buitrago a First Letter, which he signed on or about 12 August 1990 thereby indicating his consent for the commencement and performance of the ODC Works {M/87T/294.2}.
1673. Also on 12 August 1990 Snr Buitrago entered into a ROW Agreement with ODC which was in a form reflecting the fact that he had possession of his land but that his ownership was not yet confirmed by an Incora resolution {M/91T/320.10}. It was given the number 142 by ODC and referred to Snr Buitrago’s property as La Clara. It referred to a ROW for a 24 inch pipe that was 725 metres in length and 20 metres in width. That would mean an area of 14,500 square metres, but the ROW Agreement recorded it as 7,250 square metres. It provided for consideration of COP 507,500, to be paid in two tranches of COP 355,250 and COP 152,250. The Appendix described the damages as “Damages caused to trees and shrubs (mountain) fences/ Length = 725 x 10 = 7250 m²”. Assuming an area of 7250 m² a payment of COP 507,500 would equate to a rate of COP 70 per square metre.

1674. There were two amendments to the original ODC ROW Agreement No 142:
- i) An amendment executed on 5 July 1991 amended the consideration to be paid for damages and occupancy right under the “Main Agreement” and provided that ODC would pay Snr Buitrago on a one-off basis the sum of COP 1,015,000 in two instalments of COP 862,750 and COP 152,250. Assuming an area of 7,250 square metres to be in contemplation, COP 1,015,000 would be equivalent to a payment of COP 140 per square metre. Assuming an area twice that size would effectively halve the rate. The amendment records that “the readjustment to be paid amounts to COP 507,000 transfer to [the specified Bank].” There is also a note that “In the contract to be executed by the Owner upon final allocation by Incora, the owner shall be recognised a value of the ROW similar to the one recognised for other properties, i.e. \$217,000 and a further \$217,000 for damages that could be included in this readjustment for lack of titles to the land.” ;
 - ii) An amendment executed on 29 September 1991 amended the Main Agreement by agreeing to execute the ROW Deed for the ODC works on 21 July 1992.
1675. On 10 November 1990 ODC authorised its contractors to carry out the works on LC50 {M/87T/294.1}. It seems likely that the secondary road was constructed by about this time or soon after {K2/2T/75} though there is no direct evidence of the date of construction. Snr Buitrago’s belief that it was built as part of the Ocesa works is wrong; if there is any substance in his recollection of it being associated with the laying of a pipeline, it suggests that it was built at about the same time, or shortly before, the ODC works {D5/91/1034}. The precise time of construction is otherwise not material.
1676. It was not until 31 March 1992 that Snr Buitrago’s ownership of the property was confirmed by Incora Resolution 0464 {M/89/297} {M/91T/320.5}.
1677. On 24 August 1994 Snr Buitrago entered into a second ROW Agreement with ODC {M/91/300} {M/91T/320.1}. It too is described as Agreement 142 but appears to be the contract which was to be executed upon final allocation of the land to Snr Buitrago by Incora, referred to in the amendment to the original Agreement on 5 July 1991. It again referred to LC50 as La Clara but identified it by reference to Incora Resolution 0464 of 1992. The agreed consideration was COP 435,000, which would equate to COP 60 per square metre for an area of 7,250 square metres and half that for an area twice that size. As foreshadowed in the note to the July 1991 amendment, it said that the consideration would be paid in two equal tranches of COP 217,500.
1678. From these documents it appears that Snr Buitrago’s original ROW Agreement with ODC was superseded by the 24 August 1994 ROW Agreement, execution of which had been dependent upon confirmation of his ownership by Incora. It also appears that the intention was for Snr Buitrago to be paid COP 1,450,000 (COP 1,015,000 under the 1991 Amendment and COP 435,000 under the 1994 ROW Agreement), with the sum that ODC was prepared to pay him being increased once his ownership (as opposed to mere occupation) was confirmed by Incora. Payment receipts and internal documents recording requests for payment indicate that ODC regarded the sum of COP 1,450,000 as split between consideration for the right of occupancy (COP 217,500) and damages (COP 1,232,500) {M/89.1T/298.16}.

1679. Untangling the dates of the receipts is not entirely straightforward. There are two potentially material facts. First, Snr Buitrago signed receipts that released and held ODC harmless from future liability {M/89.1T/298.13} {M/89.1T/298.14} {M/89.1T/298.15} {M/89.1T/298.19} {M/89.1T/298.22}. Second, it appears that the first payments to Snr Buitrago were a payment of COP 355,250 (being 70% of the initially agreed consideration), for which Snr Buitrago signed a receipt on 1 September 1990, and a payment of COP 507,500 pursuant to the 1991 Amendment, for which Snr Buitrago signed the receipt on 21 September 1991 {M/89.1T/298.19}. The balance of payments making up the COP 1,450,000 due to Snr Buitrago were paid in 1994.
1680. The sums paid to Snr Buitrago are relevant because he says that he bought his five young cows and a chain saw out of the monies he received from ODC. Leaving aside the chain-saw, that would suggest a price of not more than COP 300,000 per cow. If he bought the cows with the initial two payments, it would suggest a price of under COP 200,000 per cow. The later ODC payments were in smaller sums and were paid in 1994. The Claimants' submit that Snr Buitrago bought his heifers in 1994. There is no documentary or other objective evidence to help. Snr Manco's evidence was that Snr Buitrago had "a few cows" when he started working for him in 1992 or 1993 {D5/88/941}. That seems to me to be something that Snr Manco is likely to have remembered. On the basis of Snr Manco's evidence and the size of the cheques paid to Snr Buitrago by ODC I find that Snr Buitrago bought his five heifers and put them on La Alborada in about 1992.
1681. The Claimants allege that two of Snr Buitrago's cows got stuck and died in 1997. I deal with this claim in detail later. In summary, I accept that he lost two young cows in the pond near to his house and subsequently sold his three remaining animals. However, my acceptance of the evidence that he bought the five heifers in 1992 has certain implications. Snr Buitrago said that his cows were still "young" cows which "were still not breeding" {D5/91/1036}. If, as he says, he lost them in 1997 they would by then have been at least five years old, which is inconsistent with their being described as still young and would raise questions about why he had not yet bred from them. Once again, there is no documentary or objective evidence to help. On this occasion I consider that Snr Buitrago is likely to remember that his cattle that died were still young and were not breeding. That recollection, however, casts doubt on his present recollection that he lost them after the Ocesa works. I am not satisfied that he lost his two young cows in 1997 and think it more likely that he lost them before the Ocesa works took place. Because the state of the pond by the house was not in any event attributable to the Ocesa works (even if the loss had been in 1997 or later), the main significance of this mis-attribution of date is as another pointer to the unreliability of Snr Buitrago's memory of chronology.
1682. There is no evidence of any negotiation to increase the payments due to Snr Buitrago because of unexpected damage caused by the ODC works; and there is no evidence that ODC entered into a *force majeure* amendment with Snr Buitrago as they had with others, increasing the payment on account of damage caused by suspension of the ODC Works from 18 January 1991. Other than the signed receipts, there are no other documents disclosed between Snr Buitrago and ODC in the form of Paz y Salvos. No evidence was given about any of these matters. No direct evidence was given about the dates on which the ODC works were carried out on LC50. It may be inferred that

they were carried out after the certificate of authorisation on 10 November 1990. I am not in a position to make any further finding save that it seems likely that they would have been concluded in 1991 or, possibly, 1992.

1683. The Claimants say that Snr Buitrago and Snr Manco formed a partnership in about 1988. They base this on a document produced by the two men in 2007 for which there are two translations {M/107T/368.1}. I reject the Defendant's submission that, on its proper translation, it refers to forming a company: the word "sociedad" in the context of this document means a partnership. The document was prepared by a notary {Day8/21:21} and contains the following clauses:

“One: We formed a partnership in 1988 between [Snr Buitrago] and [Snr Manco] for the extraction of timber, with crop farming for cacao, yucca, banana and fishing, where we also had cattle, on a property ... called La Alborada...

Two: in 1992, the other half was purchased from [Snr Buitrago] which we had jointly for a value of ...\$8,165,000 who granted [Snr Manco] an indefinite time period to pay all of the debt, which I paid him in full in monthly amounts of \$400,000

...

Five: The people from ECOPETROL brought from [Snr Buitrago] an easement for the oil pipeline to pass, where they promised to pay the sum of \$7,000,000 for the passing of the said pipeline, they only paid for the sum of ...\$300,000 ...”

1684. There are a number of points that arise on the document. It is not self-evident what caused the document to be brought into existence, not least because it is inconsistent with Snr Manco's evidence in three respects {D5/88/940}:

- i) First, it is inconsistent with his evidence that he first started to work for Snr Buitrago in 1992-1993;
- ii) Second, it is inconsistent with his evidence that Snr Buitrago offered to sell him half of the farm on favourable terms for payment a while after he had started working for him {Day8/19:11} and that, from then on, they worked in partnership but “we never drew up a document to formalise the partnership”;
- iii) Third, it is inconsistent with his evidence that he agreed to buy out Snr Buitrago's half of the farm about eighteen months after the laying of the Ocesa pipeline.

1685. Snr Manco said (and I accept) that he could not remember why the document was drawn up. He was asked in cross examination whether the purpose of the document was to assist in a claim against Ecopetrol, on the basis that to do so would require him to show an interest in the property before 1992 {Day8/24:21}. That suggestion is repeated in the Defendant's closing submissions as part of an attack on Snr Manco's credit {C4/4.8/785}. I agree that the reference to Ecopetrol is perplexing. First, and assuming always that the reference to Ecopetrol is a reference to the ODC pipeline,

there is no evidence that ODC ever offered to pay anything approaching COP 7,000,000. Second, the COP 1,450,000 which it is known that ODC agreed to pay was paid by 1994: see above. Third, the Ocesa ROW Agreement, to which I will refer in more detail later, involved payment of COP 7,400,000, which is at least close to the COP 7,000,000 mentioned in the 2007 Agreement; but that was paid in full by September 1995.

1686. After his evidence, Leigh Day provided an explanation, confirming that “the document was provided by Sr. Manco and Sr Buitrago in 2007 following a request from Leigh Day. We were concerned to have documents, if they existed, which set out the nature of the partnership between [Snr Manco and Snr Buitrago]” {C6/33/2}. I assume that, if their purpose in asking for the documents (or the purpose in producing the documents) had been to enable a claim to be made against Ecopetrol arising out of the ODC works, Leigh Day would have made that clear in the light of what Snr Manco had been asked and said in cross-examination. I therefore infer that the request was made in relation to the proposed claim arising out of the Ocesa pipeline. On that basis I think it likely that Leigh Day asked Snr Manco and Snr Buitrago to provide documents evidencing the course of their dealings, including their partnership, and that Snr Manco and Snr Buitrago, having no such document, responded to the request by going to a notary and attempting to set down a formal record of what had happened. On this inferred state of affairs, the document does not harm their credit at all; but I cannot assume that it is reliable, since it will have been produced on the basis of their recollection in 2007.
1687. In the light of Snr Manco’s evidence in his witness statement {D5/88/940} and at trial {Day8/19:4}, I find that he first went to work for Snr Buitrago in 1992 or 1993 primarily as a wood cutter; that he entered into an informal agreement to buy half of the farm from Snr Buitrago some time after 1992 or 1993, after which they worked as informal partners; and that about 18 months after the construction of the Ocesa pipeline (i.e. in about mid- to late-1998) Snr Manco agreed to buy out the other half of Snr Buitrago’s interest in the farm. The total payments made by Snr Manco to Snr Buitrago for the farm were in the order of COP 8,000,000. Snr Manco had completed his payments before Snr Buitrago finally left the farm in 2002. At some point after he started working on the farm, Snr Manco started clearing forest to lay it to pasture. He reintroduced cattle in 2002.
1688. The Claimants accept that there may have been some sedimentation in streams before the laying of the Ocesa pipeline but submit it would have been at low background levels and would have had no effect on water supplies for human or animal consumption. Similarly, it is the essence of the Claimants’ case that there was no excessive sedimentation of the slopes below the ridge or of SW1 or W3 before the coming of the Ocesa ROW. That is the gist of the Claimants’ evidence but, for the reasons that follow, it is not open to the Court to accept that evidence without scrutiny.
1689. The starting point is that during the period between the laying of the ODC pipeline (completion in 1991 or, possibly, 1992) and the opening of the Ocesa ROW (November 1996) the ODC ROW was exposed to the elements. It lay along the same ridge and route as later taken by the Ocesa ROW. The Ocesa ROW was slightly wider (at a nominal 25 metres plus sobranchos compared with 20 metres plus sobranchos) and the Ocesa pipeline was laid to the east of the ODC pipe, and thus

closer to the slopes above LC50. No detailed evidence about the carrying out of the ODC works is available; but the same pathways for sedimentation from the ODC works would have existed from the ridge and on the slopes as later existed for sedimentation from the ROW after the Ocesa works. There is no evidence of major protective works being undertaken by ODC to prevent eroded soil from escaping to the slopes to the east. In particular, there is no evidence that longitudinal drains or other long term geotechnical works were installed to divert the flow of waters away from the slopes below the ridge.

1690. The most detailed analysis of the position before the Ocesa works comes from Dr Savigny with his review of the 1995 aerial photograph. His evidence {H2.3/3/683}, which I accept, is that:
- i) The amount of soil exposure on and adjacent to the ODC ROW is clear evidence of relatively recent construction. It indicates 90-100% exposed soil;
 - ii) There is evidence of an access trail in two places adjacent to the west side of the ODC ROW. They are not as wide as the ROW but they indicate exposed soil and appear to be the same construction vintage as the ROW;
 - iii) He found no evidence of steep backslope cuts, deep fills, sidecast fill or sediment plumes extending from the ODC ROW or the access trails adjacent to it. However there does appear to be extra work space at the east side of the ODC ROW at one point, which may be a location where some waste fill was disposed.
1691. The second feature to be borne in mind is that, until it was realised that the secondary road had nothing to do with Ocesa, Snr Buitrago was in no doubt that it damaged his land, as was made clear in his witness statement and in his pleaded case.
1692. The third feature to be borne in mind is that Snr Buitrago did not keep cattle on La Alborada until after the ODC pipeline had been installed and, when he did, he kept them near to the house. Furthermore, even in 1995 most of SW1 and the eastward course of W3 remained primary forest and Snr Manco's push to the west to clear additional pastures had not yet happened. As the Claimants put it, the 1995 aerial photograph "is clear in showing that the relevant area to the east of the ROW right down to the area near to the house which Dr Savigny designates as wetland was densely forested mostly with well-defined tree crowns" {C4/3.6/860}. So the focus of agriculture was to the east of the property – "the ODC ROW ... was of course located well away from any farming activity undertaken by the Claimants,..." {C4/3.6/861}. There would have been no call for the Claimants to go regularly into the area that has subsequently been designated SW1 or the lower reaches of W3 and there is no evidence that they did so. This fact, combined with the demonstrable unreliability of important parts of the evidence about chronology and the fact that both men are now convinced that their problems only began with the Ocesa pipeline mean that I am unable to treat absence of evidence from them about what was happening to the west of the property as evidence that nothing was.
1693. In this particular lead case, I have come to the conclusion that the better way of approaching the question of the impact of the Ocesa ROW is to consider it in the round and without making prior findings about the state of the property after the ODC

works and before the Ocesa ones. I have reached this conclusion because the extent of forest cover in the pre-1997 aerial photographs means that detailed information about the areas of particular interest (SW1 and the lower reaches of W3) is limited. It will therefore be necessary to look at the possible contributors to the damage that is alleged to have occurred after the Ocesa works and to make findings about the extent to which they are attributable to Ocesa and whether they may have existed, wholly or in part before the Ocesa works were carried out.

The Relevant Factual Background: Pre-construction Period

1694. Dealings for the Ocesa pipeline started in 1994. Snr Manco took no part in them {D5/88/950}. Snr Buitrago's memory is not good. I accept that representatives would have come to the farm before he signed any documents and that they would have been reassuring about the consequences of having another pipeline running through the farm. I do not accept that he has any reliable recollection of what was said beyond that. He says that documents were read to him, but that he does not know if they were read completely. His recollection is that he was always paid in cash {D5/91/1028} but it is common ground that he received cheques {M/94/333} {M/97/348}. In this state of evidence and lack of recollection on the part of Snr Buitrago I am not in a position to find that the whole of the relevant documents either were read to him or that they were not.
1695. The First Letter from the Defendant was in its standard form and dated 14 July 1994: see [368] above. Snr Buitrago signed it on or about 28 July 1994 {M/90T/299.1}. For some reason which is not explained, he signed another one on 2 November 1994, which was in identical terms apart from describing La Alborada as being in the municipality of Segovia rather than Remedios {M/92T/321.1}. Also on 2 November 1994 he entered into the ROW Agreement with the Defendant {M/93T/332.1}. It was in the Defendant's standard form as set out at [369] above. Snr Rojas acted on behalf of the Defendant. La Alborada was declared to be just over 79 hectares. Clause 5 said that the pipeline and complementary works would pass through La Alborada "in a 25-meter wide and 740-meter long strip of land, for a total of 18,500 square metres ...". Under Clause 9, the price of the easement rights and the damages caused by the construction of the pipeline was COP 400 per square meter for a total of COP 7,400,000. The Annex described the damages as "Damages in: Pastures, trees and fences". The rate of COP 400 per square meter compares with the aggregated rate of COP 100 (1,450,000/14,500) paid by ODC under the various agreements outlined above. It is not far short of the c. COP 8,000,000 paid by Snr Manco to Snr Buitrago for the farm.
1696. The ROW Deed was signed by Snr Buitrago and executed on 6 February 1995 {M/95T/345.1}. It was in standard form and was notarised. It was duly registered in the Land Registry on 15 June 1995 {M/95T/345.11}.
1697. Snr Buitrago was paid the first 70% of the consideration (COP 5,180,000) on 27 January 1995 {M/94T/333.1} and the outstanding 30% (COP 2,153,400) on 14 September 1995 {M/97/348}. He signed receipts on each occasion. The receipt for the second payment had added in manuscript the words "and that I have been fully paid (Paz y Salvo) in all respects."

The Relevant Factual Background: Construction Period

1698. The Claimants submit that short term erosion control works were installed in early September 1996 {C4/3.6/822}. The Ocesa ROW was opened on about 6 November 1996. No detail is available about what, if anything, was done before the opening of the ROW, but there must have been some activity because Snr Buitrago entered into a settlement agreement with Ocesa and Saipem on 6 November 1996 {M/99T/354.1}. It was in the standard form of settlement contract as set out at [388] above. It referred in Clause 5 to “utilisation of a 7,400 m² access, at the rate of \$280 x m²” and in Clause 6 to Snr Buitrago having claimed “\$4,000,000 as compensation for the damages caused to the property, identified in the preceding clause, considering that they have caused him losses such as: throng of unauthorized people passing through this access.” Clause 7 recorded that Saipem believed the real value of the damages caused on account of access to be \$1,000,000 and Clause 8 recorded that the parties did not agree about the actual value of the damages. The settlement terms were that Saipem would pay Snr Buitrago COP 2,070,000 within thirty days. That settlement sum equates to the rate of COP 280 per m² for the 7,400 m² mentioned in Clause 5.
1699. It is possible that this is the settlement to which Snr Buitrago refers at [76] of his witness statement {D5/91/1033}. The receipt recording payment of the damages on 25 November 1996 {M/98.2T/351.2a} is consistent with his evidence that he remembers being paid in cash, as there is no mention of a cheque. There is, however, no explanation in the evidence of the reference to a throng of unauthorized people and I am not able to make any finding other than that the settlement appears to have been for sobranchos and to have been reached before (or, at the latest, on the day of) the opening of the ROW. To that extent it shows a willingness and ability on the part of Snr Buitrago to make a complaint even before the Ocesa works were carried out. He entered into a second settlement after the works had been completed, to which I will return when setting out what happened after construction.
1700. Trench excavation and backfilling took place between about 25 and 30 November 1996 {K39/409.1/3}. Reformation of the ROW was carried out on about 4/5 December 1996 {K45/476/108} {K45/476/107}. The long-term geotechnical works were carried out by about 12-14 December 1996 and the revegetation works completed by about 21 March 1997. The revegetation works may have been commenced before then but it is not possible to identify specific dates {Day19/157:1}. Snr Manco’s recollection that the revegetation works started in the same month as the Recomposition of the ROW {D5/88/952} is suspect (for reasons outlined earlier when considering his evidence generally) but supports the Defendant’s submission that revegetation was at least commenced at about the same time as the installation of long term geotechnical works. The evidence does not justify a finding that there was a clear gap between the long term geotechnical works and revegetation works or that there was a gap from December 1996 to March 1997. Brachiaria grasses were used for revegetation {D5/88/952}.
1701. No complaint was made during the works. Snr Manco said that it didn’t occur to him to make a complaint then “because at that time you couldn’t see any damage” {D5/88/953}. This evidence must be treated with some caution because of the limited opportunity he and Snr Buitrago had to observe the works along the ridge as they were being carried out: see [1707] and [1711] below.

