Neutral Citation Number: [2013] EWHC 2916 (QB)

Case No: HT-11-311

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

The Rolls Building
Fetter Lane
London
EC4A 1NL

Date: 10/10/2013

Before:

THE HONOURABLE MR JUSTICE STUART-SMITH

- -

Between:

SABIC UK PETROCHEMICALS LIMITED (formerley HUNTSMAN PETROCHEMICALS (UK) LIMITED)	**Claimant**
- and -	
PUNJ LLOYD LIMITED (a company incorporated in India) (by original action)	**Defendant**
- and between –	
PUNJ LLOYD LIMITED (a company incorporated in India)	**First Claimant**
- and -	
SIMON CARVES LIMITED (In Administration)	**Second Claimant**
- and -	
SABIC UK PETROCHEMICALS LIMITED (formerly HUNTSMAN PETROCHEMICALS (UK) LIMITED) (by Counterclaim)	**Defendant**

Piers Stansfield QC and Gideon Scott Holland (instructed by **Bond Dickinson LLP**) for the **Claimant**

Nicholas Dennys QC and Steven Walker QC (instructed by **Fenwick Elliott**) for the **Defendant**

Hearing dates: 24, 25, 26, 29, 30 April 2013, 1, 2, 3, 7, 8, 9, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24 May 2013, 24 and 25 June 2013

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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.

THE HONOURABLE MR JUSTICE STUART-SMITH

The Honourable Mr Justice Stuart-Smith:

Introduction

1. The claimant ("SABIC") is a manufacturer of petrochemical products. It is a subsidiary of the Saudi Basic Industries Corporation and is part of the SABIC group, which is a major producer of plastics in Europe and has a centre of European operations in the Netherlands. In 2006, when it was known as Huntsman Petrochemicals (UK) Limited, SABIC wanted to develop a plant capable of producing 400 kilotonnes of low density polyethylene ("LDPE") per annum on part of the old ICI site at Wilton. To that end, it turned to Simon Carves Ltd ("SCL"). SCL was part of the Punj Lloyd group, and was a subsidiary of the defendant ("PLL"), which is based in India. SCL held itself out as being a world leader in the delivery of LDPE plants, and it had considerable experience in the application of proprietary licensed engineering knowhow from ExxonMobil ["EM"] in their delivery. SCL went into administration in 2011 having received substantial financial support from PLL over a number of years before then. PLL is the defendant to SABIC's claims because it provided a Parental Company Guarantee in respect of SCL's performance of the Wilton contract in June 2008. When speaking about the presentation of the case against SABIC, I shall generally refer to PLL and SCL collectively as PLL/SCL.

2. On 9 February 2006, SABIC entered into a contract with SCL by which SCL agreed to design, procure and construct the LDPE plant. The contract sum was £135 million. SCL was required to provide a performance bond in the sum of £13.5 million, which it did. By the end of 2006 it was apparent that the original date for completion would not be met and the parties entered into a compromise, which varied the main contract by extending the completion date and increasing the contract price by just under £5.5 million.

3. Further problems arose as a result of which the revised completion date was not going to be met. SABIC considered that SCL was failing to discharge its obligations under the contract, while SCL contended that it was entitled to additional payments over and above the revised contract price. After a meeting of senior management, a handshake agreement was reached on 15 May 2008. That agreement was eventually formalised in a further agreement and variation of the main contract on 2 July 2008, known as SSA2.

4. The agreement which led to SSA2 had a number of key provisions. First, SCL agreed to carry out certain works that it had previously said were outside the scope of its contractual obligations. Second, the parties identified the date upon which ethylene could first be introduced into the plant for the purposes of commissioning (the "Ethylene In Date" or "EID") as the critical date going forward. They agreed that EID should be on 5 December 2008, in accordance with a Completion Plan that was agreed and incorporated as part of the compromise; and they agreed that liquidated damages should be payable by reference to the EID rather than (as had previously been the case) by reference to Sectional Completion Dates. Third, SCL agreed to procure the services of such key subcontractors as were necessary to ensure the EID of 5 December 2008. Fourth, SABIC agreed to make payment of the whole of the balance of the existing contract price (which amounted to £14,338,609) in advance although it was not yet due. The advance payment was made on 1 or 2 July 2008. Fifth, in return for the advance payment, SCL was required to provide an Advance

Payment Guarantee in the sum of £15 million, which it did on 24 June 2008. Fifth, the existing contract price was increased by a further £15 million. Sixth, SABIC agreed to pay the additional £15 million in advance of completion of the works, which it did on 2 September 2008. Seventh, any claims which SCL may have had up to 2 July 2008 were compromised and, subject to immaterial exceptions, so were any claims which SABIC may have had against SCL.

5. The background to SSA2 and its terms will be considered in greater detail later. For present purposes it is sufficient to say that SABIC's decision to make the advanced payment of £14.3 million and also to pay the additional £15 million in advance of completion of the works was influenced by its concern that SCL was in financial difficulties and its hope that the aggregate advanced payment of nearly £30 million would enable SCL to complete its work on SABIC's LDPE project.

6. Further difficulties arose and further slippage to the timetable occurred after SSA2. Just three months after SSA2, SABIC issued a letter on 3 October 2008, relying upon terms of the original Conditions of Contract that would allow SABIC to terminate the contract if "despite previous warning by [SABIC] in writing [SCL] is failing to proceed with the Engineering Works with due diligence or is otherwise persistently in material breach of its obligations under the Contract" or if "the financial position of [SCL] deteriorates to such an extent that the capability of [SCL] adequately to fulfil its obligations under the Contract has been placed in jeopardy."[1] A month later, on 3 November 2008, SABIC terminated the contract and took on the task of bringing the project to completion itself, employing the same principal sub-contractors as SCL had used before termination. At about the same time, it called in the Advance Payment Guarantee of £15 million and the Performance Guarantee of £13 million. PLL/SCL dispute SABIC's entitlement to terminate the contract on both procedural and substantive grounds. They also dispute SABIC's entitlement to call upon or retain the proceeds of the Performance Bond or the Advance Payment Guarantee.

7. These events have led to claims and cross-claims that are the subject of this judgment. In briefest outline:

    i) SABIC claims the additional costs of completing the project works and the losses caused by the delay in its production of ethylene. Its pleaded claim is for approximately £27.5 million, but this figure has been refined, as explained later;

    ii) PLL/SCL counterclaim for the return of the monies paid out under the Performance Bond and the Advance Payment Guarantee.

8. The issues have been refined during the trial but, for the purposes of this judgment, the main issues may be summarised as being:

    i) Whether SABIC's was justified in sending the warning letter dated 3 October 2008. This issue involves examination of the progress made by SCL in the period to 3 October 2008 and the reasons for that progress (or lack of it);

[1] Clauses 27.2.10 and 27.2.5 respectively.

ii) Whether SABIC's letter of 3 October 2008 was sufficient and proper "written warning" for the purposes of clause 27.2.10 of the EPC contract;

iii) Whether SCL failed to proceed with the Works with due diligence despite previous warning, so as to entitle SABIC to terminate SCL's employment under clause 27.2.10 of the EPC Contract on 3 November 2008. This issue involves examination of the progress and the reasons underlying that progress during the warning period;

iv) Whether SCL's financial position had deteriorated to such an extent that its capability adequately to fulfil its obligations under the EPC Contract was placed in jeopardy, so as to entitle SABIC to terminate SCL's employment under clause 27.2.5 of the EPC Contract on 3 November 2008;

v) Whether SCL was in repudiatory breach of the contract and, if so, whether SABIC accepted that repudiatory breach;

vi) Whether SCL is entitled to maintain its Counterclaim on the basis that SABIC's termination of the contract was wrongful;

vii) Whether SABIC reasonably incurred the costs claimed to complete the Works, and suffered the other losses which contribute to SABIC's claim;

viii) Whether the contract limits or excludes the claims made by SABIC;

ix) How the payment of the APG and the PB are to be brought into account;

x) The balance due to either party in the light of the foregoing issues.

This Judgment

9. This judgment adopts the following course:

Section	**Paragraph Numbers**
Introduction	1-8
This Judgment	9-10
Summary	11-12
The Contract – Liability Provisions	13-49
The Background History	50-147
Issue 1: was the warning letter justified?	148-152
Issue 2: was the letter of 3 October 2008 sufficient?	153-164
Issue 3: did SCL exercise due diligence during the Warning Period?	165-364

Issue 4: financial deterioration.	365-376
Issue 5: repudiatory breach.	377-383
Issue 6: PLL and SCL's counterclaim.	384-386
Issue 7: SABIC's quantum claim.	387-519
Issue 8: does the contract limit or exclude all or part of SABIC's claims?	520-533
Issue 9: how are the APG and PGs to be brought into account?	534-547
Conclusion: the balance due.	548

10. While the majority of this judgment will necessarily concentrate upon the facts that have given rise to the dispute, a number of legal issues have arisen, which are important for the resolution of the action. They include (but are not limited to):

    i) The nature and extent of SCL's contractual obligation to exercise due diligence in carrying out the works;

    ii) The nature and extent of SCL's obligation to procure the services of subcontractors;

    iii) The status of the Completion Plan included in SSA2;

    iv) Whether there was an implied term of the contract that SABIC would collaborate with SCL, or at least not hinder or disrupt SCL from carrying out its obligations under the contract; and, if so, the precise formulation of that implied term;

    v) The test to be applied when considering whether SCL was in repudiatory breach of the contract;

    vi) How to apply the contractual formulation for computing payments on termination;

    vii) Whether the contractual limitations of liability have any applicability to SABIC's claim under the provisions for payment on termination; and

    viii) The nature of the APG and the PG respectively, and how they fall to be taken into account.

Summary

11. For the reasons set out below, this judgment reaches the following conclusions:

    i) Issue 1: SABIC was entitled to send the Warning Letter on 3 October 2008 because of SCL's consistent failure to plan or execute the works in accordance

with the Completion Plan and its failure to take any steps to remedy the slippage of which it was aware from an early stage;

ii) Issue 2: the Warning Letter was sufficient and effective as notice pursuant to Clause 27.2.10 of the EPC contract;

iii) Issue 3: SCL substantially failed to proceed with the works with due diligence during the Warning Period. Its failure persisted to 3 November 2008 and justified SABIC's decision to terminate the contract under clause 27.2.10 of the EPC contract;

iv) Issue 4: SCL's financial position deteriorated to such an extent that its capability adequately to fulfil its obligations under the contract was placed in jeopardy. The deterioration provided additional grounds justifying SABIC's decision to terminate the contract under clause 27.2.5 of the EPC contract;

v) Issue 5: SCL was not in repudiatory breach of the contract;

vi) Issue 6: PLL/SCL's counterclaim fails;

vii) Issue 7: Subject to the issue of interest as a constituent part of a claim under clause 30.9, SABIC's costs to complete for the purposes of clause 30.9 of the contract were £39,117,514;

viii) Issue 8: clause 35.1 excludes SABIC's claims for damages for lost revenue;

ix) Issue 9: The APG and PB are to be brought into account before the application of the 20% cap;

12. There will be judgment for SABIC for £11,797,514. Statutory interest will be the subject of a separate judgment.

The Contract – Liability Provisions

13. The EPC contract was a lengthy and detailed contract in writing, the contract documents being identified in the Memorandum of Contract between the parties. Relevant extracts from the Conditions of Contract are at Annexe A. Schedule 2 to the Conditions of Contract was entitled Description of Works and set out in considerable detail what the respective parties were to do. Clause 2.1.1 of the Conditions of Contract (to which I refer in greater detail later) set out SCL's general responsibilities, while Clause 3 stated that SABIC "shall be responsible for the activities ascribed to [SABIC] in the Description of Works which (save where the contrary is expressly stated in this contract) shall be an exhaustive and exclusive list."

The Obligation of Due Diligence

14. Clause 2.1.1 of the Conditions of Contract is central to the dispute between the parties. It provides that:

> "Save to the extent that the Purchaser has not complied with Clause 3 and such failure has affected the ability of the Contractor to comply with its obligations under the Contract,

> the Contractor shall, with due diligence, carry out and complete the Engineering Works in accordance with the Contract and the Regulations and to the reasonable satisfaction of the Project Director and provide all labour, materials, equipment, Contractor's equipment, transport to and from and in and about the Site and all other things, whether of a temporary or permanent nature, required for the performance of the Engineering Works insofar as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract."

15. Similar obligations were imposed upon SCL by Clause 9, which required it to comply "with due diligence" when instructed by the Project Director to prepare or to assist in the preparation of a potential Variation and then to carry out Variations "with due diligence" when they were issued[2]. The other reference to due diligence in the Conditions of Contract was the provision for termination under Clause 27.2.10, which entitled SABIC to terminate SCL's employment forthwith if:

> "despite previous warning by the Purchaser in writing the Contractor is failing to proceed with the Engineering Works with due diligence or is otherwise persistently in material breach of its obligations under the Contract;"

16. There is an issue between the parties on the scope and extent of the obligation to carry out the Engineering Works with due diligence under Clauses 2.1.1 and 27.2.10. Both parties refer for relevant guidance to the observations of Simon Brown LJ in *West Faulkner v London Borough of Newham* (1994) 71 BLR 1; and the parties are agreed that the requirements of due diligence cannot be expressed in the abstract. However:

    i) SABIC submits that the obligation of due diligence must be assessed by reference to SCL's obligations under the contract including, most relevantly, that at all material times SCL was contractually committed to achieve the EID of 5 December 2008 and did not (either then or in these proceedings) contend for an extension of time for that date. It submits that a failure to make the progress necessary to achieve the contractual requirement of EID on 5 December 2008 either constitutes or evidences a lack of due diligence;

    ii) PLL/SCL disagree. Their case is that due diligence "requires a contractor to maintain an appropriate rate of progress having regard both to the requirements of the contract and the date by which completion can realistically be achieved when the contractor's rate of progress is being assessed."[3] Although they accept that due diligence implies the efficient control and prosecution of the work[4], they submit that the obligation of due diligence does not require SCL to achieve the impossible. Rather, at any given moment, the obligation of due diligence should be assessed with regard to what is feasible at that time. On that basis, they contend that SCL's obligation of due diligence during the warning period (3 October to 3 November 2008) should be assessed

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[2] Clauses 9.3.3 and 9.3.1 of the Conditions of Contract
[3] Rejoinder [6.1.1]
[4] SCL Opening Submission [97]

by reference to an EID date in February or March 2009 because by then neither party considered that the contractual EID date of 5 December 2008 was feasible[5]. As part of those submissions, PLL/SCL dispute the proposition that the obligation of due diligence may have imposed an obligation upon SCL to take accelerative measures to ensure that it complied with the contractual EID date[6], at least to the extent that the delays were not in fact retrievable[7]. In addition PLL/SCL submit that delay is not necessarily the result of a lack of due diligence and that lack of due diligence may not be inferred from delay.

17. In *Ampurius Nu Homes Holdings v Telford Homes* [2012] Ch 1820 (Ch) Roth J accepted the concession of counsel that the concept of due diligence in construction contracts "usually connotes both due care and "due assiduity/expedition." I respectfully agree that the concession was correctly made. It does not, however, answer the question in the present case, namely: by reference to what is the due assiduity or expedition to be assessed? An answer to that question is suggested by the observation of Parker LJ in *GLC v Cleveland Bridge and Engineering Co* [1984) 34 BLR 50, 77 that:

> "what is due diligence and expedition depends, of course, on the object which is sought to be achieved. If one is obliged to achieve a certain object within twelve weeks, it may be necessary to exercise much more speed than if your only obligation is to produce it in twenty-four weeks or indeed in four years. The same applies to diligence. You cannot have diligence in the abstract. It must be related to the objective."

18. There is an inevitable danger in considering similar but different words appearing in the different context of different contracts, but I agree that the observations of Simon Brown LJ in *West Faulkner* are relevant when considering the obligation of due diligence in the context of the present contract. There the obligation under the JCT Standard Form of Contract was that the contractor should "proceed regularly and diligently with the Works". As with the present contract, the contract in *West Faulkner* also had separate and discrete obligations requiring the contractor to complete the works by specified times. Simon Brown LJ said, at 14:

> "My approach to the proper construction and application of the clause would be this. Although the contractor must proceed both regularly and diligently with the works, and although each word imports into that obligation certain discrete concepts which would not otherwise inform it, there is a measure of overlap between them and it is thus unhelpful to seek to define two quite separate and distinct obligations.
>
> What particularly is supplied by the word 'regularly' is not least a requirement to attend for work on a regular daily basis with sufficient in the way of men, materials and plant to have the

[5] SCL Closing Submissions [7]
[6] SABIC Closing Submissions [3,150, 156]; SCL Supplementary Closing Submissions [2ff]
[7] T21/21.8-11.

> physical capacity to progress the works substantially in accordance with the contractual obligations.
>
> What in particular the word 'diligently' contributes to the concept is the need to apply that physical capacity industriously and efficiently towards that same end.
>
> Taken together the obligation upon the contractor is essentially to proceed continuously, industriously and efficiently with appropriate physical resources so as to progress the works steadily towards completion substantially in accordance with the contractual requirements as to time, sequence and quality of work.
>
> Beyond that I think it impossible to give useful guidance. These are after all plain English words and in reality the failure of which clause 25(1)(b) speaks is, like the elephant, far easier to recognise than to describe."

19. In *West Faulkner* Simon Brown LJ inferred an obligation to provide sufficient capacity to complete the works from the use of the word "regularly". In the present case Clause 2.1.1 imposed an express obligation upon SCL to provide sufficient "capacity" by requiring SCL to "provide all labour, materials, equipment, Contractor's equipment, transport to and from and in and about the Site and all other things, whether of a temporary or permanent nature, required for the performance of the Engineering Works…" In this context, the obligation to carry out the Engineering Works with due diligence imports an obligation to carry them out industriously, assiduously, efficiently and expeditiously. These words do not define the requirement of diligence, but they are all included within it. What is "due" diligence will depend upon the object to which the obligation attaches.

20. Although Simon Brown LJ said that he was not seeking to define the obligation to use diligence as a separate and discrete obligation, it is apparent that his reference to applying physical capacity industriously and efficiently "towards that same end" is a reference back to the requirement in the previous paragraph to "progress[ing] the works substantially in accordance with the contractual obligations." In linking the concept of diligence to the contractor's obligation he identified the object in the same way as Parker LJ had done in *Cleveland Bridge*: his "object to be achieved" was the contractual obligation to achieve the object within the time specified in the contract, be it twelve weeks, twenty-four weeks or four years. These authorities therefore tend to support the proposition that the obligation of diligence will be linked to the parties' contractual obligations. That said, the starting point in the construction of any commercial contract, and frequently the end point as well, is the words of the provision itself, read in the context of the contract as a whole and applying the normal canons of construction that are too well known to require repetition here.

21. Before considering the reference to due diligence in its present contractual context, it is to be noticed that the obligation under Clause 2.1.1 applies "save to the extent that the Purchaser has not complied with Clause 3 and such failure has affected the ability of the Contractor to comply with its obligations under the Contract." It will be necessary to bear this in mind later when considering whether or not there is an

implied term of the contract as contended for by PLL/SCL. For present purposes, it serves to make clear that if SABIC did not comply with its obligations under Clause 3 then, to the extent that such non-compliance affected SCL's ability to comply with its obligations under the contract, the obligation to exercise due diligence does not apply.

22. Clause 2.1.1 states the object to which the obligation of due diligence attaches: it is "to carry out and complete the Engineering Works in accordance with the Contract and the Regulations and to the reasonable satisfaction of the Project Director." It is therefore clear on the express terms of the clause, and without the need to refer to authority, that the exercising of due diligence was to be directed to the discharging of the contractual obligations relating to the carrying out and completion of the Engineering Works to which SCL was subject from time to time. Since all of the period with which this case is concerned fell before the contractual date for EID of 5 December 2008 it follows that the contractual object to which the obligation of due diligence was directed included, at all material times, achieving EID on that date.

23. PLL/SCL seek to deflect or qualify this conclusion by submitting that an obligation to use due diligence did not require SCL to achieve the impossible and, more specifically, that the obligation of due diligence did not require it to undertake accelerative measures. These points should be considered in turn.

24. As a matter of language and interpretation, PLL/SCL are correct to submit that the obligation to use due diligence does not of itself give rise to an absolute contractual obligation to achieve a particular outcome. The absolute obligation to achieve EID by 5 December 2008 was imposed by Clause 25 of SSA2, with non-compliance giving rise to liability for liquidated damages. Unless and until that date was changed (which it never was) SCL was under two separate obligations, which were (a) to achieve EID on that date and (b) to exercise due diligence in pursuing that objective. A failure to achieve EID on 5 December 2008 would amount to a breach of the first obligation but not necessarily of the second. Similarly, once SSA2 introduced the obligation upon SCL in completing the Engineering Works to procure the services of such key subcontractors as were necessary to ensure the [EID] of 5 December, SCL was under two separate obligations, which were (a) to procure the services of such subcontractors as were necessary to ensure the EID of that date and (b) to exercise due diligence in pursuing that objective.

25. However, I would not accept that the mere fact that an absolute contractual obligation is or has become impossible for SCL to achieve renders that contractual obligation irrelevant when considering the separate obligation to exercise due diligence. A number of points arise. First, the fact that complying with one or more of its absolute contractual obligations has become impossible or not realistically achievable for a particular contractor does not mean or imply that those obligations are objectively incapable of achievement. The court is likely to look to the contractor who asserts that it is impossible to comply with his absolute contractual obligation to prove it. On the facts of this case, there can be no doubt that by October 2008 SCL was not going to achieve EID by 5 December 2008 (for reasons that are examined in detail later). However, no one has set out to prove that it would (or would not) then have been quite impossible to achieve under any and all circumstances. Second, the fact that by October 2008 the parties contemplated that EID would not be achieved before February or March 2009 if the EPC Contract remained in place does not mean that February or March was necessarily the earliest date upon which in any circumstances

EID could have been achieved. Third, there is nothing in the terms of the contract to suggest that the obligation to exercise due diligence should be emptied of content in the event or to the extent that a particular contractual obligation was or became incapable of performance. Taking the contractual completion date as a working example, if achievement of that date became impossible and the Purchaser would be deprived of his plant by the Contractor's breach of contract then, in the absence of special circumstances, the Purchaser is likely to want his plant as soon as possible. In those circumstances the obligation to exercise due diligence should attach to the contractual objective of minimising the ongoing breach. In other words, if an absolute contractual requirement becomes incapable of performance, the obligation to exercise due diligence will attach to the nearest possible approximation to proper contractual performance of the obligation. Fourth, where a contractor asserts that an absolute contractual obligation (to which an obligation of due diligence is attached) has become incapable of performance, the court is likely to wish to scrutinise the reasons why it is said to have become incapable of performance. Fifth, the obligation to exercise due diligence is flexible in the sense that what constitutes due industry, assiduousness, efficiency and expedition will depend upon what is required from time to time to achieve the contractual objects in hand. It follows that, unless the terms of the contract compel a different conclusion, circumstances may arise where the exercising of due diligence may require the taking of measures that were not originally contemplated in order to achieve (or come as close as possible to achieving) the contractual objects in hand – and these may include accelerative measures if that is what is required.

26. PLL/SCL submit that Clause 20.4 taken in conjunction with Clause 20.2.2 of the Conditions of Contract mean that there is no obligation upon SCL to take accelerative measures if the project is going into delay. There is no substance in this point. Clause 20.2 includes a sequence of sub-clauses, of which Clause 20.2.2 is one, which apply when it becomes reasonably apparent to the contractor that the progress of the Engineering Works is likely to be delayed "by any event which would entitle [SCL] to an adjustment of Sectional Completion Dates." In those circumstances, SCL is to give notice of the event as soon as possible (Clause 20.2.1) and shall use best endeavours to avoid or mitigate any delay but without being required to increase resources (Clause 20.2.2). The reasoning is clear: SCL does not have to increase resources because the delay will entitle it to a change in the Sectional Completion date and therefore it should not be obliged to increase resources to try to restore the original date. That reasoning and the terms of Clause 20.2 do not apply more generally. It is therefore quite wrong to suggest that Clause 20.2.2 and Clause 20.4 are related so as to provide a comprehensive code covering SCL's obligations in the event of delay. Taken on its own, Clause 20.4 gives SABIC protection in circumstances where it identifies that a delay has been or will be caused by reasons attributable to SCL. However, it does not follow that if SABIC does not implement the Clause 20.4 machinery SCL can allow delay to accrue with impunity. It remains under its obligation to comply with its contractual obligations, including as to the achievement of Sectional Completion Dates (under the original Conditions of Contract) or EID (under the contract as amended by SSA2) and the need to exercise due diligence to that end.

27. Drawing these strands together, SCL was at all material times under the contractual obligation to carry out and complete the Engineering Works in accordance with the

contract and to use due diligence to achieve that object. The obligation of due diligence imports (but is not limited to) an obligation to carry out and to complete the Engineering Works industriously, assiduously, efficiently and expeditiously. What would satisfy the obligation to act with due diligence would depend upon what was required in order to achieve the contractual objects and might include the adoption of accelerative measures if delay occurred which threatened those contractual objects. There is no reason to think that the obligation of due diligence would become less onerous if it was or became impossible for a particular contractual object to be achieved. Delay does not of itself provide conclusive proof of lack of due diligence; but it may suggest and evidence a lack of due diligence and may call for an explanation – not least because if and to the extent that the delay is attributable to a breach by SABIC of its obligations under Clause 3 of the Conditions of Contract, SCL is released from its obligation to carry out and complete the Engineering Works in accordance with the Contract and with due diligence. Although once the achievement of the contractual object becomes impossible the exercise of due diligence will, by definition, not render it possible, the standard to be applied is not to be determined by what can realistically be achieved when the particular contractor's rate of progress is being assessed. Due diligence is not determined subjectively by reference to the individual contractor's achievements (or lack of them): it is a contractual requirement with which the contractor must comply; and it is to be assessed in the light of the other contractual obligations that the contractor has undertaken. In that sense it is an objective concept, though its requirements will depend in each case upon the terms of the contract in question.

The Obligation to Procure the Services of Subcontractors

28. Clause 32 of SSA2 provided that "in completing the Engineering Works, the Contractor agrees to procure the services of such key subcontractors as are necessary to ensure the [EID] of 5 December including but not limited to the subcontractors identified and listed in Appendix 6[8]."

29. The effect of this clause was to impose an absolute obligation upon SCL to procure "the services of … subcontractors" as were *necessary* to ensure the EID of 5 December 2008. The list in Appendix 6 was not an exhaustive list and if the services of other subcontractors were necessary to ensure the EID of 5 December 2008, SCL was to procure them. It was not sufficient to procure a subcontractor if he did not provide the services necessary to ensure EID on that date: what SCL had to procure was all subcontractor *services* that were necessary to ensure EID on that date. It was an absolute and onerous obligation, even though it is difficult to conceive of circumstances in which SCL might have been in breach of the obligation to achieve EID on 5 December 2008 but not in breach of Clause 32 of SSA2, and vice versa.

The Status of the Completion Plan

30. SCL and SABIC jointly agreed "to secure the [EID] of 5 December 2008 in accordance with the Completion Plan which has been produced as set out herein." Clause 27 of SSA2 recorded that "the Parties have agreed a Completion Plan demonstrating how the EID of 5 December 2008 shall be achieved. The Completion

[8] The listed subcontractors included Shaw, Cape, Balfour Kilpatrick ["BK"] for Control, Electrical and Instrumentation,Tolent for Civil and Structural, Halliburton for Chemical Cleaning and Nitrogen Blowing.