1702. A walk through took place either immediately or within a few weeks of revegetation {E2/7/346}. Records would have been kept as the walk throughs affected payments to Saipem; but no records are available to the Court {Day19/43:24}. An inspection on 6 June 1997 recorded as the only items on LC50 “casing setting on ditch and cracks” {J24/74T/40}. Snr Loeber explained, and I accept, this to mean that the tube had settled in the ground giving rise to gullies. Precisely where this happened has not been identified and neither party has linked it to particular problems that are relevant to the loss and damage alleged by the Claimants. By 18 November 1997 most of the punch list items had been cleared satisfactorily, but it is not possible to tell which ones were outstanding {J24/80/1}. What can be said of the original punch-list is that it and the other walk throughs should have picked up significant problems if they were present and that there is no sign that they did. Also, in contrast to the position on LC74, the daily and weekly reports recorded no serious problems that can be linked to LC50 or its surrounding area, though they do refer to adverse weather conditions, as I summarise below.
1703. The records at La Palma di Coco, which Professor Monsalve considers and I find to be the appropriate reference weather station for LC50, provide the following information (partly summarised at {C4/3.6/819} and set out in full in Professor Monsalve’s Appendix 5 {H8.16/16/4209}):

Month (96/97)	Month’s Rainfall	Max (24 Hours)	Days with Rainfall
September	314	50	17
October	341	58	22
November	267	54	13
December	130	25	15
January	60	20	7
February	286	120	14
March	26	7	5
April	202	71	10
May	365	84	18
June	337	77	16
July	174	81	8
August	242	90	11
September	295	77	12
October	428	105	11
November	375	100	8

1704. It is relevant to consider the total annual rain fall from when the ODC pipeline was installed {H8.16/16/4317}- {H8.16/16/4319}:

Year	Annual Rainfall	Max (24 Hours)	Days with Rainfall
1991	3647	155	145
1992	3104	180	113
1993	4730	100	156
1994	3918	130	150
1995	4118	120	164
1996	3943	95	182
1997	2842	120	124

From this annual data it can be seen that 1996/1997 were not extreme periods by the standards of La Palma di Coco. The average annual rainfall for 1991-1996, which broadly covers the period from the laying of the ODC pipeline to the laying of the Ocesa pipeline was 3,910 mm. The annual rainfall for 1997, the first full year after

stripping of the Ocesa ROW, was 72% of that average: I bear in mind that I have left November and December 1996 out of account.

1705. The Spread B weekly reports contain numerous references to rainy conditions affecting the works. It is not possible to tie particular references to the works being conducted on La Alborada, but they give a flavour of the typical weather conditions experienced on this spread. On 8 November 1996, two days after the ROW was opened on La Alborada, bad weather made it impossible for inspectors to visit work spreads {K39/400T/2}. Between 10 and 30 November there were references to rain hindering progress on five days {K39/401.1T/2} {K39/408.1T/2}. There were references to rain during the night saturating the ground on 3 December and slowing progress on 5 December {K40/413.1T/3}. During the period after reconfirmation on about 4/5 December 1996, rain reports are incomplete. The Zaragoza camp was some 40 kms away and its records are incomplete. The data is therefore partial and of limited assistance. The highest daily rainfall recorded at Zaragoza between January and 21 March 1997 is 54 mm on 18 January 1997 {K41/429T/4}.
1706. Taking the data that I have summarised above overall, the weather during the period of and for the year after the Ocesa works was not extreme by local standards, though it undoubtedly included days with heavy rain. I bear in mind my references to the ferocity of the climate elsewhere in this judgment. The climate in the Central Cordilla is of the same character and ferocity.
1707. Snr Buitrago gave little evidence about the carrying out of the works and such evidence as he did give has to be treated with caution for the reasons I have already given and because I am not satisfied that he was able to distinguish after so many years between what happened with the ODC works and the Ocesa works. As he had neither crops nor animals near the ridge, he “would go there from time to time” {D5/91/1029}. His evidence was that the earth that was dug up was not protected and was simply piled up on the sides “while they dug out the ditch”. He says that they did not put up trinchos. He said that earth from the trench was piled on earth that had previously been stripped and that it was left at the side of the ROW. His recollection was that costales were installed after revegetation and that in some areas (presumably at this later stage) they built “walls or trinchos” with the sacks to stop the earth going down to the water sources. He cut wood for them to use for trinchos over a period of two weeks. He made a complaint in Remedios that there was a stream which was being contaminated by mud from the ROW and that the stream, now full of mud, fed into the stream that came to the house: when it rained the earth would come loose from the ROW and come down to the stream and was adversely affecting the water. His concern at the time was that the damage was going to be very great because the water was going to be contaminated. He described a negotiation where “they” said the damage was minor and would not continue. Initially they did not agree on the level of compensation; but at a subsequent meeting fifteen days later he was offered an increased sum on a take-it-or-leave-it basis and he accepted what he was offered. According to Snr Buitrago, he was paid in cash.
1708. Snr Buitrago’s description of mud coming off the ROW is important because of the link between rain and its effects on the land below. Thus “after the Ocesa pipeline was laid, when it rained earth started to be carried down toward the water channels and it got stuck just before the meadow where I kept the cattle. ... When heavy rain finally fell and the pressure built up, the earth that had been stuck was washed away

and the meadow got covered in earth and mud and a wave of water. The meadow became a deep swampy lagoon. ... Every time it rained more and more swamp formed. ...” {D5/91/1035}. When speaking of the sedimentation of water sources he said that “it happened little by little, first the stream about which I complained during the construction was contaminated. This stream definitely started to be contaminated as soon as they started construction. Later other water sources and the pool were contaminated little by little each time it rained” {D5/91/1036}. His evidence about erosion on the ROW was that “a lot of earth had come down from the [ROW]. The cortacorrientes and the barriers that they installed did not hold back the water and the whole lot went down into the water channels. Every time I went to look when it was raining, the erosion had got worse and more and more earth was going down into the water channels” {D5/91/1037}. On the Claimants’ case, by the first winter, mud was flowing to the lower reaches and into the fish pools, of which more later.

1709. There is a considerable danger of over-interpreting Snr Buitrago’s evidence, but it is to be remembered that when the Ocesa pipeline was laid, the meadow in which he was keeping his cattle was the area of 1-2 hectares near the house and the forest to either side of W3 further to the west had not yet been cleared. His description of earth getting stuck “just before” the meadow where he kept his cattle is therefore a description of earth making its way past the area of SW1 and further down W3 to a point close to the house. Similarly, his description of “the meadow” becoming a deep swampy lagoon most naturally refers to the meadow around the house. The case advanced by the experts concentrates on SW1 and the wetland close to W3 and does not support a finding that the general area of meadow around the house where Snr Buitrago was keeping his cattle in 1997 was turned into a deep swampy lagoon, though the area he cultivated included an area of pre-existing wetland and the pond, from which water was drawn for human and animal consumption {D5/88/955}. The pond where (as I find for reasons given elsewhere) Snr Buitrago’s two heifers were lost was near the small bridge below the house and was described by Snr Manco as very deep, swampy and full of mud {Day8/69:18}. While I accept as possible that water coming down stream W3 to the house may have been discoloured in times of heavy rain after the Ocesa works, I do not accept that the state of the pond when the heifers died was of recent origin or attributable to the Ocesa works.
1710. One aspect of Snr Buitrago’s evidence that was quite wrong was that he says he complained (in the context of the Ocesa works) that the link road (which from his description means the secondary road) was causing him a lot of damage {D5/91/1033}. I accept that he complained that the secondary road was causing him a lot of damage but, as I have already said, it was nothing to do with the Ocesa works and was either before or during the ODC works. I infer and find that he complained about the impact of the secondary road before the Ocesa pipeline was laid because he perceived that it was causing significant damage to his land.
1711. Snr Manco’s evidence was that the ODC pipeline had caused no damage {D5/88/950}. During the Ocesa works he would go up to the ridge once a week, but he only looked “in passing” because it was a militarised zone and people were not allowed to watch because of the security risk. His evidence was that the soil from the trench was placed on either side of the ditch, within the ROW and unprotected. Excess soil after the trench had been backfilled was spread and compressed; but his evidence was that this soil was washed away towards where the streams were. His

statement indicates that he saw the water carrying away the soil and that this was before revegetation took place. His evidence is that barriers made of fibre costales were put up in rows along the ROW and that they made some walls with fibre costales along the edge of the ROW; but they didn't use matting. He remembered the building of gabion walls made from fibre costales containing soil; but he says they have disintegrated and no longer exist.

1712. Snr Manco's evidence was that the water started to turn muddy during the first rainy season so that it looked cloudy and tasted strange. The first rainy season after the Ocesa pipeline was laid would have started in about the second half of April 1997. He described that the water gradually filled with more and more sediment and that "with the slightest hint of rain, this water becomes undrinkable", even in summer {D5/88/955}. In his oral evidence he said that, before the Ocesa pipeline there wasn't a swamp at SW1 and one could walk there easily but that now land comes down from the crest and gets stuck there so that it gathers more and more mud each year {Day9/74:1}.
1713. I will take this evidence into account when making findings about what was and was not done during the Ocesa works. I reject the evidence of Snr Echevarria that there was at some point a huge explosion in the high part of the forest after which black mud which smelled like petroleum seeped out of there until it pooled on the low plain, growing until it blocked the path that cattle had to take to their pastures {D5/97/1057}. This, which is his description of how the swampy areas formed on La Alborada, did not happen.
1714. I now turn to the Claimants' criticisms of the carrying out of the works on LC50 and the specific findings for which they contend. In their closing submissions the Claimants' criticisms of the carrying out of the works on LC50 are divided into four categories: (1) Soil piles; (2) Erosion on the ROW/Long Term Measures/Revegetation; (3) Soil mixing and Inversion and (4) Failure to protect watercourses. I shall follow broadly the same course.
1715. **Soil piles:** the findings for which the Claimants contend {C4/3.6/829}ff are:
- i) Retention structures were not installed to protect soil piles prior to or during ROW opening (6-9 November 1996) or Trench Excavation (25 November – 4 December 1996), or at all in circumstances that amounted to negligence;
 - ii) Further or alternatively, any retention structures that were provided failed or were inadequate in circumstances that amounted to negligence;
 - iii) Stockpiles were not covered in circumstances that amounted to negligence;
 - iv) Stockpiles were left standing from ROW Opening (6-9 November 1996) until ROW Recomposition (4-5 December 1996) in circumstances that amount to negligence;
 - v) There was a failure to review or maintain or replace such that the failure to install or the inadequacy of any retention structures was not rectified in circumstances that amount to negligence;

- vi) Stockpiles were not placed and shaped at suitable locations and in particular were placed (i) outside the 25m ROW width, (ii) on or next to sloping ground (iii) built too high and/or of too large volume in circumstances that amount to negligence;
 - vii) There was soil loss from piles of topsoil and/or subsoil and/or trenchspoil (i) during ROW opening in early November 1996; (ii) during or just after trench excavation (25 November – 4 December 1996), and (iii) at all times from ROW opening until ROW recomposition in 4-5 December 1996.
1716. *Stockpiles*: the Claimants' case is summarised at [1715](iii) (iv) (vi) and (vii). There is no satisfactory evidence of substantial stockpiles on the Ocesa ROW. Even with their limited viewing of the works, had there been substantial stockpiles of the size contended for by the Claimants, I would expect that either Snr Buitrago or Snr Manco would have seen them and remembered them. Snr Manco describes trench soil being placed on either side of the ditch within the ROW. That could be a description of piles being placed in strategic places, but it does not say so and is not necessarily to be inferred. I am not convinced that Snr Buitrago's evidence about trench soil being placed on earth that had previously been stripped is correct, unless he is referring to trench soil being placed on other lower-horizon soil that had been stripped from the ROW.
1717. It follows from the findings that I have already made that the earth stripped from the ROW would have stood from 6 November 1996. I am not able to make more precise findings about where it was placed. In addition excavated trench soil stood on the ROW for up to five days between 25 and 30 November 1996 before the trench was backfilled. There would then have been modest windrows of excess soil. That soil would have been spread on reformation on or about 4/5 December 1996 with long term geotechnical works being installed a minimum of seven days and a maximum of about 10 days later on 12-14 December 1996. After Recomposition there would have been no significant piles of soil exposed to the elements. Revegetation commenced on a date that I am not able to specify, but there was no clear gap between the long term geotechnical works and the start of revegetation works, which were in any event concluded by March 1997: see [1698] ff above.
1718. *Retention works*: the Claimants' case is summarised at [1715](i) (ii) and (v). Snr Buitrago initially said that Ocesa did not put up trinchos. Later in his witness statement he said that he cut wood for them to use for trinchos, though this evidence does not specify when or where the trinchos were erected. It is possible that Snr Buitrago was supplying wood for use on trinchos on a nearby property, but that does not appear from his evidence. There is no evidence about the parapets that were the subject of Snr Buitrago's settlement with Saipem: see [1744] below. I am therefore unable to make any finding other than that parapets were erected and were destroyed at some stage, for which Snr Buitrago was compensated.
1719. A short way below the ROW, polypropylene sacks were stacked in what appears to have been some sort of retention structure, which the Claimants have described as a gabion. They can be seen on the Claimants' dry season video {H7.5/25/1228} and in Dr Velez' photograph at {H5.4/5/854}. Their precise purpose is not clear and it is apparent that there is sediment below them so that they have not acted as a completely effective barrier in the years until they were photographed. Dr Velez described this

area as “Along the right-hand border of the ROW running south to north overlooking LC50’s farm, continuous vegetation cover was seen consisting of secondary forest and high barbechos in good condition with no erosion processes visible, but within which could be seen works such as gabions ... constructed by the company as a remediation measure to counter the flow of sediment” {H5.4/5/840}. I accept that evidence, though the circumstances in which the sacks were placed remain unclear.

1720. Balancing the Claimants’ assertion that short-term erosion measures were not taken against the evidence of system provided by Snr Gasca, I am not satisfied that no retention structures or other short-term measures were installed; but I am not able to make specific findings that particular measures were taken or that they were taken in particular places. The existence of the gabions indicates that sediment was coming off the ROW – but that cannot seriously be disputed in the light of all of the evidence about sediment being found on the slopes below the ROW and making its way to the lower slopes. Similarly, although there are no records of serious problems in the reports, I am not able to make a finding that Ocesa never made mistakes either in its conduct of the works or in its record keeping. I therefore find the absence of attributable mention in the reports to be of little assistance.
1721. With these preliminary findings I address the Claimants’ criticisms set out at [1715] as follows:
- i) It is probable that, if required, some trinchos or other retention structures were provided. The absence of evidence of substantial stockpiles or specific escapes from the ROW during construction means that no specific findings can be made about where structures were either required or provided;
 - ii) The Claimants have not proved that any retention structures that were provided either failed or were inadequate save that the presence of the gabions may have been a response to an unspecified failure of short-term erosion works. The Claimants have not proved that any failure or inadequacy was the result of negligence;
 - iii) There is no evidence of substantial stockpiles. The more modest piles of topsoil and trench soil were not covered but that did not amount to negligence in the circumstances of LC50 because of the limited surface that was exposed and, in the case of the trench spoil, the limited time that it was out of the ground;
 - iv) No substantial stockpiles were left standing from ROW Opening on 6 November until Recomposition on 4/5 December 1996. No analysis of the operative reasons why Recomposition took place just under a month after ROW Opening and about a week after backfilling the trench has been undertaken. There is no proper basis upon which it could be said that the period of exposure was attributable to negligence on the part of Ocesa, particularly when the period during which the ROW was open was during the dry season;
 - v) While there is evidence (including the direct evidence from Snr Manco) that after the Ocesa works there was erosion from the ROW which led to sedimentation of the slopes below, it has not been shown that this was due to

either a lack of retention structures during construction works or their inadequacy. The Claimants' evidence, such as it is, is that they did not notice damage during the works and that water did not start to turn muddy until the first rainy season, which was after completion of the works. There is no proper basis for a finding of negligence in these circumstances;

- vi) There is evidence of agreement for sobreanchos both before and after the works were concluded: see [1698] and [1744]. There is no evidence that enables me to find that stockpiles were placed in particular places or in places that were inappropriate or in too great volumes.

1722. It follows that I reject the criticisms and allegations set out at [1715] above. However, as in other cases, I accept that there would have been some soil loss from the exposed soils between ROW opening on November 1996 and ROW Recomposition on 4/5 December 1996. The real issues are (a) how much soil was lost, (b) where it went, and (c) what effect it had on the Claimants' land, with particular reference to the fish ponds and SW1. I address those questions below.

1723. **Erosion on the ROW/Long Term Measures/Revegetation:** the findings for which the Claimants contend {C4/3.6/835}ff are:

- i) There was no erosion matting on the ROW between long term works (12-14 December 1996) and Revegetation (around 21 March 1997) in circumstances which amount to negligence;
- ii) If any erosion matting was installed, it was installed on the basis of dispensing with matting from slopes of 10 to 20% in circumstances that amount to negligence;
- iii) If any erosion matting was installed, it was not consistently provided at all or provided between ditch diverters across the full width and length of the ROW in circumstances which amount to negligence;
- iv) Ditch diverters were spaced too widely in circumstances that amounted to negligence;
- v) No or no sufficient longitudinal drains (or "channels") were provided on LC50 in circumstances which amount to negligence;
- vi) No sediment traps were provided at the discharge points of longitudinal drains in circumstances that amount to negligence;
- vii) No EDS were installed on LC50 in circumstances which amount to negligence;
- viii) There was a significant delay between ROW opening (6-9 November 1996) and recomposition (4-5 December 1996) in circumstances which amount to negligence;
- ix) There was delay between ROW recomposition (4-5 December 1996) and Long Term Works (12-14 December 1996). The ROW was naked during this period in circumstances which amount to negligence;

- x) There was a significant delay between Long Term Works (12-14 December 1996) and revegetation (around 21 March 1997) in circumstances which amount to negligence;
 - xi) There was a failure properly to review and maintain the ROW throughout the periods cited above including a failure to maintain and replace short and long term measures which became ineffective and/or failed in circumstances that amount to negligence;
 - xii) Fencing was not installed to protect the ROW from cattle. When it was installed, it was removed prematurely (on instructions from the Defendant and/or contractors) in circumstances that amount to negligence;
 - xiii) Fertilisation/liming did not occur at all, alternatively did not occur at the same time as sowing of seeds in circumstances that amount to negligence;
 - xiv) There was increased erosion on the ROW at all times (a) from ROW opening (6-9 November 1996) until ROW reconstitution (4-5 December 1996), (b) from then until the long term works in (12-14 December 1996), (c) from then until re-vegetation works (around 21 March 1997), and (iv) after re-vegetation works (around 21 March 1997 onwards}.
1724. *Erosion matting*: the Claimants' case on erosion matting is summarised at [1723] (i)-(iii) above. I refer to the findings that I have made about the timing of the long term geotechnical works (by 12-14 December 1996) and revegetation works (completed by about 21 March 1997, but with no finding that there was a clear gap between the long term geotechnical works and revegetation or, if there was a gap, not one of great length) at [1700] above.
1725. Snr Manco said that no erosion matting was used {D5/88/953}, but Dr Card found remnants which show that it was used at least to some extent {H1.4/22/966}. I am not satisfied that Snr Manco's evidence is based on recollection or that it is reliable on this point. The GDS are uninformative because zig-zag lines were not used to indicate matting on Spread B or, if they were, were not used consistently {E1/2.1/118.2}. It is therefore not possible to conclude that the remnants found by Dr Card had been placed as part of remedial works carried out later. TQ61 applied and therefore it is unlikely that matting was used on the ROW where its gradient was less than 20%. This would have caused the rate of erosion to be higher on those slopes than if it had been used; but no analysis was presented by reference to the individual slopes and, for the reasons given at [569] ff above, the decision not to use erosion matting on those slopes cannot automatically be held to be negligent.
1726. *Ditch diverters*: the Claimants' case on ditch diverters is summarised at [1723](iv) above. Dr Card summarised his findings at {H1.1/1/180} as follows: "generally the slope and ditch diverter spacing measured in the field are between 26% and 44% gradient and are at 6m to 7m spacing respectively. The diverters are formed from compacted soil on the shallower slopes (i.e. up to 30% slope gradient) and polypropylene soil filled sacks on slopes greater than 30% and conform to Type 3 and 4 respectively given in the RECS. *The spacing as measured in the field does not conform to the RECS, it is at much closer spacing than the requirements of the RECS and GDS.*" (Emphasis added). Dr Card's gradient measurements were not all

accepted, and the experts agreed that there were difficulties in taking slope gradients {H1.4/22/957}. However, in the light of Dr Card's opinion as emphasised above, it is not necessary to examine particular gradients in detail.

1727. *Longitudinal drains, sediment traps and energy dissipation structures:* the Claimants' case on longitudinal drains, sediment traps and energy dissipation structures is summarised at [1723985](v)-(vii) above. Dr Card found longitudinal drains on the side of the ROW over a partial length and partial evidence of energy dissipation structures in drainage channels from the longitudinal drain system {H1.1/1/182}. Dr Savigny found no evidence of longitudinal drains on LC50 {Day36/99:22}. The GDS provided for a longitudinal drain from KP 466-680 to KP 466+705 at a point with a gradient of 20% {K43/451/89}, which was thought to be at the southern end of the property {H2.7/9/1782}. Each expert found difficulty in correlating the chainages in the GDS to the topography on the ground and neither was able to identify a longitudinal drain that matched with the GDS requirement {H1.4/22/959}. Neither expert explained why a longitudinal drain would be required at the point indicated on the GDS but not elsewhere. There is no evidence of sediment traps on or adjacent to the ROW.
1728. The real dispute between the experts at trial was whether there should have been a longitudinal drain down from the ridge to the southern end of the ROW near where it entered LC50. Dr Card proposed a longitudinal drain running from the north to the south end of the property where all run-off from the ROW would be discharged at a safe velocity into one stream, the flow of the run-off having been controlled by energy dissipation structures on the way down {Day26/168:10}; and he referred to the longitudinal drain on LC74 by way of supporting analogy {Day26/167:17}. When he returned to the subject in re-examination the next day (at the Court's request) {Day27/114:16} his overnight order of magnitude calculations indicated that a series of 10 linked ditch diverters (covering roughly 140 metres of the ROW) would generate up to 260 m³ of flow per hour. The effect of running a longitudinal drain for the whole length of the ROW to channel flow down to the lower lands and from there into a stream (which is what Dr Card had suggested the evening before) would be to require a drain that could cope with many multiples of 260 m³ of flow per hour, whether the relevant stretch of the ROW is treated as c. 725 metres or c. 1000 metres in length. This confirms my initial impression that a longitudinal drain to take all runoff down to the lower slopes was an impractical suggestion.
1729. Perhaps in recognition of the impracticality of taking all run-off down to the lower land by a single longitudinal drain, Dr Card modified his suggestion. By the time of re-examination, he was suggesting that the longitudinal drain should discharge to a natural drainage system every 140 metres {Day27/116:16}. The question then arose whether it was better to concentrate the run-off from the ROW to discharge into a natural drainage system on the slopes above LC50 and W1-W4 at the end of each ditch diverter or, as Dr Card was suggesting, about every 10 ditch diverters. Dr Card's opinion was that it would not be satisfactory to allow the flow from individual ditch diverters to cascade over the side of the ridge down the slope, not least because there is little vegetation cover below the forest canopy {Day27/128:15}. His opinion was that such uncontrolled cascading would generate vortices, gulleys and erosion leading in some cases to landslip.

1730. I have considered the general criteria that may inform a decision whether or not to provide longitudinal drains at [578] ff above. I reject Dr Card's initial suggestion of a longitudinal drain taking all of the run-off from the ROW down to the southern lowlands as impractical for two main reasons. First, I find no support for such a concept in the materials to which I have been referred. Second, however substantially the drain was engineered, and with whatever energy dissipation structures incorporated, the volume of material that would be discharged at the bottom of the drain would be highly detrimental both by concentrating the potential erosive effect of the discharge in one point and by loading all water and any sedimentation into one area. Dr Card's second suggestion is more finely balanced because of the lack of vegetation below the forest canopy which distinguishes the slopes below the ROW from those adjacent to the ROW on other properties which were more fully vegetated (e.g. to the west of the South Slope of LC74). The impact on the adjacent slopes would of course be determined by the success of the revegetation programme, to which I return later, but some erosion and concentration of flow by the use of ditch diverters was inevitable.
1731. I am not satisfied that it was negligent of Ocesa not to install longitudinal drains as ultimately suggested by Dr Card because it has not been shown that concentrating run-off onto the (relatively un-vegetated) slopes at intervals would be less damaging than the solution that was adopted. The periodic concentration of discharge from longitudinal drains would inevitably mean that the flow and potential for damage at the point of discharge would be higher than if the flow were dissipated across a wider area. It might be theoretically possible to mitigate the effect of that concentration, but the proposal means that the same quantity of run-off is to be channelled onto the slopes adjacent to the ROW whether at concentrated points along the longitudinal drain or more diffusely. Once that is accepted, the building in of mitigating measures would merely adjust the point on the slopes where diffuse flow occurs. In the absence of any properly worked proposal or expression of engineering opinion on the relative merits and demerits of the alternatives, I would not be justified in holding that it was negligent not to adopt the solution ultimately proposed by Dr Card in re-examination and subsequent questions from the Court on Day 27. While acknowledging the relative lack of vegetation at ground level, I also take into account the evidence of Dr Velez that I have set out at [1719] above. Overall, I prefer the evidence of Dr Savigny that longitudinal drains were not called for {H2.3/3/733} {Day36/102:18} {Day36/178:16}.
1732. Since I am not convinced that longitudinal drains should have been installed, the question of energy dissipation structures does not arise. There is no satisfactory evidence of sediment traps as such being installed. I am not satisfied that it would have been feasible to install sediment traps in the absence of a system of longitudinal drains. Nor has it been shown that sediment traps in any particular place would have made a difference to the overall outcome for SW1 or the fish ponds, which are the areas of interest.
1733. *Delay and review:* the Claimants' case on delay and review is summarised at [1723985](viii)-(xi) above. I have already made clear that I do not consider that the Claimants' complaints of delay in the period to reconfirmation are justified. There was no delay between Recomposition on 4/5 December 1996 and long term geotechnical works which were carried out by 12-14 December 1996. My finding

that there was no appreciable gap between long term geotechnical works and revegetation leads to the consequential conclusion that there was no appreciable or negligent delay. While the possibility of failure of short or long-term works caused by adverse weather conditions cannot be excluded even in the dry season, there is no specific evidence of failure apart from the reference to destruction of parapets, about which the Claimants gave no evidence.

1734. *Fencing*: the Claimants' case on fencing is summarised at [1723](xii) above. The Claimants did not have cattle on the ROW during or after the Ocesa works, at least until in or after 2002. There is no evidence from the Claimants that their neighbours put cattle on the ROW during the Ocesa works or while revegetation was taking place. There was therefore no need to fence the ROW to protect it from cattle.
1735. *Fertilisation*: the Claimants' case on fertilisation is summarised at [1723](xiii) above. Snr Manco said that he saw people sowing seed but did not see any application of fertiliser {D5/88/952}. Snr Buitrago said that he did not know whether they put fertiliser or quicklime on the ROW, but that he did not see any {D5/91/1030}. Given their limited access and infrequent visits to look at the ROW works I can place little weight on this evidence and it does not justify a finding that no fertiliser was used. The general evidence of system and the evidence from other Lead Claimant properties demonstrates that fertiliser was used during the revegetation process: see, for example, [970] above. There may have been places where fertilisation was omitted but there is no good reason or evidence to support a finding that LC50 was one of those places.
1736. With these preliminary findings, I address the Claimants' case as summarised at [1723] as follows:
- i) Erosion matting was used and there was no substantial gap between long term works and revegetation;
 - ii) Erosion matting was not installed on slopes between 10% and 20% but it has not been shown that the omission was negligent in the circumstances prevailing on LC50;
 - iii) I deal with the process of revegetation later and find that, in general, the revegetation process was successful – at least initially. There is no evidence of wide-scale exposure of soils such as persisted on the ODC ROW up to at least 1995. In those circumstances, I am not prepared to infer that there was any significant failure to use erosion control matting on slopes of 20% or more;
 - iv) Ditch diverters were spaced in conformity with the RECS and the spacing was neither too wide nor negligent;
 - v) One longitudinal drain was installed. It has not been shown that the omission of other longitudinal drains was attributable to negligence;
 - vi) No sediment traps were installed. It has not been shown that their omission was either negligent or made any material difference;
 - vii) No EDS were called for as no further longitudinal drains were installed;

- viii) There was a period of one month between ROW Opening on 6 November 1996 and Recomposition on 4-5 December 1996. It has not been shown to have been the result of negligence on the part of Ocesa;
- ix) There was no significant delay between Recomposition on 4-5 December 1996 and long term geotechnical works, which were carried out by 12-14 December 1996;
- x) There was no clear gap or delay before revegetation;
- xi) There was no failure to review or maintain the ROW during the periods between ROW Opening and revegetation;
- xii) There is no evidence of cattle being kept on the ROW during or after the Ocesa works. There was therefore no need to provide fencing against cattle;
- xiii) It has not been proved that fertilisation was omitted on LC50 during revegetation.

1737. It follows that I reject the criticisms and allegations set out at [1723] above.

1738. **Soil mixing, inversion and compaction:** the findings for which the Claimants contend {C4/3.6/845} are that:

- i) Soil mixing and/or inversion occurred;
- ii) Topsoil was not properly and carefully removed and stored and preserved separately from other soil in circumstances which amount to negligence;
- iii) Topsoil was not returned onto the ROW after all other soils had been placed back in circumstances which amount to negligence.

1739. I will consider the evidence about the state of the soils later when addressing the state of the ROW with time from 1997.

1740. **Failure to protect watercourses:** the findings for which the Claimants contend {C4/3.6/846} are:

- i) There was no proper investigation of watercourses on this property prior to construction in circumstances which amount to negligence;
- ii) There was no proper monitoring of watercourses on this property before during or after construction in circumstances which amount to negligence;
- iii) There was no proper protection of watercourses to protect from the ingress of soil, in particular to protect from stockpiles and soil erosion from the ROW and/or in that there were no sediment traps in circumstances which amount to negligence;
- iv) Following ROW recomposition soils which escaped into water sources during construction were not removed and flow conditions were not reinstated to their pre-construction condition in circumstances which amount to negligence.

1741. Because the ROW did not cross any watercourses on La Alborada, it was not necessary to investigate or monitor watercourses for the purposes of planning how they should be crossed. There is no evidence of consideration being given to the presence of W1-W4 below the ridge. There is no direct evidence of material quantities of soil escaping into water sources so that their flow conditions were adversely affected during construction. The Claimants' case is that the streams became sedimented and contaminated when it rained {D5/91/1032}. Snr Manco's evidence is that muddy water was not noticed until the following rainy season, though this needs to be balanced against the Claimants' expert evidence which suggests that there should have been a noticeable impact as soon as it rained heavily on the exposed Ocesa ROW. Snr Manco's evidence also implies that water had not turned muddy after the ODC and before the Ocesa pipeline. That evidence needs to be tested against all the other available evidence; and it needs to be brought into the balance when testing that other evidence. Contamination of water courses was the subject matter of the settlement reached with Saipem in August 1997: see [1744] below.

The Factual Background: Post Construction

1742. It is now the Claimants' case that Snr Buitrago and Snr Manco, with the help of Snr Echevarria, dug two fish pools on the northern boundary of what is now described as SW1 between January and March 1997 {C4/3.6/826}. If correct, this would mean that they dug it in the early days of revegetation. It is convenient to examine the evidence about when the fish pools were constructed in the section dealing with the impact of the Ocesa pipeline as it has a bearing on the Claimants' case about the formation of swampy areas.
1743. It is the Claimants' case that Snr Buitrago went to Remedios to complain about contamination of water sources in the middle of August 1997 {C4/3.6/826}. He gives no date for his complaint but I accept that he went some time before 31 August 1997, on which date he entered into a settlement agreement which included compensation for contamination of water sources and landslides. I also accept the general thrust of his evidence, as summarised at [1708] above, that he complained that a stream was having an adverse effect on him because it had been contaminated by all the mud that had come down from the right of way, and that the stream, now full of mud, fed into the stream that came to the house.
1744. The settlement signed on 31 August 1997 {M/100T/357.4} was in the standard form used where Saipem was a party, as set out at [388] above. In Clause 4 Snr Buitrago was described as the owner of La Alborada. Clause 5 recorded that the damages to the property consisted of "700 meters in length, with additional land as follows: $2.5 \times 100 = 250 \text{ m}^2$ and $1 \times 600 = 600 \text{ m}^2$ for total additional land of 850 m^2 , value of additional land \$200. $\$200 \times 850 \text{ m}^2 = \$170,000$, and payment of damages caused by Bronco, knock down of 50 timber trees for parapet \$125,000, destruction of special parapets \$150,000 and contamination of water source and land corridors by Saipem \$255,000, for total damages of \$530,000 and a total amount payable of \$700,000." On this basis the settlement required Saipem to pay Snr Buitrago \$700,000, which it did on the same day {M/98.4T/351.5}. Snr Buitrago signed a Paz y Salvo in the standard form for settlements involving Saipem: see [391] above. A copy of the Paz y Salvo was authenticated by a notary on 23 October 1997 {M/102T/359.1}, but the date on which it was originally signed does not appear.

1745. Snr Buitrago gave no evidence about this settlement beyond his evidence about a claim for contamination of his water. The modest increase in sobreanchos is not of compelling interest; but the reference to special parapets that were built and then destroyed could have been significant if evidence to explain it had been given. A document described as an invoice of damages supports the calculation included in the settlement agreement but provides no further information {M/100.1/357.5}. There is no witness or documentary evidence of any settlement agreement or Paz y Salvo entered into between Snr Buitrago and Ocesa. The pattern of settlements and Paz y Salvos to which I refer at [393] does not demonstrate that Ocesa always entered into separate settlements and Paz y Salvos so as to justify a finding that it entered into a separate formal settlement or Paz y Salvo entered into with the LC50 Claimants.
1746. In about mid-1998, Snr Buitrago agreed with Snr Manco that he would sell him his remaining half-share in the enterprise {D5/88/940}. Snr Manco's evidence is that they continued to draw water from near the house for three years after the construction of the Ocesa pipeline, but only in summer as the water became sedimented with rain and the pond by the house became progressively more sedimented {D5/88/955} {Day8/51:22}. Snr Buitrago continued to work on the farm until he left because of the violence in 2002.
1747. In and from 2002 Snr Manco put his new herd of about 25 cattle on La Alborada, on the new pastures he had been clearing and continued to clear {D5/88/942} {D5/88/946}. He now has 12 fields and rotates his cattle between them. From about 2002 it was Snr Manco's evidence that he brought water to the house from a spring in the north-east of the property {Day8/52:16}. Later he built a new dam on W1/W2 at the site of a previous dam (Point 84). There are photographs which indicate that the dam is still used as a source of water for the house.
1748. On 19 November 2004 Snr Buitrago and Snr Manco entered into a notarized deed for the sale of La Alborada from Snr Buitrago to Snr Manco, with the result that Snr Manco became the sole owner of the property {M/104T/364.05}. The deed declared that Snr Buitrago had received the purchase price of COP 8,165,000 (c. £3,250) to his full satisfaction. Snr Manco considered that to be a fair price {Day8/17:22}.
1749. In 2009 Snr Buitrago started to introduce buffalo onto La Alborada {M/111.3/372.9}, increasing his numbers in and from 2011 {M/113.3/374.7}. His evidence, which I accept, is that the reason for introducing the buffalo is because they are better able to cope with swampy conditions than are cattle {D5/88/942}.

The Impact of the Ocesa Pipeline

1750. In the absence of a claim for recuperation of pastures or reduced fertility, the impact that is of interest is the alleged effect of sedimentation from the ROW making its way to the lower slopes at the western end of LC50 and having two specific consequences:
- i) The destruction of the Claimants' fish pools; and
 - ii) The creation of SW1.
1751. It is obvious that time-spans are important when assessing the feasibility and validity of the Claimants' allegations. Identifying relevant time-spans is particularly

important and difficult when, as I have found, Snr Buitrago's grasp of chronology is unreliable and Snr Manco first came onto LC50 to work in 1992 or 1993.

1752. The Claimants' pleaded case was that they dug the fish ponds before the Ocesa pipeline was laid. That was clear from the Original Schedule: see [1666] above. It was also clear from the Further Information served in June 2011 which said that "the size of the fish pools did not change between the time they were constructed and the time of the construction of the Ocesa pipeline" {B2.1/14/108}. I must assume, in the absence of evidence to the contrary, that the Original Schedule and the 2011 Further Information were based upon instructions from the Claimants.
1753. The 2012 Further Information did not indicate any change to the Claimants' case, stating that the fish ponds "had been located in" SW1, which is imprecise and neutral {B2.2/33/382}. It was not until the Amended Schedule of Loss was served in June 2012³⁴ that the Claimants' indicated a change in position and that they were now saying that they had dug the fish pools shortly after the construction of the pipeline, in the summer season of 1997 {B4.2/5/233}: and see [1668](viii)(c) above where the relevant text is set out.
1754. This change of case reflected what was said in the Claimants' statements, which were dated July 2012:
- i) Snr Manco said that the decision to make the fishpool happened after he had joined Snr Buitrago {D5/88/941} and that he, Snr Buitrago and Snr Echevarria dug the pools "the summer after the pipeline was built" {D5/88/959}. He says that they put tilapia and cachama fish into the pools and that "when winter came, the pools began to fill with dirty water from the dam" in the stream from which water for the pools was brought by a hose through force of gravity. "After that, an avalanche of soil and water came down from the mountains where the [ROW] is. First there was a small avalanche and we were able to clean the mud out of the pools, but then about a month later there was another, much larger avalanche and it completely clogged the fishpool. We were only able to harvest fish out of the tank once";
 - ii) Snr Buitrago's evidence in his witness statement was to similar effect: "After the pipeline was laid, [Snr Manco] suggested we build some fish ponds to keep cachama and tilapia because it was a good business venture. ... The two of us built 2 ponds in the ground with the help of one labourer. ... When winter came mud started to flow into the ponds because they were filled using a hose that came from a dam in the main stream. The fish started to die but we managed to get some of them out and sell them. We waited for the ponds to clear and the fish stopped breeding but later a storm came and caused an avalanche of mud, and this filled the ponds completely with mud" {D5/91/1037}.

³⁴ I have taken this date from the Defendant's submissions {C4/4.8/838} though this does not appear from {B4.2/5/238}. The date on which the Amended Schedule of Loss was served is not critical to the main point, which is that the shift in position did not come until late on in the proceedings. The first indication of a change in position came either in June 2012, if that was when the Amended Schedule was served, or in August 2012, if the Amended Schedule was served later than the exchange of witness statements.

1755. No explanation for this change in recollection, instruction and case appears and there are no documents (such as invoices) and no aerial photographs that assist directly in pin-pointing the relevant dates. The position is not made any clearer by reference to the experts' reports. Dr Atencio's original report was dated June 2013, after the Claimants' witness statements and the change of case {H11/1/118}. It was, however, based upon two attendances at LC50, on 26 September 2010 and 24 November 2011 {H11/2/219}. At {H11/2/218} he recorded "it is alleged that after the construction of the pipeline in the summer of 1997, the Claimants dug out two fish ponds on the property." Yet elsewhere in his report he stated that:

"(iv) In my opinion, the fish ponds had been in use on all the properties of the Lead Claimants having fish ponds (39, 50, 54, 74, 82) before construction of the pipeline.

...

My opinion on the existence of the fish ponds is that the fish ponds have existed since before the construction of the pipeline on the Claimants' properties. My opinion is based upon the following:

- a) The physical observations that I carried out in the areas where the Claimants with fish ponds (Lead Claimants 39, 50, 54, 74 and 82) indicated that there had previously been functioning fish ponds before construction of the pipeline.
- b) The oral evidence of the Claimants, given during our conversations while visiting the lead claimants' properties.
- c) ..."

1756. I do not accept that the physical observations made years later could be more than merely consistent with what Dr Atencio was being told about the prior existence of the fish pools. For that reason, and because I have no reason to doubt what Dr Atencio says about what he was told, I find that when he visited LC50 in 2010 or 2011 (or both) he was told that the fish ponds had been dug before the Ocesa pipeline. According to his report that information came from the Claimants, and I accept that it did.