Plan is contained within a CD retained by the Parties. An extract of the Completion Plan showing the longest path is attached at Appendix 5." This requires some interpretation.

31. The first point to note is that the Completion Plan specified steps to be taken by each of the parties on the way to EID. Second, SSA2 imposed obligations that were in addition to those to which the parties were already subject pursuant to the EPC Contract, not all of which were varied or superseded by SSA2. The subsisting obligations included the obligations imposed upon SCL by Clause 2.1.1: see [14] above. Third, 5 December 2008 was a fixed point which both parties had agreed "to secure" and in respect of which SCL was under the express obligations imposed by Clause 32: see [28] above. Fourth, in the context of a major construction project (or even the later stages of one as in this case) it might be thought commercially absurd to suggest that any deviation from the interim times in a complex programme, however modest, constituted a breach of the obligation to secure the [EID] of 5 December 2008 "in accordance with the Completion Plan." However hard and cooperatively the planners worked in order to produce the Completion Plan, it was inevitable that some tasks would or even could not be executed in precisely the time allowed by the planners in the Completion Plan. That said, the agreed Completion Plan was agreed by the parties to demonstrate how the EID of 5 December 2008 "shall" be achieved. In order to give this a commercially sensible meaning, there were therefore two separate obligations: the first was to achieve the EID of 5 December 2008; the second was to achieve it substantially in accordance with the route set out in the Completion Plan, making due allowance for the necessary imprecision of the planner's predictions of how long individual steps would in fact take. Substantial compliance was reasonably to be expected because of (a) the fixed date for EID and (b) the ability to increase speed as necessary by the application of additional resources.

32. It follows that a substantial failure to comply with the programme set by the Completion Plan could be (or could be evidence of) a breach of the obligation to secure the EID "in accordance with the Completion Plan". However, where such a failure occurred, it might be open to the party in breach to ameliorate the consequences of that breach by taking later accelerative measures.

An implied term not to hinder or disrupt?

33. PLL/SCL's complaints that SCL's progress was impeded by SABIC has been linked to the allegation that there was an implied term of the contract "implied by law or necessary to give business effect to the Construction Contract alternatively effect to the presumed intention of the parties … that SABIC would not hinder or disrupt the due and expeditious progress of the works." The use to which this alleged implied term is put in the pleadings is curious. PLL/SCL do not expressly allege any breach of the term by way of defence or to support a counterclaim; but they do refer as a matter of chronological history to the fact that SCL alleged in a letter dated 30 September 2008 that "SABIC's breach of contract, in undertaking unilateral discussions with SCL's subcontractor Cape, had a detrimental impact on the progress of the insulation and passive fire protection ["PFP"] works at that time."[9] In addition to there being no overt allegation of breach of the implied term in their pleadings, PLL/SCL did not attempt to carry out any form of delay analysis so as to identify the

[9] Re-Amended Defence and Counterclaim at [77.1]

consequences of the matters of which they complained (although they were specifically asked to identify any resulting delay[10]). As a result their pleaded case did not include claims that SCL was entitled to damages for breach of the alleged implied term or to an extension of time under the contract as a result of the matters of which PLL/SCL complain.

34. In submissions, PLL/SCL linked the existence of the alleged implied term to SCL's obligations to act with due diligence, submitting that "due diligence when applied to [SCL's] performance is therefore dependent on [SABIC's] co-operation …" In doing so PLL/SCL shifted from its pleaded position, relying upon a broader alleged implied term to the effect that SABIC had impliedly agreed "to do all that [was] necessary on [its] part to bring about completion of the contract." This was said to be derived from a proposition of both general and particular application that "building contracts are regarded as contracts of mutual cooperation, that is to say that both parties have to carry out their side of the bargain in order to achieve the desired outcome."[11] SABIC resisted the implication of any such term on the basis that the EPC contract provides a detailed framework which operates satisfactorily without the need for any further implication.

35. PLL/SCL rely upon the well known dictum of Lord Simon in *Luxor (Eastbourne) Ltd v Cooper* [1941] AC 108 at 118 that "generally speaking, where B is employed by A to do a piece of work which requires A's co-operation … it is implied that the necessary co-operation will be forthcoming" and the summary (well supported by authority) in *Keating on Construction Contracts (9th Edn)* at 3-046 under the general heading "Implication of "usual" terms – Employer" which states:

> "The employer impliedly agrees to do all that is necessary on his part to bring about completion of the contract. For example, he must give possession of the site within a reasonable time. He may be obliged to obtain planning permission or building regulation consent in sufficient time to enable the contractor to proceed without delay … ."

36. The heading and the authorities cited in support of these general propositions show that they are not of universal application. This is recognised in the passage in *Keating* at 3-045 which immediately precedes the passage just cited:

> "Where there is a comprehensive written contract such as the Standard Form of Building Contract there may be very little room for the implication of any terms, for if the parties have dealt expressly with a matter in the contract, no term dealing with the same matter can be implied."

37. The EPC is not a Standard Form of Contract: on the contrary it is a detailed contract in writing negotiated specifically between substantial commercial concerns. Although it is a construction contract, such contracts are subject to the same principles of contractual construction and interpretation as other commercial contracts. The principles that apply to determine when terms should be implied are well known and

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[10] See A/8/384-385
[11] T21/34.23-35.3

do not require detailed elaboration here: see *Keating* at 3-042 to 3-049 and *Chitty on Contracts* at 13-004 to 13-013. In briefest summary, for the court to imply an implied term into a detailed commercial contract, it will need to be satisfied that the term is necessary or is otherwise obviously what the parties would have understood or intended. This is so whether one applies the traditional approaches summarised in cases such as *The Moorcock* (1889) 14 PD 64, 68 and *BP Refinery (Westernport) v Shire of Hastings* [1978] AJLR 20, 26 or the more expansive approach outlined in *AG of Belize v Belize Telecom Ltd* [2009] 1 WLR 1988. In addition, even in the area of terms that may commonly be implied, precision in the formulation of an alleged term is likely to be critical to the prospects of it being implied or not.

38. Although there is a superficial attraction to the terms suggested by PLL/SCL, there are a number of points to be brought into account when weighing up whether they should or should not be held to be implied.

39. First, I have already said that the EPC contract made detailed provision for collaboration between the parties. The key personnel identified in the Conditions of Contract were the Project Director, who generally had full authority to act on behalf of SABIC in connection with the Contract, and the Contractor's Representative, who was to have full authority to act for SCL in connection with the Engineering Works. The Contract had many and detailed provisions identifying how SABIC, and in particular the Project Director, should interface with SCL, and in particular the Contractor's Representative. For example, SCL was to provide programmes "setting out in such manner as the Project Director may reasonably require" the manner in which it intended to carry out the Engineering Works and "the date by which the Contractor reasonably requires that the Project Director should have provided any further Documentation or information or taken any other action required under the contract to permit the Contractor to perform its obligations."[12] To like effect, the Contractor was obliged to provide within 7 days from the end of each calendar month (or at such other times as the Project Director shall from time to time direct), a progress report to the Project Director on the progress of the Engineering Works. There was to be a meeting to review such reports and, following such review, SCL was required "to co-operate with the Project Director and shall take such steps as may be reasonably required to expedite performance if performance is not in accordance with the Contract."[13] The many provisions provided a detailed and express contractual framework for co-operation between the parties. It is therefore correct to describe the contract as a collaborative contract and as one requiring collaboration between the parties; but this is based on and the result of express provisions requiring collaboration in specified circumstances.

40. Second, Clause 3 of the Conditions of Contract stated that the Description of Works was to be "an exhaustive and exclusive list" of the activities for which SABIC was to be responsible. The list provided by the Description of Works was also extensive and included express provision for many activities which in other contracts have been the subject of implied terms. By way of example, Section 4.5 of the Description of Works included amongst SABIC's responsibilities that "[SABIC] will ensure that access to the site is made available to the Contractor as shown in Attachment 23" and that SABIC would "obtain Regulatory Approvals, permits and licenses to build and

[12] Clause 6.1 of the Conditions of Contract.
[13] Clause 6.3 of the Conditions of Contract.

operate the Plant" with "Submission to the Regulatory Authorities of the necessary Documents" (using design documentation provided by SCL). These express provisions are very similar to the obligations to give possession within a reasonable time and to obtain planning permission or building regulation consent which are identified as "usual" implied terms by *Keating* at 3-046. A further example is provided by the detailed express provisions at Section 2.6 of the Description of Works, which itemised the stages whereby Systems would be handed over from SCL to SABIC. These included SCL giving "the opportunity to the Project Director to carry out an inspection of the System" which would result in "the preparation of a detailed Punch List by [SABIC's] Commissioning Team to identify any defects to the plant specification". This would ultimately lead to sign-off, again in accordance with the express terms of the contract.

41. Third, the Conditions of Contract made express provision for what was to happen if SCL was prevented by SABIC from discharging its obligations:

i) Clause 1.3.4 identified the procedure and contractual outcome if SCL considered that any instruction or order of the Project Director was likely to prevent or prejudice SCL from or in fulfilling any of its obligations under the contract. The end result might be that the order or instruction acted as a waiver of any consequent breach of contract or failure to meet with any contractual requirement;

ii) If any "wrongful act or omission" by SABIC prevented SCL from carrying out any Hand-over procedure, Clause 18.1.8 provided that the procedure shall be deemed to have been completed. Again on the subject of hand-overs, Clause 18.1.9(b) provided that SCL could be entitled to further payment if any System Hand-over Tests or Hand-over procedures had not been successfully completed because they had been prevented by any wrongful act or omission by SABIC;

iii) More generally, Clause 20.2.5 provided that "a breach of the Contract act of prevention or default by [SABIC] its servants or agents" was a ground entitling SCL to an adjustment of the Sectional Completion Dates (with its implications for the potential levying of Liquidated Damages). This provision has double significance. First, it is an example of express provision within the Conditions of Contract about the consequences of SABIC hindering or preventing performance by SCL. Second, it appears to contemplate the existence of (a) acts of prevention or (b) defaults which were not of themselves breaches of contract;

iv) Similarly, Clause 29 of the Conditions of Contract makes provision for payments to be made after suspension of all or part of the Engineering Works on the written instruction of the Project Director under Clause 26. However, Clause 29.3(b) stated that the provisions of Clause 29 were inapplicable to suspension which was "necessary for the proper execution of the Engineering Services or the safety of the Plant or Process Plant or any part thereof in *as much as such necessity does not arise from any act of prevention or default by [SABIC].*"(My emphasis added)

42. Fourth, SCL's obligation to act with due diligence was subject to the saving at the start of Clause 2.1.1 so that it did not apply at all to the extent that SABIC did not comply with Clause 3 and such failure affected SCL's obligation to comply with its obligations under the contract. Thus the obligation of due diligence was circumscribed by the express terms of the policy and could be lifted if SABIC acted in breach of Clause 3. Similar provision could have been made to lift the obligation in the event of SABIC acting in a way that was compliant with Clause 3 but uncooperative: but it was not.

43. Fifth, when the terms of SSA2 were being negotiated, an issue arose between the parties as to whether the recitals should include a statement to the effect that the parties would "collaborate". Agreement was not reached because of disagreements that were internal to SABIC and went right to the highest levels of management of SABIC Europe. As a result the proposed provision was not included. Pre-contract negotiations are inadmissible as an aid to construction, and I do not draw any assistance from these negotiations when interpreting the contract. However, the fact of the negotiations is a timely reminder that both the EPC contract and SSA2 were the product of detailed negotiations between substantial and sophisticated commercial parties. This does not exclude the possibility of implied terms; but the court should be careful to resist the easy but unjustifiable tendency to assume that a term which the parties have not incorporated as an express term is to be introduced by the court as an implied term. In other words, in a context such as this, the court's first instincts should be to respect the terms of the contract which the parties have agreed rather than to introduce terms which they have not.

44. Sixth, there is a tension between the terms that PLL/SCL have proposed in this case, which is the result of a lack of precision in formulation. Neither term addresses what should be the contractual outcome in circumstances where actions taken by SABIC which are intended to be cooperative and with a view to achieving the desired outcome have the unintended effect of hindering progress. In many cases this question might not arise and so the lack of precision would not matter, but that is not so in the present case. Here, one of the major areas of complaint is that SABIC's involvement in negotiations with Cape hindered or prevented SCL's progress. However, by the conclusion of the trial, PLL/SCL accepted (entirely correctly, in my judgment) that SABIC's involvement with Cape "was initially no doubt an attempt which was well intentioned to assist" although it subsequently "went wrong".[14] Since the implied term not to hinder or prevent is alleged to arise from an obligation to cooperate, it is not obvious that an attempt to cooperate which subsequently has the unintended effect of hindering or preventing progress should be regarded as giving rise to a breach of contract. Put another way, any implied term requires further refinement so as to recognise the fact that, in a major contractual undertaking such as this, the road to prevention, hindrance or non-performance may be paved with good intentions. For this reason if no other, in my judgment, the implied term for which PLL/SCL contended in their pleadings is too crude to be justifiable.

45. When these considerations are taken into account, they support the conclusion that the terms proposed by PLL/SCL should not be implied. I would not regard the reference to the list of responsibilities in the Description of Works as being "an exhaustive and exclusive list" as being determinative since it is clear that the Conditions of Contract

[14] T21/8.10-13

add further obligations over and above those contained in the Description of Works. The Description of Works therefore does not purport to be an exhaustive list of SABIC's obligations even though it is stated to be an exhaustive list of "activities" that are to be SABIC's responsibility. Furthermore, if taken on its own, the activities listed in the Description of Works themselves could be said to leave room for further elaboration. For example, Section 2.6 of the Description of Works does not say how soon after he is given the opportunity to inspect the Project Director should prepare and present his Punch List of defects. Taken in isolation, this can be said to be a matter of timing that is germane to the good working of the contract and one for which no express provision has been made. However, even if the contract leaves scope for implying a term that Punch Lists should be prepared and presented within a reasonable (or a particular) time after the opportunity to inspect is given, this is not a sound basis for implying a much broader term such as those for which PLL/SCL contend.

46. When the possibility of implying those broader terms is considered, the court is confronted by the fact that the contract makes detailed express provision for collaboration and cooperation between the parties and for the contractual consequences if SCL is hindered or prevented by SABIC from achieving its contractual obligations. Even if those express provisions are found not to cover every conceivable circumstance that could arise, they argue powerfully against the notion that the implication of further implied terms about cooperation or hindering or preventing is necessary or what the parties would inevitably have assumed should happen or would have understood as the meaning of the contract. When that is allied with the tension that I have just identified, I consider that the correct conclusion is to reject the existence of the implied terms as formulated and proposed by PLL/SCL. This conclusion is not dependant upon the burden of proof and applies whether or not, as PLL/SCL contend, the burden rests upon SABIC to disprove the existence of the terms because they are similar or identical to those that are sometimes described as "usual" in construction contracts.

47. Although some considerable energy was expended on the existence or otherwise of PLL/SCL's implied terms, it is worth noting at this stage that, no doubt on the basis of the express contract terms to which I have referred, SABIC accepted that if and to the extent that it wrongfully prevented SCL from discharging its contractual obligations, then it could not rely upon the fact that SCL's contractual obligations were not discharged as constituting a breach of the obligation of due diligence. Neither party made detailed submissions about what would constitute a "wrongful" prevention in this context; nor were any detailed submissions made on what exactly would constitute a "wrongful act or omission" for the purposes of Clause 18 or an "action of prevention or default" for the purposes of Clause 20.2.5. However, at this stage of this judgment it is sufficient to find that it is the express terms of the contract that governed the parties' conduct in this regard and not any implied term such as proposed by PLL/SCL.

48. Where I would agree with PLL/SCL's submission is that, in assessing whether or not SCL exercised due diligence, all external circumstances that may have impacted upon their performance, including SABIC's conduct, may be taken into account. In relation to SABIC's conduct, this is made express by Clause 2.1.1 and by the other clauses to which I have already referred which establish the contractual context in

which SCL was required to discharge its obligations. That contractual context included the steps to be taken by SABIC, and specified the contractual consequences if SABIC failed to perform. The contractual context also included the provisions of Clause 20, which specified the circumstances in which SCL's obligation to comply with Sectional Completion Dates could be relaxed, including the occurrence of circumstances constituting force majeure as defined by the contract. As a matter of factual record, PLL/SCL have not contended that any circumstances entitling SCL to adjustment of Sectional Completion Dates or the 5 December 2008 date for EID have occurred. Instead, they have asserted a number of facts which they allege amount to hindering or disrupting the expeditious progress of the works: these allegations, to the extent that they were maintained by the end of the trial and in closing submissions, will be considered later in this judgment. In addition to the allegations of hindering and disruption, it has also been submitted that the issue of SCL's exercise of due diligence is affected by the fact that, on PLL/SCL's case, EID would not have been achievable on 5 December 2008 because of work being carried on by SABIC on the Secondary Compressor. This is addressed in detail later; but PLL/SCL's case raises a relevant legal question: what is the impact upon SCL's obligation of due diligence of an external occurrence (i.e. one for which SCL was not responsible) which would in any event have prevented the achievement of EID on 5 December 2008? There is a short answer to this question. SCL's obligation was to exercise due diligence to carry out and complete its part of the Engineering Works in accordance with the contract. If some external event over which SCL had no control and for which it was not responsible prevented EID occurring on 5 December 2008, that might in theory (but not, in fact, in this case) trigger a relaxation of the 5 December 2008 date; and it might also be shown that the effect of the external event was to prevent SCL performing its other works with the diligence that would otherwise have been required of it. However, this is case and fact sensitive and would require SCL to show that its conduct had in fact been affected by the external event. If, for example, SCL had not been aware of the external event, it seems unlikely that it could justify a failure to progress its works by reference to an event of which it had been unaware at the time and which therefore did not affect its conduct.

49. Some matters internal to SCL might also be material to the exercise of due diligence, though SCL's internal inability to discharge the contractual obligations that it had freely undertaken is unlikely to be material. For example, PLL/SCL submitted that a delay to progress resulting from the illness of a member of SCL's personnel would not amount to a lack of due diligence. So far as I am aware, this did not happen, and it is not advanced as an actual reason affecting the issues in the case. If it had been, I would have rejected the submission. The obligation to man and manage the project appropriately was one that was undertaken in the knowledge that illness can strike. On a contract such as this, in the absence of express provision, the contractor's obligation to man and manage continues and has to be discharged even if an employee is ill.

The Background History

The Period to SSA2

50. During the period with which this judgment is primarily concerned, Mr Richard Buckley was the Contractor's Representative on behalf of SCL. He was appointed deputy Contractor's Representative on or around 22 May 2008 and effectively took

over shortly afterwards when Mr Abel, who had been under a considerable amount of stress, went on extended sick leave. The decision to appoint him was taken by Mr Mark Leggett, who was SCL's President and CEO responsible for the strategic management of SCL's business. Ultimate responsibility appears to have rested with Mr Atul Punj of PLL. For SABIC, Mr Andrew Teague was the Project Director. He reported to Mr Paul Booth, the President of SABIC UK. The primary management contact outside the UK was Mr Mossaed Al-Ohali, who was Vice President of SABIC Europe and as such had effective oversight of the project.

51. Under the First Supplemental Agreement, Sectional Completion of all the works was to be achieved by 26 November 2007. That did not happen and by March 2008 the contract was again significantly in delay. There were issues about the scope of SCL's contract works, but SABIC's fundamental concern was that SCL's project management lacked leadership and drive. In March 2008 SABIC drew up a number of options for internal consideration. Those options included continuing with SCL, which gave an estimated EID of the end of 2008 but was considered to be a high risk strategy; or terminating the Contract with SABIC completing the works, which gave an estimated delay of 4-6 months over the best option; or SABIC taking an increased role in carrying out the work, which gave the best option in terms of time, with an estimated EID of October 2008. In a presentation to SABIC made on 14 April 2008, SCL referred to contractual issues arising out of what it considered to be disruptive engineering modifications; it also acknowledged that there were difficulties in working relations between SCL and subcontractors, to which it said that it was committing Senior Management resources. Despite these difficulties, SCL was projecting EID for 3 December 2008 i.e. about the mid-point of SABIC's March 2008 projections.

52. SCL's presentation also informed SABIC that the contract was going to involve a major financial hit for SCL. SCL's cost to date was £162million. It had been paid £125 million leaving a current cash deficit of £37 million. It projected costs to complete of £28 million, including a contingency of £3 million. The total project prime cost was therefore anticipated to be £190 million with a current contract value to SCL of £141 million, with what was stated to be a potential loss of £66 million. SCL's proposed way forward was that there should be a cash release of £16 million (i.e. full payment of the current contract value) together with an agreement to close out the current fixed price contract as at 31 March 2008 and to move to a reimbursable basis for the remaining work scope, with SCL and SABIC sharing the current £38 million loss 50/50. The justification for this optimistic proposal was that it "allows SC senior management to focus attention on project completion, not on cash, corporate banking, auditors, governance, claims & commercial matters."

53. At the presentation on 14 April 2008, SCL agreed to prepare a programme for presentation to SABIC on 23 April. On 21 April Mr Leggett, who had been at the meeting on 14 April emailed Mr Al-Ohali requesting further time for his team to "both update and verify the reality of an earlier date than that discussed" on 14 April. Mr Leggett proposed a face to face meeting on 30 April, saying that this would have the advantage of following an SCL board meeting where SCL's revised plan would be tabled. He received a sharp response from Mr Booth. Mr Booth emphasised the seriousness of the contract situation and demanded that the planned meeting on 23 April should go ahead. Mr Leggett deflected this by saying that it was essential that

there should be "total understanding and belief in the plan by all involved …" and he emphasised the importance of "quality and commitment from our respective teams."

54. At the SCL board meeting on 29 April 2008, Mr Leggett briefed the board about the current situation of the project and the series of negotiations. There is no evidence that he presented the new plan in any detail. The board determined that Mr Leggett "should take a tough stance with [SABIC] in negotiating a settlement" and that "if there was no substantial agreement then [SCL] should start to de-mobilise subcontractors." During the same meeting, the board received advice from a Mr White of Pinsent Masons, who was an insolvency practitioner. Given reassurances that SCL was still receiving support from PLL, he confirmed that the company could continue to trade. Later in the meeting the board agreed that the accounts should be prepared on the basis that the SABIC contract would break even "since this was the minimum acceptable outcome" and despite the prospect that this might lead to the accounts being qualified.

55. Three points emerge from the board meeting of 29 April. First, given the projected loss of £66 million and the absence of any realistic prospect of recovering that loss, there was no rational justification for preparing the accounts on the basis that the SABIC contract would break even. Mr Leggett said that the decision to prepare the accounts on that basis represented the board's view and, when pressed, that it "more or less" represented his view. That evidence is incredible in the face of the information that was being presented to the board and Mr Leggett at the time. Second, SCL was being advised that it could continue to trade, but only on the assurance that it was still being supported by PLL. Third, and most important, it is apparent from the minutes of this meeting and from a wealth of subsequent evidence, some of which I shall refer to below, that from 30 April 2008 SCL's strategy in its dealings with SABIC and its running of the contract was dominated by the need to recover some of the losses that it faced on the contract. To that end, SCL set about adopting the tough stance with SABIC that the board had sanctioned.

56. It started on 30 April 2008 when Mr Leggett, Mr Buckley and Mr Abel met SABIC. They took with them a financial advisor, Mr Wildsmith of Ernst & Young. SABIC attended by Mr Al-Ohali, Mr Booth and Mr Teague. First, Mr Abel and Mr Buckley made a presentation of the programme to complete which they said was "now agreed by all of the project team, supported by subcontractors and licensors." It gave a projected EID of 24 October, an improvement of 6 weeks, which Mr Al-Ohali did not accept as feasible. What SCL did not tell SABIC was that SCL was about to start a demobilisation of subcontractors that was driven by its need to cut costs. The plan being presented to SABIC assumed no such demobilisation.

57. Mr Abel, Mr Buckley and Mr Teague then left the meeting. SCL's note of the meeting records that SCL then told SABIC about "its financial position and that the SCL board had given a clear instruction that unless immediate cash was made available then work could not continue in accordance with the proposed plan." Mr Wildsmith "explained the current position and the issue faced by the UK directors. [Mr Al-Ohali] said that he believes this is a matter for the parent. He …believes [SCL] and PLL have the financial strength to see the project through.." After the meeting, Mr Booth told Mr Teague that Mr Leggett had said SCL would become insolvent if SABIC did not provide help. Whatever the precise words used, the message was plain and had the desired effect that SABIC left the meeting with the

clear understanding that it would have to provide additional financial support to SCL if the project was to progress. In Mr Booth's words it "frightened SABIC into recognising that sitting back and doing nothing financially was no longer an option." The "tough stance" was working.

58. After the meeting, Mr Leggett told Mr Buckley and Mr Abel to prepare a demobilisation schedule and letters (to subcontractors) and to quantify the cost impact. Mr Abel correctly identified the basis of the demobilisation in an email to Mr Buckley the next day: the intention behind the demobilisation was to advise SABIC of SCL's intent to alter the site situation to prompt movement on payments, acceptance (by SABIC) of cost and postponement of liquidated damages; but mostly it was to reduce the immediate costs for SCL and its shareholders. The same day, 1 May 2008, Mr Buckley sent Mr Leggett two spreadsheets. The first showed the savings to be achieved by a "structured ramp down, maintaining some integrity and quality"; the second, which would achieve greater savings, was "a non-structured ramp down, immediate cut-off of trades, maintaining the scaffolding crews to strip the scaffold."

59. Within 24 hours, SCL told Mr Teague in confidence that it was going to start discussions with its major subcontractors early the next week about reducing manning to a level that minimised SCL's spend rate; but Mr Teague was assured that no action would be taken until the week commencing 12 May 2008. That was not what happened. After site meetings on 6 May 2008, SCL wrote to Shaw, its mechanical subcontractors, and Cape, its insulation and PFP subcontractors. The letter to each subcontractor confirmed an instruction for them to cease all further weekend overtime working and immediately to remove the night shift. In addition, they were instructed to issue notice of demobilisation to 50% of the combined workforce and staff book total (with the exception of Cape's scaffolders). According to Mr Buckley, this was the structured demobilisation approach to which he had referred in his email on 1 May 2008. Evidence was adduced which showed that Shaw were in fact over-manned on site for the work that was currently available for them. However, I find that the driving motivation behind the instructions to demobilise both Shaw and Cape was the one which Mr Abel had identified in his email to Mr Buckley and which Mr Teague had been told in confidence, namely to reduce SCL's spend on site. This in turn was driven by SCL's financial standing and the losses it was incurring on the contract and not by any considerations of what was required to bring the project to a successful and timely conclusion.

60. SABIC responded quickly with high level discussions taking place between Mr Al-Ohali and Mr Punj, which led to an agreement on 8 May 2008 that the demobilisation would not take place. Accordingly, SCL rescinded the instructions to Cape and Shaw to demobilise. Shaw described the decision as "reckless" and later submitted a claim for consequential costs. Mr Buckley considered this to be posturing as Shaw were over-manned at the time; but he agreed that it gave Shaw leverage as against SCL.