1757. There is a consistency in the experts' reports, because Dr Velez captioned a photograph of the location of the fish pools "Part of the forest that was cleared to make way for sowing grasses can be seen above the stream in which a dam was built for fish before the construction of the pipeline" {H5.4/5/835}. The photograph was taken on 26 September 2010, the same day as Dr Atencio's first attendance at LC50. Although the caption could be interpreted as meaning that the dam was constructed before the construction of the pipeline (leaving open the possibility that the fish pool was dug after it), that is not obviously what Dr Velez meant, and it seems to me to be probable that he was told the same as Dr Atencio recorded in his report.

1758. The Claimants' evidence that they had dug the pools after the construction of the Ocesa pipeline was tested in cross-examination, from which it became clear that neither witness now had a clear recollection of when the pools were dug:
- i) Snr Buitrago said he could remember about the building of the fish ponds but could not remember the dates {Day9/89:5}. Later he reaffirmed that he could not remember when the ponds were built or whether it was before or after the secondary road {Day9/107:3};
 - ii) Snr Manco said that he did not really remember when the fish pools were constructed {Day9/47:18}. Although he later said that "as far as I can remember we built them after the pipeline" {Day9/48:1} he went on to say "I don't know, I might have expressed myself badly. But we did have those fish tanks there." His uncertainty was confirmed when he added "As we never recorded dates and because we are not all that educated, we don't really write things down. You always --- you carry this in your head. So you don't really recall all that accurately. The only thing that I can really say for certain is that we had two fish ponds and that we tried to breed fish and we -- it didn't really work out. That is all that I can say for sure" {Day9/48:6}.
1759. When I heard this evidence at trial, I formed the provisional view that neither Snr Buitrago nor Snr Manco now had any reliable recollection of when they had built their fish ponds. Reviewing their evidence for the purposes of preparing this judgment has confirmed that provisional view. On the material that is available to me I find that until June 2011 the Claimants' recollection and instructions both to the lawyers who prepared the 2008 Schedule of Loss and the 2011 Further Information was that they had dug the pools before the Ocesa pipeline were laid. That recollection and account was repeated to Dr Atencio and Dr Velez in September 2010. I make no finding about whether it was repeated to Dr Atencio on his second visit in November 2011 but infer that he was not told anything different: had he then been told by the Claimants that they had dug the pools after the Ocesa pipeline had been laid I would expect him to have noted that fact in some way in his report.
1760. I infer and find that the Claimants' recollection about when they dug the fish ponds changed at some point between June 2011 and mid-2012 (or whenever the information that found its way into their statements was gathered). That was at least 14 years after the event and it seems overwhelmingly likely that the change took place in the course of compiling evidence for inclusion in witness statements for exchange in the litigation. That of itself gives rise to concern about why the change of recollection occurred and how it could be regarded (either by those compiling the evidence or by the Court) as more reliable than the earlier version in the absence of any documentary assistance. I have no information about the privileged process by which witness statements were produced and therefore should not be taken to express any view about whether the process itself contributed to the change of version on this point. For my purposes it is sufficient to find that I do not accept that the new version was based upon recollection that the pools were dug after the Ocesa pipeline was laid. I conclude that the earlier version is probably correct, that the digging of the fish pools was an enterprise embarked on by the Claimants before the Ocesa pipeline was laid and that, if and to the extent that either man now has a recollection that there was a pipeline in place when they dug the fish pools, it was the ODC pipeline.

1761. I have kept in mind in reaching this conclusion that the Claimants' evidence is to the effect that their fish pools were destroyed by sedimentation after the laying of the Ocesa pipeline and that this has been their case since it was articulated in 2008. My conclusion that the fish ponds were dug before the Ocesa pipeline is not dependent upon when they became sedimented and remains firm whether they became sedimented before or after the Ocesa pipeline was laid. I shall return to decide when the fish ponds became sedimented below.
1762. I turn now to the formation of SW1.
1763. I have summarised the Claimants' formal descriptions of SW1 at [1661] and [1668] above. Various lay descriptions of SW1 were given. Snr Manco said that around Point 199 there was probably 2 metres of mud or marshland {Day8/68:14}. When Dr Tobon entered the swampy area with the aim of taking measurements of the depth of sediments accumulated there, he sank into the swamp {H7.7/52/1903}. Dr Savigny described that his leg was not long enough to reach the bottom and that a 2 metre-long stick was not long enough to reach the bottom either {Day37/216:7}. The pleaded case is that 15 cows have become stuck and were lost in SW1 between 2002, when Snr Manco re-introduced cattle to La Alborada, and 2012. By 2002 the possibility of cattle getting into SW1 existed because he had cleared parts of the forest on either side in the way that I have described.
1764. It is common ground that pathways existed for sediment from the ODC and Ocesa ROWs to go into the watershed for W1-W4 and into the streams {H2.3/3/726}. There is also clear photographic evidence of sediment below the ROW and above the streams. Soil making its way into W1 would go down towards the alluvial fan and SW1 {Day36/134:5} ff. Because W1 runs roughly parallel to and below the ROW it forms at least a partial barrier to prevent sediment going down the hill into the valleys to the north of the valley containing SW1. Similarly, W2-W4 operate as barriers to sediment which reaches them, with their waters carrying the sediment on its further journey unless a quantity of sediment sufficient to overwhelm and overtop the stream arrives. The evidence does not support a finding that the streams were overwhelmed or overtopped in their course above the alluvial fan: Dr Tobon observed no sediment accumulation in the streams and no damage on the bed of the streams between the stream sources and the point of conflux of the streams in the flat area, except for small accumulations of sediment in the concave parts of the beds {H7.3/3/877}. From Point 197 the streambed was completely filled with sediment {H7.3/3/886} which supports the Claimants' case that the streams carried sediment down the steeper parts of the hill and deposited it where the slopes flattened out. The alluvial fan is well illustrated by {H7.3/3/884}. There is remarkably little photographic evidence showing the state of SW1 and what there is does not materially assist in determining the questions at issue between the parties.
1765. The capacity of the streams to transport sediment to the alluvial fan and beyond is dependent upon their flow rates. Each was described by Dr Tobon as being a stream with a low to very low discharge rate {H7.3/3/876}. The Claimants' case, as supported by the expert evidence I shall mention below, is that the cause of SW1 is that streams W1-W4 carried sediment from the ROW to the flatter areas below, creating the swampy conditions {C4/3.6/866}. The description of the streams as having a low discharge rate does not immediately support the Claimants' case that they transported very substantial amounts of sediment into the fish ponds and SW1

within short time-frames. However, that description must be seen in the context that they are on steep slopes and would discharge much more rapidly in times of heavy rain.

1766. I bear in mind at all times Professor Monsalve's evidence when he was asked whether, if the Court accepted the witness evidence about an "avalanche" of sediment filling the fish ponds, the Court should conclude that the material had worked its way through the forested areas and down the streams or whether it came off the slopes of the hill above and to the north, which was wrongly referred to as a deforested hill for the purposes of the original question³⁵. His answer about the relative likelihood of a large quantity of sediment arriving as a one-off event was that it was more likely to have been the consequence of a landslip. It was evident that he was talking about a landslip in the forested slopes below the ROW because he said:

"in the stream you can see that there is a lot of damage, deterioration. It is not a typical forest stream, where everything looks pretty and well ordered. You can see erosive processes taking place within the forest itself. So the theory that it might have happened, that there might have been a major – a landslip, a major soil slippage, accompanied perhaps by heavy rains, which is what normally happens when you have got repeated heavy rains falling, falling, falling, the soil becomes too saturated and it is possible that they fail, they sometimes fail. So I would say that the most likely cause would be landslips."
{Day40/100:21}

When his attention was drawn to the state of the slopes as shown in the 1995 aerial photograph he said:

"the sediment could have gone down along [W1] in an avalanche process. It could easily have happened. From the physical point of view and the point of view of nature, it is perfectly possible that could have happened..."
{Day40/100:12}

1767. Dr Card's first report concentrated on areas of erosion that he had seen on the ROW. I shall refer in greater detail to the points of erosion alleged by the Claimants later on. For present purposes I refer back to [504](i) and (ii) and Dr Card's eventual acceptance that 69% (2,100/3,035 cubic metres) of the volume of soil that he estimated had been lost from his seven "notable points" drained to the west and not onto LC50. He gave no description of SW1, but gave as his opinion that "any sediment originating from the ROW is likely to have entered Streams 1-4 and that "such sediments" (i.e. sediments that had entered Streams 1-4) "are likely to have been transported rapidly and deposited in flatter areas along the channel lengths as well as in the flattest terrain downstream where Swampy Area 1 is located. Based on the soil erosion recorded on the ROW and the lack of functional erosion control measures it is my opinion that soil erosion is on-going due to lack of repair and

³⁵ The use of the term "sediment" was imprecise and did not mean or imply that the "sediment" had to have come from the ROW.

maintenance to the erosion control measures and lack of vegetation cover on the ROW as I have described...” {H1.1/1/176}. He rejected natural soil erosion processes and deforestation as material causes of SW1 {H1.1/1/177} {H1.1/1/179} but did not himself measure or estimate the volume of sediment in the area, deferring to Dr Tobon who, he said, “provides an estimate of the volume of sediment in this area based on his field measurements” {H1.1/1/179}. As has already been seen, Dr Tobon in his turn deferred to a non-existent paragraph said to be from Dr Card’s report to establish that the amount of soil accumulated in SW1 greatly exceeded the amount of soil that could have eroded from the deforested slopes above it: see [498](ii) and [499](ii). For his part, Dr Card said that he had never done a calculation that led to the 70/30 split as asserted by Dr Tobon because he (Dr Card) was waiting for Dr Tobon’s assessment of the volumes in SW1 {Day27/19:20}. The circularity was therefore complete. For reasons already given, I find no assistance in Dr Card’s attempted quantification of soil loss in his Fourth Report. I accept his evidence that the potential for soil loss from the ROW was at its greatest before revegetation became established: the same would be true of the ODC ROW. Dr Card offered no expert analysis of or opinion about soil loss from the ODC ROW. He appears to have assumed that the Claimants’ accounts meant that there had been no significant soil loss from the ODC ROW between 1991/1992 and the end of 1996.

1768. Any review of Dr Tobon’s evidence has to be prefaced by his express disclaimer that he had no expertise in the formation of the swamp; rather, his expertise extended to describing sediments including those that extended into the swampy area. His opinion was that to determine the causes of the creation of the swamp would require a deeper study than that undertaken by any of the experts {H7.7/52/1904} {Day29/56:21}. Having now reviewed all of the expert evidence again for the purposes of writing this judgment, I have considerable sympathy with that view.
1769. Dr Tobon describes the undamaged state of the streams down to the alluvial fan, to which I have already referred. Then comes the alluvial fan. Between there and where W3 emerges from woodland close to the house is first SW1 and then the still-wooded W3 wetland. Dr Tobon writes that the “principal stream displays significant sediment accumulation on its streambed in the flat part of the farm where a swampy area has formed covering the entire flat area in this part of the farm” {H7.3/3/878}. On 24 November 2011, during the wet season, Dr Tobon measured sediment depths of c. 1 metre in the alluvial fan and measurements of 30 cms and in excess of 1.25 metres in at Points 197 and 199 in SW1. On 8 April 2013, during the dry season, he measured a depth of sediment in excess of 1.5 metres at a different point of SW1 {H7.7/61/2175}. Professor Monsalve’s measurements, taken at different places described as “immediately downstream from the conflux of streams [W1-W4]” {H8.26/30/6584}, do not cast doubt on Dr Tobon’s measurements, which I accept as accurate. Dr Tobon’s evidence (which was essentially factual on this point) was “that the swampy area [SW1] was almost entirely silted”, that the sediment “has filled the entire area of land”, and that there was significant sediment accumulation “across the swampy area” {H7.3/3/881}.
1770. Despite his subsequent disclaimers of expertise, Dr Tobon expressed the opinion that “part of the soil removed from the ROW to bury the pipeline was deposited directly over the sources of the four streams, in addition to the soil which eroded from the ROW, which was moved in the direction of the drainages and from there was

transported by the water downstream to the flat area of the farm, where it accumulated and formed the swampy area (SW1)” {H7.3/3/879}. He said that he reached his opinion on the basis of various sources of evidence including Dr Obando’s report. I have no confidence that he had in fact read a report from Dr Obando to justify that reliance, for reasons given earlier. He also gave as his opinion that soil from current erosion was still moving towards the sources of the four streams, from where it is transported down to the flat area {H7.3/3/879}. He relied upon the witness statements of Snr Manco, Snr Buitrago and Snr Echevarria to support his opinion that “a large part of the soil was either deposited directly over the location of the sources or large quantities of soil were eroded from the ROW especially during the time that the soil removed from the ditch was exposed” {H7.3/3/879}. This statement of opinion (that soil was deposited directly on the water sources in the course of construction) was repeated and relied upon on a number of occasions during his report. In my judgment, their witness statements provide no support at all for an opinion that a large part of the soil was deposited directly over the location of the sources or that large quantities of soil were eroded during the (very short) time between excavation and backfilling of the trench. His opinion was also influenced by his mistaken belief that the ROW had been entirely covered by forest until felled by OcenSA {H7.3/3/880}. The gist of his opinion was that the major problem of sedimentation derived from the period of construction, though he qualified this subsequently to include the period of construction “and in subsequent months” {H7.3/3/880}.

1771. Dr Tobon reported that LC50 “displays an area of fields in an advanced state of erosion that is related to livestock grazing below the area of forest”, indicating the north side of SW1, and gave his opinion that “this part of the farm has contributed in some way to the formation of this swampy area” {H7.3/3/880}. It is not apparent that Dr Tobon would have known when the fields were cleared for pasture by Snr Manco.
1772. Dr Obando did not refer to SW1 in his first report except when setting out the Claimants’ allegations at {H3.5/5/983} and {H3.5/5/984}. His agrological evidence was directed to allegations of inversion, mixing and compaction. As such it has relevance when considering why there is erosion on the ROW, but does not assist in determining the consequences of any erosion from the ROW during construction and thereafter. In his Fourth Report he stated that he had found “rock fragments characterized by angular faces [in SW1], serving as an indicator of a short and quick transportation similar to that of fragments coming from colluvial areas. In this particular case these corresponded to rock fragments coming from the ROW excavation and from soil deposits” {H3.10/20/2324}. So far as I have been able to tell, there is no previous mention in Dr Obando’s reports to his having taken samples or made observations in SW1 in the course of his inspections of LC50. There is a reference in his first report to finding materials and rock fragments from the ROW “in the water channels W3 and W4” which were consistent with the materials found in the soil profiles on the ROW {H3.5/5/995} {H3.5/5/1006}; but that is not the same as finding them in SW1. Neither his second nor his third report mentions SW1 or the observing of rock fragments in it. I accept his reported observation of rock fragments in W3 and W4 as described in his first report; but, although he was not cross-examined on the point, I am not confident that he made any separate observation of such fragments in SW1 and do not place weight or reliance upon his observation that he did. Dr Obando provided no observations or analysis of SW1 that contribute to a finding on how and when it was caused.

1773. Dr Savigny dealt with SW1 in his first report at {H2.3/3/727}ff after accepting that sediment had moved in runoff water from the ODC and Ocensa ROWs into the W1-W4 watersheds. His opinion was shortly stated and was that the contribution of sediment from the ODC and Ocensa ROWs is negligible in comparison to the sediment derived from land clearing {H2.3/3/729}. His view was that “the impact of sediment derived from land clearing and particularly from construction and ongoing presence of the secondary road increases sharply downstream of the W1-W2 and W3-W4 confluence To reiterate, it is my opinion that sediment derived from land clearing and construction/ongoing presence of the secondary road is the dominant cause of ... the direct cause of swampy conditions [at SW1]; [and] the reason the alleged fish pond ... was destroyed; ...”
1774. It is convenient to deal with the secondary road now. In his original report, Dr Savigny identified that there are a large number of areas of unstable soil, often showing as fresh landslides along the secondary road; and he gave as his opinion that sediment from these landslides was ultimately directed into streams flowing through the Claimants’ property {H2.3/3/716}. As part of his 2010 visit he took an inventory of fresh landslides along the secondary road and found 35 which he considered “were shedding sediment into runoff waters”. By reference to points marked A, B and C on his image LC50-5 {H2.3/3/685} there were 12 between A and B and 23 between B and C {H2.3/3/718}. He estimated that 1,000 m³ per year or something in the order of 15,000 m³ or more in the 15 year period from 1995 to 2010 had been shed from these landslides into local drainage courses and that “a significant portion of this entered the Claimants’ property.” On that basis he gave as his opinion that “this sediment together with the sediment derived from land clearing of slopes across the Claimants’ property account for the alleged sedimentation of the four watersheds and development of swampy conditions on the Claimants’ property” {H2.3/3/731}.
1775. What Dr Savigny should have appreciated but did not make clear until cross-examination, was that this evidence needed to be very substantially qualified. In a penetrating passage of cross-examination it emerged that:
- i) The 12 landslides between Points A and B were irrelevant because the land drained to the south, away from LC50, in that area: {Day36/157:20}. They included two that Dr Savigny had used to illustrate the phenomenon of sedimentation from the secondary road in his original report: see LC50-18 {H2.3/3/716}. Dr Savigny had not estimated the separate contribution to his figures of 1000 m³ per year or 15,000 m³ over time that these 12 landslides had made. Nor had he indicated that any allowance should be made for the fact that some of the landslides (including, in particular, the twelve between Points A and B) were irrelevant;
 - ii) Although Dr Savigny had said in his original report that he could not reliably determine what portion of sediment from between his Points A and B would find its way into drainage basins on LC50, that was itself inaccurate because he could have determined that the portion was nil. As it was, the overall thrust of his estimate and evidence made no allowance for the fact that, even on the mistaken basis that he could not reliably determine what portion of sediment from between his Points A and B would find its way into drainage basins on LC50, he could not determine which way it went;

- iii) There was no basis upon which Dr Savigny could conclude or assume that the presence of a landslide at the time of his inspection meant that either the same area had slid or that there had been an equivalent landslide elsewhere at any time in the past, let alone every year for the past fifteen years;
- iv) Dr Savigny had identified drainage channels from the secondary road on to LC50 by annotating an aerial image at {H2.6/8/1647} which showed surface drainage patterns. Excluding the area between his points A and B, there were two points which appeared on the land drainage image to be relevant to the sedimentation in issue in the case: to the west there is a cluster of four arrows and to the east a single arrow. Dr Savigny said, and I accept, that there were other points where surface water might discharge onto LC50 from the road, but these arrows were meant to indicate the major points: they were the channels that Dr Savigny could recognise {Day36/161:12} even though there were multiple other less pronounced ones {Day36/162:10}. Of the two discharge points marked on the land drainage image:
 - a) The single arrow to the east would discharge further downstream than any area of concern in the litigation {Day36/162:16};
 - b) The channels represented by four arrows to the west would have a limited catchment area that would exclude anything from further west than point B and anything further east than the start of the catchment area for the single arrow channel to the east. Dr Savigny did not identify which of his remaining 23 landslides were or might have been in the catchment area for the channels represented by the four arrows or the proportion of his volumetric estimates that they would have provided. Furthermore, Dr Savigny's evidence was that the main flow of sediment from that area would have veered to the east, downstream and away from the swampy area of SW1 and the wetlands of W3 that are of interest in this litigation {Day36/163:19};
- v) Dr Savigny gave evidence, which I accept, that some sedimentation would have cut through onto LC50 from the road at points higher up than the four arrows on his land drainage map. He had identified such points in his supplementary report at {H2.6/8/1636}, with a specific example at {H2.6/8/1637}. However, the furthest upstream point that he identified on {H2.6/8/1636} was downhill and downstream of SW1 {Day36/170:17}.

1776. Dr Savigny was right to acknowledge that the section of his original report on sedimentation from the secondary road was capable of giving an entirely false impression for the Court's determination of the case {Day36/178:1}. It fell far below the normal rigorous standards that Dr Savigny set for himself and which the Court is entitled to expect and had come to expect from him.

1777. The Defendant continued to rely upon the secondary road as a source of damage in closing submissions, pointing to the fact that it had originally featured as part of the Claimants' case and that Snr Buitrago had been in no doubt that it had caused his land to suffer damage. I too am in no doubt that the construction of the secondary road was a source of damage to LC50, but it has not been shown that the damage it caused was damage that contributed materially to the presence or extent of SW1. The

original Schedule of Loss was imprecise about the damage that the secondary road caused: see [1666] above. When the damage from what was then called the access road was articulated in the Particulars of Claim it referred to damage to fruit trees and damage to an unidentified stream: see [1667] above. Snr Buitrago's evidence was of earth being piled up in his meadow before being taken away by dumper trucks {D5/91/1035}. That does not suggest damage to the upper reaches of LC50, which for the most part had not been cleared. On the evidence that is available to the Court, the withdrawal of the claim relating to the secondary road was explicable on two distinct grounds: (a) the road was constructed long before the Ocesa works, and (b) it did not contribute to the damage for which the Claimants ultimately decided to claim.

1778. I turn now to another area of Dr Savigny's evidence that proved to be highly controversial. On reading Dr Tobon's report, Dr Savigny responded at length and in detail. In the course of his response he picked up on Dr Tobon's evidence that sediment had spread across the entire swampy area. He gave his own essentially factual evidence in reply:

“This is contrary to my observations crisscrossing SW1 beginning about midway between [Points] 197 and 199 and continuing east (downstream)”. I encountered considerable difficulty transiting and was forced to carefully step across tree roots that seemed to be bridging swampy water more than a metre deep with no evidence of sediment movement through the basin. In my opinion this type of swampy environment is many hundreds and possibly thousands of years in age”
{H2.7/9/1890}

He supported his view that the state of SW1 was of longstanding by reference to his observation (based on evidence set out in his Supplementary Report Number 4) that there were high water tables even towards the end of the dry season.

1779. In the course of his cross-examination, Dr Savigny gave further factual evidence about what he had encountered in SW1, describing exposed roots and walking through “the bog” on fallen logs or root systems {Day37/200:5} and that the roots were embedded in soil at considerable depth in a considerable depth of water, so that when you went from root to root, or fallen log, you had to be very careful not to slip in to quite a depth between them {Day37/208:24}. He said that the vegetation was old and of long-standing, whereas he would have expected to see smaller vegetation in the environment of a swamp formed by influx of sedimentation {Day37/209:11}.
1780. The Claimants launched a full-scale attack upon Dr Savigny's evidence about the composition and causation of SW1 both in cross-examination and in their closing submissions. They made and make a number of substantial points {C4/3.6/894} which I briefly summarise as follows:
- i) Dr Savigny went further in cross-examination that he had in writing in giving a graphic description of SW1 as a bog, which he likened to floating bogs in Canada and Peru {Day36/138:15} and in expressing the opinion that the SW1 area is a basin of long-standing, possibly to be measured in thousands of years {Day36/150:4};

- ii) Later in his cross-examination he appeared to row back to some extent from the most graphic analogies about age that he had offered {Day37/200:16};
- iii) He had taken no soil samples and had not examined the soil in the region, nor had he taken samples to determine the acidity or otherwise of the bog {Day37/208:24};
- iv) His stated opinion that SW1 was largely a bog that predated any pipeline works was inconsistent with his opinion as stated in his original report that SW1 was attributable to multiple sources of erosion and sedimentation to which the Ocesa ROW made a negligible contribution;
- v) His stated opinion that SW1 was largely a bog of long standing was inconsistent with Professor Monsalve's evidence, as Professor Monsalve had not described SW1 in such terms. He had described the area of SW1 as "waterlogged and sedimented" and had attributed the presence of SW1 to sedimentation from the slopes generated over the last 50 or 60 years {H8.11/11/2815}.

1781. As already indicated, the results of Professor Monsalve's sampling of sediment depths did not contradict those taken by Dr Tobon, not least because they were taken in different places. In addition, Professor Monsalve's opinion about the causation of SW1 contradicts Dr Savigny's opinion that SW1 is only partially affected by sedimentation and is in substance a bog as he described rather than being a swampy area such as those as discussed elsewhere in this judgment by reference to LC50 and other Lead Claimant Properties. Finally, Professor Monsalve gave the important evidence, which I have set out above, about the relative likelihood of different proposed mechanisms for sediment transport and arrival at the fish pond on the northern boundary of SW1.
1782. Pausing here, resolution of the central question, namely what caused the presence of SW1, depends first and foremost upon deciding as a matter of fact what the present state of SW1 may be. If, as is the Claimants' case put at its highest, SW1 is a swampy area which is rendered swampy in its entirety by the presence of sediment to the measured depths of up to and more than 1.5 metres, the question "where did such a volume of sediment come from and over what time scale?" must be answered with an eye to the volumes of sediment that such a finding implies. If, however, SW1 has an area that is affected by sedimentation in parts but is in other parts a waterlogged bog as described by Dr Savigny, the volumes of sediment that must be contemplated are smaller and the central question may have a different answer. To my mind, therefore, there is a question of fact that must be answered in order to resolve the dispute about SW1 and the claims that are contingent upon it: do I accept Dr Savigny's factual evidence about what he encountered when, as he says, he criss-crossed SW1? That question cannot be answered without reference to the other evidence about the history and condition of the slopes above SW1 to which I now return.
1783. There is limited evidence about the state of the slopes before the ODC ROW. In general terms there is no reason to doubt that Horizons A, B and C were to be found below the forest canopy and that the thickness of Horizon A would have varied between 0-20 cms {H3.8/16/1864}. In other words, Horizon A was generally thin and

in some places was absent. There would have been low levels of background erosion beneath the canopy and some limited sedimentation of streams {C4/3.6/859}.

1784. The objective evidence about the state of the slopes between the laying of the ODC pipeline and the Ocesa works comes from the 1995 aerial image: see [1689]-[1692] above. Of most importance is the evidence that in September 1995 (before the onset of the dry season) the ROW had 90-100% exposed soil. As elsewhere I make allowance for the inherent imprecision of these figures: but, in general terms, revegetation of the ODC ROW had failed, leaving the ROW substantially naked (to adopt a term used by the Claimants in their closing submissions). Snr de los Rios described the ROW as being bare of vegetation cover in 1995 {H5.5/6/1173}. Contrary to a suggestion made by Dr Obando there is no direct evidence and no reason to suppose that the condition of the ROW had deteriorated by September 1995 from a better condition with less exposed soil at an earlier date after the ODC works. Nor is there any evidence or reason to assume that the condition of the ROW improved significantly between September 1995 and November 1996.
1785. The photo-interpretation experts have found no evidence of geotechnical works to prevent sediment from the ODC ROW flowing onto the slopes of LC50 below the ridge. There is no reliable evidence about geotechnical works installed by ODC. The reference in the Bateman study to geotechnical works installed by ODC being destroyed (to which Dr Card referred in his report) was not specific to LC50 {H1.1/1/64}; but it is a timely reminder of the forces to which the ODC ROW on LC50 was exposed. No expert provided any assessment or analysis demonstrating that eroded material from the ODC ROW was materially less likely to have found its way onto the steep slopes of LC50 than eroded material on and from the time of the Ocesa works.
1786. Dr Card accepted, albeit at a high level of generality, that the ODC ROW had been a source of ongoing erosion since 1991 {Day26/145:16}. On all the evidence, that acceptance was not merely correct but inevitable. While recognising that the width and layout of the Ocesa ROW was not congruent with that of the ODC ROW, I find that eroded materials from the exposed soil on the ODC ROW in the period from the opening of the ODC ROW (which is most likely to have been in or about early 1991) until the commencement of the Ocesa works (in late 1996) would have had available the same pathways to and down the slopes of LC50 subject only to minor differences attributable to the increased width of the Ocesa ROW.
1787. I reject the Claimants' submission that the vegetation cover prior to the ODC pipeline was equivalent to that between the ODC and Ocesa pipeline works: the vegetation cover on the ROW had gone from being fully covered by forest to being bare of vegetation cover. Lower down, the clearance of the future pasture fields pushing west from the area near the house had not started in earnest and, in particular, the slope to the north of the fish pond had not been cleared by 1995 or, as I infer and find, by 1996/1997. Taking into account the evidence of Dr Velez, Dr Card and Professor Monsalve to which I have referred above at [1719], [1729] and [1766] above, as well as the photographic and video evidence taken at ground level of the vegetation under the canopy on the steep slopes, I accept that, in general terms, low level vegetation under the primary forest canopy is limited and does not provide a continuous or consistent barrier to the transport of sediment. I also accept, on the basis of the evidence of Dr Card and Professor Monsalve to which I have referred, that run-off

down the steep slopes associated with heavy rainfall can cause localised erosion and even landslips either before or after deforestation. For obvious reasons, such landslips cannot be identified under the forest canopy as shown in the 1995 aerial image. I find in passing that the presence of sediment and other materials on the lower lands after the OcenSA works do not and cannot, of themselves, discriminate between whether those sediment and materials originate from the ROW before or after the OcenSA works.

1788. I find that the revegetation of the ROW after the OcenSA works was much more successful than the revegetation of the ROW after the ODC works. The evidence to support this finding is:

- i) The December 1997 Agroforestry report at {K52/534T/11} shows an area which Snr Manco agreed was on LC50 {Day8/46:23}. It records 100% vegetation cover to the left and right of the ROW and 90% vegetation cover on the ROW. It also records that there are “sectors with scarce vegetation, especially current breakers.” Dr Velez accepted that, in general terms, it showed a well vegetated ROW {Day33/93:16}; and his evidence was that “the vegetation covers described in the Agroforestry Inventory, both within the ROW and in its right and left borders, are in much better condition than was observed during my field inspections” {H5.4/5/840}. I accept the description of the vegetation in the Agroforestry report as accurate and accept Dr Velez’ assessment of what it showed;
- ii) Snr Manco agreed, when being referred to the Agroforestry report, that in December 1997, when the photograph was taken, the ROW was well vegetated and had a good covering of grass {Day8/46:23}. More generally he accepted that the ROW had a better covering of grass in 1998 than in 1995 {Day8/38:3}. I place less weight on these answers because the questions he was being asked invited interpretation of and a comparison between the 1995 aerial image and the 1998 Overflight Video, which he was not competent to provide at more than a very general level;
- iii) The 1998 Overflight video shows that, apart from a well-used trail on its eastern side, the ROW appears well vegetated {H2.3/3/692}. Dr Card accepted that, apart from the presence of the trail to the east, the ROW looked “quite well vegetated” and “quite green” {Day26/148:1}, that (based on the 1998 photograph) the state of the ROW was greatly improved as compared to the position shown in the 1995 aerial photograph and that the long term geotechnical works and the revegetation process had combined well {Day26/148:6}.

1789. On this evidence I find that by December 1997 and thereafter the ROW was substantially and well revegetated, though there was an area of erosion to the eastern side where a trail existed. There were areas of scarce vegetation, particularly around current breakers; but overall it was much better covered than the 90-100% exposed soil that had existed in September 1995.

1790. A consequence of the findings I have made so far is that the rate of erosion on and from the ROW by about December 1997 would generally have been significantly less than the rate of erosion from the exposed soil of the ODC ROW in the period from

1991 to late 1996. That is not universally applicable over the whole extent of the ROW. For example, the “sectors with scarce vegetation, especially current breakers” noted in the Agroforestry report and the trail at the east of the ODC ROW that is visible on the eastern side on the 1998 Overflight Video would have been more susceptible to erosion than the rest.

1791. No one subjected the condition of the ROW to the same minute level of scrutiny in 1997/1998 as happened when the litigation experts started to look at it some twelve years later. It is therefore necessary to look at the state of the ROW as they found it to see what conclusions can be drawn retrospectively. It will then also be necessary to look at the evidence about inversion, mixing and compaction (though in less detail than in other cases) in order to form a comprehensive view about whether the surface erosion that can now be seen is attributable to failings on the part of Ocesa making the ROW more susceptible to erosion than it had been before.
1792. As a preliminary point, the use of the ROW has changed. As I have said before, there is no evidence that cattle were kept on the ROW before Snr Manco reintroduced his herd of 25 cows in about 2002, later increasing its size up to over 100 head before starting to switch to the heavier buffalo that he now keeps. Cattle and buffalo are not a source of erosion on the ROW before 2002 at the earliest. Until then the only traffic on the ROW was human (typically the army and perhaps guerrillas), with one identified reference in 2002 which may have been to heavy machinery using the ROW on La Alborada to gain access to a property to the north in order to maintain a pipeline valve {K60/590T/3}. Although the evidence is very limited, it seems probable and I find that the trail seen on the 1998 Overflight Video is probably attributable to its use as a track for humans rather than simple failure of revegetation, there being no obvious reason (and no satisfactory explanation from the experts) why the revegetation should have failed there but not generally elsewhere. As I shall set out below, I accept that the direct cause of much of the erosion that is now to be seen on the ROW is caused by the passage of cattle along trails. In some places cattle have followed and extended the width of the previous trail. I accept Dr Savigny’s general evidence that the 2009 and 2010 aerial images show numerous criss-crossing livestock trails with 90-100% exposed soil, with the balance of the pasture ranging from 10-50% up to 50-90% exposed soil {H2.3/3/694} {H2.3/3/695}. Livestock trails are visible widely over the cleared pastures.
1793. Dr Card referred to 7 “notable features” in his first report: see [504] above. On the CAI the Claimants identified the points of erosion to which attention was subsequently directed, working from south to north as follows:
- i) Point 6: the erosion at Point 6 is the result of cattle making a trail en route to the gate about 125 metres further north {H2.3/3/696}-{H2.3/3/698}. On the basis of Dr Savigny’s evidence and the acceptance by Snr Manco that the photograph showed part of his property, I find it probable that the area shown by {K52/534T/11} is the same as that shown by Dr Savigny’s LC50-7 on {H2.3/3/697}. Making all due allowance for the differences in quality between the two photographs, Dr Savigny’s image (taken in 2012) shows a marked deterioration from the well vegetated ROW shown in the Agroforestry report (taken in 1997). It is also not clear that erosion from Point 6 (which was not included in Dr Card’s original “notable features”) would drain into any of W1-W4. In summary, the direct cause of the erosion is cattle (or buffalo) and

it has not been shown that erosion from this point would drain to the areas of interest;

- ii) Point 2: see [504] above. It drains to the west. It is in the area of an access trail formed for the ODC works and has not been shown to be attributable to the Ocesa works. Since it drains to the west, it is in any event irrelevant except to the extent that it shows a general susceptibility to erosion on the ODC and Ocesa ROWs;
- iii) Points 3 & 7 are very close together on the CAI and not readily distinguishable on the ground. Point 3 was included in Dr Card's "notable features" but Point 7 was not: see [504] above. Point 3, which Dr Card identified as a significant area of erosion, drains to the west. The area is near the opening of one of the access trails created originally by ODC to the west of the ROW. The access trails may have been used to some extent by Ocesa {Day48/95:14}, but they drain to the west. The area of Points 3 and 7 was in reasonable condition in 2002 {H2.3/3/702}. Since then it has become significantly affected by cattle trails {H2.3/3/700} {Day26/163:12}. It has not been shown that Point 7 (wherever, precisely, it may be) drains to the east;
- iv) Point 100 was not identified in Dr Card's original report. It is pleaded in the 2012 Further Information as an "area of gulley erosion on the ROW and general erosion along the hill crest ridge system, lime deposits also evident" {B2.2/33/379}. The key to the CAI describes it in slightly different terms as "Area of erosion. Lime deposits over the pipe alignment" {C4/3/359}. In his first supplemental report, Dr Card referred back to Figure 14.2 in his first report, which does not refer to this item. The nearest he came to giving direct evidence on this point was to say that the 2009 image "appears to show exposed sediment at a location which could be close to site 100. Cattle trails or paths evident" {H1.4/22/964}. This does not identify damage at Point 100 and does not support the Claimants' allegation, though I agree that there are cattle trails or paths evident in the general area of where Point 100 is marked on the CAI. I conclude that no useful evidence has been given to identify precisely what or where Point 100 may be other than the identification by Dr Savigny (with which Dr Card appears to agree) that the area is subject to cattle trails;
- v) Point 694 is on the southern access trail and drains to the west {H1.4/22/968};
- vi) Images 695,700, 699, 4 and 698 are on a short stretch of the ROW and can be taken together. Going north they are on the trail rising away from a gate across the ROW about 315 metres north of the gate referred to in (i) above. The most concentrated erosion is round the gate and the effects of the trafficking by cattle can be seen to continue up the hill {H2.3/3/703}- {H2.3/3/705} {Day26/165:1}. The erosion is caused by the passing of cattle along the trails;
- vii) Point 104 is not identified as a source of erosion as such but as a gabion that is positioned off the ridge and on the slopes below the ROW {C4/3/359};

- viii) Point 696. The last “notable feature” in Dr Card’s Figure 14.2 in his Original Report identified a point as “AI/C/LC50/”, which was said to be an area of 250 m² which had contributed an estimated 150 m³ of soil loss {H1.1/1/175}. It was subsequently identified as referring to Point 696 {H1.3/21/733}; but the only description of Point 696 is “Soil observation. Mixing of horizons” {C4/3/359}. Dr Card did not address it in his Second Report {H1.4/22/962}. I am not able to identify any specific erosion feature or to attribute it one way or another;
- ix) Point 8 was included in Dr Card’s Figure 14.2 which stated that it was another area of 250 m² which had contributed an estimated 150 m³ of soil loss {H1.1/1/175}. In the 2012 Further Information it was described as “An area of gully erosion and failed ditch diverters on the ROW measuring 200 m²”: see [1668] above. The key to the CAI describes it as “Gully erosion, failure of ditch diverters” {C4/3/359}. Dr Card gave no evidence about it in the text of his first report and no substantive evidence in his second report {H1.4/22/965}. So far as I am aware Point 8 has not been identified in a photograph provided by the Claimants. Dr Savigny identified where he thought was being described, which was an area where cattle congregate and create trails {H2.3/3/707}. Dr Card responded that he disagreed with Dr Savigny’s opinion but provided no further explanation or detail {H1.4/22/965}. On this unsatisfactory state of the evidence I conclude that if Dr Savigny has correctly identified the location of Point 8, I accept his opinion on the cause of erosion. If he has misidentified the location, the correct location has not been established by the Claimant, nor has evidence been given by the Claimant that enables me to identify where it is or what the cause of any erosion may be at that location;
- x) Point 708 appears on the CAI to be on the ROW {C4/3/358} but is described in the key to the CAI as being off the ROW and to be a “Landslide due to access road” of unstated size {C4/3/360}. It was not mentioned as a “notable feature” in Dr Card’s original report. The 2012 Further Information refers to it in the context of landslides caused by the making of the ODC access trails: see [1668](iii) above. On this basis I treat Point 708 as being on or near the northern access trail originally created for the ODC ROW. It has not been shown that the Ocesa works caused or contributed to the happening of the landslide. In any event, depending upon precisely where the landslide is to which reference is being made, it is not clear that any soil would drain onto LC50: see {H2.3/3/713} at lines 1364-1378. If the soil loss was from the area shown in Dr Savigny’s image LC50-15, it would drain to the west {H2.3/3/707}. In summary, I am not satisfied that the landslide was attributable to Ocesa (as opposed to ODC) works or that soil from the landslide would have drained onto LC50, though some may have done for the reasons given by Dr Savigny, whose evidence as identified above I accept.

1794. On the basis of these conclusions I find that:

- i) There are a number of places identified on or near the ROW which are subject to continuing erosion;

- ii) The erosion that has been identified does not demonstrate a generalised failure of the revegetation of either the whole of the ROW or significant sections of it to take hold. The evidence to which I have referred indicates that the revegetation of the ROW was generally satisfactory;
- iii) The Claimants have substantially overestimated the number of identified erosion features that could have contributed to erosion draining onto the slopes of LC50;
- iv) The erosion features associated with the access roads are not attributable to the Ocesa works;
- v) The direct cause of most of the identified erosion features is the passage of cattle (and, to a lesser extent, humans), predominantly since 2002. In the one instance where direct comparison can be made (Point 6) the present state of the ROW is markedly worse than in December 1997. Generally, there has been a marked deterioration since 2002. The ground-level and aerial imagery shows a proliferation of cattle trails since Snr Manco's reintroduction of cattle in 2002.

1795. The overall pattern that is presented is that, after the commencement of the Ocesa works, the exposed soils of the ROW were most vulnerable to erosion in the period before vegetation took hold, for the reasons explained elsewhere in this judgment. There is no evidence of widespread failure of the revegetation. The ROW was reasonably re-vegetated by December 1997. I do not accept that there was any material deterioration in the state of the ROW from then until 2002, when Snr Manco re-introduced cattle. Though there may have been localised areas of failure during that period the evidence does not show them to have had such an impact on the revegetation generally as to affect the overall outcome.

1796. It remains to consider whether the proliferation of cattle trails and the current condition of the ROW can itself be said to be attributable to the Ocesa works having made the ROW more susceptible to erosion than it had been before. This is necessary because of the evidence from, among others, Dr Velez that tracks and pathways are a normal part of the infrastructure of any farm and that the effects of those tracks on the ROW is worse than the effects of those off it {H5.7/10/1549}. As a preliminary point, my assessment is that the trafficking of the ROW, often on quite steep slopes, is more concentrated than elsewhere on LC50, as can be seen most clearly in the approaches to the gates on the ROW to which I have referred above. I therefore do not accept the premise that the usage of the land on LC50 has been the same on and off the ROW.