61. SABIC by now had every reason to be concerned about the state of the contract. It had been told that SCL was unable to meet its proposed programme without further cash injections from SABIC and had only averted substantial demobilisation by the intervention of Mr Al-Ohali with Mr Punj. In addition, and not surprisingly, there was gossip on Teesside that SCL were in difficulties. SABIC therefore decided to call a meeting of SCL's subcontractors. Mr Booth intended that SCL should be invited and asked Mr Teague to invite them. Although Mr Teague's recollection was

that he passed on the invitation, I find that the message did not get through to SCL, though this was not as a result of deliberate obstruction by Mr Teague. The meeting went ahead without SCL despite some of the contractors expressing concerns at SCL's absence. The key messages included that SABIC was and remained committed to the completion and successful commissioning of the project and that it continued to hold discussions with SCL to resolve the current situation and other differences. SABIC confirmed its understanding that there had been difficulties with payments to subcontractors and said it had every confidence in the capability of the main subcontractors to complete the project. It ended with the plea: "Before you lay people off from our Project, please talk to us."

62. PLL/SCL attempted to portray this meeting as an unreasonable interference with and undermining of SCL's position as main contractor. Mr Teague accepted that the presentation contemplated SCL becoming insolvent, but he justified that premise by reference to the fact the subcontractors were, with reason, very worried that SCL were going to become insolvent and SABIC were very concerned that the subcontractors may not wish to continue with the project if SCL dropped out. I accept his evidence that the purpose of the presentation was to give confidence to the subcontractors that SABIC were determined to complete the project as soon as possible, even if the worst came to the worst and SCL became insolvent. I also accept that SABIC viewed the prospect of SCL becoming insolvent as the worst coming to the worst. I reject the suggestion that this meeting was an unjustified interference with SCL's position as main contractor. It was a reasonable commercial and strategic response to a very difficult position. SCL was directly responsible for that difficult position: it had cultivated it by using its financial difficulties as a central bargaining tactic in its negotiations on 30 April 2008 and by its demobilisation instructions on 6 May, which were inconsistent with the plan it had recently presented to SABIC and contrary to the assurance that Mr Teague had been given that no demobilisation would occur before the week commencing 12 May 2008. It could not reasonably complain if SABIC took steps to protect its position against the possibility of SCL dropping out of the project.

63. In the event, the parties achieved the handshake deal on 15 May 2008, which included the substantial additional injections of cash by SABIC paying the whole of the existing contract price up front and agreeing to pay the enhanced contract price in advance. In return, SCL agreed that it would work to achieve the earliest possible EID.

64. There can be no doubt that SABIC committed itself firmly to SCL to bring the project to completion by the handshake deal and its subsequent formalisation as SSA2. Quite literally, it put its money where its commitment lay. That does not mean that everyone at SABIC was confident that the commitment to SCL was the right choice or that there was widespread confidence that SCL would perform as it agreed. In particular, Mr Teague always doubted SCL's ability to bring the project to fruition; but he was overruled by the decisions made by his superiors and, at least until quite late on, his commitment to SABIC and SABIC's need to bring the project home outweighed his doubts about SCL, and that he acted properly in his role as Project Director seeking to implement the contract successfully. Whatever the doubts harboured by individuals, I have no hesitation in rejecting any suggestion that the handshake deal and SSA2 were merely stratagems that were intended to set SCL up to fail.

65. As part of the formalisation of the agreement, planners from both sides set about preparing a completion plan, working hard and collaboratively. It was plain that a substantial increase in productivity was required in key areas. However, in the period between the handshake deal on 15 May and SSA2 on 2 July 2008, SCL again instructed its subcontractors to demobilise:

    i) On or before 29 May 2008 SCL instructed Shaw to reduce its manning levels by 100 men. This led Shaw to predict a completion date for their subcontract of 25 September 2008;

    ii) SCL instructed Cape to reduce its site manning levels, confirming its instruction by letter dated 13 June 2008. Cape confirmed that the instruction would be put into immediate effect but warned that an early analysis of the current SCL programme meant that the instruction to reduce manning would result in a significant prolongation of the sub-contract: its opinion was that the Completion Date for the insulation sub-contract should be amended to July/August 2009[15]. It is clear from all the evidence that Cape's management were savvy and tough negotiators who would take any opportunity to exert pressure when it was perceived to be to their advantage[16]. For that reason, it is necessary to treat their assertions with caution. Even so, the assertion that the demanning which had been instructed by SCL would lead to prolongation of the sub-contract was true.

66. SCL's demanning of key subcontracts came as a shock to SABIC. The weekly statistics produced by SCL were plotting progress against the then current programme (AP24) which showed EID on 25 October 2008. This programme was the result of SCL's rebaselining in April 2008. The 13 June 2008 weekly statistics showed a clear falling off from planned progress in several areas, including equipment & pipework installation, insulation, PFP, and loop checking. On 13 June 2008 SABIC wrote to SCL expressing their serious concern that SCL was already 2 weeks behind required progress and that, in the context of continuing slippage by SCL against programme requirements, it was "undertaking a severe de-manning exercise at a time when the current level of manpower is failing to achieve the required progress." It also pointed out that there was yet no contract in place between SCL and Halliburton who were the selected Cleaning & Blowing subcontractor.

67. On 20 June 2008 Mr Leggett prepared an update for the SCL board. By this time the sums to be paid under SSA2 had been agreed. Mr Leggett expressly recognised that, while SSA2 significantly improved SCL's position on the project and in terms of immediate cash, it did not fully recover SCL's losses. He recorded that three additional courses were now being construed, which were (1) further negotiations

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[15] On 11 June 2008, two days before the demobilisation instruction to Cape, SCL's planner had sent a programme to Mr Buckley setting out the current iteration which had been prepared after a 2 day review with SABIC. In that programme, insulation was planned to have an early finish date of 28 August ***2008***, 11 months or a year before the date projected by Cape in the light of the demobilisation instruction. SABIC were not made aware of the coming demobilisation during their 2 day review of the programme with SCL, as Mr Buckley confirmed.

[16] This is not necessarily a criticism of Cape; nor was Cape unique in this respect. All the parties involved in this project were, to a greater or lesser extent, savvy and tough and were guided by what they considered to be in the best interests of their organisations. This approach did not, however, always coincide with the best interests of the project, as the experience outlined in this judgment shows.

with SABIC Saudi Arabia, (2) mitigation of forward costs, and (3) development of a counter-claim strategy to recover substantial sums from subcontractors and vendors. In the event, there is no evidence of further negotiations with SABIC Saudi Arabia after SSA2. SSA2 provided an additional recovery of £15 million by the increase in the contract price, but it also compromised all outstanding claims. Taking the numbers projected on 14 April 2008, the effect of SSA2 was to reduce SCL's potential loss on the contract to about £34 million, assuming a projected spend of £190 million and recovery of £156 million, before cost reductions.

68. SCL responded to SABIC's letter of 13 June 2008 ten days later, on 23 June. It referred to independent research proving that prolonged and excess overtime resulted in reduced productivity rates and that increasing manning levels to compensate for low productivity levels also has the same effect. It stated that "a management decision was reached to balance the site manning to a level consistent with the work to go and achieving the overall completion schedule."; and it stated that the reduction in the insulation labour force was a temporary measure and that it would be increased as necessary to enable the EID of 5 December 2008 to be secured. No contemporaneous document has been identified to support this explanation. It is inconsistent with the ample evidence that SCL's reduction was at least primarily driven by its own financial concerns. It was substantially untrue and I reject it. In evidence Mr Buckley supported the letter's assertion that the reduction was a temporary measure, but he was unable to point to any document supporting this view. While he may have had some hope that manning levels would increase again one day, I reject his evidence to the extent that it suggested that there was any coherent plan to increase manning levels in the future. He also suggested that the reason why SCL decided to stop spending money was that negotiations on SSA2 were not getting very far. I reject this explanation: it was not suggested by SCL at the time and, although the finalisation of SSA2 took some time, there is no evidence of particular difficulties or of any suggestion that SABIC was going to renege on the handshake deal.

69. It is apparent from SCL's letter of 23 June 2008 that, by then, the parties were looking to an EID on 5 December 2008, as was later incorporated in SSA2. The completion plan that was incorporated as Appendix 5 to SSA2 was an extract from the Completion Plan 10JU showing the longest path to achieve that date. That plan had been compiled by the planners on both sides, but neither set of planners knew of the de-manning that was taking place. On 1 July 2008, the day before SSA2, Mr Hall sent an email to Mr Buckley which adverted to the fact that there had been de-manning which was not reflected in the current plan and indicated a level of concern that the plan would be misleading if issued without taking the de-manning into account. There is no evidence that his concerns (or the mismatch between the current plan and current resourcing levels) was brought to SABIC's attention, and I find as a fact that they were not.

70. On 2 July 2008, the day on which SSA2 was signed, Mr Hall sent an email to Cape with a Lookahead for Insulation and PFP based on an extract from programme 12JU with a Data Date of 16 June 2008 pointing out the imperative need to be able to work on all items on the lookahead, particularly those with a float of less than 25 days. That extract also took no account of SCL's demanning. Mr Buckley was, in my judgment, correct to accept the summary of how things stood at 2 July 2008 that was put to him in cross-examination: first of all, Cape had been told to de-man; secondly,

they had informed SCL of the likely effect of that on the completion date; third, a programme had been prepared for the purposes of the contract which did not take account of the de-manning; fourth, an updated version of that programme was used by SCL to create lookaheads and Cape were told that it was imperative that they were able to work on all items on the lookahead. It was not an auspicious start to the post-SSA2 period.

71. Also on 2 July 2008 Mr Buckley responded to a request from Mr Hall who wanted to know what plan to use when developing revised S-curves. Mr Buckley asked him to "produce curves based on 12JU (16th June Data date)." During his cross-examination Mr Buckley was taken to this email and then to a version of the plan 12JU with a 16 June Data Date {0/921} which showed an EID of 18 December 2008, the implication being that this was the programme to which he had been referring on 2 July 2008. He accepted that it appeared to be a "deliberate decision to base the S-curves on 12JU with a 16 June data date rather than the contract programme 10JU with a 2 June data date *and with differing EIDs*." Later, he accepted that the S-Curves appearing in SCL's Weekly Progress Reports for the week ending 11 July 2008 were based upon the same 12JU programme that he had instructed Mr Hall to use. And, later still, he agreed that the same set of S-Curves showed that "at a time when [SCL] was aiming at 18 December, or planning on the basis of the idea of 18 December, your plan was to reach 100% in the week of 28 September for insulation." He was not re-examined on this topic.

72. Mr Buckley's evidence taken on its own would have provided compelling support for a finding that SCL had, at the time of and immediately after SSA2, planned on the basis of achieving EID on 18 December, 13 days after the date it was contractually obliged to meet. Such a finding would be serious for Mr Buckley and SCL and a strong point for SABIC in support of its submission that SCL did not aim for 5 December 2008 either with due diligence or at all. However, after closing submissions, PLL/SCL produced a previously undisclosed document and submitted (on the basis of the new document and other documents which had previously been disclosed but not referred to at trial) that the version of the plan which Mr Buckley was shown in cross-examination was superseded on or about 26 June 2008 by a subsequent version of 12JU with a data date of 16 June which showed an EID of 5 December 2008; and that on 3 July 2008 Mr Corking of SABIC distributed a plan answering that description with the same EID of 5 December 2008. On the basis of these submissions and the documents identified in support, PLL/SCL submitted that Mr Buckley's evidence on this point was wrong and should be rejected. In response, SABIC submitted (correctly) that Mr Buckley's evidence was clear and that this was an issue that should have been dealt with by timely disclosure and with the witness in evidence.

73. There is force in SABIC's submissions. In particular, it is unsatisfactory that the matter was not addressed with Mr Buckley in re-examination or at all during the main hearing and that PLL/SCL now relies upon a document that was not available to SABIC during the hearing. However, Mr Buckley's acceptance that he instructed Mr Hall to use a document with an EID of 18 December just when SSA2 was signed was surprising when he gave it, though his evidence was clear. It was surprising because there was a significant degree of cooperation between the planners from SABIC and SCL and, as a result of that cooperation, both sets of planners (including Mr Hall)

would have known perfectly well that EID was to be 5 December 2008. Mr Hall was not slow in raising concerns when he thought that things were not being done correctly, to the extent that those who he worked with sometimes thought he went well beyond his remit. It seems intrinsically unlikely that he would have been prepared to adopt what he knew to be the wrong EID for the S-curves, or that he would have done so without significant protest. In addition, Mr Buckley knew that the EID to which they were meant to be working was 5 and not 18 December 2008. My assessment of him is that he would not have deliberately instructed Mr Hall to plan to the wrong EID for two main reasons. First, although the programme later slipped, it would have been irrational to programme on the basis of achieving EID on 18 December 2008 on 2 July 2008 when the contractual EID was (and was known to be) 5 December and there is no other evidence to suggest that SCL had yet given up on that date. Second, even if he had been tempted to do so and Mr Hall had not objected, the level of planning expertise that was available to SABIC and the degree of continuing communication and collaboration between the planners would have raised the pragmatic problem that SABIC would be likely to rumble what was going on. Finally, the parties have not identified any S-curves produced as a result of Mr Buckley's instruction to Mr Hall which were based upon achieving an EID of 18 December 2008.

74. In these circumstances, it is the later version of the 12JU programme (with an EID of 5 December 2008) which is more likely to have been the one in Mr Buckley's contemplation on 2 July 2008 rather than the superseded one, and his subsequent evidence to the contrary is probably mistaken. As a result, I find as a fact that programme to which Mr Buckley referred in his email on 2 July 2008 was a version of 12JU with a Data Date of 16 June and which showed an EID of 5 December 2008. That still leaves unresolved the question why he should have instructed Mr Hall to use a 12JU programme rather than the contractual 10JU completion programme. That question was one for which Mr Buckley did not provide answer. However, it has not been shown that working with the 12JU rather than the 10JU programme had any significant impact on SCL's planning or progress and it is not self-evident that it must have done so. It is therefore of less practical importance than the fact that SCL's planning ignored the de-manning about which Mr Buckley was aware but Mr Hall was not.

The Period from SSA2: 2 July to 3 October 2008

75. I have identified key provisions of SSA2 at [4] above and have considered the meaning of Clause 32 at [28] above. In addition, there were express terms of SSA2 as follows:

i) Recital (e) recorded that the parties had agreed to secure the EID of 5 December 2008 "in accordance with the Completion Plan which has been produced as set out herein.";

ii) EID was defined as "the date on which SABIC is first able to introduce ethylene into the Process Plant for the purposes of commissioning": Clause 1.1;

iii) "The [EID] shall not be before all necessary Engineering Works have been completed to the reasonable satisfaction of the Project Director except

Category 3 defects … which do not affect the operation of the plant …": Clause 26;

76. SABIC paid SCL the advance payment of the remaining contract sum (£14,388,609) on 1 or 2 July 2008. The further £15 million was stipulated in SSA2 to be payable on or before 31 July 2008 conditional upon SCL achieving milestones identified in Appendix 3 to SSA2 and the procurement of the PCG from PLL. The PCG was provided but the milestones had not been achieved by the time that SABIC paid the additional £15 million on 2 September 2008.

77. From the outset, SCL proved unable to maintain the planned levels of progress after SSA2. Further detail appears later in this judgment. SABIC relies upon the fact that SCL's Weekly Progress Report for the week ending 11 July 2008 showed that no progress at all had been made on insulation during the week of SSA2, with minimal progress the week after. The S-curve for insulation shows that progress had virtually flatlined during the four weeks commencing 16 June 2008 and was over three weeks behind programme. This pattern was repeated elsewhere: equipment and pipework installation was falling progressively behind schedule, as was E&I Installation. However, it was insulation that caused most concern. This was probably for a combination of reasons: Cape was recognised to be a difficult subcontractor to manage; its productivity levels were inadequate; and insulation and PFP were recognised to be on the critical path for many systems, as was pointed out by SABIC in its letter of 13 June 2008. Mr Buckley accepted (as do I) that by May 2008 SCL's relationship with Cape was not good. That continued to be the case into July 2008, though relations on site were rather better than those at higher managerial and commercial levels. Even on site there was friction, with Cape's supervisors being discontented and lacking commitment to completion of the insulation and fireproofing work and SCL being driven to instruct the removal of Cape's site manager because of his refusal to accept instructions and violent and unacceptable behaviour. These happened in May 2008, but industrial relations involving Cape and its workforce were at best strained from then on.

Dealings with Cape

78. In this litigation, attention has concentrated most closely upon two episodes relating to Cape. The first was a sequence of events between the end of June and mid-August when SABIC became involved in commercial negotiations with Cape and SCL. The second concerned the introduction and subsequent removal of a site manager, Mr Echlin. PLL/SCL relies upon each of these episodes as demonstrating unwarranted interference which hindered or prevented it from carrying out its obligations expeditiously and efficiently.

79. On 27 June 2008 Mr Richard Shuttleworth of Cape telephoned Mr Booth. Although SABIC had a commercial relationship with Cape by virtue of another contract known as the IMS contract, Mr Booth had not spoken to Mr Shuttleworth before and the call came out of the blue. Mr Shuttleworth told Mr Booth that he was concerned about SCL's administration of the subcontract valuation process and that SCL was under-certifying, issuing payment certificates late and paying invoices late. He said that Cape had an exposure to SCL of up to £3 million. In the course of the conversation, Mr Shuttleworth suggested to Mr Booth that Cape's contract with SCL might be novated to SABIC. This was the first time that novation had been suggested as a

possibility. Mr Booth said that there was nothing he could do, as it was a matter for Cape to resolve with SCL under the subcontract.

80. Mr Booth and Mr Teague spoke to Mr Al-Ohali on 8 July 2008. Mr Al-Ohali asked them to consider how they could get SCL to get Cape to increase manning, insulation being regarded as critical to progress. Mr Booth and Mr Teague then had a conversation with Mr Shuttleworth on 10 July 2008, during which Mr Shuttleworth suggested that SABIC should pay Cape direct for the work it was doing, adopting the rates that were current on the SABIC/Cape IMS contract. He agreed to increase manning levels in the interim to 25 men and Mr Teague said that he would speak to Mr Buckley and get back to him. Although Mr Buckley did not remember having a conversation with Mr Teague, I accept Mr Teague's evidence that he spoke to Mr Buckley on 10 July and told him about the conversation with Mr Shuttleworth, including that because of the on-going disputes about payment Cape were reluctant to commit more resources to the project, that Cape had suggested that SABIC should make direct payments, and that he had said to Cape that nothing would be done without SCL's approval. Mr Buckley said he would go away and think about it: he did not either then or later suggest or complain to SABIC that SABIC's involvement was unwarranted, unhelpful or should cease.

81. At Mr Teague's request, Mr Buckley contacted Mr Shuttleworth. During the conversation, Mr Shuttleworth raised the prospect of varying the scope of Cape's subcontract with SCL and the scope of the SABIC/Cape IMS contract so that work which would have been carried out under the SCL subcontract would now be carried out under the IMS contract, with the result that it would be paid for direct by SABIC. Mr Buckley did not object to the suggestion being made but made clear that the position was not straightforward. He too made clear to Mr Shuttleworth that any arrangement with Cape to that effect would require SCL's consent and said that he would have to look into the suggestion.

82. On 11 July 2008 Mr Teague sent an email to Mr Shuttleworth, copied to Mr Buckley, requesting that Cape "increase insulation resources on the project to approximately 25 starting from Monday 14 July 2008 with further increase in the future …". Mr Shuttleworth replied to Mr Teague, copied to Mr Buckley in which he said his discussion with Mr Buckley had been very different from his earlier discussion with Mr Teague about the possible way forward. He set out a basis of how Cape should progress and be paid which involved transferring work content from the SCL/Cape subcontract to the IMS contract. He did not repeat his earlier suggestion that Cape's subcontract with SCL should be novated to SABIC. He confirmed that Cape would increase its resources to 25 insulators ASAP, pointing out that the last instruction from SCL had been to down man to "circa 10". Although he referred in the email to there being "agreements between the parties", no such agreement had in fact been reached since the earlier conversations had been inconclusive. To that extent, Mr Buckley's view that Mr Shuttleworth was "posturing" was correct. There was a dispute at trial about whether Mr Teague had previously told Mr Buckley that direct payment *on IMS rates* was being discussed. What is clear is that Mr Buckley knew that direct payment under the IMS contract was on the table from the time of his conversation with Mr Shuttleworth and receipt of Mr Shuttleworth's email.

83. Mr Buckley forwarded Mr Shuttleworth's email to Mr Leggett, commenting that "it sounds like SABIC had gone a bit too far (offering to takeover the works), I've told

him that it's not that simple – this still being construction work. However, I have got his undertaking to bring men onto the project from Monday." Neither he nor Mr Leggett went to SABIC to complain that they should not have acted as they had or asking them not to engage in any further discussions with Cape. The reason for this became clear in Mr Buckley's oral evidence. He accepted that, if SCL had wanted SABIC not to have any direct involvement with Cape, it was important that SCL should say so clearly. But, although he later came to think that it had detrimental results, in the period just after SSA2 he did not regard what was happening as objectionable. At the time, he saw SABIC's intervention about possible adjustments to the contract as all part and parcel with Mr Booth using his commercial leverage to try to help in getting Cape to increase their resources on site, which he regarded as beneficial, and for which he was grateful. It is therefore not surprising that the impression of the SABIC team was that SCL were happy with SABIC to be involved in breaking the deadlock with Cape[17].

84. On 12 July 2008, Mr Teague replied to Mr Shuttleworth's email and attempted to clarify SABIC's position. He said that SABIC had agreed to facilitate a conversation between Cape and SCL, which had now happened with the conversation between Mr Shuttleworth and Mr Buckley. SABIC had also agreed "to use our influence with regard to timely payment of due amounts." He continued that "[SABIC] also offered (and the offer still stands) that if, following your conversation with [SCL] you remained concerned about payment going forward, SABIC would pay directly under the existing IMS arrangements … ." and he added "If, following your discussions with Richard Buckley you wish to adopt the IMS arrangements, I suggest that these commence from Saturday 19th July." Mr Teague did not copy SCL in on this email. There was no underhand or improper motive underlying his failure to do so. It was suggested to Mr Booth in cross-examination that this email meant that if SCL could not sort things out to Cape's satisfaction, SABIC would step in and pay them on IMS rates. Mr Booth rejected this suggestion and was right to do so. SABIC had already made clear that any change to the contractual structure would require SCL's agreement and its position did not change. Read in that light, the email meant that if, following Mr Shuttleworth's discussions with Mr Buckley Cape still wished to adopt the IMS arrangements *and SCL agreed*, then the arrangements could commence from 19 July.

85. That is how Mr Shuttleworth understood Mr Teague's email because he replied that "notwithstanding where we get to with [SCL] he would wish to have a direct arrangement going forward with SABIC" However, Mr Teague replied to Mr Shuttleworth that he would "ask Daren [Smith] to make arrangements with Cape local management to put this into effect." Mr Shuttleworth took this as a green light, but by 18 July 2008 nothing had been done. He therefore emailed Mr Teague and Mr Smith (and others) pointing out that he had received no formal order or variation to the IMS contract and nothing from SCL terminating their contract with Cape. He also pointed out that he had heard nothing from SCL about Cape's outstanding claims and suggested that SABIC might take direct responsibility for monies due under the SCL subcontract although Mr Buckley had promised to look into them and come back to him on 11 July 2008.

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[17] See Naisbitt First Statement at [50].

86. Mr Teague replied promptly. He said that he thought a separate order had been set up within the existing IMS contract "to facilitate the collection of charges relating to insulation for the LDPE project": there is no separate evidence to substantiate his belief. He also said that "we cannot accept responsibility for any outstanding payments or disputed amounts with [SCL]. We will, as agreed take responsibility for payment of all new insulation labour costs going forward from this weekend (Sat 19th July)." But he added a request for details of Cape's contracts with SCL "before I speak to [them]." Mr Shuttleworth replied with details of Cape's contracts and concluded with a request that Mr Teague "confirm that all work undertaken by Cape on [the project] from 19th July will be under the IMS contract."

87. Mr Teague did not give the requested confirmation. The following day, 19 July 2008, Mr Smith emailed Mr Shuttleworth saying that he had been in discussions with SCL and was aware that Mr Buckley wished to invite him to site and conduct a commercial review meeting. Mr Buckley wanted the meeting because Mr Booth had suggested that SABIC might settle Cape's claim on SCL and he (Mr Buckley) felt that it was "reasonably unsubstantiated" and he wanted to share what SCL had put together so that SABIC should realise that Cape's claim was flawed.

88. The meeting happened on 24 July 2008, but Mr Buckley did not attend as he was on holiday. It was attended initially by SABIC, SCL and Cape. Cape presented its claims. The meeting broke up for the parties to consider their position, the intention being that they should reconvene later in the day. Neither SCL nor SABIC considered that Cape had substantiated its claims. At some point, Mr Leggett had a meeting with Mr Shuttleworth in the course of which Mr Shuttleworth alleged that SCL were in financial difficulties and that Cape wanted an agreement with SABIC instead. SCL considered that the parties were too far apart and therefore did not attend the re-convened meeting; but SABIC decided to meet Cape as planned in order to listen to any proposals they might have so that they could advise SCL with the intention of moving matters forward. Cape proposed that it should enter into a direct arrangement with SABIC from Monday 30 June 2008 and that SABIC should settle Cape's disputed claims direct, recouping its outlay from SCL at a later date. This was not a proposal that had been made before.

89. SABIC responded to this proposal by an email from Mr Teague to Mr Leggett on 28 July 2008, which he copied to Mr Buckley, attaching the Cape proposal. He stated that SABIC's preferred route was that SCL and Cape continue with their current contractual and commercial arrangements. Noting that relations between Cape and SCL were not good, SABIC was willing to act as a quasi-mediator/arbitrator to try to broker a settlement; and he added that, because time was of the essence for the project and increased insulation resources were urgently needed, SABIC was willing to consider Cape's proposal (for direct engagement of Cape) if "the current arrangements are untenable for a successful project." He also made proposals for the funding of the outstanding balance of the insulation, access and cleaning subcontracts.

90. Mr Leggett replied the following day, 28 July 2008. He had tried to talk to Mr May, the CEO of Cape. He described Mr Teague's summary as "reasonably accurate". His view was that transferring the contract to SABIC would not make any difference as SABIC's QS would take the same line as SCL's in requiring justification of claims. While he recognised the possibility of novating the contract, the email made clear that his preferred way forward was for SCL and SABIC to stand united and use their

collective purchasing strength and influence to force Cape to complete their existing contractual obligations. The email notably did not express any criticism of or complaint about SABIC's continued involvement in the ongoing negotiations with Cape. To the contrary, after an unsatisfactory conversation with Mr May, Mr Leggett suggested that a direct call from Mr Booth might help. Mr Booth tried, but was given an unceremonious brush off by Mr May.

91. At about this time, Cape was hit by a strike at the centre of which was Mr Echlin. He had been brought in to Wilton after SCL had required Cape to replace its site manager on 30 June 2008. He had previously been working on the IMS contract. For some reason which was never fully explained, his removal from the IMS contract required authorisation from SABIC, but his employers were Cape and it was necessary for Cape and SCL to decide how Cape was going to man the Wilton site: I reject the suggestion that they merely did SABIC's bidding in deciding to transfer Mr Echlin. At first his influence appeared to be beneficial and welcome, but the honeymoon did not last. On 27 July 2008 he suspended a scaffolder and supervisor for failure to adopt safe working practices. This led to unofficial action which quickly progressed to a walk out by the scaffolding workforce. Despite being threatened with dismissal for gross misconduct, they were still out on 30 July 2008 and Shaw's men had downed tools in sympathy, bringing their hydrotesting to a halt.