1797. The Claimants' expert evidence on the state of the soils after the Ocesa works took no account of the likely impact of the carrying out of the ODC works or the five years of exposure of the ROW between 1991/1992 and late 1996. In one respect Ocesa's task will have been simpler than ODC's because Ocesa did not have to carry out the destructive and disruptive job of clearing the forest as a precursor to stripping the ROW. There is no quantitative analysis of the deterioration that the soils on the ridge will have sustained as a consequence of the ODC ROW.

1798. As elsewhere, I accept as a general proposition that the processes of pipeline laying will have caused some soil mixing and a reduction in the amount of topsoil available

to be spread on the reconformed ROW. I do not, however accept that the evidence shows there to have been wholesale inversion, mixing or compaction or that mixing or compaction in the course of the Ocesa works made a material difference to the rate of erosion from the ROW to the slopes below.

1799. In his first report Dr Obando summarised his findings as including that there was soil mixing and inversion of soil horizons along the entire length of the ROW {H3.5/5/991}. His reasons for holding that opinion were set out at {H3.5/5/997}. They did not include either a statement of having observed inversion or photographic evidence that supported an allegation of inversion (e.g. by showing a line of Horizon A soil buried below Horizon B/C soils). He dug one test pit on the ROW with samples taken from different depths – Trial Pit 1, dug on his second visit. The results from that test pit show (a) decreasing organic content with depth, which contra-indicates a finding of inversion, and (b) do not provide any support for a finding of inversion {H4.13/18/4008}. Professor Montenegro found no evidence of inversion {H4.4/4/1005}. I accept Professor Montenegro’s evidence and reject Dr Obando’s reported finding as set out in the summary in his original report. There is no satisfactory evidence of inversion and I reject the Claimants’ allegation that inversion occurred on the Ocesa ROW.
1800. The photographic evidence of the areas identified by the Claimants as erosion features show extensive areas on the ROW where Horizon A is now missing. The absence of Horizon A from parts of the ROW where cattle trails are now established does not provide evidence that Horizon A was missing from the time of the Ocesa works. To the contrary, the evidence of the generally successful initial revegetation indicates that some Horizon A soils were re-spread as part of the works of reformation.
1801. I have referred previously to the different approaches adopted by Dr Obando and Professor Montenegro in their selection of sampling locations: see [727]. It is not necessary to address Dr Obando’s sampling location selection on LC50 in greater detail. Taking the test pits dug on the ROW where vertical comparisons can be made – Professor Montenegro’s samples LC50-A1-032 and LC50-A1-033 and Dr Obando’s first Trial Pit from his second inspection – both show characteristics (where tested) which are inconsistent with a finding of substantial mixing: CIC, base metals, organic content, carbon and nitrogen all decrease with increasing depth while free aluminium oxide and free iron oxide increase with increasing depth {H4.13/18/4008}. The difference between the organic content on and off ROW is largely accounted for by choice of sampling locations and it is notable that no result for organic matter in a surface layer on the ROW from any expert was below 2%: see [760] above. What the results do not show is the extent to which a lower level of organic content on the ROW is attributable to the impact of the ODC works and ROW until 1996 or the subsequent impact of the Ocesa works and ROW thereafter.
1802. I am not sure whether or to what extent the Claimants rely upon Dr Obando’s reported findings of plinthite or laterite on LC50. I do not attach any weight to those findings, as Professor Montenegro found what I accept (despite Dr Obando’s evidence to the contrary) were plinthite, laterite and petroferic crusts on CF50 {H4.12/12/2561}. Their presence on LC50 is therefore neutral.
1803. Viewed overall, I do not accept that the evidence proves substantial mixing on the ROW. Furthermore, the evidence does not analyse or demonstrate whether any

mixing that has occurred is attributable to the ODC works, the Ocesa works or a combination of the two.

1804. Dr Obando's bulk density results on and off the ROW on his first inspection were very similar {Day31/89:6}. On his second visit his on-ROW sample bulk density result (1.31 g/cm³) was higher than his off-ROW results (0.8 g/cm³ and 0.91 g/cm³); but, even applying his chosen benchmark, the on-ROW reading would fall at the bottom of the range indicating slight limitation for light textured soils (1.3-1.4) or at the bottom of the range indicating moderate limitation for heavy textured soils (1.3-1.6) {H6.3/10/711}.
1805. Dr Obando's evidence about bulk density on LC50 was unsatisfactory in a number of respects. First, in his original report he did not include his results from his first inspection (which did not support his thesis or the Claimants' case), but did include his results from his second inspection (which were more favourable to his thesis and the Claimants' case) {H3.8/16/1894} {H3.8/16/1895}. Second, when asked about his results from the first inspection, he prevaricated about whether there was a material difference between the on and off ROW results and then suggested that the small differences in the results "might mean a huge impact in the soil" {Day31/88:20}. Third, when his position on the bulk density results had been shown to be unreasonable, he said that "bulk density as such, on its own, does not really mean anything" {Day31/93:7}, which was inconsistent with his previous written evidence and wrong.
1806. As elsewhere, Dr Obando preferred to rely upon the methodology he had devised based upon the work of Lal. I have reviewed that methodology and do not find it helpful, for the reasons given at [741] above. In the case of LC50, his results were distorted by excluding the bulk density results from his first visit when compiling his scores for his methodology {H3.8/16/1895}. Had he included them, his figure for bulk density on the ROW should have been less than the 3 he allocated on the basis of his later results alone. Had he done so, the divergence shown at [747] would have been greater.
1807. Professor Montenegro's evidence, which was supported by his results, was that he did not find evidence of over-compaction or a reduction in the water-retention capacity of the soil on [LC50]" {H4.4/4/1005}. His choice of sampling location is also liable to influence the results he obtained and, for that reason and the reasons given above, is no more representative than Dr Obando's. Subject to that qualification, however, I accept his evidence based upon his inspection and results.
1808. Taken overall, the evidence does not support a finding that there was widespread over-compaction of the soils on the ROW and I find that there was not.
1809. In general, the experts' descriptions of the state of pasture tended to follow a tendency depending upon whether the expert concerned was engaged by the Claimants or the Defendant. Thus the experts engaged on behalf of the Claimants tended to concentrate on perceived deficiencies while those engaged on behalf of the Defendant tended to draw attention to other areas of La Alborada or CF50 that exhibited similar characteristics. Two points bear mention at this point. First, I find the evidence about CF50 to be of little assistance. There is evidence that the pastures may have been better managed than those on La Alborada {H4.12/12/2561}. I accept

that there is no area on CF50 in the same condition as the ROW, but there is no area that has had the equivalent treatment of two pipeline operations being run through it. Once that is taken into account, the differences in findings are, to my mind, surprisingly modest and not such as to add significantly to an understanding of what actually happened on La Alborada. Second, the only objective testing of the quality of pasture is Dr Avila's bromatology testing, which does not support a finding of significant difference on and off the ROW, though the results are less good than those from CF50 {H21.5/5/1135} ff.

1810. I accept that there are instances where there is erosion on the ROW in places where the remnants of pipeline works can be seen: see, for example, Dr Velez' photograph 5-LC50 at {H5.4/5/836}. I also accept that, overall, the pipeline works since 1991 have led to a reduction in the availability of Horizon A materials and a consequential reduction overall in organic content of the upper soils. This is for the reasons discussed earlier, including the inevitability of some mixing of soils. Subject to that, however, the Claimants' evidence does not establish that there has been inversion or that there has been widespread mixing or compaction of the soils to enable a finding to be made that the erosion that has occurred since 1997 is caused or materially contributed to by inversion, mixing or compaction in the course of the Ocesa works.
1811. I return to the composition and causation of SW1. In qualitative terms, I am satisfied that there would have been erosion from the ROW both between 1991/1992 and 1996 and since 1996. Equally, in qualitative terms, I am satisfied that the fact that the Ocesa ROW was wider than the ODC ROW is more than offset by the fact that the ODC ROW remained bare or virtually bare throughout the five years before the Ocesa works, while the Ocesa ROW (as it had become) was generally well vegetated by December 1997. Without attempting to attach any numbers, this follows from the most basic consideration of the very dramatic changes that are applied to the C-factor in the USLE calculation as between land that is bare and land that is vegetated, as discussed earlier in this judgment: see, in particular, [526] ff. Simply on these findings I am unable to accept the Claimants' central case that all the sediment that has come from the Ridge has come down since the Ocesa works and that there was no appreciable flow of sediment to the lower slopes between the carrying out of the ODC and the Ocesa works.
1812. The crying need for reliable quantitative evidence becomes apparent when it is remembered that (a) the total area of the ODC ROW was c. 14,500 m²: see [1673] above, (b) the total area of the Ocesa ROW was c. 18,500 m² (or 25,900 m² if the November 1996 settlement adds a further 7,400 m²) see [1695] and [1698] above, (c) the total area of SW1 is pleaded as c. 26,800 m², and (d) the aggregate contribution of Dr Card's seven "notable features" in his first report was 3,035 m³. Only a proportion of material eroded from the ROW would leave the ROW. Of the material that left the ROW only a proportion would drain to the east, and only a proportion of what drains to the east would end up in the alluvial fan or, beyond that, in SW1 because some remains on the higher slopes. Yet even if, contrary to the facts, one were to assume that everything that was eroded on the ROW drained off it to the east and made its way through the alluvial fan to SW1 then, if the entirety of SW1 is to be covered in sediment, each centimetre of sediment depth will require more than a centimetre of sediment loss from the whole of either the ODC ROW or the Ocesa ROW. As in another context, the mathematics may reasonably be described as magnificently

imprecise and I am not attempting to achieve any measure of precision. My purpose is simply to attempt to achieve some form of qualitative understanding of the implications of the Claimants' case that the entirety of SW1 is covered in sediment. If the depths of sediment at the points measured by Dr Tobon and Professor Monsalve were representative of the entirety of SW1, the volumes of sediment that would be required to come from the area of the ROW would, in non-technical and non-quantitative terms, be enormous. None of the observational or photographic evidence of the present condition of the ROW supports a finding that such enormous quantities have been shed from the ROW at all, leave aside the need to increase the aggregate loss to cater for the fact that not all would drain off the ROW to the east.

1813. For reasons that I have outlined earlier, there is no reliable quantitative evidence about the quantities of sediment that have left the ROW to the east or would have reached the lower slopes. Dr Card's attempt in his fourth report has been demolished and the Claimants' attempted reworking of the USLE calculation cannot provide reliable evidence of the quantities of material that would have come off the ROW for the reasons I have given earlier.
1814. The Claimants' closing submission on their reworking of the figures for LC50 included the statement that "the rate of soil loss from the ROW can be expressed as the loss in centimetres from the ROW per year" and asserted a rate of 8 cms per year {C4/3.6/878}. Even if this were otherwise a reliable figure, it is the maximum rate on the Claimants' reworked figures and would only apply to the very short period between construction and the installation of erosion control measures {C4/3.8/1366.7}. Thereafter the rate of delivery would reduce with the impact of erosion control measures and subsequent revegetation of the ROW. It is not possible for me to quantify the effect of the revegetation after the Ocesa works: I can only record again that the revegetation was generally successful. I am therefore unable to attach any weight to this calculation as evidence of the likely quantities of soil to be lost from the ROW which may have found its way to SW1 over time.
1815. Standing back and reviewing all of the evidence about the state of the ROW from 1991/1992 onwards (other than Dr Savigny's disputed factual evidence), I am not remotely convinced that the entirety of SW1 could have been covered with sediment from the ROW sufficient to turn it into a deep and dangerous swamp, whether one takes the likely delivery of sediment from the time of the Ocesa works or adds to it the delivery of sediment from the time of the ODC works.
1816. I have already discounted the secondary road as a significant contributor to the formation of SW1. In his original report Dr Savigny proposed sediment derived from land clearing as his second major contributory factor: see [1773] above. Professor Monsalve supported this, giving as his opinion that "the sedimentation is the result of the deforestation in the drainage basins on the property, in particular the drainage basin of Stream W1" {H8.11/11/2816}. I reject this aspect of Dr Savigny and Professor Monsalve's opinion for a number of reasons:
- i) Although some early clearance of forest is evidenced at the west end of LC50, it tended to be limited, temporary and allowed to regrow as evidenced by the photographs that are available up to and including 2002: see [1662] above;

- ii) In particular, apart from the clearance of the ROW, there was no wholesale or extensive deforestation of the slopes that would drain into SW1 until Snr Manco started his westward push in the years shortly before reintroducing cattle in 2002;
- iii) I accept that the slopes to the north of SW1 deteriorated significantly after being cleared and would have contributed to its continuing sedimentation thereafter: see [1771]. However, I find that those slopes were not cleared until relatively shortly before 2002, if not later;
- iv) Overall, I have come to the conclusion that, as the Defendant has submitted, Snr Manco's clearing of slopes for pasture was limited by the presence of SW1: in other words, SW1 predated the clearance and was not originally caused by it;
- v) It has not been shown that background erosion from the relatively small basins feeding into SW1, which for most of the time were densely forested, would have caused the levels of sedimentation suggested by Dr Tobon and Professor Monsalve's measurements.

1817. For similar reasons, I do not accept that the Claimants' farming practices or overgrazing were an original cause of SW1. Although there is clear evidence of deterioration of pastures (for example, Dr Tobon's observation, to which I have referred at [1771] above) and I find that, for example, the slopes that drain into SW1 from the north provide a continuing source of eroded materials, the evidence does not satisfy me that SW1 has extended in either scope or dangerousness as a consequence of erosion from those slopes since they were cleared. It remains possible that they have helped to perpetuate the condition at the edge of SW1 and continuing downstream through the W3 wetlands, but the expert evidence is not sufficiently precise to enable me to make a positive finding about their causative contribution to the present state of those areas. Because of my conclusion on the causative effect of such erosion, I can state shortly that there is clear evidence, which I accept, that (whatever the theoretical carrying capacity of the area converted to pasture) Snr Manco's increasing numbers of cattle and, latterly, his much heavier buffalo are a material cause of the observable deterioration on the other pastures as well as on the ROW.

1818. There is direct evidence of landslides on the slopes above SW1 from photographs taken after the slopes were cleared but none from the period before clearance. Dr Tobon referred to two landslides which he saw on cleared fields {H7.4/4/897} and (possibly a reference to the same thing) a mass landslide event affecting stream W1 {H7.7/52/1850}, and I have referred to the landslides adjacent to works on the secondary road and the access roads on the ridge. I accept that inundation of steep slopes may cause landslides without any direct human intervention: see Professor Monsalve's evidence set out at [1766] above. I shall return to the question of landslides when considering the fishpool claim. For present purposes, it is sufficient to say that the parties have not identified landslides that could have made more than a relatively small contribution to the creation or continued existence of SW1.

1819. I return to Dr Savigny's factual evidence about the state of SW1. I am surprised that, if correct, it did not feature in his original report. However, there are a number of

pieces of evidence that suggest he is correct. The first is the enormity of the amount of sediment that would have had to come from the ROW in order to cover the whole of SW1 (and the W3 wetlands) with a thick layer of sediment downstream of the sediment deposited in the alluvial fan. The second is the lack of contribution from the secondary road and the late clearing of relevant pastures. The third is Dr Velez' description of the terrain as being composed of hills and canyons, in which wetlands are easily formed during the rainy season: see [1663](v) above. The fourth is the relative absence of damage to W1. The evidence is not consistent about the state of the streams: see, for example, Professor Monsalve's evidence set out at [1766] above. I accept the thrust of Dr Tobon's observational evidence that there was limited damage to the streams: see [1769] above. Despite the steepness of the slopes down which the streams flowed, there is a relative absence of evidence of overwhelming sedimentation in and around these small streams which does not support the suggestion of the massive amounts of sediment coming off the ROW over time that would have been necessary to cover the entirety of SW1 with a layer of sediment that made it all swampy.

1820. The canopy above SW1 remains intact and there is no evidence, expert or otherwise, of widespread death of or damage to trees. The Defendant submits that this is another reason for concluding that SW1 has not been substantially affected by sedimentation from the ROW. The Defendant may be right but there is no satisfactory expert evidence that trees of the age and type found in SW1 would be affected by the proposed levels of sedimentation. I therefore do not rely upon the present state of the trees in SW1 and the wetlands downstream as a factor in this discussion.
1821. My review of the other evidence suggests that Dr Savigny *could* be right in the factual evidence he gave. The final decision rests on my assessment of Dr Savigny as a witness of truth. For reasons I have set out in this section of the judgment, there are a number of aspects of Dr Savigny's opinion evidence in relation to LC50 which I reject. More importantly in the present context, my impression of his original report on LC50 was and is that it was less thorough and less compelling in a number of respects than his work on the other three properties that I have had to consider. I referred at [507] to the Claimants' submission that he had a tendency to blame everything *except* the Ocesa pipeline for the damage which the Claimants allege that their land has suffered. To my mind, his original report on LC50 provided evidence of such a tendency. Whatever the reason for this falling off from his normal standards, I do not find it inconceivable that his subsequent factual evidence was true but omitted from his first report. I recognise that the factual evidence is inconsistent with the terms of his original report as to the cause of SW1; but if, as the Claimants have submitted, he was succumbing to a tendency to blame what might be described as "the usual suspects", I can conceive how his original report ended up as it did.
1822. What I do find inconceivable is that Dr Savigny would have lied to the Court. Having studied his work before, during and since trial I am as certain as it is possible to be that Dr Savigny would not have given the factual evidence he gave about the state of SW1 if it was not based on genuine recollection. Some of his descriptions were surprisingly florid for Dr Savigny, but he rowed back from the most extreme of them the next day. I am satisfied and find that the factual evidence he gave, that he encountered areas of SW1 that were not a sedimented swamp but a wet bog of long standing and with the mineral base a significant distance below the surface, is true.

1823. Having reached this point, I can summarise my findings on the state and causes of the alluvial fan, SW1 and the W3 wetlands quite shortly:

- i) There has been erosion from the ROW and a passage of sediment onto the slopes above SW1:
 - a) Until the ODC works in 1991/1992 at background rates reflecting the fact that for the great majority of time the entire area has been under primary forest and that for about 20-30 years before the ODC works small areas of land were temporarily cleared;
 - b) From the time of the ODC works in 1991/1992 at a rate reflecting the size and configuration of the ODC ROW and the fact that it remained effectively bare until November 1996;
 - c) From November 1996 until revegetation took hold in mid- to late- 1997 at a rate reflecting the size and configuration of the OcenSA ROW and the fact that the ROW was effectively bare. Thereafter the ROW was reasonably well vegetated until it started to deteriorate with the impact of livestock after their reintroduction in 2002 (with numbers increasing thereafter);
 - d) Landslides are likely to have occurred below the ROW, which would have contributed to the supply of material being transported downhill. Subject to their possible impact on the fish ponds, to which I will return, it has not been shown that they made a material difference to the outcome;
 - e) Erosion from the ROW has been the major source of the sedimentation that has come down W3 into the alluvial fan. I accept that sediment depth readings were taken at points 194 and 195 on the CAI. The alluvial fan has not been materially influenced by the secondary road. The slopes to the north of the alluvial fan generally contributed only background levels of erosion until the fields were cleared. Thereafter they have contributed fresh sediment but have not materially altered the state of the area of the alluvial fan;
 - f) Some sediment has made its way downstream from the alluvial fan to SW1. Part of SW1 is a wetland bog, the condition of which has not been materially influenced by any sediment from the ROW that reached it. Part of SW1 has been rendered swampy by sediment from the ROW. In the absence of detailed evidence establishing the zone of influence of sediment coming down from the ROW, the precise outlines of the areas that are and are not adversely affected by sedimentation are not capable of being precisely identified. However, I accept that sediment readings of 30 cms and more than 1.25 m were taken by Dr Tobon in swampy (rather than boggy) parts of SW1 at Points 197 and 199, both of which are towards the northern side of SW1. This suggests that the northern side of SW1 was adversely affected by sedimentation, which is consistent with the continued flow of water carrying sediment downstream of the alluvial fan;

- g) Despite the positive evidence that Snr Buitrago complained about sedimentation of his water sources in August 1997, the absence of evidence of complaints before the Ocesa works and the positive evidence from the witnesses that the ODC works caused no difficulties or damage, I am unable to accept that sedimentation from the ROW only started to affect watercourses after the Ocesa pipeline was laid. I accept that there would have been sedimentation of watercourses in times of heavy rain after the Ocesa pipeline works were carried out, reducing as the revegetation took hold. But sedimentation of watercourses and the lower slopes from the alluvial fan to the affected parts of SW1 commenced with the ODC pipeline works and did not significantly reduce in rate in the period to November 1996 because revegetation of the ODC ROW failed.