92. 30 July 2008 also marked the arrival of a new and influential person in the form of Mr Martin. He is a very experienced construction manager and had been brought in by PLL to manage the completion of the construction work at Wilton. Initially he expected to stay at Wilton until about the end of September. In the event, he remained until just before 6 November 2008, although he was away from the site during two important periods, first between 10 and 21 September and, second, between 16 and 27 October 2008 during the Warning Period. In addition to being a highly competent construction manager (which he demonstrated by resolving disagreements between SCL and Shaw swiftly after his arrival) he is a man who holds and expresses strong views; and he saw clearly that his primary obligation was to his employers. As will be seen, this combination of characteristics was not always beneficial to the smooth running of the contract.

93. The strike led to a meeting being convened on 31 July 2008 which was attended by SABIC, SCL and Cape. Mr Martin attended but does not appear to have taken an active role. Mr Shuttleworth tried to link the strike to his broader agenda of settling Cape's claims and novation of the subcontract. Mr Buckley did not object to the notion of novation: he probably just sat and listened. Mr Booth objected strongly to Mr Shuttleworth's attempt to link the strike to the broader agenda and required from Mr Shuttleworth a commitment to resolve the strike. In the event, Mr Shuttleworth moved Mr Echlin in order to defuse the situation and the men went back to work on 1 August 2008.

94. On 31 July 2008 Mr Shuttleworth tried again, writing an email to Mr Teague in which he linked the resolution of the strike to his broader commercial agenda. He asserted that SABIC were to arrange for Cape's existing subcontracts with SCL to be novated to SABIC forthwith; and that all outstanding disputes were to be finalised between Cape and SABIC; and that SABIC was to implement new arrangements as from the beginning of July based upon the IMS contract arrangements. This was a further example of Mr Shuttleworth "posturing": SABIC had not agreed that these steps

would be taken. Mr Teague's response on 1 August 2008 was to forward the email to Mr Booth pointing out that, as had previously been discussed, novation would require agreement from SCL, and to reply to Mr Shuttleworth making the same point and saying that he had started discussions with SCL which Daren Smith would continue the following week. He was thanked by Mr Shuttleworth who referred to wanting to process a valuation on which he was asking for assistance. Mr Shuttleworth added the comment that "on a separate note I met with John [Echlin] today and will ensure he is looked after both work wise and financially." SCL wished to invest this last comment with some significance, but I accept Mr Teague's evidence that this was merely a reflection of the fact that Mr Echlin was not thought to have done anything wrong and that it was felt that he should not suffer from being moved in order to defuse the strike.

95. Although SABIC had authorised Mr Echlin's transfer from the IMS contract to Wilton, it did not thereby assume responsibility for his actions when acting as Cape's manager or supervisor, and there is no basis for imposing responsibility on SABIC for his transfer (which, in any event, was not unreasonable) or for his conduct when acting as a Cape employee on site (which has not been shown to be unreasonable or "wrong"). Furthermore, it has not been shown that the decision to transfer Mr Echlin to the Wilton site caused any delay or increase in the cost of SCL's works. As I have said, at the outset his involvement was welcomed and seen as beneficial to Cape's performance on site. No attempt has been made to show that equivalent progress would have been made if Mr Echlin had not been transferred in the first place or someone else had been transferred in his stead. PLL/SCL has concentrated exclusively upon the happening of the strike making no allowance for the earlier benefits of Mr Echlin's presence; but, in the light of my finding that Mr Echlin did nothing wrong in his suspending men for unsafe working practices, there is no basis for assuming that any other (competent) person in his shoes would have acted differently or that the strike would not have happened. Even when the strike is looked at on its own, the evidence of Mr Naisbitt was that it was not a major factor affecting progress of the works. His evidence is likely to be correct on this point: there is a complete absence of any contemporaneous assessment of the effect of the strike and SCL's contemporaneous documents do not identify it as a major feature, though it undoubtedly could have become so if it had not been resolved promptly. For these reasons, and because I reject the submission that SABIC is to be held responsible for his presence on site or his actions while employed there by Cape, I reject PLL/SCL's criticisms of SABIC arising out of the employment of Mr Echlin.

96. Just as Mr Martin was getting his feet under the SCL table, Mr Teague went on holiday on 2 August 2008. In his absence, Mr Turner of Cape wrote to Mr Naisbitt of SABIC wanting to discuss various matters including "position with [SABIC's] discussions with [SCL] in terms of agreeing to a novation", operational arrangements and control on the ground (whether by SCL or SABIC) and a payment on account in respect of the historical SCL account. After a prod from Mr Shuttleworth to Mr Booth, Mr Naisbitt met Mr Turner on 7 August 2008. Mr Naisbitt set out his understanding of their discussions the next day, which included that "the process of any acceptable novation must come from [SCL] and Cape, SABIC will assist where applicable, but have no power to interfere in the subcontractor/contractor relationship (without the agreement of both parties). [SCL] do not favour the novation of the Access and Insulation subcontract to SABIC, and desire to continue working directly

with Cape." This was regarded as "totally unacceptable" by Mr Turner who asserted that it did not "in any way" reflect the agreements that he had reached in Wilton the previous week. He requested an urgent meeting. Mr Naisbitt replied that, given SCL's reluctance to consent to novation, the matter was out of SABIC's hands. A meeting was then set up to be held between Cape and SABIC on 12 August, in advance of which Cape sent to SABIC a draft tri-partite novation agreement which would have novated the existing SCL/Cape subcontract from SCL to SABIC. The draft said nothing about altering the terms of the sub-contract after novation or to suggest that Cape would thereafter work on other rates in general or IMS rates in particular. Cape forwarded it to SCL on 11 August 2008, on which date there was a meeting between SABIC and SCL where Mr Booth and Mr Smith agreed with SCL that their favoured option was to find a solution that would allow the current contracting arrangements with Cape to continue as well as addressing the lack of resources being deployed by Cape. This set the scene for the meetings involving SCL, Cape and SABIC on 12 August 2008.

97. In advance of the meetings, Mr Leggett had understood Mr Booth's view to be that Mr Teague had "stepped over the line" in offering to pay all work on IMS rates but that he was prepared to novate the existing subcontract. Mr Leggett attended on 12 August with Mr Martin, whose view was that novation was problematical – a view with which Mr Booth came to agree. At the initial meeting, SCL and SABIC discussed the claims being put forward by Cape. They then met Cape who pressed their claims, which were challenged by Mr Martin on the basis that further substantiation was required. It was agreed that there should be a further meeting with all three parties later in the day after SABIC and SCL had reviewed the position and come up with a proposed solution. In the event, SCL decided not to attend a further meeting with Cape, so SABIC met Cape in their absence. No agreement was reached. This concluded SABIC's active involvement in the negotiations with Cape. At no stage had SCL objected to SABIC's involvement in the discussions.

98. On 13 August 2008 Mr Shuttleworth sent Mr Booth a long email setting out Cape's version of events, in the course of which he accused SABIC of unwinding previous agreements and asserted that Cape's obligation under its subcontract with SCL was to provide no more than 10 insulators, which would lead to completion of the insulating works in February/March 2009. Two days later, on 15 August 2008, Mr Buckley wrote to Cape asserting that communication between Cape and SABIC concerning any proposed or potential novation of their subcontract would itself be a breach of contract and stating that SCL did not accept the proposal to novate the subcontract. This was the first clear rejection of the possibility of novation by SCL and marked a distinct change in the tone of the communications. It was written because Mr Martin was beginning to take charge of events: the letter was his idea. He sent a long email to Mr Leggett that day setting out his account of the meetings over the past two days. He summarised the position as he saw it at as follows:

> "Sabic discussions and negotiations with Cape since June have created a situation where Cape refuses to work with Simon Carves to complete the project. P. Booth appears to understand the magnitude of the problem Sabic has created with Cape and to a degree all of [SCL's] site subcontractors with unauthorised communication. He also appreciates the fact Cape has been

> disingenuous in their description of contractual disputes they have with SC.
>
> Recommended Path Forward
>
> 1. SC will send Cape a detailed analysis of all disputed amounts.
>
> 2. Letter should be sent Cape advising their communications and taking action at direction from Sabic on the scope of work under contract to SC places them in breach of contract.
>
> 3. Use this mistake by Sabic as a key component in recovery strategy."

99. Mr Martin's primary concern was recovery of SCL's financial position. He had sent a detailed email to Mr Leggett on the subject on 10 August 2008 setting out SCL's current opportunities for capital recovery; the letter to Cape on 15 August was in execution of his second recommended path forward; and he saw what he regarded as SABIC's "mistake" in becoming involved in communications with subcontractors as "a key component" in his financial recovery strategy. His thinking was further developed in an email to Mr Kaushik, the CEO of PLL, which he sent on 14 August 2008, setting out the financial situation as he saw it. The projected loss to SCL as shown in the latest cost report had increased by £8.2 million. While he felt that some £3.5 million of that increase could be avoided by changes and savings, he was left with an increase in the shortfall of £4.7 million. His view was clear: "the only credible option for recovery of the £4.7 million is Sabic. Any attempts to manufacture claims against subcontractors or withhold payments for questionable deductions will result in contractors demanning." In another email, sent to Mr Kaushik on 8 August, he had reported that relations with the client site team were good, which was accurate. In the 14 August email he identified that SABIC site management was "developing a degree of confidence the 05 December completion date will be met and understands their dependency on Simon Carves." This gave SCL leverage against SABIC. In addition he set out his view that SABIC had destroyed SCL's contractual relationship with Cape and tainted relations with other contractors; he asserted his view that SABIC's involvement with Cape had been without the knowledge or consent of SCL and that "I do not mean to imply we will be able to demonstrate damage of £4.7 [million] but rather that we are in a strong position with the end in site"; he recommended that the time to address the shortfall of £4.7 million with SABIC was within the next 2 to 4 weeks because, as he accepted in cross-examination, that would put SCL in the best negotiating position.

100. Precisely two weeks later, on 28 August 2008, SCL wrote to SABIC complaining for the first time about SABIC's involvement with Cape and other subcontractors. While the terms were slightly elliptical, the general thrust was clear: SCL gave notice that it was going to claim from SABIC in respect of any impact that SABIC's involvement may have had on the completion of the Engineering Works or SCL's commercial position. In a second letter on the same day SCL said that it would be taking "appropriate recovery steps" against Cape arising out of the industrial relations problems and that it put SABIC on notice that it reserved its position generally in that

regard under the terms of its contract with SABIC. This was followed up by later correspondence between the parties in which the allegation that SABIC had acted in breach of contract in its dealings with Cape became central to SCL's negotiating position for the recovery of its losses under the contract and when seeking to deflect criticism for the serious lack of progress on Cape's subcontract. In this action PLL/SCL's case has been that SABIC's involvement with Cape was a major example of unwarranted interference which prevented SCL from discharging its contractual obligations.

101. Mr Martin's view of SABIC was materially affected by misunderstandings on his part. As part of his understanding of the dealings with Cape, he came to believe that SABIC had advised Cape that they would agree to settle Cape's outstanding claims against SCL for £1 million, which he regarded as both ridiculous and incredibly generous. No such offer or statement was made to Cape by SABIC. He also came to believe that SABIC had led Cape to believe it had an agreement that it would be paid on more generous rates than provided by its subcontract with SCL. Once again, though Cape undoubtedly angled for such an agreement from about 10 July 2008 and latterly adopted the posture that it had been agreed, SABIC's willingness to enter into an agreement was contingent on the agreement of SCL, which was not forthcoming. Although SCL knew of this proposal from 11 July 2008, it did not object to the proposal having been made or reject it in the weeks that followed. This may in part have been because of a common confusion about whether what was being discussed was novation of the subcontract or transfer of some of the work scope into the IMS contract or, possibly, some other composite agreement. The main reason was that, at the time, SCL was content with SABIC's involvement because it understood it to be a collaborative attempt to assist in getting Cape to perform. Whatever the complete reasons, SCL did not effectively terminate the discussion until 15 August 2008. Mr Martin's understanding that SABIC had led Cape to believe that it had an agreement was therefore both wrong and partial. It was wrong because any agreement was contingent; and it was partial because SCL had, by its continuing engagement in the discussions after it knew that IMS rates were being proposed by Cape, contributed to the tripartite debate which (from the point of view of both SABIC and SCL at the time) was a well-meaning and constructive attempt to find a way to get Cape to perform in accordance with the needs of the contractual programme.

102. Most damaging to his relations with SABIC was that Mr Martin came to believe that SABIC had behaved duplicitously in its dealings with SCL surrounding an offer made by Mr Booth in early September 2008 arising out of Cape's industrial action at the end of July. Mr Booth took the view (correctly) that SABIC was not responsible for the happening of that industrial action. However, by the beginning of September 2008 he was concerned that the time lost to the strike was not being regained and decided to make an ex gratia offer to pay demonstrable additional costs of making up the lost time. Instead of taking up that offer of an ex gratia payment covering additional costs of making up lost time, SCL submitted a formal Variation Notification on 26 September 2008 indicating a claim for £2 million. This bore no relation to the additional costs attributable to the Cape industrial action. Its derivation appears to have been to take 2,000 hours for Cape and 22,000 hours for Shaw in August 2008, neither of which figures could sensibly be attributed to the

consequences of the industrial action[18]. The resulting sum was multiplied by 1.5 and a further £550,000 added for no apparent reason. SABIC rejected the claim but reiterated its offer of an ex gratia payment in respect of demonstrable sums that were attributable to the industrial action on 27 October in a letter that, with justification, described SCL's pursuit of the larger claim as "mischievous and unnecessary".

103. For his part, Mr Martin formed the view that SABIC's rejection of SCL's Variation Notification involved reneging on Mr Booth's offer that SABIC would bear the cost of the premium hours incurred in making up time lost as a consequence of the Cape strike. He stated during his oral evidence that, in the course of a long and cosmopolitan career he had "never experienced such duplicitous conduct as Paul Booth and Andy Teague exhibited on this contract." There was no justification for this view and PLL/SCL did not attempt to support it in its closing submissions; but there can be no doubt that Mr Martin held it at the time and that he felt he could not depend upon SABIC to conduct business in good faith. The combination of SCL's pursuit of the exaggerated and unsustainable claim and Mr Martin's mistaken beliefs about SABIC's conduct contributed significantly to the breakdown of trust and good relations that happened between August 2008 and the termination of the contract.

104. Mr Buckley's evidence was that Mr Martin managed during August to resolve the problems with Cape. I accept his evidence on this point which is consistent with Mr Martin's evidence that "negotiations and discussion with Cape became fruitful once they were fully aware that they weren't going to get a novation and they weren't going to have this pot of gold at the end of the rainbow with SABIC." But it is clear that, even after such resolution, Cape continued to be troublesome. During August 2008 SCL attempted to secure increases in manpower and productivity because current levels were inadequate. On 18 August 2008 SCL wrote to Cape requiring Cape to man the work at the level required to achieve 1,000 linear metres each week and 2,000 linear metres each week from 25 August through to 17 October 2008 so as to ensure completion of pipe insulation by 31 October. Cape responded that it had more than sufficient capability to progress the works diligently and was doing so. It implicitly accepted that the contract was in delay but denied responsibility for the delays that had occurred, adding that if acceleration was required, the contract provided a mechanism for achieving that. By this time, SCL was contemplating engaging other contractors to do some of Cape's work and word had clearly got to Cape of what was in the offing, since it warned SCL of the "very serious implications of this suggestion." On 10 September 2008 SCL wrote again to Cape pointing out that the contract required sufficient resources to be applied to achieve some 400 linear metres each normal working day and stating that current progress was not sufficient to achieve the current programme. On 11 September 2008 Cape wrote referring to a recent meeting and repeating the proposal they had previously made for future work to be paid on a cost reimbursable neutrally funded commercial mechanism and other commercial adjustments that would be favourable to Cape. A similar letter was sent on 30 September. The net effect of this correspondence was that Cape was prepared to increase resources if it was paid more but SCL was not prepared to instruct it to do so on that basis.

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[18] Three additional hydrotest crews had been brought onto site after the strike. It is not clear for how long their presence could be attributed to the need to make up time lost *as a consequence of the strike*, but on any view the claim advanced by SCL was exorbitantly exaggerated.

105. SCL and SABIC met to discuss the insulation contract on 22 September 2008. Internally, by then SCL was deeply concerned about progress on insulation and the fact that it would not be completed on time unless there was an improvement in progress. At the meeting, SCL presented various options and recommended terminating Cape's contract. Mr Teague felt that not enough thought had been given to the risks involved in bringing in another contractor but took the view that the decision was one for SCL to take. On 23 September 2008 Mr Martin met an alternative contractor, Hertel, who told him they were prepared to start work within a week or two. On 24 September he drafted a letter that was sent to SABIC referring back to correspondence asserting that SABIC was in breach of contract because of its dealings with Cape and outlining the four options (including termination of Cape's subcontract). Following his strategy of attempting to recover some or SCL's losses from SABIC, Mr Martin attempted to shift the onus onto SABIC by saying that SABIC had not responded to the options at the meeting and that "further delay and prevarication by SABIC in determining an appropriate remedy for SABIC's own breach of Contract and the foreseeable and natural impact this is having on SCL's ability to procure delivery of Cape's scope of work is hindering the programme and causing SCL to incur additional cost; all of which will require to be reflected in a Variation to our Contract." The letter did not mention Hertel or seek approval for Hertel to replace Cape. At the same time, SCL was writing to Cape alleging that it was in breach of contract for failing to provide sufficient resources and that Cape's failure was causing unnecessary delay in meeting the date of practical completion. By now, everyone believed that insulation was on, or was coming onto, the critical path.

106. On 27 September 2008 Mr Martin internally proposed next steps, which included moving the EID to March 2009, raising a claim for £7 million as the cost of breaches by SABIC, stopping all overtime, and releasing staff and contractors' manpower to contain costs. In relation to the proposal to release staff and contractors' manpower he noted that "this was planned however SABIC is not party to our demob program so it should cause concern on their end", by which he meant that the causing of concern to SABIC was likely to be a benefit to SCL.

107. SCL adopted Mr Martin's proposals and sent SABIC a letter on 30 September 2008 which estimated that EID would be in March 2009 and asserted that the added cost of SABIC's alleged breaches in relation to Cape were estimated to be circa £7 million. Although he said that he would not have plucked that figure out of the air, Mr Martin was not able to identify a rationale for it and no underlying calculation has been identified.

108. On the same day, 30 September 2008, at a meeting attended by Mr Martin and Mr Buckley for SCL and Mr Mark Williams and Mr Daren Smith for SABIC, there was a discussion about the possibility of achieving EID by the end of the year. It appears from the account given by SABIC in a letter dated 6 October 2008 that, in response to a question whether SABIC believed an EID of December 2008 was possible, the SABIC representatives said that they thought it could, subject to a number of caveats which included their reservations about the current rate of progress on insulation, System Handovers and chemical cleaning; and that, to address those concerns, it would be necessary for SCL to increase resources. With unconstrained resources SABIC's analysis indicated that SCL should be able to achieve EID by 15 December 2008. As a matter of fact, as outlined elsewhere, SCL was not at any stage likely to

apply unconstrained resources to the contract and, in the event, did not do so. The 15 December 2008 EID date was never more than theoretical.

109. It was Mr Martin's evidence that he was at the time of the Warning Letter on 3 October 2008 still "shooting for" the 5 December 2008 EID. He did not concede that the contractual date was now unfeasible, even without the need for a recovery plan[19]. This evidence was surprising in the light of the programmes that were then current, which indicated that the works were in substantial delay. It was also frankly inconsistent with what SCL was prepared to say to SABIC in its letter of 30 September 2008, implementing the strategy that reflected Mr Martin's advice. Mr Teague's evidence was more realistic: SABIC's planner by 3 October indicated that 5 December 2008 was not possible and SABIC was not at that date anticipating that it was realistic to think that the works could be completed by that date.[20] I reject Mr Martin's evidence that by 3 October he was still shooting for 5 December in any meaningful sense: given SCL's slippage and rate of progress to date, no competent construction manager could have thought that there was a realistic prospect of SCL achieving the 5 December deadline – and, as I have said, Mr Martin was experienced and highly competent.

110. It is convenient to draw together the factual strings relating to SABIC's dealings with Cape at this point. I have already said that the motivation behind SABIC's intervention in the negotiations with Cape was collaborative and essentially consensual. It is correct that SABIC did not keep SCL fully informed of where the negotiations had got to at all times. Specifically, SABIC did not copy in SCL on the email traffic which identified 19 July 2008 as the potential switch-over date with costs thereafter being funded directly by SABIC. But SCL knew that novation and transfer of work scope to the IMS contract were under discussion and took no steps to prevent those discussions continuing; and I reject the suggestion that the failure to keep SCL informed of every stage and detail of the discussions was intended by SABIC to be covert or underhand, although it is easy to understand why, in retrospect and given the serious deterioration in relations that has since occurred, SCL has come to that view. What is clear beyond argument is that Mr Martin saw the episode as an opportunity to generate claims alleging breaches of contract and thereby to reduce SCL's losses on the contract.

111. PLL/SCL's case is that the effect of SABIC's intervention was to harden Cape's position such that Cape would not bring additional resources to site without a commercial agreement with SCL on terms that included payment on a time and materials basis. This is alleged to have reduced the progress that could be made in relation to the insulation works during and after the negotiations. The evidence does not establish PLL/SCL's factual case. First, I find that the main driver for Cape's negotiating position was, as Mr Shuttleworth said to Mr Leggett on 24 July 2008, that Cape were concerned about SCL's financial stability and wanted a direct contract with SABIC. The source of that driver was the widespread perception amongst subcontractors that SCL was in financial difficulties and not any unwarranted interference by SABIC, although I accept that part of the benefit of a transfer to direct working for SABIC was that Cape were more likely to achieve their goal of a cost-plus basis of reimbursement. However, the evidence does not justify the conclusion

[19] T3/125.9-22
[20] T3/178.13-179.1

that Cape would have acted materially differently in the absence of SABIC's involvement in negotiations. In particular, the fact that some increase in resourcing and progress was achieved in October 2008 does not demonstrate that Cape would have acted differently before then. Second, the immediate effect of SABIC's intervention was that Cape increased its resources on site, and there is no evidence to suggest that SCL would have been more successful in arranging for further increases in the absence of SABIC's involvement. Third, the effective period of negotiation was relatively short, with SABIC backing out on 12 August 2008 and SCL requiring a further increase in resources from Cape within a week after that. Fourth, a significant reason (if not the only reason) why resolution with Cape was not achieved was (in the terms of PLL/SCL's submission) "due to Cape's commercial expectations in relation to what remained unsubstantiated historical claims". Those expectations were not attributable to unwarranted interference by SABIC since SABIC and SCL were in agreement that the claims (which were claims against SCL and for SCL to deal with) were not substantiated. Fifth, no attempt has been made by PLL/SCL to quantify the effect on progress of the interference of which it complains. I therefore reject PLL/SCL's factual assertion that SABIC's involvement with Cape caused a reduction in the progress that could and would otherwise have been achieved.

Control of Programming

112. At the start of the trial, it appeared to be a significant part of PLL/SCL's case in support of the general allegation of unwarranted interference by SABIC that "SABIC took over control of SCL's Completion Programme for its works, altered the logic and converted the said programme into a different planning software that SCL could not access." Time was spent with witnesses. The lead witness for SABIC on this area of dispute was Mr Corking, who was successively SABIC's Planning Manager and then Project Controls Manager for the Wilton Project and who was directly involved with the events in question. For PLL/SCL the lead witness on this topic was Mr Buckley. The person most directly concerned on behalf of SCL had been Mr Hall, SCL's chief planner for the Wilton Project until he left SCL's employment on 30 October 2008. Mr Hall was not called to give evidence. I found Mr Corking to be a thoughtful and good witness and accept the main thrust of his evidence.

113. By the end of trial, this issue appeared to have less prominence, meriting only one sentence in PLL/SCL's written closing submissions[21]. In my judgment, this apparent down-grading of the issue by PLL/SCL was realistic and correct. In the circumstances, I can deal with the factual background to this issue more shortly than would otherwise have been the case.

114. The Completion Plan annexed to SSA2 was and remained the document by reference to which the parties' contractual obligations fell to be determined. However, as usual, programmes were generated as time passed which were updated to reflect past progress and adjusted to reflect current planning for the balance of the project. Until August 2008 primary responsibility for updating programmes rested with SCL. The programme platform being used by SCL was Primavera 3.1. SCL was contractually obliged to provide SABIC with regular updates of programmes in pdf rather than in native format, which meant that SABIC's ability to interrogate or understand the basis for the pdf version they were given was limited. As part of the cooperation between

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[21] T.4/1/35 at [64]

the parties, SCL made a terminal available to SABIC so that SABIC had access to SCL's programmes in native format, which meant that SABIC could and did input information directly. SABIC's own platform used a different version of Primavera (P3Ec.1 also referred to a P4.1). In addition to the contractual obligation upon SCL to provide information to SABIC, the Description of Works[22] required SABIC to operate a planning system that reflected construction activities through to Beneficial Operation of the Plant and that SCL would issue regular updates of the construction and handover status for SABIC to incorporate into the plan. Pragmatically, this would mean that, as the plant moved into the commissioning phase, the preponderance of planning responsibility was likely to shift towards SABIC.

115. Approaching August 2008, SCL was producing its updated programmes generally on a fortnightly basis only and it took another week for SCL to submit the information to SABIC. This meant that the information that SABIC had in order to assess progress was up to three weeks out of date. This gave rise to practical difficulties for SABIC as it was having to plan its commissioning works by reference to the plans generated by SCL and provided after the time-lag. The position was exacerbated by the fact that Mr Hall was to go on holiday at the start of August 2008 and no deputy had been appointed in his place, which would affect SCL's capacity to update programmes. So, in advance of Mr Hall's holiday, Mr Corking discussed with him a proposal for SABIC to take over the task of updating the live plan. It was agreed that it would make more sense for SCL to pass information to SABIC to facilitate SABIC's updating of one schedule. SABIC's plan was to transfer the programme to its P4.1 platform, making a terminal available to SCL, thereby reciprocating the arrangement that had been in place previously. There was at this stage a considerable amount of collaboration between SCL's and SABIC's planners and I accept Mr Corking's evidence that the intention was for SABIC and SCL to continue to work on programmes and plans together. Mr Hall agreed to this proposal and went on holiday. The transfer was achieved by SABIC being provided with a copy of SCL's current programme. SCL kept the original. SCL was therefore free to work with its original on its own platform or on the programme that had been transferred to the SABIC platform, using the terminal made available to it for that purpose by SABIC.

116. It is plain that the transfer did not go smoothly, even though Mr Hall was capable of using SABIC's terminal and did so. In their pleadings PLL/SCL identified specific changes that were made by SABIC on taking primary control of the programmes[23]. In contrast, their complaint that the taking over hindered SCL's progress is presented at a high level of generality, it being said that the level of detail in the programmes produced by SABIC "hindered SCL's ability to plan and mange its resources and works, particularly in the context of the [areas of work identified] in the Warning Letter of 3 October 2008" and "hindered SCL and/or SABIC's ability to be able to determine if as a matter of fact SCL's performance during the Notice Period i.e. 3 October 2008 to 3 November 2008, had failed to remedy the stated shortfalls."

117. On the evidence, although PLL/SCL came to describe this sequence of events as "confiscation of SCL's programme for the works" it was no such thing. The original transfer was agreed by Mr Hall with Mr Corking; SCL had access to the SABIC platform and was free to input whatever data it wished either onto the original SCL

[22] Clause 2.6.8.7.2 {E.1/3.1/178.71}
[23] A/8/401

programme that it had retained on his platform or by accessing the SABIC platform; and although some difficulties were being encountered, SCL did not at any stage request that SABIC hand back primary responsibility for inputting data to update programmes or for the general control of the ongoing programming. On the evidence, SABIC carried out its responsibilities for updating programmes after the transfer responsibly and, even if the detail in the programmes as maintained by SABIC was at a higher level than SCL required for detailed planning, it was open to SCL to programme at whatever level of detail it wished for the purposes of contract management. Equally, on the evidence, although SCL encountered some difficulties in working with the new arrangement and did not contribute to updating information on the current plan after early August 2008, PLL/SCL did not put forward any evidence that sustains the generalised pleading assertions on the effects of the transfer to which I have referred. I find that the transfer and difficulties which followed did not make any appreciable or measurable difference to SCL's progress in the period to termination.

Preparations for Termination - 1

118. SABIC had contemplated terminating the contract before SSA2. In April or May 2008 a detailed presentation was compiled in preparation for possible insolvency on the part of SCL. After SSA2 it maintained what it called "Plan B" although senior management in the Netherlands were not in favour of implementing it and it ultimately took considerable persuasion from the United Kingdom management to persuade them to do so. Given the difficulties and delays that had already been experienced on the contract there was nothing intrinsically sinister about the maintenance of Plan B, but the documents relating to it shed some light on the thinking and responses of the parties in their dealings with one another. By mid-July 2008 Mr Heath had prepared a draft summary of SABIC's position on Plan B which identified financial deterioration and failure to proceed with due diligence as potential triggers for termination; it expressed the view that the financial choice (i.e. in favour of termination) was now clear but that other factors had to be taken into account in reaching a decision; it reviewed the prospect of "picking up" (i.e. working after termination with) various subcontractors and said that Cape had already been picked up[24]; and it contemplated calling the two bonds with a claim and counter claim then ensuing to establish final settlement. On the same day Mr Al-Ohali directed SABIC UK that, because SCL was potentially "a losing horse", it was necessary to put enough of SABIC's people in charge of the key contracts with Shaw and others to be able to take charge should SCL "let go of the project". In the event, though SABIC personnel worked alongside SCL with a number of contractors, they did not take charge of key contracts in the manner apparently envisaged by Mr Al-Ohali. At the end of August 2008 Mr Heath prepared a draft termination letter and circulated a presentation in advance of a meeting with Mr Booth on 28 August 2008: the presentation recommended termination on the grounds that SCL was now six weeks behind the SSA2 Completion Plan, its deteriorating financial position was affecting performance, and termination would maximise value to SABIC. On the same date, the presentation that had been prepared in April/May against the event of the possible insolvency of SCL was circulated more widely. However, SABIC Europe was not

[24] This was correct in the sense that SABIC had indicated its willingness to take over the Cape subcontract if SCL agreed and Cape was in favour of the idea, but no concluded agreement had been reached.

persuaded and the second major payment under SSA2 was paid at the start of September.

119. Planning for possible termination continued in September. On 3 September 2008 Mr Teague circulated a presentation addressing the commercial and contract organisation for the LDPE Project. The headline objectives were to secure value through contract management and to be prepared "should [SCL] cease to be involved in the project e.g. go into administration", although certainly by then Mr Teague was contemplating that SCL might cease to be involved without having first gone into administration.

120. On 11 September 2008 SABIC sent a letter to SCL registering its concerns at the slippage against the Completion Plan and asking SCL to advise by return what mitigating actions they had put in place. By now, SCL was well aware of slippage against the Completion Plan and it would at the end of the month estimate that EID would be in March 2009, subsequently revising that date to bring it forward to early February 2009. However, SCL had not put in place anything in the nature of a recovery plan and did not do so at any stage before termination. Although SCL's Weekly Progress Reports included some charts (including for Passive Fire Protection and Insulation) which included a "Recovery Curve" and outline figures suggesting resourcing for recovery, Mr Martin's evidence was that Mr Hall (who was SCL's chief planner) was not capable of developing a recovery plan; and Mr Buckley confirmed that "Recovery Curves" were theoretical only and that there had been no planned recovery. I accept their evidence on these points. Neither PLL/SCL's witnesses of fact nor Mr Laslett, the expert called by PLL/SCL to give evidence on Process Engineering, identified any coherent recovery plan or strategy or any activities that could be described as the implementation of a recovery plan, even on the most charitable of interpretations. Specifically, although Mr Martin in his witness statement said that he told SABIC at a meeting on 30 September 2008 that an expediting programme was being developed, his oral evidence was that he did not see the need for a recovery plan "per se": he merely saw a need "to make sure that [SCL was] hitting the metrics that assured us we were going to complete on time." This applied specifically to Insulation and Passive Fire Protection, the work content of the Cape Subcontract.

121. I find as a fact that, although by the end of September 2008, slippage of approximately 2 months against the Completion Plan had occurred and was known by SCL to have occurred, SCL did not formulate or implement any formal or coherent plan for the recovery of the slippage that occurred in the period from formulation of the Completion Plan that was incorporated in SSA2 at any stage either before the issuing of the warning letter or before termination.

122. On 30 September 2008 Mr Teague circulated the presentation that had been given to SABIC Europe at the end of August and a new draft presentation entitled "Review of Performance Since 2cnd SSA2 Payment (£15M) and Way Forwards – 2 October 2008." The new draft presentation made the case for termination, reflecting Mr Teague's views, identifying disputes about the scope of SCL's work, slow down in progress, cash constraints and the fact that the project was now more than 6 weeks behind the Completion Plan. Subject to some amendments it formed the basis for the presentation made to SABIC Europe on 2 or 3 October 2008. As given, the presentation placed at the centre of the argument the financial benefit and certainty for

SABIC in terminating, given the availability of the two bonds, and it requested SABIC Europe Board approval for termination.

123. On this occasion Mr Al-Ohali was persuaded to take overt steps on the road to termination and, on 3 October, the Warning Letter was sent to SCL.

The Warning Letter – 3 October 2008 – and SCL's Response

124. On 3 October 2008 SABIC sent SCL what has become known as "the Warning Letter." Since it is PLL/SCL's case that the letter was not effective as a written warning within the meaning of clause 27.2.10 of the EPC Contract, it is necessary to set it out in some detail. The letter stated as follows:

> ""[SCL] will be aware that under terms of the contact, [SCL] agreed to secure an [EID] of 5th December 2008 in accordance with the Completions Plan, which was appended to the Supplemental Settlement and Schedule Agreement dated 2nd July 2008 ("SSA2").
>
> [SCL] will also be aware that under clause 2.1.1 of the Contract [SCL] shall, with due diligence, carry out and complete the Engineering Works in accordance with the Contract.
>
> SABIC are concerned at [SCL's] lack of due diligence in completing the Engineering Works.
>
> Examples of the activities causing the delay include the following:
>
> i) Hydrotesting[25]…
>
> ii) Loop Testing – these were programmed to be completed by [SCL] on 3rd October 2008, and as of the date of this letter Circa 900[26] Loop tests remain to be done. Again the majority of the Loop tests were finished later than the dates required in the completion plan.
>
> iii) Insulation – the insulation works were to be completed by [SCL] on 10th October 2008, as of the date this letter Circa 14,000 linear metres remains to be installed.
>
> iv) Systems at MC1– based on the early finish dates in the Completions Plan, 122 Systems should have been achieved MC1, as of the date of this letter only fifteen systems have achieved MC1.

[25] In evidence, Mr Teague accepted that the hydrotesting was virtually complete. SABIC no longer relies upon it as an activity that was causing delay by 3 October 2008. It is therefore not necessary to consider it in any further detail.

[26] This was in fact an overestimate, the actual number being in the region of 848.

v) System Cleaning and Blowing – based on the Completions Plan in SSA2 by 25th September 2008 [SCL] should have cleaned and/or blown 29 Systems, however only two systems had been completed.

The above list is not exhaustive, and bulk work in the reactor bay, outstanding civil and structural work, the absence of QA documentation a lack of design support, and [SCL's] ongoing inability to properly manage key subcontractors are all contributing to the ongoing delays for which SABIC hold [SCL] responsible.

The resultant effect of the delays being incurred, from the latest estimate that is available, estimates that Ethylene-in will not be achieved until early March 2009, twelve weeks late, in a programme that was anticipated to last 23 weeks. In addition, SABIC has received no assurances from [SCL] that Ethylene-in will be achieved by 5th December 2008 or any other date.

Clearly, this is a situation which SABIC finds unacceptable and cannot be prepared to tolerate. SABIC must therefore consider the options open to it so as to protect its interests against the failure on the part of [SCL] to comply with its obligations under the contract.

There is no doubt that should it wish to do so, SABIC could terminate the Contract immediately in accordance with Clause 27.2.5. This would be on the basis that the financial position of [SCL] has deteriorated to such an extent that the capability of [SCL] adequately to fulfil its obligations under the contract has been placed in jeopardy. This is demonstrated by [SCL's] inability to resource the works to ensure that Ethylene–in is achieved by 5th December 2008.

Notwithstanding the fact that SABIC would be entitled to terminate the contract, its preference would be for [SCL] to remedy its breaches by completing the engineering works with due diligence.

Please treat this letter as a warning under clause 27.2.10 of the Contract that SABIC considers that [SCL] are failing to proceed with the Engineering Works with due diligence or is otherwise persistently in material breach of its obligations under the Contract.

The delays set out above confirm that [SCL] are failing to proceed with the engineering works with due diligence.

In addition, by reference to the delays indentified above, [SCL] is in persistent material breach in not complying with its obligations to, with due diligence, carry out and complete the

> Engineering Works in accordance with clause 2.1.1 of the contract.
>
> [SCL] is therefore given a further seven (7) days from the date of this letter to rectify their failure to proceed with the Engineering Works with due diligence.
>
> SABIC also makes it clear that it reserves its rights to enforce the Parent Company Guarantee (PCG) dated 13 June 2008, which it has in place with Punj Lloyd Limited in any manner it considers appropriate. In this connection SABIC would advise you that it has today contacted Punj Lloyd Limited advising them of the contents of this letter.
>
> Please also be aware that SABIC's rights under the Advance Payment Guarantee issued by HSBC bank plc dated 24th June 2008 and the Performance Guarantee issued by standard chartered bank on 21st July 2008 are reserved in all respects. "

125. SCL replied on 6 October 2008. It denied breach of contract, asserting that any delay to EID was attributable to SABIC's breach of contract; it disputed the projected EID of March 2009; it challenged SABIC's assertions that the works were in delay; it denied that the letter could be notice of persistent breach, on the grounds that it was the first such letter; and it characterised the Warning Letter as "a vexatious attempt at reacting to [SCL's] letter dated 18th September." SABIC countered on the same day, requiring SCL to increase resources to achieve what SABIC now regarded as the earliest possible EID, namely 15 December 2008. This was always likely to fall on deaf ears, given the strategy that SCL had adopted at the end of September[27], and it did so. Further correspondence passed between the parties involving allegations and counter-allegations along the lines already set out.

The Warning Period: 3 October - 3 November 2008

126. The predictable effect of sending the warning letter was that relations between the parties plummeted. By the end of October they were variously described as "poisonous" and "toxic", neither of which was an exaggeration. Individuals continued to do their best to work together, but the threat of termination was real and there was a mood amongst SCL's people that, whatever they did, SABIC would not be satisfied.

127. Inevitably, under the pressure of a contract that was obviously in delay and of the threat of termination, incidents occurred which would not have happened on a contract that was running smoothly and to programme. PLL/SCL rely upon some of these as acts of hindrance and prevention and as an answer to SABIC's claim that SCL did not exercise due diligence during the Warning Period. Some are dealt with during this summary of background facts; others are dealt with when considering

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[27] See [106-107] above.

specific aspects of progress during the Warning Period for the purposes of Issue 3 below.

128. There are issues about what was in fact going to be on the critical path which will be examined later. Specifically, PLL/SCL point to a SABIC programme dated 27 October 2008 which in its native form indicates that civil works, modifications outside SCL's scope and insulation (with what is alleged to be an increased scope of works) were on the critical path as at that date. However, what is not in doubt on the evidence is that the contract was considerably in delay on 3 October 2008 and that during the Warning Period both parties believed that Insulation and PFP were critical and substantially in delay. I therefore accept SABIC's submission that how SCL responded to the perceived difficulties on Insulation and PFP is of particular importance when assessing whether or not SCL were acting in conformity with its contractual obligation of due diligence.

129. The parties identified a number of areas of work as their chosen battle-ground on the issue of conforming with the contract and exercising due diligence. Further detail appears when considering Issue 3 below. At a more general level, as I have already said, SCL did not formulate or implement any coherent acceleration plan prior to termination; nor did it implement any effective measures to enable it to make up lost time.

130. One of the options proposed by SCL at the meeting with SABIC on 22 September 2008 had been terminating Cape's insulation subcontract and replacing Cape with Hertel. That did not happen and Cape remained on site. PLL/SCL submit that the non-appointment of Hertel to carry out insulation was in some way the responsibility of SABIC because of Mr Teague's reservations about that course of action. Although it is probable that further steps would have been taken to investigate whether Hertel could help if SABIC had been more enthusiastic, the need to achieve satisfactory progress was part of SCL's existing contractual obligation, which SCL is not entitled to avoid by attempting to pass responsibility to SABIC. The discussions relating to insulation are to be contrasted with those relating to PFP (outlined below) where, when SCL formally asked SABIC permission to bring Hertel in, SABIC gave it promptly. I reject the suggestion that SABIC's conduct in relation to Hertel and insulation reflected a lack of proper cooperation on SABIC's part.

131. In the event, the rate of progress on insulation improved to some extent when compared with the earlier rates achieved by Cape, but not to the extent required to regain any of the time already lost. It is common ground that progress on insulation did not match that assumed by the Completion Plan[28]. Viewed overall, there was a further slippage in relation to insulation.

132. SCL was disadvantaged by the fact that Mr Martin was away from site from 16 to 27 October 2008, at a time when strong contract management was vital if SCL were to have any chance of turning the contract round. By the date of termination, he had approached Hertel again with a view to their deploying personnel shortly afterwards on PFP works. This had been discussed earlier, most recently on 22 October, after which no formal step was taken by SCL until 29 October 2008, when Mr Martin met Hertel to discuss arrangements and SCL asked SABIC for approval of Hertel to carry

[28] SCL Closing Submissions at [151]

out the supply and installation of PFP materials. SABIC gave approval the same day, though with the slightly surprising proviso that SCL confirm in writing that Hertel possessed the appropriate certification and licenses to install the PFP materials that were to be used. This was surprising because Hertel were already well known to SABIC, but no great significance can be attached to the proviso. It did not materially hinder SCL from progressing matters with Hertel and, in the event, while Mr Martin reckoned he had a deal with them, SCL's intention to bring in Hertel had not been converted into contractual reality by the time of termination. The last relevant contact was on 3 November 2008 when Mr Martin met them again to discuss the scope of works and noted in his diary that Hertel would mobilise. That same day, SCL's contract was terminated. In summary, although SCL had discussions with Hertel before the Warning Letter, and SCL's intention to mobilise Hertel would probably have been converted into reality within about a week of the date of termination, progress towards bringing them on site was left by SCL until the end of October, and no additional resources from Hertel had been formally contracted for or deployed by the time of termination.

133. Two incidents occurred during the Warning Period which illustrate the progressive deterioration of relations. The first occurred on 10 October 2008. For some time, Mr Malan and Mr Sanderson of SABIC had been involved with the cleaning and blowing works that were being carried out by Halliburton as subcontractor to SCL. Their role was to be there in an advisory capacity, offering help and support; but it is clear that there were sensitivities about whether SABIC would overstep the mark and take on the role of management, to the detriment of SCL's organisation of its subcontractor. There had been an incident on 29 September 2008 when Mr Martin, who held typically forthright views on the matter, excluded Mr Sanderson from a meeting between SCL and Halliburton, though Mr Sanderson's evidence was that he had not been giving instructions to Halliburton on that occasion. On 10 October 2008, shortly after noon, Mr Cockerill sent an email to Halliburton in which he said that SABIC had concerns about the Halliburton calculations that were being used to calculate the necessary flow rate for nitrogen blowing. Mr Cockerill wrote that SABIC "recommend that Halliburton aim for a flow rate of at least 3000 $stft^3/min$ for the remaining blows ...". This email was passed by Halliburton to Mr Martin with the comment that "communication paths are being bypassed again. …" Later that afternoon Mr Malan was meeting Halliburton. On his evidence, which I accept, he was simply enquiring whether there were blowing activities planned for that evening, which would be innocuous enough, when Mr Martin stormed in and, in front of Halliburton, made quite clear that he was not welcome. So he left. Mr Martin accepted that he was acting on the basis of the feedback he had received, and it does not appear that he took the trouble to enquire what Mr Malan was in fact doing. After the incident Mr Martin sent an email to Mr Teague in which he said that "any further direct communication by SABIC with [SCL] subcontractors that intentionally bypasses [SCL] will be considered a wilful intent to subvert the work"; and in its closing submissions PLL/SCL relies upon this incident as an example of unacceptable interference by SABIC. On the evidence that I have summarised above, I am not satisfied that Mr Malan was doing anything unacceptable when Mr Martin came in on 10 October 2008. Mr Martin's evidence was that he found Mr Sanderson argumentative; that may be so, though I think it likely that Mr Martin would have given as good as he got. Although I accept that there may have been occasions when SABIC went close to or even marginally beyond the line, I find that there was no

substantial hindrance or disruption. Although Halliburton were SCL's subcontractors, SCL and SABIC had agreed that SABIC should have some significant involvement, not least in liaising with Halliburton's planner to optimise the Halliburton plan. In my judgment, this episode is merely a regrettable illustration of parties to a major contract whose commercial relations were gradually unravelling under the pressures of a contract that was and continued to be in substantial delay.

134. On 24 October 2008 a further incident occurred which exemplified the lack of trust then existing between the parties and the poisonous atmosphere on site. Shortly before that date, Mr Buckley and others at SCL became concerned because Shaw had unilaterally decided that it would not release QA documentation to SCL when it was complete and because the flow of such documentation from BK seemed to have slowed. SABIC had not interfered with the flow of QA documentation at this stage. At the same time Mr Buckley was concerned that SCL should have a complete set of records at its offsite base at Cheadle and wanted to ensure that records that had been checked didn't get mixed up with those that had not been. He therefore gave the instruction that any QA documentation that was completed should be taken offsite. He apparently believed that the documentation was SCL's property. Had he consulted the contract he would have realised that this was wrong since Clause 21.2 of the EPC Contract vested property in all such documentation in SABIC. What Mr Buckley correctly understood was that the QA documentation was extremely important on a site such as the LDPE plant, but he failed to realise at the time what was apparent to him with hindsight, namely that the removal of the documents might be sensitive (particularly in the strained atmosphere then prevailing). Regrettably, he did not explain what he was doing to SABIC.

135. The removal was noticed by site security and reported to SABIC management. SABIC promptly demanded the return of all documentation, as it was entitled to do. In addition, in the morning of 24 October SABIC organised what can only be described as a raid on SCL's Completions and QA offices and seized the filing cabinets containing all of the QA documentation, including SCL's master P&IDs and loop test packs, apart from a few loop test packs that were left in place sitting on tables. On the same day, SABIC also removed QA documentation held by Shaw.

136. In the letter demanding return of documents that had gone offsite, SABIC "confirm[ed] that SABIC will allow [SCL] supervised access to this documentation by prior arrangement." There was a dispute about whether and to what extent SABIC did allow access. By the end of the evidence a reasonably clear picture had emerged. Although some loop test packs had been left in SCL's offices, the assumption that these would support SCL's current loop testing was unwarranted. Over the weekend of 25/26 October 2008 SCL did not have access to any additional loop test packs other than those few that may have been left on desks. Over the following week, thanks to a residual spirit of cooperation between Mr Honeyman of SCL and Mr Burns of SABIC, the supply of loop test packs to SCL increased from an initially inadequate 20 packs per day to 100 packs a day. This incremental process took about five or six days. By now, however, the morale of those working for SCL was atrocious and productivity dropped. I accept without any reservation Mr Honeyman's evidence that he "could not get men to do barely anything" and that they would come to him each day asking him if he still had a job, to which his (accurate) response was that he had no idea.

137. SABIC submits that its conduct on and after 24 October in relation to the QA documentation was not an act of prevention or hindrance on its part. I disagree. While Mr Buckley's decision to remove the QA material offsite was misguided and insensitive, I have no doubt at all that, but for the poisonous lack of trust by then prevailing on site, SABIC must have sought an explanation first and, in all probability, a solution would have been achieved without the necessity for anything approaching the raid. SABIC must have realised that removing the loop test packs was bound to hinder SCL's progress and should have realised that an offer of 20 loop test packs per day was quite inadequate for SCL's needs, particularly at a time when SABIC was applying constant pressure on SCL to increase the speed of its works. The hindrance lasted for just over a week, but it occurred at a time when any disruption was liable to have knock on effects on SCL's planning and the carrying out of its works. Looking at things at a high level, the disruption was relatively minor in the overall scope of things, coming as it did only 10 days before termination; but to the extent that disruption followed, I accept SCL's submission that SABIC hindered and prevented SCL from carrying out its work and did so without contractual justification.

138. During the Warning Period, SCL failed to maintain the progress required to avoid further slippage and approximately 18 days further slippage against plan occurred[29].

Planning for Termination - 2

139. By October 2008 the SABIC UK team were convinced that SCL was not able to deliver. They were also convinced that it would be in the interests of the project and in SABIC's financial interests to terminate SCL's contract. A presentation on about 9 October 2008 entitled "Deterioration in SC Performance" recorded that there had been some improvements after SSA2 but also identified adverse changes since the second stage payment had been paid at the beginning of September 2008. With justification, SABIC perceived there to have been a withdrawal of cooperative working, examples being SCL's ceasing to update information on the current plan on SABIC's platform[30], the exclusion of SABIC from cleaning and blowing meetings[31], and removing SABIC from managing Tolent (the civils contractor). SCL was (correctly) identified as controlling costs at the expense of schedule, examples being descoping of cleaning and blowing[32], the failure to mobilise additional insulators to meet the programme and to increase PFP resources, which were now on the critical path. The identified differences that would be implemented "post termination" all pointed to the conclusion that termination was appropriate. A report to Mr Al-Ohali on 12 October 2008 stated that "the team is highly motivated to terminate with [SCL] and has full confidence in successful execution of the termination programme", which accurately reflected the SABIC UK team's view. The report also stated that termination had "been technically well prepared."

140. Though the SABIC UK view and recommendation was clear, SABIC Europe was not convinced. On 15 October 2008 Mr Al-Ohali responded that SABIC UK was to seek an amicable agreement with SCL to keep the project moving forward toward

[29] See Issue 3 below.
[30] See [117] above.
[31] See [133] above.
[32] See Issue 3.3 below.

completion as a preferred option and to take termination as a last resort. His view appears to have shifted after a further meeting on or shortly before 21 October 2008: Mr Teague reported that Mr Al-Ohali "was very positive about termination and has proposed a timetable that would end in termination next Wednesday unless [SCL] come back with a better option." A meeting was therefore set up for 28 October 2008. SABIC told SCL that the purpose was to require SCL "to present their detailed programme to achieve delivery of an acceptable … EID … and confirmation that this EID can be delivered without further unjustified demands for additional monies". Internal SABIC correspondence generated suggestions for the demands that might be made of SCL, which led to the compilation of a list of requirements. Commercial requirements included that all claims for delay since SSA2 should be withdrawn (including those relating to interference with subcontractors and the consequences of industrial relations problems), confirmation from all of SCL's subcontractors that SCL was up to date with valuations and certification and a statement from the subcontractors that they believed SCL to be properly certifying, and proof from subcontractors that all claims were settled or had agreed to be deferred. Scope of work requirements included that SCL should accept that the scope of work for cleaning and blowing identified in PI092 should be executed in full and that resource levels should be in accordance with the "requirements of earliest Ethylene-in". On any view, it was a daunting list given the current state of progress and relations.

141. On 27 October 2008 SABIC wrote to SCL setting the agenda for the meeting the next day, namely "clear confirmation from [SCL] that they will proceed with the Engineering Works with due diligence and demonstration of same by them through the presentation of a detailed programme that delivers to SABIC an Ethylene-in Date (EID) acceptable to them" and "confirmation from [SCL] that they will complete all of their contractual obligations with regard to the Engineering Works, including those set out in [SSA2]".

142. At the meeting SABIC pressed SCL for a detailed plan to completion. In reply, SCL stated that they were committed to bringing the project to completion as soon as possible. Mr Martin took the view that SABIC had decided to terminate and that the meeting was merely a formality. He did not hold back on his frustrations and blamed SABIC for most of the delays since he had come on board. He said that he thought EID in January 2009 was possible but felt he was not being listened to. Part of his frustration was because of his view that the state of the secondary hyper-compressor, which had been deconstructed by SABIC for cross-head alignment (of which more later) meant that there was no sign of that work being completed in the foreseeable future, while "SCL's staff and I had been breaking our backs to deliver the project." After the meeting he recorded his view that further effort on the project was "futile" and recommended that SCL take legal steps to remedy the situation it was in immediately.

143. On 29 October 2008 SCL provided a set of S-curves which graphically illustrated the failure over time to maintain planned progress, particularly for PFP, insulation, loop checking, handover documentation, and system mechanical completion. At the same time SCL sent a pdf version of plan 31JL with a data date of 29 September 2008. Being a pdf, it could not be interrogated. Much later, a version that could be interrogated was produced which showed that SCL had in fact at least partially updated the plan with information to near the end of October, but that was not

apparent from the version sent at the time. The S-curves and plan were scrutinised by Mr Corking who was not impressed, identifying inconsistencies between what was going on on site and what was shown in the plan and S-curves. Mr Teague distributed them more widely saying "I think "it's all rubbish" is the phrase that comes to mind! Or something stronger!"

144. Given the reaction of SABIC's planner (Mr Corking) and Project Director (Mr Teague), termination was by now a racing certainty. On the same day, 29 October 2008, SABIC wrote to SCL identifying respects in which it said that SCL had failed to comply with the Completion Plan and concluding "Once again, [SCL] are asked to advise by return the actions they intend to implement to ensure achievement of the current agreed EID." In truth, everyone now knew that the agreed EID of 5 December 2008 was not going to be achieved, and that the request was academic.

145. SABIC UK reported to SABIC Europe and the supervisory board now authorised termination. The contract was formally terminated by letter dated 3 November 2008.

Post-Termination

146. SABIC took possession of the site and completed the LDPE project itself, using most of the same subcontractors as SCL had been using. The process of bringing the plant to completion was more protracted and more costly than had been anticipated or hoped. In the event EID took place on 22 June 2009. The reasons for the protracted period and the costs to complete are considered later in this judgment.

147. In due course the disputes that had been simmering were formalised into claim and counterclaim and led via an adjudication process to this litigation.

Issue 1: Was the Warning Letter Justified?

148. I have set out the factual background relevant to the period to 3 October 2008 at [50] to [124] above. Shortly stated, by 3 October 2008, SCL was two months in delay by reference to the Completion Plan which it had worked out with SABIC and to which it had committed itself on the signing of SSA2 on 2 July 2008. In other words, three months after committing to achieve EID on 5 December 2008, SCL was two months in delay and, as I have set out above, had no realistic hope or intention of retrieving any significant part of that delay.