1824. The allocation of causal responsibility for the swampy area of SW1 is made almost impossibly difficult by (a) the lack of definition of the area of SW1 affected by sedimentation; (b) the complete absence of recognition on the part of the Claimants' experts that the ODC ROW between 1991/1992 and November 1996 was relevant; and (c) the lack of any reliable quantitative evidence about the amount of sediment from the ROW that would have reached the affected areas of SW1 either between 1991/1992 and 1996 or thereafter.
1825. The loss of Snr Buitrago's heifers does not provide assistance because they did not die in SW1: see [1831] below. Because the fields to the west of La Alborada were cleared by Snr Manco after the Ocesa works, the affected area of SW1 had already been subjected to the sediment from both the ODC and the Ocesa ROWs since 1991/1992 and 1996 respectively. In the absence of reliable quantitative evidence, I can and do accept that the delivery of sediment from the ROW would have increased to a rate higher than had been prevalent since the ODC works for a relatively short time from November 1996, because of the increased area affected by the Ocesa works and the fact that soil that was already disturbed was being re-disturbed; but after the Ocesa revegetation took hold, there is no basis for a finding that erosion continued at the same rate as during the relatively short period from November 1996 or that it continued at a rate as high as had been prevalent from the bare ODC ROW. It follows that, by the time that Snr Manco says that he started losing cattle in 2002, SW1 had been affected by sedimentation from the bare ODC ROW for approaching five years, from the bare Ocesa ROW for approaching six months and then from the Ocesa ROW at a reducing rate as revegetation took hold from about mid-1997 to 2002. The initial rate of sedimentation from the Ocesa ROW was sufficient to cause Snr Buitrago to complain in August 1997, which was well into the rainy season. The evidence does not justify any more detailed findings about the relative rate of sediment delivery from the ODC and Ocesa ROWs respectively.
1826. I am left with the conclusion and finding that, between them, the ODC and Ocesa pipeline works caused the creation of a swampy area that was predominantly to the northern side of what has been designated SW1. I am not able to exclude the absolute quantity of sediment that came from the ROW after November 1996 as immaterial. However, I am not satisfied that the incremental quantity after November 1996 (i.e. the amount by which the sediment from the area of the ROW from November 1996 was greater than it would have been if the Ocesa works had not been carried out)

was material. While the rate may have increased during the first six months, the fact that the Ocesa revegetation was much more successful than ODC's means that it was probably lower by December 1997 than it would have been if the Ocesa works had not been carried out at all.

1827. I do not accept the Claimants' submission that the carrying out of the Ocesa works should be treated as if they somehow wiped the ODC slate clean; or, in other words, that the Ocesa works should notionally be treated as if they had been carried out on land in the condition that it had been in before the ODC works were inflicted on it. To my mind, therefore, it is the incremental effect of the Ocesa works that matters. On that basis, the incremental effect has not been shown to have made a material contribution to the causation of the swampy area of SW1. Put in other words, the Claimants have not shown that SW1 was materially worse as a result of the Ocesa works than it would have been if the Ocesa works had not been carried out.
1828. The fish pond claim raises different issues which I will address when considering the claim below.

The Claimants' Heads of Claim

1829. As in other lead cases, the Claimants in their closing submissions "recognise[d] the difficulties they face in proving the quantum of their claims: that is inevitable given (a) the distance in time since the events complained of and (b) the social, education and cultural characteristics of the Claimants. Together these mean that their records are likely to be less complete or sophisticated than would be the case with farmers in, say, this country" {C4/3.6/936}. As in other cases, this is true but it understates the true level of the Claimants' difficulties, which go wider than simply the assessment of quantum. As I have indicated, Snr Buitrago's memory is unreliable, particularly for questions of chronology; and, as I have found, the presentation of the Claimants' case suffered from the fundamental flaw of ignoring the significance of the ODC ROW. Snr Manco's memory was in some respects better; but it became clear during the trial that, in crucial respects, he was not in a position to give reliable evidence about what happened or when it happened. Quite how memory changes and works is well beyond the scope of this judgement, save to observe that there are many instances in this litigation which suggest that memory has been affected by the evidence gathering process.
1830. As a second preliminary point, as with other Claimants, I do not accept that the Claimants were in position to give evidence that their Schedules of Loss had been read to them and that they were an accurate description of their losses. I rely upon the contents of early formulations of the Claimants' claim when discussing the digging of the fish pools, for the reasons I give there. Otherwise, however, I do not accept that the Claimants understood their Schedules of Loss even if they had been read to them: see [411] above.

Snr Buitrago's Two Heifers Lost and Three Heifers Sold – COP 3,180,683 (c. £1,180)

1831. The Claimants' case is that Snr Buitrago lost two heifers in 1997 in SW1 (at Point 92) {C4/3.6/909}. I accept that Snr Buitrago lost two heifers but not that he lost them in about 1997 or that he lost them in SW1. For the reasons given at [1681] above, I find that they were lost before the Ocesa works were carried out. They drowned in the

ponded area of wetland near to the house which is shown in Dr Savigny's photographs at {H2.6/8/1638} {Day9/93:2}. I reject the submission that Snr Buitrago's evidence in re-examination indicated that he had been trying to refer to part of SW1. He drew a clear distinction between having to walk 30 minutes to the fish ponds (which are on the northern boundary of SW1) and a distance of about 100 metres to where his heifers had died {Day9/120:12}. If he had maintained that his two heifers died in SW1 I would have found that profoundly unlikely and that he was confused, because his 5 heifers were being kept on the 1-2 hectares near the house and were nowhere near the area by SW1, which had not yet been cleared and was heavily wooded. The ponded area where the two heifers in fact died was in the area which had been cleared and where they were being kept. It is not alleged that the ponded area where they died was rendered dangerous by the Ocesa works and, given my finding that he lost the heifers before the Ocesa works were carried out, that question could not arise in relation to their loss. Had they been lost in 1997 and had it been alleged that the ponded area near the house had been rendered dangerous by the Ocesa works in 1997, I would have rejected that suggestion, for two main reasons. First, the general area has been identified as including an area of wetland since 1961: see [1662](i) above. Second, I would reject as implausible and not supported by any reliable expert evidence that sedimentation from the ROW since the Ocesa works could have reached the lagoon near the house in such quantities as to make a material difference to its state of swampiness or danger for cattle. Both the formation of the wetland near the house and the swampiness of the pond was of long-standing.

1832. It follows that the claim in respect of the loss of the two heifers fails without reference to any other legal arguments.
1833. The claim arising from the sale of the other three heifers that were sold fails with the claim for the two heifers that were lost because it was the loss of the two that had got stuck in the lagoon that caused the remaining three to be sold, which is not attributable to the Ocesa works {D5/91/1036}. The pastures round SW1 had not yet been cleared: fear of losing cattle in SW1 cannot have been and was not the reason for selling the three heifers (whether that had happened in 1997 or, as I find, before). In any event, there is no evidence that Snr Buitrago sold them at an undervalue. As I have said elsewhere, a claim for loss of production of calves or milk where the full value of the productive animal has been obtained by sale or awarded as damages is double recovery: see [908] above.
1834. It follows that the claim arising from the sale of the three remaining heifers fails without reference to any other legal arguments.

Cattle lost between 2002 and 2012 – COP 18,708,125 (c. £6,941)

1835. The Claimants' case is that Snr Manco lost 15 cattle which became stuck in the mud of SW1 between 2002 and 2012. His witness statement said that he and Snr Buitrago had lost "some 25 cows" and provided no detail about when or where they were lost {D5/88/960}.
1836. Dealing first with numbers, Snr Echevarria's witness statement could be interpreted as saying that seven calves and either two or five cows were lost between 2002 and when he stopped working for Snr Manco in August 2011 {D5/97/1057}. Snr Manco said that this was a correct estimate for the period during which Snr Echevarria

worked for him {Day8/78:4}. The Claimants' case as previously stated did not refer to calves, claiming damages on the basis that they were mature animals. Later, he maintained that he had lost about 25 animals, again without distinguishing between mature cattle and calves. No explanation has been given for the discrepancies between the claim made for 15 cattle and Snr Manco's evidence that he lost some 25 animals.

1837. Snr Manco was asked about when he lost his animals. His clearly stated evidence was that he had lost all the animals since 2008 {Day9/43:25}. I was concerned when the questions were asked that he may not have fully understood them and revisiting the evidence leaves me still concerned. However, apart from the evidence of Snr Echevarria, there is no other witness evidence about when the cattle were lost.
1838. Snr Manco was also asked about where the cattle were lost. His first response, by reference to what was meant to be a reference to SW1 in the Further Information served on his behalf in 2011, was to state that the cattle got lost in an area near to the pond close to his the house {Day27/62:22}. When asked to show the area where the cattle got stuck, he marked the CAI to indicate that it was between Points 92 and 201 {C6/4/1}. Roughly speaking, that is between a point towards the eastern end of SW1 and the bridge near to the house. Point 92 is identified in the key to the CAI as "Bodies of cattle that got stuck in the swamp" and is close to Point 107, which is identified in the key as "area where cattle stuck in swamp" {C4/3/362}. Points 92 and 107 are approximately 75 metres to the east (downstream) of the easternmost of Dr Tobon's sediment measurements (Point 199). Points 92 and 107 were the points identified in the RARSL as the points where Snr Manco's cattle were lost: see [1668](viii)(b) above.
1839. This evidence is unsatisfactory as to numbers, time and place:
- i) As to numbers, I bear in mind that Snr Echevarria's evidence is unreliable in other areas; but Snr Manco endorsed his estimate. Either the claim has simply failed to identify that most of the animals that were lost were calves or, if the claim is to be taken as a claim in respect of 15 mature cattle, it would mean that Snr Manco lost approximately 10 cattle in the short period between when Snr Echevarria left his employment and the end of the claim period in 2012, which is not plausible;
 - ii) As to time, Snr Manco's answer about losing all of the animals after 2008 causes me some concern, as I have indicated. But, even if that were to be left on one side, there is a complete lack of clarity about when the cattle have been lost. This is not immaterial in the context of a farmer who rapidly expanded his herd from an initial 25 to over 100 before he started to introduce buffalo. Nor is it immaterial in the light of evidence that, when Dr Savigny made his inspections, cattle had access to the area alongside W3, which was not fenced off: see [1850] below;
 - iii) As to place, Points 92 and 107 are within SW1, but point 201 is remote from it and is more consistent with Snr Manco's first answer in cross-examination that the cattle got lost near to the pond by the house, which is not an area alleged to have been made swampy by the Ocesa works.

1840. On this evidence, I accept that Snr Manco has lost some animals but am not satisfied that he lost either some 25 animals (as he said in his statement) or 15 cows (as claimed). I disregard Snr Echevarria's evidence about calves being lost because there is no hint of that happening in Snr Manco's evidence or the claim as advanced, and I am not satisfied that Snr Echevarria's evidence is reliable in the absence of corroboration. I also accept that Snr Manco lost animals within SW1 near to Points 92 and 107 but am not satisfied that all of the animals he lost were within SW1, because both his initial answer in cross-examination and his marking on the CAI indicates that some animals were lost much closer to the house. I do not think that Snr Manco has a real recollection of when his animals were lost and am unable to place any reliance on the fact that the claim is pleaded as being losses between 2002 and 2012, since I am not satisfied that inclusion in the pleadings has reliable evidential significance.
1841. There is a further question to be answered, which is how the cattle got into the area of trouble in the first place. The fencing claim is for fencing around the pastures into which the cattle were placed. Snr Manco gives no evidence about how his cattle got into the area of trouble. Snr Echevarria gave evidence that he "tried to fence off the swampy area but the cows kept pushing the fence down. As a worker on the farm of [Snr Manco], one of my jobs was the reconstruction of the wire fences that had been broken down by the cows. I did it about eight (8) times, if I remember rightly. ... The fences we had to repair were 50-60 metres long, because most of the ones that were broken down by the cows were in meadows without solid ground, so if they pushed down one fence post all the rest would follow" {D5/97/1058}.
1842. Taken on its own, this evidence first suggests that the fencing was put round the swampy areas but later suggests that the fences were in meadows. The reference to meadows being without solid ground is consistent with the photograph of the fence erected on one side of the pond near the house {H8.26/30/6824} but is otherwise uninformative. His evidence does not receive further explanation or corroboration from other witnesses. As will be seen at [1847]ff below, neither the pleaded case nor the Claimants' closing submissions make clear where the fences were placed. This failure is not one that the Court can make good either by making assumptions or by assuming that there is a "kernel of truth" in the Claimants' case.
1843. The evidence at trial is that typical fencing for cattle in the relevant areas of Colombia will be by post and barbed wire, and there is photographic evidence that Snr Manco used that sort of fencing {H8.26/30/6824} {H5.4/5/834}. I accept that cattle sometimes break down fences and that the ease and regularity with which they do so will depend on various things such as their desire to get to water and the quality of the fencing. If I were to conclude that the numbers of cattle claimed had all broken through Snr Manco's fences with the consistent regularity suggested by the formulation of the claim, I would seriously question the competence of the fencing he had erected and the decision to keep his cows in pasture with such inadequate fencing. Although Snr Manco himself is not by profession primarily a farmer, the evidence of his farming practices does not suggest that he would consistently keep his animals in pastures with such inadequate fences.
1844. On this unsatisfactory and incomplete evidence, I accept that there were occasions when Snr Manco's cattle broke down the fencing round the pasture fields in which they had been placed. For the reasons set out above and in relation to the fencing

claim below I do not accept that Snr Manco made any attempt to fence round the 2.68 hectares of SW1 (or the W3 wetlands further downstream). Nor do I accept that they broke out with the regularity that the formulation of the claim suggests. I am not persuaded that more than about 10 cows escaped between 2002 and 2012 and were subsequently lost. Of those, I am not persuaded that more than about 3 or 4 were lost in the area of SW1. In relation to those that were lost in the area of SW1 I accept Snr Manco's description that they were lost in an area of swamp and, on this tenuous evidence, accept that the 3 or 4 cows were lost in an area of swamp in SW1 caused by sedimentation from the ROW. I am not persuaded that the balance of the 10 or so cows that escaped and were lost went into SW1 or into an area alleged and proved to be made dangerous by sedimentation from the ROW. On these findings no question of failure to mitigate damages or contributory fault arises.

1845. For the reasons I have set out above, I reject the submission that the incremental sedimentation from the ROW attributable to the Ocesa works made a material difference to the state of the swampy area of SW1. It follows that the claim in respect of the 3 or 4 cows that perished in SW1 fails.
1846. If my conclusion on causation were wrong, I would assess damages based on the replacement cost of 3.5 cows, that being a reflection of my finding that 3 or 4 cows were lost. Taking a broad approach, I would award COP 2,250,000 (c. £850).

The Fencing Claim – COP 494,200 (c. £185)

1847. The fencing claim was introduced by the Revised Schedule of Loss which alleged the existence of SW1 and that “in order to continue keeping cattle on the Property, and to keep cattle away from dangerous areas, the Claimants built approximately 250 metres of fencing on a number of pastures on the Property” {B4.2/5/227}. Later in the Revised Schedule of Loss it was alleged that, as well as clearing new pasture areas between 1997 and 2002, “they erected fencing to keep cattle away from affected areas” but that “fences erected by the Claimants were not always sufficient to keep cattle safe as they occasionally pushed fences down to access further pasture areas and strayed into swampy areas” {B4.2/5/231}. Neither the Further Information nor the CAI or its key identified where the fences were. It was not alleged that the fence was an attempt to place a fence round all or part of SW1. Two days' labour per year was claimed for maintaining the fences. The gist of what was being said appeared to be that the fences were part of the enclosure of new pastures that were away from the swamp. The 2015 Further Information {B4.4/2/66} was in the same terms, which therefore represent the most developed statement of the Claimants' case.
1848. The Claimant's closing submissions do not identify what fencing is the subject of the claim. They include that:
- i) “The development of and permanent nature of SW1 ... has resulted in the Claimant having to change the configuration of his grazing fields and fence off SW1 in order to prevent cattle from accessing this location (although despite the fencing it has proven difficult to keep cattle off the area)” {C4/3.6/874};
 - ii) “[Snr Buitrago's two heifers] got stuck in the swampy area before it was fenced off. ... The cattle often break down the fence and get into the swampy area” {C4/3.6/910};

- iii) “[Snr Buitrago’s two heifers] got stuck in the swampy area before it was fenced off” {C4/3.6/943};
- iv) “The cattle often break down the fence and get into the swampy area” {C4/3.6/943};
- v) [Snr Echeverria] says that fences that needed to be repaired were in meadows without solid ground and stretches of 50 or 60 meters long needed to be repaired because once the cow had pushed down one fence post, the rest would come down too” {C4/3.6/946}.

1849. Neither Snr Buitrago nor Snr Manco identified the location of the fences for which they were claiming in their witness statements. Snr Buitrago did not refer to them at all {D5/91/1036}. Snr Manco’s only references to fencing for cattle were:

- i) “Firstly, two cows belonging to [Snr Buitrago] got trapped. A while after that we fenced off this area” {D5/88/958}. This is consistent with fencing off the ponded area near the house where Snr Buitrago’s two heifers were lost, though it is not clear how the decision to fence that area ties in with Snr Buitrago’s decision to sell the remaining three heifers;
- ii) Later (at [91]) he describes cattle beginning to get stuck in “areas of swamp [that] started to be created across the lower part of the farm.” He continued “the first time this happened, we fenced off the area, but the animals still manage to break the fences and get inside. Since the construction of the pipeline, we have lost some 25 cows like this. Over all this time, I have kept trying to stop the livestock getting in by building fences, but the animals keep breaking them. ...” {D5/88/960}. This is vague and confusing. The reference to “the first time it happened” could be a reference to the loss of Snr Buitrago’s two heifers near the house. The reference to building other fences which the animals break, does not identify where these fences are on the farm. Neither passage suggests fencing off SW1 itself.

1850. The experts were unable to identify the fences in respect of which the claims were being made. Dr Velez’ evidence was that “in the wet, swampy areas we did not observe any mitigation measures, either on the part of the company or of LC50. However, I understand from the Claimant’s witness statements that he has constructed fences in the fields to prevent the cattle from entering these areas” {H5.4/5/857}. If there had been evidence of any attempt to place fences round all or part of SW1, I am confident that the experts would have identified it. Dr Savigny reported having seen livestock grazing beside the W3 wetland area and evidence of livestock having freedom of movement throughout the SW1 and broader W3 watershed area {H2.7/9/1890}, which is inconsistent with the existence of fencing around SW1.

1851. Snr Manco’s evidence at trial did not provide any greater clarity. He identified a short length of fence near to the house as being one that he built to stop animals getting into the pond at that location, which he described as very deep, swampy and full of mud {Day8/69:18}. That is the pond near the house (where I have found that Snr Buitrago’s two heifers died) and is not part of or near to SW1. When asked about other fences, he was at a disadvantage as he did not remember that his Schedule of Loss claimed for 250 metres of fencing {Day8/71:15}. He then said that he had only

fenced one side of the pond (which appeared to be a reference to the pond by the house) {Day8/72:7}. At one point he suggested that the experts had looked in the wrong place for fences {Day8/71:1} but he did not identify where the right place might be.

1852. I accept that the Claimants erected a fence along one side of the pond near the house, probably soon after one or both of Snr Buitrago's heifers died. That was not attributable to the Ocesa works as neither the pond nor the fact that it was deep, swampy and full of mud, was caused by the Ocesa works. There is no evidence to support a finding that the Claimants attempted to fence off all or part of SW1 by putting a fence or fences around it or the wetlands along W3 and, given the inability of the experts to find such fencing and the evidence of Dr Savigny that it was not there, I find that no attempt to fence off all or part of SW1 or the W3 wetlands by placing fences round them was made.
1853. There is no evidence to establish where the fences for which the claim is made were located. Nor is there any evidence to justify a finding that 250 metres (or any length) of fences were erected to keep cattle out of the swampy areas over and above the lengths of fencing that would have been required in any event to enclose the new pasture fields for the purposes of rotating cattle on a regular basis (as Snr Manco says he does {D5/88/946}). I can attach no evidential significance to the fact that mention of fencing was included in the Revised (and later versions of the) Schedule of Loss. Even if I could, the description is so vague that I could not make a finding that the length of fencing on the farm was increased overall by the need to keep cattle out of swampy areas.
1854. The claim is financially small by any standards; but that does not justify allowing it in the absence of any properly directed and presented evidence in support. It follows that, without reference to any other legal arguments, the claim for fencing fails.