149. For the reasons discussed earlier, SCL cannot blame its delays upon unwarranted or non-contractual hindrance or disruption by SABIC. On the contrary, SCL failed across the board to procure the services of such key subcontractors as were necessary to ensure the EID of 5 December 2008. When confronted by the fact of slippage, SCL failed to take any steps to try to retrieve the position by accelerative measures. It seems simply to have accepted delays (particularly at the hands of Cape) as being an established fact about which it took no effective action. PLL evidently recognised the need for heavyweight project management but, while the introduction of Mr Martin at the end of July 2008 introduced someone of high competence, his overriding concern was to retrieve SCL's financial position rather than to take effective steps to improve its performance against the Completion Plan or generally. Hence, at a time when SCL should have been increasing resources, it took the path of de-manning and reducing its costs which its board had sanctioned on 29 April 2008. That course was not pursued

with the intention of maximising SCL's proper performance on site; rather it was pursued with the intention of minimising SCL's losses on the contract, as detailed earlier. Mr Martin's contribution to this course was to suggest and then pursue the strategy from mid-August 2008 of generating unjustifiable claims against SABIC arising out of the tripartite negotiations with Cape. Even when SCL's problems with Cape had been resolved in August 2008, SCL took no effective steps to ensure adequate resourcing of PFP and Insulation, both of which were rightly regarded as critical.

150. The failure to drive the works forward or to procure the services of such key subcontractors as were necessary to ensure the EID of 5 December 2008 was primarily the result of management decisions that can be traced back to board level. However, the failure was also contributed to by the absence of heavyweight project management at site until the arrival of Mr Martin and the strategies he adopted thereafter, at least when he was on site. When he was absent, there was again a lack of sufficient site management. These failures were compounded by the weaknesses in SCL's planning capability, which Mr Martin recognised[33]. SCL's failure to make the necessary progress was therefore the result of its financial difficulties, strategic decisions at board level, management weakness at site, and a lack of planning capability.

151. Applying these factual conclusions to the principles I have discussed above, SCL did not apply itself industriously, assiduously, efficiently or expeditiously to its contractual obligation to ensure EID by 5 December 2008. Apart from relying upon alleged interference and hindrance by SABIC, SCL has not argued that it was always impossible either for it or for a competent contractor to have ensured EID by 5 December 2008. To have mounted such an argument would have required SCL to establish not merely that the Completion Plan as drawn was impossible to achieve but that EID on 5 December 2008 was impossible to achieve even with appropriate allocation of resources and any necessary adjustments of planning. What the factual background summarised above establishes clearly is a persistent absence of assiduity or expedition when confronted by a contract that was known to be slipping seriously into delay. In other words, in the period to 3 October 2008, SCL persistently and substantially failed to carry out the Engineering Works in accordance with the contract or to use due diligence to achieve that object.

152. I conclude that SCL's consistent failure to plan or execute the works in accordance with the Completion Plan and its failure to take any steps to remedy the slippage of which it was aware from an early stage fully justified the sending of a warning letter pursuant to Clause 27.2.10 of the EPC contract.

Issue 2: Was the Letter of 3 October 2008 Sufficient?

153. I have set out the material terms of the Warning Letter at [124] above.

154. PLL/SCL's pleaded case is that the Warning Letter was ineffective (and therefore the pre-requisite to termination of a warning having been given was not satisfied) because:

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[33] See [120]

i) It did not purport to be a notice under Clause 27.2.10 of the EPC contract;

ii) It did not identify in sufficient detail the nature of the breach which was required to be remedied or the steps necessary to remediate that material breach; and

iii) The period of time given for rectification of 7 days was not compliant with the provisions of Clause 27.2.

Notice Under Clause 27.2.10

155. There is nothing in this point. The letter said "Please treat this letter as a warning under Clause 27.2.10 …": it was plain on these terms that the letter purported to be notice under and pursuant to that clause.

Sufficient description of the breach to be remedied

156. PLL/SCL submits that a warning under Clause 27.2.10 must "mirror" the requirements under Clause 27.2.1, which permits the Purchaser to terminate the contract if "the Contractor commits a material breach of any of the terms and conditions of the Contract which is not rectified within ten working days of notice from the Project Director to take such steps to rectify such breach as shall reasonably satisfy the Project Director." It therefore submits that a warning under Clause 27.2.10 must identify the respects in which the Contractor is failing to proceed with due diligence and what is necessary in order to rectify it.

157. The terms of Clause 27.2.1 and Clause 27.2.10 are materially different. Under Clause 27.2.1 it is plain that the Project Director must give notice to the contractor to take steps to rectify a material breach and, if the Contractor fails to take steps that reasonably satisfy the Project Director within ten working days, the right to terminate arises. Under this clause, it would be commercially absurd for the draconian right of termination to arise if the Purchaser has not identified the material breach in question: it cannot be for the Contractor to work out what the material breach is alleged to be without it being identified by the Purchaser. If, however, the Purchaser identifies the breach and the notice is clearly given under Clause 27.2.1, the onus shifts to the Contractor to take steps to rectify the breach which will reasonably satisfy the Project Director. But the clause does not state that the Project Director must identify the steps that the Contractor must take. All that is required of the Purchaser is to identify the material breach and to give notice that it is to be rectified in ten working days.

158. Under Clause 27.2.10 what is required to give rise to the right to terminate is that the Contractor is failing to proceed with the Engineering Works with due diligence or is otherwise persistently in material breach of its obligations under the contract "after warning by the Purchaser in writing". The context makes clear that the warning must be a warning that the Contractor is failing to proceed with due diligence or is otherwise persistently in material breach of its obligations under the contract. As with Clause 27.2.1 the notice must make plain to the Contractor the breach that is alleged. But it does not follow that, where the Purchaser gives warning of a failure to exercise due diligence, he must particularise the respects in which the contractor has failed. The difference between a warning of failure to exercise due diligence and an allegation of another material breach is that, where material breach of another

obligation is relied upon, the particular obligation requires it to be specified so that the Contractor may understand the allegation of breach; however, where failure to exercise due diligence is relied upon, the particular obligation (namely, to exercise due diligence) is fully identified and the nature of the breach is sufficiently clear. Once again, the clause does not say that the Purchaser must prescribe the steps to be taken in order for the Contractor to avoid termination: there is no need to do so because, once the obligation (of due diligence or not otherwise to act in persistent breach) is clearly identified, it is for the Contractor to comply with its obligations as it sees fit.

159. I therefore reject the submission that for a warning under Clause 27.2.10 to be effective it must specify the respects in which the Contractor is failing to proceed with due diligence and what is necessary in order to rectify it.

160. As a matter of fact, the Warning Letter did identify with fair precision the respects in which SABIC considered that SCL was not proceeding with due diligence. First and foremost, it identified that the obligation to use due diligence attached to securing the EID of 5 December 2008. Next, it identified that its concerns related to delay in carrying out the works. Then it gave specific (but not exhaustive) examples of the activities causing the delays, including Loop Testing, Insulation, Systems achieving MC1, and System Cleaning and Blowing. It went on to identify bulk work in the reactor bay, the absence of QA documentation, and SCL's ongoing inability to manage subcontractors as additional areas. As will be seen when considering Issue 3, these formed much of the bedrock upon which SABIC's case has been and continues to be founded. Having identified them, it returned to its central concern, namely that EID was projected to be 12 weeks late on a programme (the Completion Programme) that was meant to last 23 weeks. It then stipulated that its preference would be for SCL "to remedy its breaches by completing the engineering works with due diligence" before repeating that the delays it had identified (i.e. the delay of 12 weeks on a 23 week programme) "confirm that [SCL] are failing to proceed with the engineering works with due diligence."

161. In my judgment, even if a letter under Clause 27.2.10 was required to specify the nature of the failure to exercise due diligence, the Warning Letter was sufficiently specific. It identified that the warning related to a lack of due diligence leading to delay; and it highlighted many, though not all, of the matters upon which it still relies. SCL can have been in no doubt about the nature of SABIC's concerns.

162. I therefore reject this ground of challenge.

Time for remediation

163. The letter specified that SABIC gave SCL a further seven days in which to rectify its failure to proceed with the Engineering Works with due diligence. Had the letter come out of the blue and if SABIC had in fact only allowed SCL seven days, SCL's suggestion that seven days was an insufficient period might have held some attraction. Even in that event, however, seven days would have been sufficient for SCL to demonstrate that it was taking steps to get a grip of the contract, although it would obviously have been unrealistic to expect all problems to have been resolved within that time. Had SCL initiated effective steps within seven days, those would be recognised by the Court even if not by SABIC. However, the letter did not come out

of the blue since SABIC had been raising its concerns for some time, as by its letter of 11 September 2008. Furthermore, even if the time specified by SABIC were held to be inadequate, that would not vitiate the fact of the warning: it would merely lead to the conclusion that more time should be given for SCL to turn things round. In the event, SABIC in fact allowed a month, to 3 November 2008, before terminating. PLL/SCL have not suggested that the month-long Warning Period was an inadequate period within which SCL could and should have been able to get a grip and proceed with due diligence and, if it did, I would reject the suggestion.

164. I therefore reject each of the challenges advanced by PLL/SCL and hold that the Warning Letter was effective as a warning under Clause 27.2.10. The question then arises whether, due warning having been given, SCL was still in breach of its obligation of due diligence at the time of termination. That is the subject of Issue 3, to which I now turn.

Issue 3: Did SCL Exercise Due Diligence During the Warning Period?

Introduction to Issue 3

165. When looking at SCL's conduct and progress on the various identified elements of the Works during the Warning Period two separate questions have tended to be asked. The first has been, what progress (typically against plan) did SCL achieve during the Warning Period? The second has been, was the work on the particular element critical? PLL/SCL has advanced arguments on criticality that have been both general and specific. Generally, it is PLL/SCL's case that at all material times the Secondary Compressor was on the critical path because of extensive delays to the cross-head alignment works and therefore other work elements were not. It has pursued this argument to suggest that a failure to comply with the Completion Plan in relation to elements other than the Secondary Compressor is unimportant and should not be taken as evidence of a failure to comply with SCL's obligations under the EPC Contract and SSA2, including the obligation to act with due diligence. More specifically, in relation to particular elements, it has addressed arguments about whether those elements were or were not on the critical path on any view.

166. I will address the significance of the Secondary Compressor later. However, when looking at the other individual elements, two points should be made. First, it is in my judgment most important to look at how SCL reacted to those elements that were thought to be critical during the Warning Period since those were, or should have been, the ones to which SCL should have been giving primacy at the time. A failure to exercise due diligence in relation to the works that were perceived to be critical would tend to support a conclusion that SCL was not exercising due diligence overall. Second, the mere fact that an element was not critical (or not thought to be critical) at a particular moment does not render SCL's performance on that element uninformative when assessing its attempts to comply with its contractual obligation of due diligence. This is because there were a number of elements at any given time which could have become critical if they had slipped into delay. It is to be remembered that SCL's obligation to secure EID covered the whole of the works (apart, of course, from category 3 defects, which were those that could be left until after EID).

Planning and Programming Experts

167. Experts were called to give their opinion upon planning and progress. This included evidence on what was or was not on the critical path from time to time and on whether SCL's performance matched the requirements of the completion plan or was otherwise to be regarded as satisfactory. For SABIC, Mr Crane analysed the work scope and progress on systems as at 3 October and 3 November 2008 and, typically, extrapolated forwards the progress that was made during the Warning Period as a straight line to arrive at a date when that speed of progress would have led to completion of the required work content. At the same time, he plotted actual progress against S-curves that showed his opinion of what progress was required in order to complete the works on time. On the basis of the assumptions that he made, he gave opinion evidence about what would or would not have been on the critical path from time to time. As was common ground, these exercises do not show with absolute precision either what had happened to the relevant dates or what would happen in the future. As with any form of modelling and extrapolation from past performance, they are dependent upon the validity of the underlying assumptions and adjustments may need to be made. Thus for example, an assumption that progress on PFP would have been at the same rate after termination as in the month before needs to be seen in the light of the evidence that SCL was making the arrangements with Hertel which, it was hoped, would lead to an increase in the resources applied to PFP, with a consequent upturn in progress. However, Mr Crane's projections provide useful indicative evidence on the basis of the assumptions that he set out in his reports.

168. PLL/SCL called Mr Crossley. Superficially, Mr Crossley carried out exercises that were similar to those carried out by Mr Crane. However, his underlying assumptions were different, particularly when addressing the question of criticality. There were, to my mind, a number of rather curious features about Mr Crossley's evidence:

   i) He was instructed to consider progress during the Warning Period and agreed that a comparison between the progress actually achieved and that required by the Completion Plan was an appropriate exercise in relation to the warning period. However, he did not attempt to assess the state of progress as at 3 October 2008, instead basing his analyses on programme 31JL with a data date of 28 September 2008. He did not update that programme to 3 October 2008; nor did he create or adopt any other programme to show progress as at 3 October 2008. Thereafter, he did not do a further updating (either in relation to 31JL or otherwise) to show the position as at 3 November 2008, although he accepted that it would have been a relatively straightforward task for him to do so. He therefore provided no analysis of progress during the Warning Period similar to that provided by Mr Crane;

   ii) His approach to the issue of what was critical was idiosyncratic in the extreme. He carried out his analyses based on the critical path shown programme 31JL as at 29 September 2008, which projected EID on 9 February 2009. His analysis led him to conclude that insulation was not on the critical path, contrary to the working assumption of the parties at the time of the Warning Letter. Detailed cross-examination revealed the reasons why this and other surprising conclusions flowed from Mr Crossley's critical path analysis. First, Mr Crossley considered that it was realistic to ignore actual progress before the data date. In other words, however poor progress had been to date, his

analysis assumed that future progress from the point reached would match the rate originally planned from that point on. To give a concrete example, where an item of insulation that had originally been planned to take 10 days had in fact taken 50 days to reach 46% completion, the analysis assumed that it would be complete in 6 more days. Second, a consequence of the historic delays was that very large numbers of activities now required to be carried out simultaneously, all of which were attributed their original planned durations. In compiling his analysis, Mr Crossley did not consider whether it was feasible to resource such numbers of activities simultaneously. In evidence he accepted that his analysis bore no relation to the resources that were available on the data date; and he conceded that it was not realistic for so many activities to be carried out as shown on the programme[34]. Third, because Mr Crossley had not carried out the exercise of updating his workings to 3 November 2008, he ignored the actual progress on site during that period. The artificiality of this approach was shown by the fact that, according to his 3 October projected analysis in relation to insulation, there would, by reference to their early finish dates, only be five insulating activities outstanding on 3 November, which bore no relation to reality;

iii) The lack of realism in his approach to criticality was demonstrated by his workings in relation to the Secondary Compressor. Mr Crossley compared the *actual* progress made on the Secondary Compressor by 15 October 2008 with the *planned* progress for other works up to that date as shown in his 31JL as at 29 September 2008 programme. As SABIC correctly submits, the effect of this was that *if* SCL had carried out the works as shown on his 31JL programme in the period between the data date of the programme and 15 October 2008, *then* the Secondary Compressor, given its actual progress to that date, would have been on the Critical Path. However, this completely ignores the fact that SCL did *not* carry out the other works as shown on his 31JL programme.

169. In my judgment, Mr Crossley's evidence in relation to criticality was so artificial as to be effectively valueless, and I derived no assistance from it. Taken overall, I found Mr Crane's evidence to be much the more satisfactory of the two experts. Mr Crane's assumptions were clearly stated and bore at least some relation to reality. I preferred his evidence to that of Mr Crossley.

<u>Issue 3.1 - PFP</u>

170. Four issues arise which I shall take in the following order:

i) Whether the PFP work was critical to completion during the Warning Period;

ii) The Scope of SCL's PFP Works

iii) The progress of the PFP works and the date when the PFP work would have been completed;

[34] Which, in his view, was why (in addition to the early finish dates that appeared to be the basis of his analysis) there was also provision for late finish dates.

iv) Whether SCL progressed the PFP works with due diligence during the Warning Period.

Criticality

171. The evidence that PFP was regarded by all as critical during the Warning Period is overwhelming. On 6 October 2008 an internal SCL report identified PFP and insulation as "on top most critical path". SABIC held the same view, which continued through the month. By the end of the month it was Mr Martin's view that application of PFP at current rates would keep PFP on the critical path and delay would result. Mr Crane's retrospective analysis supports the view that PFP was critical. Mr Crossley disagreed but, for reasons given above, I do not find his evidence on this point persuasive. On this evidence, I find that the parties believed PFP to be critical and also that, subject only to the question of the Secondary Compressor (to which I return later) it was critical.

Scope

172. After the contract had been terminated, the scope of PFP works was reduced. However, SCL's discharge of its contractual obligation of due diligence requires to be assessed by reference to its existing contractual scope of works for reasons that have been discussed earlier. It is not to be presumed that the same descoping would have occurred if SCL's contract had not been terminated. Even if it had been, while that may have brought forward the date upon which the descoped works might have been finished by SCL, it throws no light upon the question whether SCL exercised due diligence during the Warning Period.

Progress

173. I have already touched on the progress made during the Warning Period on PFP: see [132] above. SABIC pressed for the application of further resources from early in the Warning Period. On 14 October 2008, SCL wrote to Cape recording that SCL would neutrally fund additional manpower and equipment once agreed with SCL. Although the letter envisaged discussions between SCL and Cape about the further resources to be applied, Mr Martin did not have any such discussions before leaving site between 16 October and 27 October 2008 and there is no evidence that such discussions happened or that agreement was reached. Separately, the negotiations with Hertel at the end of the month about bringing on additional PFP resources came about because Mr Martin was concerned that progress was "falling off the curve". In the event, those negotiations only started late in the month and were not concluded by the date of termination.

174. There is therefore no evidence that SCL took effective measures to increase the resourcing of PFP either by Cape or otherwise or to implement a recovery plan or accelerative measures during the Warning Period. The best that can be said is that, late in the month, it had commenced negotiations which may have improved things after the date of termination.

175. The progress made by SCL on its contracted scope of work during the Warning Period can be derived from a variety of sources:

i) SCL produced a progress "tracker" for PFP which showed that the percentage of the works completed increased by 6%, from 39% to 45% during the Warning Period. Based on the productivity shown by the "tracker" it would have taken until about August 2009 to complete the PFP works assuming that the rate of progress did not improve;

ii) Mr Martin's concern that SCL's PFP works were "falling off the curve" is graphically illustrated by SCL's Weekly Progress Report for the Week Ending 24 October 2008 which showed actual progress showing no sign of improvement and falling away from both the originally planned S-curve and the notional planned cumulative recovery curve. In the week commencing 20 October 2008 PFP reached a cumulative 42.3%, an increase of 1.8% over the previous week. By contrast, when the PFP works should have achieved cumulative c. 43% (4 August 2008), weekly progress was planned to be over 9%;

iii) Mr Teague's evidence was that progress on PFP during October 2008 increased week on week (0.65%, 1.06%, 1.10% and 2.86%). PLL/SCL rely upon this as signs of improvement, but the figures need to be seen in the context that, to enable EID to be achieved by 5 December 2008, 6.73% per week would have needed to be achieved weekly from the start of October 2008. This remains a valid order-of-magnitude observation even if 5 December 2008 was no longer viable by the start of October;

iv) Mr Crane's analysis indicated that, based on the rates of progress achieved during the Warning Period, forecast completion of the PFP works was mid-August 2009;

v) Mr Crossley's evidence was that a delay of 3.5 weeks by comparison with 31JL occurred to the PFP works during the Warning Period. He accepted that it was patently obvious that the PFP was not progressing at the rate it should be and that resources needed to be increased. He agreed that the data included in Mr Crane's analysis was correct[35];

vi) A report by ABB prepared in early November 2009 for SABIC reported that PFP had a target completion date of February 2009.

176. On this evidence I find that at no time during the Warning Period did progress on PFP match what was planned or what was required given the slippage that had already occurred. If Hertel had been brought in to provide added resources, the August 2009 projected date for the works to be finished would have been brought forward; but SCL did not take any steps that were effective to increase progress significantly during the Warning Period despite the fact that PFP had been recognised to be critical and in delay well before that time.

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[35] Although not asked about every one of Mr Crane's graphs, he accepted the general proposition that they were correct on the basis of the assumptions Mr Crane had made.

Due Diligence

177. In the face of this evidence and these figures, PLL/SCL is reduced to submitting that it is inconceivable that SCL would allow PFP to delay EID and thus expose SCL to liquidated damages of £1.5 million when operatives on dayworks basis could be obtained at a lesser cost. On a well administered contract that may be so; but this was not such a contract. The history as I have outlined it shows a failure to take effective measures to increase productivity and progress on PFP during the Warning Period, despite SCL being clearly of the view that PFP was critical. When the issue is whether SCL exercised due diligence during the Warning Period, it is no answer to say that at the very end of the period Mr Martin had nearly concluded negotiations for Hertel to come to the rescue at some later date. What was required was urgent and effective action during the Warning Period. It did not happen.

178. In my judgment, applying the principles I have outlined earlier in this judgment to the facts I have found, SCL failed to exercise due diligence during the Warning Period in relation to PFP.

Issue 3.2 - Insulation

179. The following issues arise:

    i) The Scope of SCL's insulation work;

    ii) Whether and, if so, to what extent SCL intended to use temporary insulation before EID and, if so, the consequences of that intention;

    iii) Whether and, if so, to what extent SCL intended to delay insulation work until after EID and, if so, the consequences of that intention;

    iv) Whether the insulation work was critical to completion during the Warning Period;

    v) The progress of the insulation works during the Warning Period and when the required insulation works would have been completed.

The Scope of SCL's insulation work

180. SABIC contends that the total scope of SCL's contract insulation works was 47,421 metres, that being the amount of insulation that was eventually installed. On the basis of this figure, SCL had completed approximately 72% of its work scope by termination. PLL/SCL contend for 41,813 on the basis of the tracker it maintained dated 3 November 2008. If that is the correct figure, it had completed over 81% of its work scope by termination.

181. The importance of this issue is that the total scope is likely to determine the date on which the insulation works would have been completed. To that extent, and subject to PLL/SCL's argument that it could and would have left some of the insulation until after EID, the correct scope may affect the date upon which EID might feasibly have been achieved if SCL's contract had not been terminated.

182. The scope of the insulation work was shown on issued isometric drawings and manufacturers' drawings from time to time. It is common ground that the perceived scope of the insulation works increased with time. This was at least in part because, as was also common ground, SCL did not have in place comprehensive or robust systems for recording or reporting either scope or progress by the time of termination. Although Mr Tottey, who was the lead witness for PLL/SCL on this topic, said that SCL had provided a full set of isometric drawings to Cape before termination, he was not involved in their issue and was not copied in when they were sent; so he had no direct knowledge of what had been issued. On the evidence as a whole, it appears that further drawings were issued after termination, which increased the scope (though to an extent which the Court is not able to identify). Mr Tottey accepted that the systems in place for recording were not complete and that he could not identify with precision the state of progress in a number of important areas. For example, his pre-termination tracker omitted any allowance for the reactor bay because he had not completed an assessment of the progress in that area when the contract was terminated.

183. The parties identified various areas of dispute as to scope, which I consider in turn below in the following order:

    i) The reactor bay: see [184] to [185] below;

    ii) Bolts and brackets: see [186] to [188] below;

    iii) Jumper loops: see [189] below;

    iv) Removal and reinstallation round brackets: see [190] below;

    v) Peroxide lines: see [191] below;

    vi) Lens Ring Joints: see [192] below;

    vii) Additions: see [193] below;

    viii) Defects: see [194] below.

184. *The reactor bay* was a large area of high pressure and high temperature piping surrounded by a blast wall. It was out of bounds for safety reasons when in operation and therefore all insulation needed to be in place by EID, since additional works would require an outage. The final Cape assessment of insulation work in the reactor bay was 9,108 metres (which contributes to SABIC's overall figure of 47,421 metres). Although Mr Tottey had not completed the necessary work to assess scope in the reactor bay by the time of termination, PLL/SCL rely upon an estimate (produced by Mr Tottey) of 5,041 metres supported by a detailed buildup in spreadsheet {H.4/2}. The difference is therefore 4,067 linear metres. To give some idea of what this might entail, at the beginning of October 2008 SCL was trying to achieve 400 linear metres per day and generally achieving considerably less.

185. The competing submissions may be shortly summarised. SABIC submits that the Cape assessment reflects what was done and therefore what needed to be done; and the figure produced by Cape is submitted to be consistent with Cape's pre-termination

estimate of 12,572 metres and an assessment by a Mr Toth, who carried out another assessment on 2 October 2008. PLL/SCL points to the lack of detail in the Cape estimate and the fact that the early October assessment includes items which did not require insulation, namely bolts, brackets and lens ring flanges. I consider it is necessary to make some allowance for the likelihood that Cape's pre-determination estimate may have been inflated for its own financial motives and that it would have been in Cape's interests after termination to carry out as much insulation as possible (whether strictly necessary or not) because it was now being paid on day rates. In addition, the complete lack of detail supporting the Cape final assessment does not inspire confidence or enable the Court to engage closely with it. For these reasons, and subject to the inclusion of the bolts, brackets and lens ring flanges, I find that SABIC's figure needs to be discounted to a limited extent.

186. *Bolts and Brackets*: this consists of two items namely (a) the construction of insulation boxes and insulating around bolts and brackets and (b) an allowance for sealing the ends of insulation where it was exposed at junctions with bolts and brackets. SABIC includes 7,500 manhours for the boxes; in the alternative, it includes 2,000 manhours for sealing edges.

187. The evidence in relation to this dispute is diffuse and inconclusive. It is common ground that, before termination, Cape fabricated and installed some boxes to insulate bolts attached to the pipework. On 14 October 2008, when some of these had been damaged, SCL's view was that they should be replaced. In his witness statement, Mr Tottey said that such boxes were unnecessary but not that they had been done by Cape without authorisation. However, in his oral evidence he said that Cape had not been instructed to do the work and that it had merely been trying to increase its scope of works (for its own financial advantage). Mr Buckley's witness statement went further, asserting that the boxes were not merely unnecessary but detrimental to safe operation. For SABIC, Mr Lumley gave expert evidence that the bolts needed to be boxed in, but Mr Payne for PLL/SCL disagreed, provided that the edges of the insulation were sealed against water ingress. Mr Toth (who was not called as an expert but was an insulation inspector) expressed the view that a failure to box in the bolts would be "very poor and would not achieve correct insulation levels." No drawing, specification or instruction was identified that required the provision of the boxes. There is no contemporaneous correspondence that unequivocally states either that the boxes are required or that they are not.

188. On balance I prefer the submissions of PLL/SCL on the boxing in of bolts for four main reasons. First, there is an absence of any unequivocal evidence that they were in fact required. Second, though no quantitative evidence has been provided, it seems unlikely that the boxes would have made a substantial or significant difference to the thermal qualities of the insulation as a whole, since they affected short (though numerous) stretches of pipework. Third, insulating the bolts and brackets would hinder subsequent access for no appreciable operational advantage. Fourth, as already stated, inclusion of the work by Cape is equally likely to be attributable to Cape's perception of its own financial interests as it is to be to actual need. However, if the boxes were to be omitted, the edges of the insulation adjacent to the bolts and brackets required to be sealed.

189. *Jumper Loops*: SABIC has included 1000 hours in total, being 4 hours of work for each of 250 jumper loops. SABIC took the view that the work was necessary, and it

was done. PLL/SCL opposes their inclusion on the basis of a contemporaneous query raised by SABIC about whether or not the work was required. Mr Tottey said in evidence that he had been instructed that the work should not be included, but he could not remember who by and no document supporting his recollection has emerged. To the contrary, SCL correspondence in October 2008 confirmed that all jumper loops were to be insulated, notwithstanding the fact that Mr Tottey had not included them on his tracker. On the basis of SCL's contemporaneous evidence I find that the jumper loops were properly included in SCL's scope of work and no adjustment is required.

190. *Removal and reinstallation round brackets*: during the trial, evidence was given about whether it had been necessary to remove and reinstall insulation around the brackets holding up the reactor bay pipework which had not been placed centrally on the main support steelwork. SABIC includes 500 hours for this work. The claim that the work of adjusting the brackets was necessary is supported by photographic evidence and by evidence from Mr Reynolds of SABIC, which I accept. Mr Tottey agreed that if the work needed to be done (which I find it did), then the insulation would require to be removed and refitted. On this evidence, I find that the work was required and the allowance is properly included and no adjustment is required.

191. *Peroxide lines*: at termination, SCL had started but not completed the work required to insulate the peroxide feeder lines. SABIC engaged specialist contractors to complete the work. The evidence on this subject was limited and does not bear lengthy recitation. By the end of the hearing, the dispute on this item appeared to have waned. I find that the allowance was correctly included by SABIC and no adjustment is required.

192. *Lens Ring Joints*: SABIC included 250 hours for this item but it is now common ground that the work was not carried out. An adjustment is therefore required.

193. *Additions*: In closing submissions SABIC relied upon some generalised evidence from Mr Reynolds that the existing assessment did not include for time required to gain access to complete the scope as a consequence of SCL having removed much of the scaffolding prematurely, plus the need to insulate anchors and bellows. This evidence was unquantified and is insufficient to justify any addition to the existing estimates.

194. *Defects*: SABIC's assessment includes time spent on remedying defects. SABIC accepts that it is not possible to identify which defects pre-dated termination and which may have post-dated it and therefore not be SCL's responsibility. Illustrative photographic evidence of defects in August and October 2008 is of limited assistance since there is no evidence to establish when such defects were remedied, although Mr Reynolds for SABIC gave evidence that SCL did little to remedy defects before termination, which I consider likely to be true in the absence of clear evidence to the contrary, because of SCL's known financial consraints and Cape's general levels of performance. I would therefore accept that SABIC is entitled to bring in an element, which is not capable of precise quantification, for the remedying of SCL's defective insulation work. I would also accept that some if not all of the defects would have been defects that had to be remedied before EID, not least because some would have been within the reactor bay.

195. *Discussion and conclusion*: The evidence does not allow sufficient precision to enable the Court to settle on a specific and scientifically calculated figure for the scope of SCL's work. For the reasons set out in the preceding paragraphs, SABIC's figure requires downward adjustment; but SCL's figure is too low. The omission of the insulation boxes is a reasonably significant item but is mitigated to some extent by the need to seal edges. The lens ring joints are a relatively minor item. Otherwise, SABIC's case has held up reasonably well. I therefore adopt a fairly high level approach and assess the overall scope of SCL's insulating work to be approximately 45,000 metres.

Temporary insulation

196. At termination, SCL's tracker indicated that SCL considered insulation to be about 50% complete. PLL/SCL pleaded that temporary rockwool insulation could have been used on areas that required to be insulated before EID. Although Mr Tottey described applying temporary insulation as being like putting on a duffle coat, I reject the suggestion that widespread use was contemplated or would have been acceptable if it had been contemplated. First, there was no evidence of any plan for any significant use of temporary insulation at the time of termination, and Mr Buckley rejected the suggestion that the use of temporary insulation could cover anything approaching the whole of the outstanding 50% of the perceived work scope. Second, I accept the evidence of Mr Teague that widespread use of temporary insulation would be unsatisfactory because it tends to fall off, and the evidence of Mr Lumley that only limited use would be acceptable. Third, Mr Lumley's view (which I accept) was that he would expect discussion between the parties before the expedient was adopted; and Mr Buckley agreed that SABIC would have to agree. There was no such discussion and no reason to suppose that SABIC would have agreed. Fourth, SCL had placed no orders for temporary insulation before termination. Furthermore, if the suggestion be made, I reject the suggestion that the use of temporary insulation formed any coherent part of SCL's thinking during the Warning Period such that it could be brought into the scales when weighing the issue of due diligence during the period.

Delaying Insulation Until After EID

197. Under the terms of the EPC contract, all of the systems had to be handed over to SABIC before EID. The Completion Plan specified that all systems requiring insulation were to be complete and insulated by 21 November 2008. By EID, all defects other than category 3 defects had to have been remedied. It follows that, subject to agreement relaxing that obligation, only minor and relatively unimportant elements could be omitted. These would not include any material outstanding works in the reactor bay because it would become inaccessible after EID. In the event, no agreement was reached about what might be omitted.

198. Although no request for a concession was made and no agreement was reached on omitting insulation, it is clear that some consideration was given to what insulation, if any, might be delayed until after EID. On 15 September 2008 Mr Bence of SABIC produced a spreadsheet called "Lagging Hours to Complete". PLL/SCL characterises this as quantification of what was not required for EID, but I accept Mr Teague's evidence that it was merely a first attempt to quantify the lagging that might be omitted, which would require further refinement. There was a dispute about whether

or not SABIC ever provided a list of priority areas to SCL. Minutes of a meeting on 16 October 2008 indicate that such a list was provided, though Mr Buckley could not remember it and the list has not resurfaced. On the basis of the minutes, I find that a list was provided; but it was not in any sense a prescriptive or contractually binding list. Other evidence shows that SABIC continued to look at whether insulation could be omitted. This is not surprising given the delays that had occurred and were occurring on the contract; and it does not demonstrate that any particular level of omissions overall would have been acceptable if a coherent plan had been formulated.

199. What SABIC certainly did not do was to take over the direction of what insulation should be installed and when. That was and remained SCL's domain. It was SCL which determined to insulate straight runs first, leaving bends and more complicated areas until later (of which more anon) and it was SCL's design office that produced the insulation specification and the isometric drawings for Cape. SCL did not at any stage prepare a plan or approach SABIC with a plan for what might be omitted; nor did SCL at any stage ask its design office to identify what insulation could be omitted for the purposes of achieving EID. Had the design office been asked to do so, it would have had to consider (at least) issues of personnel protection and thermal insulation. It did neither. Mr Payne for PLL/SCL considered that the amount of insulation required for personnel protection was "fairly minimal" but he did not quantify it. Similarly, Mr Payne did not carry out any quantitative analysis of what the thermal effects of omitting insulation would be, no doubt in part because of the absence of any coherent plan about what might be omitted.

200. In the end, PLL/SCL's case on this aspect appears to have rested on Mr Bence's preliminary analysis. Applying the progress achieved in October and November, Mr Buckley calculated that a total of 10,264 hours derived from Mr Bence's workings would have taken 7 weeks to achieve i.e. well into 2009. PLL/SCL says that this would have been within the times that were by then being contemplated for EID; it can equally be said that it is well after the agreed contractual date. However, since I do not accept that Mr Bence's figures are to be relied upon as showing what could or would have been delayed until after EID, I do not accept the end point of Mr Buckley's calculation.

201. In the absence of any coherent or formalised plan for the delaying of insulation at the time, it would have been open to PLL/SCL to advance a theoretical case based on detailed assessment of key requirements (such as personnel protection and thermal values), but it has not done so. Mr Payne's evidence fell well short of the mark; and it was countered by Mr Lumley for SABIC, whose view was that any material absence of insulation is a category 1 defect (which precludes handover, let alone EID) because of the disruption to thermal values on which the LDPE processes are dependent. There is substance in this view though it can be overstated and Mr Lumley, like Mr Payne, had not conducted a full or detailed quantitative analysis. That said, his view (which was rationally based) was that only 1,714 metres of insulation (about 6% of the total) could reasonably be omitted. I suspect that this is an underestimate, but PLL/SCL has not provided satisfactory evidence to support any larger figure.

202. As with the question of temporary insulation, my overriding impression on the evidence in relation to SCL's approach to delaying insulation is that, if it was considered at all, it was not considered in an ordered or structured manner. No coherent plan for delaying insulation had been formulated by the time of termination.

While it is possible that some coherent plan might have been formulated later, that would have been after Mr Martin left site for good and there was a chronic lack of heavyweight leadership at SCL to bring the insulation contract under control by the formulation of and adherence to sensible plans.

203. I therefore conclude that, although SCL had a general intention, born of necessity because of the state of delay of the insulation contract, to delay some works, it has not shown that major proportions of the 50% which it considered on the basis of its tracker to be outstanding as at termination could reasonably have been delayed until after EID. Since the intention was relatively unformed and the proportion that could have been omitted cannot be decided with precision, the consequence of SCL's intention is that, although some advancement of EID might have been achieved by delaying insulation, it was not substantial.

Criticality

204. As I have said, by the time of the Warning Letter, all concerned considered that insulation was or was becoming critical for the achievement of EID. SCL confirmed this in an internal email on 6 October 2008 and it was recognised again at a Senior Management Meeting attended by SABIC and SCL on 16 October 2008. Mr Martin's evidence was that he regarded insulation as a critical area up to the time of termination. Therefore, throughout the Warning Period, the parties considered insulation to be critical or potentially critical. It was also recognised that the contract was already in delay, in the sense that EID on 5 December 2008 was not feasible on current progress.

205. Mr Crane extrapolated forward at the rate achieved during the Warning Period (264 metres per day) on the basis of a total scope of 49,344 metres, to reach a projected date of 10 March 2009. I have held that the total scope was 45,000 metres, which (adopting the same rate of 264 metres per day) would result in a reduction from 99 days outstanding work to 83 days: a reduction of 16 days. Adopting SCL's figures and making allowance for either increased time to complete bends and more difficult areas or the resources actually applied by SCL, the extrapolation led to a date towards the end of April 2009. Treating these analyses as indicative rather than as being absolutely precise, and subject to the Secondary Compressor issue, they support the conclusion that insulation was seriously in delay and was critical, as the parties believed at the time.

Progress

206. On 2 October 2008 SCL identified that it needed to achieve more than 500 metres of insulation per day to achieve EID on 5 December 2008. During the Warning Period SCL carried out negotiations with Cape, including agreeing to pay part of Cape's outstanding claims. In return, by 17 October 2008 Cape had agreed to increase resources on site, and to carry out work on straight runs of pipework only. Two points need to be made about this agreement. First, PLL/SCL submit that this was an accelerative measure. It was not. What it meant was that the achieved daily meterage would increase as Cape would be doing straightforward work – the best assessment in evidence being that bends would take about 1.5 times as long as straight pipework. The bends had to be done, so the carrying out of straight lines first would not advance the date of completion. If anything, it was likely to delay it since the contractors

would have to remobilise to return to carry out the more complicated works later, with associated time and cost implications. Second, Cape's agreement to do straight runs first came with an assertion that, once the straight runs were done, Cape would have achieved substantial completion under the contract, with subsequent works to be done on a dayworks basis. As between SCL and SABIC, the contract required the bends to be done and no agreement to the contrary was either mooted or concluded.

207. In any event, SCL never achieved 500 metres per day. Once again, the evidence of progress comes from a variety of sources:

i) SCL recorded that it achieved 400 metres per day once, on 7 October 2008. The average rate achieved during the Warning Period was 264 metres per day. In the second half of the Warning Period progress fell off. During the week commencing 10 October 2008, the daily average was 319 metres per day; the following week it was 258 metres per day, a reduction of 19% on the previous week and just over 50% of the required rate of 500 metres per day;

ii) On 23 October 2008 it was recorded in the Weekly Senior Management Meeting Minutes that there had been a 50% drop in daily insulation meterage "caused, probably by the fact that most of the easy, straight work was complete and work was now concentrated on the bends.";

iii) Mr Crane's analysis indicated completion dates well into 2009, as above;

iv) Mr Crossley's evidence was that during the Warning Period there was a delay of about 3 weeks by reference to the progress required by 31JL;

v) SCL's Weekly Progress Report for the Week Ending 24 October 2008 graphically illustrates the failure of SCL to achieve the required progress both against the original S-curve and against the notional recovery curve. While progress improved to some extent during the Warning Period, this was from a position of almost no progress at the beginning. On no occasion during the Warning Period did the "Earned Men" resource match the "Planned Men Recovery" requirement. In the last recorded week (ending 24 October 2008), the Report evidences that SCL had achieved 49.1% completion with 4.1% having been achieved that week. On the original S-Curve, 49% completion should have been achieved in early August 2008 with weekly progress being achieved at about 7% or more. The notional recovery curve showed 49% being achieved in early September 2008.

208. PLL/SCL submits that insulation would have been completed in time for any feasible EID. However, that is based upon its case that (a) completing straight runs only would constitute substantial completion, (b) substantial areas could be clad with temporary insulation for EID, with permanent insulation being substituted later, and (c) substantial areas could be left until after EID. I reject each of these three arguments as retrospective rationalisations. The date on which Insulation would have been complete for the purposes of EID cannot be identified with complete precision, but it would have been well into 2009.

209. On this evidence I find that at no time during the Warning Period did progress on Insulation match what was planned or what was required given the slippage that had

occurred. No effective measures were taken to accelerate progress or to recover the delays that had occurred. On the contrary, about 3 weeks further delay occurred during the Warning Period despite the fact that all concerned viewed Insulation as a critical area that was significantly in delay.

Due Diligence

210. On this evidence and these findings, SCL failed to take effective measures to drive forward the Insulation sub-contract, either by instructing Cape to accelerate or otherwise. Having accepted Mr Buckley's evidence that Mr Martin managed to resolve outstanding problems with Cape in August 2008[36], I reject the suggestion that SCL's failure to make more progress during the Warning Period was caused by SABIC's earlier intervention in the discussions with Cape. In my judgment, applying the principles I have outlined earlier in this judgment to the facts I have found, SCL failed to exercise due diligence during the Warning Period in relation to Insulation.

Issue 3.3 – Cleaning and Blowing

211. Chemical cleaning of carbon steel pipework was required and certain pipework required to be blown with nitrogen to remove dirt and debris. In order to carry out these works, spools are fabricated and attached to give access to the pipework. They are removed after the cleaning and blowing (which is carried out by rigs) and before loop checking. Cleaning and blowing is a specialist activity and Halliburton was SCL's chosen subcontractor for the works.

212. In 2007, there had been a dispute between SABIC and SCL on the proper scope of the cleaning and blowing works. In order to set the scope on a proper contractual footing, SABIC issued a Purchaser's Instruction ["PI 092"] on 24 December 2007, which required SCL to carry out the scope of works there specified. In the run up to SSA2, SCL advanced claims in relation to PI 092, all of which were compromised by SSA2. Clause 11 provided that "the Contract Price includes the costs incurred by [SCL] in carrying out the works which are specified or described in [PI 092], a copy of which is identified at Appendix 2."

213. The Warning Letter identified cleaning and blowing as one of the examples of the activities causing delay: it alleged that, based on the Completion Plan in SSA2, by 25 September 2008 SCL should have cleaned and/or blown 29 Systems but only two had been completed.

214. The issues arising in relation to cleaning and blowing may be summarised as follows:

a) Whether SCL attempted to reduce the scope of the cleaning and blowing works and, if so, whether it was entitled to do so;

b) The progress of the cleaning and blowing works during the Warning Period;

c) The significance of the cleaning and blowing works to progress during the Warning Period;

[36] See [104] above.

d) Whether SCL exercised due diligence in relation to the C&B works during the Warning Period.

Reducing the Scope

215. SCL's contractual scope of cleaning and blowing was as specified by PI 092. Any derogation from that scope therefore required SABIC's agreement. SABIC's case is that SCL attempted to derogate from its proper scope of cleaning and blowing works consistently in the period to termination. The Completion Plan provided for equipment to be mobilised at site at the beginning of July 2008, with cleaning and blowing to commence on 27 July 2008. In fact, SCL did not enter into a subcontract with Halliburton until 31 July 2008. The subcontract covered the whole scope of the PI 092 works and was priced on a daily rates basis. The risk of cost increases therefore fell on SCL, as would the benefit of cost savings. It is clear that SCL saw the cleaning and blowing subcontract as a potential area for saving expense, since this was recorded in a strategy document on 30 June 2008; and on 14 August 2008 Mr Martin identified potential savings of £3.5 million. There is no evidence to suggest that SCL ceased to be motivated by the imperative desire to make savings on the cleaning and blowing contract; but it is not clear that the desire to make savings was a reason for the delay in entering into the subcontract with Halliburton.

216. Halliburton mobilised in August 2008 and the first cleaning and blowing activities commenced on 3 September 2008, about 5 weeks behind the Completion Plan start date. On 11 September 2008, SCL provided a document to SABIC which proposed a substantial reduction in the scope of SCL's cleaning works. At the weekly meeting on 18 September 2008, on which date SCL provided a further cleaning and blowing plan, Mr Teague told SCL that the proposed reductions were not acceptable to SABIC and Mr Buckley agreed to provide a separate plan for the whole scope of PI 092 works. That was not done.

217. On 19 September 2008, at Mr Buckley's request, Mr Hall sent Mr Buckley a plan leading to an EID of 2 January 2009 with a reduced scope of work. Mr Hall informed Mr Buckley that the full scope of work would lead to an EID of 24 January. These plans were not issued to SABIC. Instead, on 23 September 2008 SCL wrote to SABIC asserting that "we do not accept that amendments to method or quantity require to be formally submitted through the existing concessions process prior to changes being undertaken in the field." In other words, SCL was entitled to amend the method *and quantity* of the cleaning and blowing without submitting the changes to SABIC for approval. Mr Buckley's evidence was that this letter only went to the question of priorities, but that is not what the letter said or meant. SABIC duly challenged SCL's entitlement to change the quantity (scope) of the works by a reply the following day.

218. On 1 October 2008, Mr Hall emailed Mr Buckley with an updated plan which he said showed a month's slippage against Halliburton's dates, which appears to be a reference to slippage against the plan Mr Hall had produced on 19 September, two weeks before, which itself showed substantial slippage against the Completion Plan. Mr Hall was projecting EID on 8 February 2009 on the assumption that outstanding PFP and Insulation issues would be resolved. Once again, this projection was being made on a substantially reduced scope of works, which excluded (amongst other things) the reactor bay: Mr Hall pointed out that EID would be "much later if a greater

scope were to be assumed." It appears that Mr Buckley was out of the loop, at least temporarily, because when asked by Mr Myers of SCL what Mr Hall's programmes meant for SCL's contractual completion date he replied that he had no idea, that Mr Leggett was involved, and that perhaps he (Mr Buckley) should take it as a vote of no confidence. That is how things stood at the date of the Warning Letter.

219. On 7 October 2008 Mr Myers emailed Halliburton "a schedule listing the reduced scope of cleaning we wish you to proceed with." The email was copied to Mr Martin. With limited exceptions, the reduced scope shown on the schedule omitted the works that Mr Hall had omitted on 1 October. The following day, Mr Hall sent an email to Mr Buckley attaching a programme issued by SABIC which incorporated the full scope of cleaning and blowing works. He pointed out that it would be "very misleading" for anyone getting the SCL version of the scope or the SABIC version of scope, explaining that he had followed Mr Buckley's instruction from two weeks before to produce a reduced scope plan. He asked "Can you PLEASE clarify [SCL] project strategy with respect to Halliburton? (Full scope/reduced scope? What should Halliburton be working to? What should SCL be engineering?). Is there anything further you require with respect to SABIC plan? Obviously, with work within their plan, which will not be carried out, this impacts on float and criticality." In evidence Mr Buckley was unable to explain why it was that Mr Hall was issuing plans on his instructions showing reduced scope at a time when SABIC was proceeding (and SCL should have been proceeding) on the basis of full scope.

220. At the Senior Management Meeting on 9 October 2008 Mr Martin said that a programme showing the cleaning and blowing based on the scope discussed with SABIC would be issued to SABIC the following day. It was not provided before the following week's meeting on 16 October. That day, Halliburton issued a further programme to SCL which omitted major areas of the PI 092 scope including the reactor bay.

221. On 18 October 2008 Mr Malan of SABIC sent Mr Buckley an email setting out details of discussions that they had held on the scope of the cleaning and blowing works. It is apparent from the email that SABIC and SCL had agreed to some adjustments with further reviews to be carried out by Mr Buckley and Mr Malan. SCL had expressed a concern about the amount of work involved in blowing the reactor system. Mr Buckley had queried why it was necessary; a representative of EM had explained that he was concerned about damage to thermocouples and that the blowing was an EM requirement; and the parties had agreed to consider a simplified proposal for reactor blowing so that it could be progressed. In evidence, Mr Buckley said that SCL was not refusing to carry out its full scope of work but that it was looking at alternative ways to carry it out. That is an accurate reflection of the discussion recorded in the email of 18 October 2008, and there were discussions before then which led to changes and clarifications in the contract scope[37]. Equally, however, there is no contemporaneous evidence that SCL gave instructions to Halliburton to carry out the full scope (subject to the matters discussed with SABIC) after receipt of the 18 October 2008 email, although the Halliburton subcontract as

[37] See, for example, an internal SABIC email on 23 September 2008 shows that SABIC was prepared to contemplate changes to the Halliburton work packages provided such changes were endorsed by ExxonMobil {O/4851/1}; and SABIC's letter to SCL dated 10 October 2008 {F.4/419/970}

originally entered into required Halliburton to carry out the full scope of the PI 092 works.

222. On 21 October 2008 SCL provided a programme to SABIC which omitted the reactor bay and other areas. On 29 or 30 October 2008 Mr Hall produced a programme showing progress on the Halliburton works, entitled "Simon Carves – Halliburton Cleaning Scope"[38]. This programme omitted the same areas of work as had been omitted on 21 October 2008. Mr Buckley's evidence was that this was the programme from which he was working on a day to day basis and that it showed the position as agreed between SABIC and SCL just before termination with the exception of the reactor systems which were not included as the parties were discussing how to blow them. His explanation for the omission of the reactor bay work was that SCL would have blown them just before EID with installed equipment as part of the nitrogen run of the compressors, without the need for any additional engineering; and he said that Halliburton had prepared work packs showing how they intended to do the works. This would be an approach endorsed by EM in its pre-commissioning guidelines. However, no contemporaneous documentation evidencing such an intention has been identified[39] and, as Mr Buckley accepted, no programme was ever produced showing the full scope of the PI 092 works, despite SABIC asking repeatedly for it.

223. Two other points relating to scope of the cleaning and blowing works were debated during trial. They now appear relatively insignificant and can be dealt with shortly. First, there was a dispute about whether thermocouples in the reactor bay piping should be removed before the systems were blown. SABIC insisted that they should be and SCL ultimately agreed in mid-October 2008[40]. Nothing turns on this dispute. Second, there was a dispute about whether SCL refused to clean storage tanks. On this issue I accept the evidence of Mr Buckley that an additional chemical cleaning rig was brought to site to carry out cleaning including the tanks in question. Again, nothing turns on this.

224. I make the following findings of fact on the basis of what I have summarised above. First, SCL's subcontract with Halliburton was for the full scope of the PI 092 works. Second, SCL was constantly alert to the possibility of making savings on the Halliburton contract and looked to do so by varying the methods of work or reducing the scope of works if it could do so. Third, SCL's current intention on 1 October 2008, which was made explicit in Mr Myers' email to Halliburton on 7 October 2008, was that the scope of work to be carried out by Halliburton would be reduced from that required by PI 092. However, I accept Mr Buckley's evidence that SCL did not expect or intend to omit the reactor bay altogether, though it wanted to reduce the amount of work involved, as discussed on 17 October 2008. Fourth, SCL negotiated with SABIC to reduce the scope of work or the amount of work involved in various areas and reached agreement on a number of points. Fifth, although SCL would have liked to reduce the scope of works beyond those adjustments negotiated with SABIC it did not actually refuse to carry out works, although it is possible that it might have

[38] During trial it was said by SCL to be a Halliburton document but, apparently, the metadata shows the author to be Mr Hall.
[39] Although the existence of Halliburton work packs for the reactor bay systems is confirmed by Mr Sanderson's email of 18 October 2008 {O/6377/2}.
[40] {F/980/2588}

done so after 3 November 2008 if termination had not occurred. Sixth, it was not satisfactory that SCL should be asking Halliburton to carry out and programme for a reduced scope of works without the knowledge of SABIC, but no analysis has been done to show whether (and if so to what extent) that caused any actual delay during the Warning Period. Seventh, there is no programme from Halliburton or SCL for the full scope of works. All that is known, from the observations of Mr Hall, is that the full scope of works would have pushed back the end date for the cleaning and blowing works, with consequential effects for EID.

Progress during the Warning Period

225. Halliburton's programme reflected the fact that it started later than required by the Completion Plan and did not plan recovery to catch up that delay. Having started late, by 1 October 2008 Mr Hall estimated that Halliburton's work had slipped by up to a month against its programme and that the delay to the longest path was two weeks based upon SCL's reduced cleaning scope but longer if a fuller scope was assumed.

226. On 5 October 2008 a SABIC internal report noted that "the Chemical cleaning and Nitrogen blowing plan continues to exceed that required to achieve the targeted [EID]". However, on 7 October 2008 Mr Myers reported to Mr Martin that he had vented his frustrations on Halliburton at the lack of progress and that he had "told them to go away get [their] act together and come back tomorrow with a clear list of actions need[ed] to let the job progress and not a list of excuses why it should not."

227. The current delays were noted in the Senior Management Meeting on 9 October when Mr Martin reported that "the biggest hold up to completions was Halliburton and Halliburton's safety performance and that they were not diligently pursuing the work." He also reported that the cleaning and blowing rigs were only 60% available and that more equipment was required. In his evidence he agreed with Mr Teague's assessment that the three main areas of concern for the schedule were (1) insulation and especially fireproofing, (2) cleaning and blowing, and (3) System handover. At the following week's meeting, on 16 October 2008, Mr Martin reported that Halliburton had brought in additional blowing equipment and that progress had improved; and Mr Buckley said that SCL had asked Halliburton to increase the amount of equipment on site to 3 blowing and 3 chemical cleaning rigs, which was expected in the next week or so. In evidence Mr Martin agreed once more with Mr Teague's assessment at the meeting that cleaning and blowing was one of the critical areas and that it remained so up to the time of termination. At this meeting Mr Teague also noted that, in the absence of a full plan for cleaning and blowing, SABIC could not schedule its remaining work. No full plan was ever provided to SABIC before termination.

228. Halliburton did increase resources before termination. On 24 October 2008 SABIC reported that (as previously) "cleaning and blowing continues to be constrained by system handover, system preparedness for cleaning and rig mobilisation. … A 2nd cleaning rig is now being mobilised on site. [SCL] are targeting its operation for the 28th October." On 25 October 2008 (the day after SABIC took control of the QA documentation) Mr Reynolds was asked "has cleaning and blowing proceeded as planned today? Any unusual happenings?" to which he replied "cleaning and blowing reported as ongoing and "starting to show some results and a faster pace."" This

cannot be taken as wholehearted endorsement of and satisfaction with Halliburton's progress.

229. After termination, as a result of aggressive management by SABIC, Halliburton increased the resources applied to cleaning and blowing further and completed the works before Christmas 2008, which was the target that SABIC set them.