The Fish Pond Claim – COP 36,302,6627 (c. £13,471)

1855. I have summarised the claim for loss of fish production at [1668](viii)(c) above and, for reasons set out at [1752] – [1761] above, have found that the fish pools were dug between when Snr Manco went to work with Snr Buitrago in 1992 or 1993 and the laying of the Ocesa pipeline in November 1996. At that time the area where the fish pools were dug was covered by the forest canopy and the slopes to the north had not been cleared for pasture. The evidence of both Snr Buitrago and Snr Manco was to the effect that the fish pools were a short-lived enterprise: see [1754] above. It is the Claimants' case in closing that mud coming down from the ROW in water, particularly in W1, was the cause of the destruction of the fish pools {C4/3.6/890}.
1856. On the basis of his inspection, Dr Atencio estimated that there were two pools having areas of 80 m² and 20 m² {H11/2/223}, which is consistent with Snr Manco's evidence that one was bigger than the other, though his estimate was that the larger pool was 40-50 m² {Day9/49:15}. It is pleaded that the pools were 2 metres deep {B2.1/14/108}. So far as I am aware, neither Claimant gave evidence about the depth of the pools. On the basis that the minimum size of the two pools was about 70 m² and the maximum about 100 m², an average depth of 1 metre would entail a volume of between 70 and 100 cubic metres, while a depth of 2 metres would entail a volume

of twice that amount. The pools had no perimeter edging {Day9/50:11}. They were positioned a short way from the stream {Day9/57:21}.

1857. I have set out the accounts of what happened from Snr Buitrago and Snr Manco's witness statements at [1754] above. Each was cross-examined on how the fish pools were damaged:

i) Snr Buitrago initially confirmed the contents of his statement and said that "the avalanche of mud" came down the main stream and came down from those streams that came down from the springs up above. The incident happened at night when he was asleep in the farm. The next day he saw that the pool was covered and clogged {Day9/108:16}. In re-examination he was asked whether there had been one occasion or more than one occasion when mud had got into the fish ponds, to which he replied that "before there was a little storm and it sort of half blocked it up and we cleaned it out and we hoped that it would be all right. But then there was another – when the strong storm came, the strong storm, and that blocked it up completely" {Day9/122:3} ff. Viewed overall, it is clear that Snr Buitrago did not witness what happened and that the gist of his evidence is that he found the pools clogged and covered in the morning;

ii) Snr Manco said "when it rained heavily, when it rains heavily for two or three hours and a lot of water comes down. I don't know where the mud came from, but as far as I am concerned, it came from up above there, and from that earth that there was in sacks there, in costales, on either side, maybe that is where the earth came from. There was a huge downpour, the water level rose and it brought all that mud down and it filled up, covered up, clogged up those ponds. And that is how things happen" {Day9/58:1}. He confirmed the evidence that both men had previously given that there was a less serious incident followed by the one that led to them abandoning the fish pools for ever.

1858. I do not treat the Claimants' description of the pools as being "completely clogged" or "filled ... completely" as being literally true. The sense they conveyed was that a dramatic event happened so that when one or both of them went to the pools one morning they found that large amounts of soil or sediment had gone into the pools and the surrounding area which made it clear that the pools could not be salvaged. On that basis I accept the evidence of what they found. It is not necessary to determine in any greater detail how much "mud" had come down or precisely how and where it was deposited.

1859. The Claimants' case that the mud came down in water "particularly in W1" may be intended to mean that some of the mud came overland rather than being transported downhill in the streams. That would be consistent with the use of the word "avalanche" to describe the event that finally covered and clogged the pools. As a result of their oral evidence, however, it is clear that neither Snr Buitrago nor Snr Manco saw the happening of an avalanche; and neither Claimant nor any expert identified the site of an avalanche on the slopes that could explain the use of the word "avalanche" to describe what happened. Snr Manco was explicit in saying that he didn't know where the mud came from. Snr Buitrago's evidence was to the effect that

he found the pools clogged in the morning, but he did not identify any particular source for the soil than that it came down from the mountains where the ROW was.

1860. Dr Atencio said that he agreed with evidence from Dr Tobon that “it is supposed that the earth that was removed in order to bury the pipeline ... and which has eroded from the [ROW] moved in the direction of the drainage channels, where it accumulates and spills out around both sides of the slopes.” So far as I am aware, no such passage appears in Dr Tobon’s original report: Dr Tobon did not deal with the fish pool claim at all at that stage. Dr Atencio also gave as his own opinion that “during the first rains, the sediment was dragged from the high slope down to the lower part of the land, where it encountered the ponds, clogging them completely” {H11/2/224}.
1861. The high point of expert support for the Claimants’ proposed mechanism of transport of the very large amounts of sediment needed to clog and cover the fish pools overnight comes from Professor Monsalve in the answers I have already set out at [1766], which contemplated the possibility of either (a) a physical avalanche or landslide generated by saturation of the soils or (b) sediment going down W1 in an avalanche process or, presumably, (c) both. It remains difficult to visualise how a rush of water down W1 could have deposited and left behind something of the order of 70 cubic metres in the pools overnight: as the required volumes increase towards 200 cubic metres, the difficulty of visualising such an incident or accepting that it happened increases.
1862. The first question to decide is when the destruction of the fish pools happened. The evidence of the Claimants is that they dug the pools during the dry season and that the pools were destroyed in the following wet season after they had extracted one harvest of fish. I accept that evidence. On my finding that the pools were dug before the Ocesa pipeline was laid, the pools were dug at the latest in the dry season of 1995/1996 and were destroyed in the wet season which followed. The 1996 rainy season was coming to an end when the Ocesa ROW was opened in November 1996. Between then and August 1997, when Snr Buitrago complained to Ocesa about sedimentation there was the dry season until the rainy season returned during April 1997. On the Claimants’ evidence, the damage to the fish pools would have occurred before then and probably during the rainy season before the Ocesa ROW was opened. On the most generous view, at least the first incident to which they both referred would have happened. If either the partial clogging from the first incident or the final clogging of his pools had happened, Snr Buitrago would have complained about it in August 1997. He did not do so.
1863. I therefore reach the provisional conclusion that either the pools were dug during a dry season before that of 1995/1996 or that, if they were dug in the dry season of 1995/1996, the damage to the fish pools happened before the Ocesa ROW was opened. In either event, the damage of which they have complained happened before the Ocesa pipeline works and was not caused by them.
1864. This provisional conclusion must be tested by reference to the Claimants’ evidence about how the fish pools came to be damaged. Both mechanisms accepted as possible by Professor Monsalve could have occurred during a rainy season before the Ocesa ROW was opened. Accepting, as I do, his evidence that it was perfectly possible for sufficient sediment to have gone down W1 in an avalanche process, there is no

evidence to indicate that such an event could not have happened while the ODC ROW was in its bare condition. Equally, I accept that his alternative mechanism of a landslip caused by the saturation of soils during prolonged and heavy rain could have caused the sudden arrival of a substantial amount of soil at the fish pools. I recognise that no particular landslip has been identified as being the landslip in question; but, even with the resources that have been devoted to this litigation, I do not find that surprising and conclude that such a landslip may well have happened and contributed to the clogging of the fish pools. This conclusion is more easily arrived at if the description of the fish pools being “completely clogged” or being “filled ... completely” are not taken entirely literally. I therefore find no objection to my provisional conclusion in the descriptions of what happened and the possible mechanisms that have been advanced.

1865. For these reasons, I reject the evidence of Snr Buitrago and Snr Manco that the damage to their fish pools was caused by sedimentation from the Ocesa ROW. I find that it occurred before the Ocesa ROW happened and was the result of sediment from the ODC ROW, probably supplemented by the proceeds of a landslip in the hill above the fish pools.
1866. It follows that the claim for loss of fish production fails without reference to other legal arguments. I therefore say nothing about quantum save that I am not satisfied that the quantities for which the Claimants contend were sustainable in the basic pools they had dug, supplied and oxygenated only by a hose from the dam in the stream. I would also reduce any sum awarded substantially because the keeping of fish requires daily attendance and routine maintenance which I find to be most unlikely in the light of the security situation and Snr Manco’s frequent absences now and in the future. I have no confidence that fish farming was a sustainable long term venture in these circumstances, even on the basis that Snr Manco would hope to continue to employ others to run La Alborada for him.

Moral Damages

1867. I have set out the principles applicable to the awarding of moral damages at [194] above. The Claimants do not summarise or set out the basis of their claims for moral damages in their closing submissions. I therefore take the formulation of the Claim as set out in the RARSL {B4.4/2/71} as representing their case, as follows:

“Signor Buitrago, who was living on the Property at the time of the construction of the pipeline, has suffered emotional distress, pain and suffering due to:

10. The anguish and uncertainty caused by the damage to the soil and water sources on the Property, and the damages attendant thereon (notably, loss of livestock and fish);
11. In particular, the uncertainty is the availability of drinking water due to damage caused to the water source used by himself and his family. The water supply system used by the family became filled with sediments, such that water had to be boiled before being consumed by the family.

Taking water from an alternative source of drinking water required carrying water uphill to the

12. His inability to provide adequate food and/or food security for himself and his family.”

1868. My findings as set out above are at odds with this portrayal of what has happened. Both the ODC and the Ocesa works had an impact on LC50, but this formulation of the claim for moral damages ignores the previous impact of the ODC ROW, particularly in the light of my findings that Snr Buitrago lost his two heifers and the fish pools before the Ocesa works took place. The formulation of the claim for moral damages ignores the prior impact of the ODC ROW. The only feature in the claim for moral damages with which I have not dealt previously is the need to take water from an alternative source. I make no finding about whether that happened before or after the Ocesa works; but even if it happened after, I am satisfied that the water sources on the slopes below the Ridge were compromised before the Ocesa works in the manner I have described earlier, and that the need to find temporary water sources was likely to have happened in any event.
1869. I do not consider that the findings that I have made satisfy the stringent requirements for an award of moral damages in this case: it cannot be said that the Ocesa works have affected Snr Buitrago’s feelings to a high degree in the sense explained at [194] above.

Damages for loss of amenities of life

1870. I have set out the principles applicable to the awarding of damages for loss of amenities of life at [198] above. The Claimants do not summarise the basis of their claim for damages for loss of amenities of life in their closing submissions. I therefore take the formulation of the Claim as set out in the RARSL {B4.4/2/72} as representing their case. After summarising the nature of subsistence farming and stating that farming one’s own land and ownership of property gives increased social status, it alleges that Snr Buitrago suffered loss of amenity/loss of quality of life in that he was no longer able to carry on his traditional way of life and/or was unable to carry on such a way of life without considerably increased difficulties. A claim is made for Snr Manco for the same reasons. The claim gives the following instances:
- Since the construction of the pipeline, the Claimants have had to expend extra time and labour in order to secure his maximum level productivity from the property. Extra work has been required to achieve a lesser result;
 - Snr Buitrago, and Snr Manco after him, have had to spend extra time to acquire suitable water for themselves, their family and livestock;
 - The Claimants have had to spend additional time caring for their cattle, many of which died after becoming stuck in swampy areas. The risk to cattle caused as a

result of the construction of the pipeline required extra vigilance on their part to mind their cattle herd;

- In view of ongoing losses of cattle, the Claimant have had to explore other types of livestock which would cope with the deteriorated condition of the Property, and gradually converted the livestock from cattle to buffalo;
- Due to the aforesaid increased labour time, attributable to the damage caused by the pipeline, the Claimants have had less time to pursue such leisure and social activities as he previously enjoyed;
- The destruction of the fish pools shortly after they had been built shattered the efforts Snr Buitrago and Snr Manco had invested in developing this new area of activity on the Property;
- The loss of productivity on the property has led to the increased impoverishment of Snr Buitrago and his immediate family. This has led to a consequent loss of social status of Snr Buitrago and his immediate family.
- As the Property is no longer as productive as it was before the construction of the pipeline, the Claimants were and are no longer able to provide the same level of food security for themselves and/or their immediate family. In particular, this has resulted in situations where Snr Buitrago and his family have suffered from lower and/or less nutritionally balanced or varied food resources than before the construction of the pipeline. Snr Buitrago and his family have therefore been obliged to go hungry and/or forego key nutritional elements of their diet, if they have been unable sources elements by other means (e.g. purchase, bartering);
- As the productivity of the property has reduced, the Claimants were and are no longer able to generate the same surplus of products as previously could have been achieved.
- Further, Snr Buitrago had to allocate more of his own and his own family's labour time to the Property until he left in 2004. This means that Snr Buitrago and his family were unable to provide surplus products and labour time for barter to the level that they would have achieved before the construction of the pipeline. This resulted in their inability to source items and labour necessary for their property, which previously they could have obtained through barter;

- Inability to participate in the barter economy has lowered the social status and reputation of the Claimants.

1871. Once again, my findings are at odds with this portrayal. La Alborada has suffered some damage as a result of pipeline works and has deteriorated in other respects which are not attributable to either pipeline (e.g. the creation of the secondary road, progressive deforestation and the deep cattle trails now evident on the property); but the RARSL portrayal makes no concession to the contribution of the ODC pipeline or other causes of deterioration. The need to prevent cattle from getting into the swampy and boggy areas of SW1 and the wetlands of W3 and further downstream would have existed whether or not the Ocesa pipeline had been laid and it is simply not possible to find that the switch to buffalo was attributable to the presence of the Ocesa ROW. The destruction of the fish pools is not a relevant consideration in the light of the findings I have made about timing. The evidence given at trial does not establish that Snr Buitrago or other members of his family have gone hungry, nor is there evidence that they suffered significant adverse changes in their diet. The Ocesa pipeline has not increased the extent or the dangerousness of SW1 and has therefore not caused a further reduction in the productivity of the property. There is no evidence that either Claimant has suffered any actual loss of status or respect as a result of the Ocesa pipeline works.
1872. Applying the principles I have set out to the facts as I have found them to be in this judgment, I do not accept that the Ocesa works have prevented either Claimant from being able to enjoy the normal amenities of life in such a way or to such an extent as to justify an award of damages for loss of amenity.
1873. In summary, I reject the Claimants' claims that they have suffered loss or damage as a consequence of the Ocesa pipeline works that justifies an award of damages applying the principles of Colombian law that I have set out earlier in this judgment.

Bases of Claim

1874. All of the claims relate to damage alleged to have been suffered off the ROW. I have held that they fail on the facts because damage attributable to the Ocesa pipeline works has not been proved. I provide a short statement of what the position would have been if the factual position had been different and it were necessary to consider whether the facts gave rise to a claim enforceable in law in the present litigation.
1875. I consider the position of Snr Buitrago first. On my findings, the Defendant was subject to the dangerous activities doctrine as guardian. Accordingly, if it had caused material damage it would be liable to Snr Buitrago unless that liability were excluded or extinguished.
1876. Snr Buitrago entered into two settlements with Ocesa and Saipem: see [1698] and [1744]. The first was on 6 November 1996 and therefore predated the Ocesa pipeline works which commenced with stripping the ROW that day. Although it was capable of settling future claims arising out of what had occurred up to that date, it did not cover and could not affect liability for claims arising out of activities that followed it. It therefore does not need to be considered further. The second was made on 31 August 1997, after the Ocesa works had been carried out. For the reasons set out in

Sections 3 and 7 above, Snr Buitrago's pursuit of his claim against Ocesa and Saipem and his entering into the settlement agreement with those parties rather than making a claim against and settling with the Defendant amounts to tacit acceptance of the assignment of the ROW Agreement by the Defendant as assignor to Ocesa as assignee. That has the effect that the Defendant could no longer rely upon the ROW Agreement as excluding liability by invoking Article 5. In any event, as the ROW Agreement was concerned with the area on the ROW and not with the area off it, it would not have provided protection against the heads of claim advanced by Snr Buitrago in this action.

1877. The August 1997 settlement with Ocesa and Saipem effected a settlement of all claims of the ROW (present and future) as between Snr Buitrago on the one hand and Ocesa and Saipem on the other. In doing so it also effected a novation by substituting the new contractual rights and obligations under the settlement in place of any existing or future obligation in tort. As a result, any liability which the Defendant might otherwise have had to Snr Buitrago in respect for the damage alleged to be attributable to the Ocesa works was extinguished by novation.
1878. Snr Manco's position is different because he was not a party to the ROW Agreement or to the settlements which were entered into by Snr Buitrago with Ocesa and Saipem. His position is also different because he became the owner in 2004. Before that, he entered into an informal agreement to buy half the farm from Snr Buitrago some time after 1992, after which they worked as informal partners; and in about mid-1998 he agreed to buy out the other half of Snr Buitrago's interest in the farm. His ownership was formalised by the notarized deed for the sale of La Alborada dated 19 November 2004, which recorded that Snr Buitrago delivered the real estate to him on that date {M/104T/364.06}. In other words, title to the property was conveyed to Snr Manco on 19 November 2004 {H14/1/126}.
1879. The RARSL to a large extent glosses over the different capacities of the two Claimants. On this basis, the Claims advanced on behalf of Snr Manco are:
- i) Loss of the fishponds and fish, which occurred before 2004;
 - ii) Loss of cattle in SW1 between 2002 and 2012. I have found that 3 or 4 cattle were lost in SW1 between 2002 and 2012 but that Snr Manco has no real recollection of when they were lost;
 - iii) The fencing claim: the RARSL implies that the fences were erected in 2002 and claims annual maintenance thereafter {B4.4/2/79}.
1880. In their Joint Statement the Experts treated the claims generally as claims for damage to land and reached agreement about the categories of persons who are entitled to make a non-contractual claim for damage to real estate property {H23.2/7/559}. Snr Manco did not fall within any of those categories until he became the owner of the land in November 2004. Professor Castro agreed that this was the case {Day21/226:16}. However, she had previously said in her first report that Snr Manco would be entitled to pursue compensation for damages based on his interest as Snr Buitrago's de facto partner between the date on which the informal partnership was created and November 2004 {H14/1/126}. In her oral evidence she returned to this opinion, stating that Snr Manco could claim from the Defendant in tort for a reduction

in the income from the partnership that he had with Snr Buitrago {Day21/229:7} {Day21/231:1}. In doing so, she accepted that questions of remoteness might arise just as they might in the example of a labourer who loses his job because of damage to his employer's land.

1881. Put in this way, I prefer the opinion of Professor Vallejo. It seems to me to be most unlikely that Colombian Law would confine the right of recovery for direct damage to land to those having the particular interests agreed by the Experts but allow a right of recovery to a wider class for consequential economic losses. If a person such as Snr Manco, who has entered into a de facto partnership to work the land with Snr Buitrago, is not entitled to recover damages for direct damage to the land, there seems no obvious reason why he should be entitled to recover for the more remote consequential financial losses he suffers as a result of the reduction in the productivity of the land.
1882. So far as I am aware, neither expert addressed the issue as being one of direct damage to Snr Manco's property. Included in the claims for loss of income as set out in the RARSL are the allegations that fish died when the fish pools became sedimented and that cattle died from 2002 in SW1. The cattle on La Alborada from 2002 were Snr Manco's. There is no direct evidence about who owned the fish. Although it seems implicit in the evidence that it was Snr Buitrago, I assume for present purposes that the two men might have bought and owned the fingerlings together. On this basis, the question might arise whether a claim would be admissible to the owner of property other than real estate (in this case fish or cattle) who suffers loss as a result of their deaths caused by a dangerous activity. Such a claim seems to me to be conceptually possible, but it is not the way in which Professor Castro was supporting Snr Manco's claim. Furthermore, it is not obviously the way in which any part of the claim has been advanced on behalf of Snr Manco, although the death of the fish and cattle is a constituent element of the claims that have been brought. In the light of the fact that the claims have not been pursued in this way and that the expert evidence has not addressed Snr Manco's claims on this basis, I do not express any view on it one way or another and leave the point undecided.
1883. After 2004 Snr Manco had the requisite interest in land to bring a claim in respect of damage to it. I accept Professor Vallejo's opinion that he would then only be entitled to claim for new damage suffered to the property {H15/1/208}. On the facts that I have found, no new damage has been caused to the property that is attributable to the OcenSA works: if the loss of Snr Manco's cattle included losses after 2004, their loss was consequent upon damage to the land that had been suffered by November 2004.
1884. It follows that, in the absence of proof of new damage to the land after 2004, any claim which Snr Manco might otherwise have maintained on the facts would have failed as giving rise to no right to claim in law.

Conclusion

1885. The claims of Snr Buitrago and Snr Manco fail.