230. In the absence of any SCL/Halliburton full plan during the Warning Period, there is limited contemporaneous evidence about the progress of the works against such a plan. Mr Hall's plan produced on 29 or 30 October 2008 shows progress matching the planned programme, but this omits the reactor bay and other areas which were required to be carried out. Some assistance is provided by the experts:

   i) Mr Crane produced graphs extrapolating progress made on chemical cleaning and nitrogen blowing during the Warning Period, on the same basis as those referred to previously. In relation to both chemical cleaning and nitrogen blowing, the graphs show that SCL did not at any stage achieve acceleration that would have been required to reduce the delay to the contractual EID of 5 December 2008. On the contrary, having started late, the progress of the works did not even maintain the rate that would have been required to achieve the Completion Plan target dates if Halliburton had started on time. Dealing specifically with progress during the Warning Period, progress fell well short of what was required to achieve the then target date for EID of 7/9 February 2009. Each graph shows a progressive falling off from the required curve at all material times;

   ii) Mr Crossley compared progress derived from Mr Hall's 29 October 2008 Cleaning Scope Document ({0/7199}) with progress planned according to 31JL. However, this comparison is vitiated by the fact that {0/7199} omits substantial areas of work that are contemplated by 31JL. What Mr Crossley's extraction from 31JL does show is that a large number of activities contemplated for completion in October 2008 were not in fact done during the Warning Period.

231. On the evidence that I have summarised above, I make the following findings of fact. First, at the beginning of the Warning Period, cleaning and blowing was significantly in delay against the Completion Plan. Second, the rate of progress during the Warning Period did not match the rate that would have been required to meet the targets in the Completion Plan if Halliburton had started on time in accordance with that plan. Third, the rate of progress improved to some extent during the Warning Period, at least in part because Halliburton increased resources in the second half of the month. Fourth, the increase in resources started in the second half of the Warning Period and, by the end of October, progress was still being constrained by the need for further rig mobilisation. Fifth, even the improved rate of progress fell short of what was required to achieve a target EID of 7/9 February 2009. Sixth, the failure by SCL to produce a plan for SABIC showing the full scope of works will have affected SABIC's ability to plan its commissioning works, but the extent of that effect has not been quantified and cannot be measured.

Significance of Cleaning and Blowing Works

232. During the Warning Period the cleaning and blowing works were considered on all sides to be one of the three critical areas. The evidence of both Mr Crane and Mr Crossley supports the finding that cleaning and blowing were or were potentially on the critical path to EID, which is consistent with the observations of Mr Hall about the effect of implementing full scope rather than reduced scope to which I have referred above. On the evidence, those assessments were correct and the importance attributed to cleaning and blowing works and the possible impact of delay was justified.

Due Diligence

233. There are two criticisms that can validly be made of SCL's performance in relation to cleaning and blowing during the Warning Period. The first is the rate of progress. This was recognised to be unsatisfactory in the period to 9 October 2008, with Mr Martin's assessment being that Halliburton was not diligently pursuing the work. By 16 October 2008, half-way through the Warning Period, resources had increased but more were still required. Three cleaning rigs were identified as necessary, but by 24 October 2008 only one further rig had been mobilised and rig mobilisation was a continuing constraint on progress. By the end of the Warning Period, though progress had improved, SCL was still falling off the curve required even for EID in February. Had this level of response by SCL been forthcoming earlier, it might have been regarded as a sufficient start; but in the particular context of the Warning Period and the intense need to make maximum progress, SCL's response lacked urgency and effectiveness. In part, at least, this was because of SCL's alertness to the need to make savings in this area; in part it may have been because of a lack of direct and effective leadership, with Mr Martin away for much of the period and Mr Buckley feeling sidelined and not in full control, as indicated by his email on 1 October 2008. In the result, no effective steps were taken to increase resources until the second half of the Warning Period and, even then, urgency was lacking. The second criticism is of SCL's failure to plan or provide plans for the full scope of the works. While I would accept Mr Buckley's evidence that he did not anticipate that the reactor bay would be omitted altogether, the lack of any plans showing the full scope of the works is symptomatic of SCL's hand-to-mouth approach, which involved attempting to agree reductions in the amount of work to be carried out (not unreasonable in itself) and a failure to plan the works coherently with a view to full and proper coordination of its works.

234. Viewed overall, I conclude that the history of the cleaning and blowing works supports SABIC's case that SCL failed to carry out the Engineering Works with due diligence during the Warning Period.

Issue 3.4 – Loop Testing

235. In common with many modern process plants, the Wilton plant was to be highly automated with a large number of control loops that operate the process equipment remotely from a central control room using a central computer known as the distributed control system, or DCS. Control loops represent the umbilical cord between the process equipment in the field and the DCS and comprise the field equipment and its interconnecting wiring back to the DCS. Signals from process instruments located in the field, such as flow meters, pressure witches, thermocouples

and level switches, are transmitted to the DCS, processed using algorithms, and the resulting control signals sent out to the field to operate control valves and other actuators. As construction nears completion, control loops require to be tested to ensure their integrity. SCL was responsible for testing that the full loop functioned correctly while SABIC was responsible for final commissioning, which involved carrying out functional tests to ensure that the high level functions of the control and trip systems operated correctly. Control loops are at the heart of the plant's operation. There is a dispute between the parties about how many control loops there were, but on any view there were well over 1500. Errors in the design or installation of control loops could lead to disastrous consequences that could endanger personnel, the plant and the environment[41].

236. SABIC's complaints about SCL's loop checking can be broadly divided into three categories. First, it alleges that SCL's procedures were inadequately robust to provide assurance of quality. Second, it alleges that SCL misreported the true state of its loop checking, representing that many loops had been completely checked when in fact they had not been. Third, it alleges that SCL made many errors in its loop checking. It is SABIC's case that, as a result of these three broad criticisms, it was justified in taking the decision after termination to retest all (or nearly all) control loops again. More generally, although it is common ground that loop checking was not on the critical path (because there were other areas of delay that were greater than the delays on loop testing), SABIC raises two issues for determination, namely:

i) Whether SCL exercised due diligence in the management, and carrying out, of loop testing; and

ii) Whether SCL's progress of the loop testing was sufficient.

SCL's Procedures

237. Mr Summersgill was the completions manager for SCL with responsibility for the overseeing and management of the loop testing department. He had 20 years of experience though he had no formal academic qualifications for the position. The loop testing team was headed up by Mr Honeyman, who also had suitable experience for the job. The members of the loop testing team were agency staff engaged by SCL for the Wilton project.

238. SABIC criticises SCL's procedures on three grounds. First, it criticises the fact that the paperwork for each loop check (known as the loop check pack) comprised 13 sheets of paper and was split into separate procedures. Mr Lumley's evidence was that this approach ran the risk that the procedures would not be read as a whole, with the consequential risk that some procedures might be omitted. While I accept that it might have been possible to develop loop check packs that were more compact, the evidence does not show that the form of the loop check packs led to actual errors. I regard this criticism as being academic only. The second criticism is that the quality plan developed by SCL in 2006 was not updated to reflect the revised programme or other requirements of the first Supplemental Agreement or SSA2. That is true as a matter of fact but, once again, the evidence does not show that any actual errors

[41] The description in this paragraph is largely drawn from Mr Lumley's report at 3.2.1-3.2.9 {D.2/9.1/145} which was essentially common ground and which I accept.

occurred as a result. Third, SABIC criticises the lack of audits. This criticism is more substantial. Mr Summersgill did not know of any procedure for checking that the loop checking procedures were being carried out correctly; and he did not himself check or institute checks on the quality of the work his team was carrying out. In the event, when SABIC carried out checks on SCL's work, it identified what it considered to be defects, of which more later. Apart from that, the only form of audit established by the evidence was that, apparently, a quality assurance team at SCL's Cheadle design office had some QA involvement with the Wilton project. Whether that team did anything to audit the loop checking work does not appear from the evidence: if it did, reports were not passed to site and Mr Summersgill did not see them. It therefore appears that there was no effective audit or oversight of the loop checking operation.

239. While these criticisms suggest a lack of robustness in SCL's procedures, I do not consider them to be of primary importance in determining the two issues that I have identified. What seems to me to be much more important is whether things went wrong in practice. It is to that question that I now turn.

The Loop Tracker

240. SCL operated a loop tracker, which was intended to list every loop and to indicate the status of the tests on each loop. It should have been the key tool for recording what work had been carried out and what, if any, additional work was required to be done on any given loop. The information on the loop tracker would be derived from information on the paper loop test packs. It was obviously not feasible for SCL to refer to all individual loop test packs whenever it wished to ascertain the status of the loops: that is why the information was reduced to the form of the loop tracker.

241. While Mr Clarke and Mr Burns[42] of SABIC gave evidence that they remembered having seen the loop tracker, Mr Summersgill's evidence was that the electronic version of the loop tracker was not issued to SABIC. Instead, what was provided was a rolled up report which "basically identified what the percentage complete was, how many loops for a particular system and what the status for that was, and that was sort of the level that would be issued to [SABIC] … at weekly meetings." His evidence is consistent with the fact that SCL provided weekly handover statistics to SABIC which included (a) the total number of loops (b) the number of loops available and (c) the number of loops "tested (OK)". On this evidence I find that the electronic version of the loop tracker was not provided to SABIC.

242. The significance of this finding arises from a dispute between the parties about what was and was not shown on a proper understanding of the electronic version of the loop tracker. Column K listed "Loop Pack Testing Completed and Logged". Column M was headed "Loop Tested need Rework". The number of loops appearing in Column K coincided with the number of loops stated to be "Tested (OK)" in the weekly handover statistics provided by SCL to SABIC. Thus, for example, the number of loops appearing in Column K of the final pre-determination loop tracker was 1441 while the number of "Tested (OK)" loops in the weekly handover statistics

[42] Mr Clarke was a Commissioning and Maintenance Engineer; Mr Burns was a Project Manager with responsibilities that included the management of the control, electrical and instrument functions within the project.

for 30 October 2008 was 1423, the slight difference being attributable to the different data date for the two documents. SABIC naturally took these figures to mean that the stated number of loops had been fully and completely tested and had passed their tests. That was also Mr Summersgill's understanding; but it was incorrect. Mr Honeyman was entering loops into Column K where some work had been carried out but further work was still required. Detailed interrogation of the electronic version of the loop tracker would have disclosed information that showed this to be the case; but full information was only contained in the individual loop test packs. Mr Honeyman did not see any problem with this state of affairs, since (as he said) he was in charge of loop checking and he understood the true position. But it was, as SCL conceded in closing submissions, unsatisfactory because it meant that SCL was representing in its weekly handover statistics that more control loops had been fully tested than was in fact the case. I accept Mr De Main's[43] evidence that 220 of the 1441 loops recorded in column K of the last pre-determination tracker in fact had further work to be done on them. The outstanding work included matters that were significant, such as missing cables, faulty thermocouples or missing wiring. Mr De Main analysed the severity of the faults and estimated that over 200 of them were category 1 or 2 faults, which required to be remedied before EID. While the precise number may be susceptible to argument, I accept the general thrust of his evidence that there was a large number of significant omissions on loops that had been represented by SCL to have passed all necessary tests. Mr Summersgill rightly accepted that the outstanding items were significant and that, had he known the scale of the problem, he would not have been happy.

243. SABIC was misled by SCL's presentation of the loop testing data. I accept Mr Clark's evidence that he took the statistics he was given at face value. The error was identified when Mr Burns carried out an investigation of the loop tracker in late October 2008; until then SABIC's interpretation of the "Tested (OK)" figure in the weekly handover statistics was that the loops there appearing were ready for use. In my judgment there was no reason for SABIC to doubt what it was being told by SCL before then, and any suggestion that SABIC should have understood the true position is without foundation – particularly in the light of the fact that not even Mr Summersgill understood what Mr Honeyman was doing.

Loop Checking Errors

(a) Alarms

244. It is normal practice for loop testing to test alarms that are part of the loop test circuit. SCL's loop test sheets made express provision for the testing of alarms. Despite this, until the omission was discovered by SABIC during an audit of SCL's loop testing in August 2008, SCL routinely failed to test alarms as part of the loop testing procedure. The reason for this failure is obscure and does not matter: it rested either on a misunderstanding of SCL's own procedures or a misinterpretation of SCL's Instrument Installation and Test Sequence ({O/8254}). Whatever the reason, when the omission was discovered, SCL agreed to review the tests it had carried out and to test alarms in future, and it did so. The retesting was carried out before the Warning Letter was sent. SABIC criticises the fact that SCL did not implement a rigorous

[43] Mr De Main was a senior technical engineer who became involved in the LDPE project in August 2008 to assist with matters regarding instrumentation and electrical equipment.

procedure to ensure that all loop tests were checked and to ensure that no alarms had been missed. As a result there is a divergence of evidence about the scope of retesting that SCL carried out. Mr Summersgill's response was that he had confidence in the competence of the individuals who were instructed to recheck, though he could not guarantee that every loop test pack was investigated and re-checked where necessary. SABIC relies upon this uncertainty in support of its decision to carry out extensive retesting after termination. I find that approach to be justified on the facts that I have found. Otherwise, this is not an issue that remained live during the Warning Period.

(b) Float Switches

245. It is common ground that, during re-testing of loops by SABIC in August 2008, it was discovered that three float switches were not connected, although they formed part of control loops that had been recorded on the loop tracker as tested and complete by SCL and there was no record of further work being required on the fault log. SABIC raised the issue of the float switches by its letter dated 30 September 2008 in which it pointed out the potentially serious consequences of the switches not being connected. SCL replied on 16 October 2008 stating that it had always been its intention to let the Vendor of the switches set them up. Mr Honeyman's evidence is that this is best practice, lest mistakes are made that invalidate vendor's warranties. SABIC does not accept that SCL was intending to let the Vendor return and maintains that this was an example of inadequate testing and misleading reporting by SCL which supports SABIC's lack of faith in the integrity of SCL's loop testing.

246. The following points are made on either side:

i) SABIC submits that the letter of 16 October 2008 is the first documented occasion on which SCL mentioned an intention to let the Vendor return. This is correct on the documentation that is now available.

ii) PLL/SCL rely upon Mr Honeyman's evidence that, although the loop tracker marked the relevant loops as tested and complete, the loop test packs were marked "function test only" and were endorsed with the words "to be set up by vendor". This evidence is challenged by SABIC on the basis of evidence from Mr Burns who says that he checked the loop test packs in November 2008 when SABIC was raising concerns about the float switches and found no reference to the vendor returning. The relevant documents are no longer available because SABIC disposed of them at a later date. SABIC also disputes that it is realistic to suggest that it should have looked to the loop test packs rather than relying upon the information given to it by SCL, as discussed above;

iii) SABIC submits that if Mr Honeyman's explanation was correct it would (or at least should) have been recorded on the tracker and the fault log, which it was not;

iv) It was suggested that Mr Burns and Mr Clarke had been informed of the intention to get the Vendor to return[44]. There is no record of that information

[44] Though later Mr Walker QC for SCL disclaimed the suggestion that Mr Burns knew of the intention {Day 5/166:1-3}

being passed to SABIC and SABIC refuted the suggestion in a letter dated 28 November 2008;

v) PLL/SCL submit that this is a storm in a tea-cup because there was a further stage of certification which required both parties to verify that a loop had been fully tested before being handed over to SABIC, which stage had not yet been reached.

247. These being the competing submissions, I make the following findings of fact. First, it was misleading for SCL to provide information to SABIC that the loops in question had been fully tested when they had not. Second, it is quite unrealistic to suggest that SABIC should have discovered the true position by examining loop test packs: SABIC was entitled to take the information it received at face value. Third, SCL did not tell SABIC that it intended to get the Vendor to return before its letter of 16 October 2008. Fourth, I accept the evidence of Mr Burns (who I found to be a good and thoughtful witness) that he looked at the loop test packs and found no reference to the vendor returning. Even if Mr Honeyman had the intention to get the Vendor to return to site, that intention was not documented; nor had the intention progressed far enough for SCL to have made arrangements for the Vendor to return or to decide when the Vendor would be asked to return. In other words, though there may have been an intention in Mr Honeyman's mind, it had not progressed further. Fifth, in the absence of such documentation there can be no assurance that final certification would have identified the problem.

248. These findings relate to the period before the Warning Period, since the problem of the float switches was identified in August 2008. However, on the findings I have made, the incident provided support for SABIC's concern that SCL's procedures and practices were unreliable. Mr De Main was, in my judgment, correct to point out that an incident such as that relating to the float switches causes justifiable concern that there may be other similar omissions which have not as yet been identified.

(c) Thermocouples

249. Thermocouples in the Hyper Compressor and the reactor bay piping are critical to the safety of the plant. They need to respond in a fraction of a second to minor changes of temperature which, if unchecked, may lead rapidly to potentially catastrophic exothermic reactions.

250. It is common ground that a problem was identified with the polarity of these thermocouples. In September 2008 SCL's testing revealed a disparity in the temperature readings that it was obtaining on inputting an artificial signal at the field junction box. The SCL technicians involved SABIC and Mr Clarke became involved in the investigation. The first significant finding was that there was a design error: SCL had put crimp pins on the cable ends of the cables. There were about 1800 crimp pins and they had to be removed since they may have been interfering with the readings from the thermocouples. Subsequently, SABIC removed one of the thermocouples. On examination it was discovered that the polarity of the thermocouples had been reversed because SCL's drawings were incorrect. This had the effect that the reading from the thermocouples would show the temperature as increasing when it was in fact decreasing, and vice versa. SCL accepted the finding and changed the polarity of the thermocouple wiring. There was then a dispute

between SABIC, who wanted every thermocouple tested to ensure that it now functioned properly, and SCL, who considered that since the problem was a common one it would be sufficient to test one only as representative of them all. In its letter dated 16 October 2008, SCL stated that this issue had been "reviewed and addressed."

251. This is a further issue that was resolved before the Warning Period. However, although it is right that the existence of a problem first came to light as a result of SCL's testing, it was SABIC's intervention that led to the discovery of the reversed polarity, which was itself the consequence of a SCL design defect. It is not possible to conclude on the balance of probabilities that SCL would not have discovered the reverse polarity without the assistance of SABIC: all that can be said is that it did not in fact do so as things happened and there remains the possibility that it would not have done so. This is relied upon by SABIC as supporting its general case that SCL's workmanship and testing did not inspire confidence. That is reasonable, but the point can readily be overstated.

(d) York Chillers

252. The York Chillers provided refrigeration for the cooling system on the plant. An integral part of the control loop for the chillers was a comms link from the PLC serving the chillers to the DCS. That link was established either at the end of June or on about 3 July 2008. The link was subsequently disabled by an act of sabotage by SCL's subcontractor and was still down at termination. Despite this, in and from May 2008 SCL reported 115 out of a possible 124 loops on the chillers as testing complete and logged them as such on the loop tracker, although the testing could not have been complete because of the absence of the comms link. The loops were retested after the comms link had been established, but no change was made to the loop tracker when the link went down again as a result of the sub-contractor's actions. As a result, at termination the loop tracker was recording all testing as complete, when it was not.

253. There can be no doubt that SCL knew that its testing of the York Chillers was incomplete. The substance of SABIC's complaint is therefore the misreporting of status, which is established. Mr Honeyman did not think that this was a problem because he had detailed knowledge and it was simple for him to identify the correct position by referring to loop test packs; but that does not meet the twin points that it was not realistic or feasible for SABIC to check the information it was being given against the loop test packs and that SCL was providing SABIC with false information.

254. While this episode can be seen as a continuing failure during the Warning Period to provide proper information to SABIC, it contributes to the overall picture of a loop testing regime that was structurally weak and that reasonably contributed to SABIC's loss of confidence in the loop testing that SCL had carried out.

(e) Radar Alarm

255. On about 18 August 2008 it was discovered that there was a fault with the loop from a radar alarm that monitored the levels in a tank. The alarm was recording spurious signals. Having called in the manufacturer, Endress + Hauser, SABIC removed the alarm from the tank using a crane. Inspection showed that part of the equipment

(described as a radar horn) was missing. When SABIC tackled SCL with these findings, it emerged that the missing piece of equipment was sitting in SCL's office. Mr Clarke's evidence was that SCL told him it did not know what to do with it. There was nothing on the loop tracker to indicate that Endress + Hauser were going to be got back to remedy the situation as it had been discovered to be.

256. On these basic facts, PLL/SCL submits that SCL knew the horn was missing and that it had intended to get Endress + Hauser back to remedy the situation. Mr Clarke accepted that he knew that Endress + Hauser would attend site to "profile" the instrument, but he did not accept that "profiling" comprehended installing missing pieces of equipment or that the radar alarm should not have been fit for purpose before Endress + Hauser attended. In evidence, the thrust of which I accept, he said "the Endress + Hauser engineer would possibly find … a detector not working or something externally. He's not expecting to have to get a crane and lift it out and then find the horn is missing and things. That's like - - that's just total negligence." That is consistent with Mr Honeyman's evidence which was that Endress + Hauser would be attending site "to undertake in situ calibration" of the radar alarm devices.

257. On the evidence that I have summarised, I reject the suggestion that SCL had told SABIC that it intended to get Endress + Hauser back to remedy the absence of the radar horn. Had SCL done so, there is no reason why SABIC would itself have involved Endress + Hauser and gone to the lengths of involving heavy lifting equipment to inspect the radar alarm. I also reject PLL/SCL's submission that SCL realised that the horn was missing, preferring the evidence of Mr Clarke that the horn was in SCL's office and that he was told that SCL did not know what to do with it. In these circumstances, the loop tracker was misleading in failing to identify the need for further work. That does not mean that SCL may not have identified the problem and involved Endress + Hauser at some stage; but as things turned out, SCL had installed the radar alarm incorrectly, had not identified the problem, and had wrongly recorded the loop as completely tested on the loop tracker.

258. Once again, this was a problem that emerged before the Warning Period. But it goes to the general competence of SCL's work and the robustness of its loop checking procedures.

(f) Handover of Faulty Loops

259. I deal with the general question of faults found on retesting below; but SABIC takes a discrete point on the form of the handover certificates, by reference to the handover certificates for System 9.02 ({O/4435.3}) and System 15 ({O/4757.1}). On the front sheet of these certificates, SCL recorded under the heading "Exceptions/Comments" that the loop testing was 79% (System 9.02) and 40% (System 15) complete. However, close inspection of one of the supporting documents in each case shows that included in the 79% and 40% are some loop tests where there were outstanding faults. SABIC submits that this shows the assertion that the loop testing was 79% (or 40%) complete was inaccurate and misleading; and that this shows that SCL did not have a rigorous system for resolving defects before handover.

260. While the factual premise (that the stated percentage includes items with faults and further work required) is correct, I do not consider that this advances SABIC's case substantially. In each case, the certificates were signed off by SABIC in the

knowledge that the loop testing was incomplete (because of the reference to 79% or 40% completion). While I accept that the Comments/Exceptions box could have been more amply filled out, this acceptance of systems with only partially completed loop testing indicates that SABIC was prepared to allow some leeway in the interests of progressing the contract works. SABIC has not tried to prove that it would have acted differently had the correct position been shown on the front sheet of the certificate; nor has SABIC tried to prove that the discrepancy between the front sheet and the supporting sheet caused material difficulties in practice. I therefore attach little weight to the point beyond noting that it is an example of a lack of precision on SCL's part, which SABIC not unreasonably did not notice at the time.

Retesting after Termination

261. Soon after termination, SABIC decided to retest all the loops. The decision was taken by senior management on the advice of Mr Burns and Mr De Main. The only near-contemporaneous document touching on the decision to retest is an email dated 20 November 2008 from Mr De Main to Mr Burns. In that email Mr De Main identified a number of elements that needed to be covered by comprehensive loop testing, including "especially the documenting of as-built status". In the absence of any other documented explanation for the reasons for retesting, PLL/SCL submit that the dominant purpose underlying the decision to retest was that SABIC wanted as-built documents. In evidence Mr De Main did not accept this to be true. One of the other considerations he had outlined in the email of 20 November 2008 was that SABIC's retesting before termination (of 239 loops) had been spread across many systems and had not involved comprehensive testing of full systems. The email had not mentioned any fundamental deficiency in SCL's loop testing; on the contrary, Mr De Main accepted that he would expect *most* of SCL's tests to pass on retest. But he identified SABIC's difficulty as being that, having retested a small sample (239), they had come up with some errors and they did not know at that point how large the population of errors would be. In other words, for *most* SCL loops to pass on retest would not be sufficient, and merely carrying out commissioning tests at a later date would not repeat the loop testing that should have been carried out.

262. I accept the thrust of Mr De Main's evidence, which was supported by Mr Clarke, that the primary reason for retesting was not the desire to have as-built documents but was the uncertainty that SABIC felt as a result of the errors that had been identified on the limited retest combined with the difficulties that had emerged before termination (i.e. in relation to alarm testing, float switches, thermocouples, York Chillers, Radar Alarm, testing being recorded as complete when it was not, and lack of transparency in the information provided to SABIC by SCL) which I have considered specifically above.

263. SABIC submits that, in any event, its decision to retest was vindicated by the faults that were found. Apart from 68 low risk loops, SABIC carried out a full retesting programme. I accept Mr De Main's evidence that the retesting revealed 305 faults out of the 1435 loops that were retested. 480 loops had not previously been tested by SCL, and they disclosed 217 faults affecting 170 loops. The exercise therefore disclosed faults in 475 loops in total. I also accept Mr De Main's evidence that, on his categorisation, and as set out in Exhibit JDM11 to his second statement, a large number of the faults were either Category 1 or Category 2 faults (i.e. faults that required to be rectified before EID).

264. PLL/SCL challenge this evidence on a number of grounds:

i) First, they submit that a number of faults may have occurred due to a change to the DCS after SCL had carried out its loop test. While it is not possible to exclude the possibility that this may have happened, a modification to the DCS would have been carried out under the Change Control procedure and so should not have been registered as a fault[45];

ii) Second, in relation to instrument faults it is suggested on the basis of Mr Honeyman's evidence that damage may have been caused after SCL's testing by other disciplines. However, significant numbers of faults were of a kind (such as missing cabling, faults with valves caused by faulty drawings or installation) which were not likely to have been caused or affected by following trades, for the reasons given in evidence by Mr Clarke and accepted in general terms by Mr Summersgill;

iii) Third, some of the faults were minor and would take little time to remedy. There is substance in this point, though no quantitative analysis has been carried out by SCL (or SABIC).

265. The evidence before the Court does not allow a precise analysis of the numbers of faults that were or were not present when SCL tested. The evidence does however justify the conclusion that PLL/SCL has not made major inroads into the evidence of Mr De Main in relation to the numbers and categorisation of faults that were identified on retesting but which had not been identified by SCL. The evidence justifies the inference that at least a substantial proportion of the faults identified by Mr De Main would have been present when SCL tested the loops in question. This inference leads to the conclusion that SABIC's concerns about the quality of SCL's loop testing and the accuracy of its reporting were largely justified.

SCL's Progress on Loop Testing

266. By 3 October 2008 SCL was well behind the Completion Plan on loop testing. SABIC has not shown that this was because of a simple failure to resource the activity and the primary reason appears to have been the lack of availability of systems for testing because of the slippage on SCL's work generally. I accept Mr Crane's analysis of the factual position[46]: SCL failed to progress in accordance with the early date curve in the Completion Plan or in accordance with the early date curves shown in progressed versions of the Completion Plan; by 3 October 2008 SCL's progress was also dropping below the late date curve in the Completion Plan; and the extrapolation of actual progress of loop testing in the Warning Period would give a completion date of 3 December 2008, though this may be an overestimate of delay because the programme relied upon by Mr Crane may have recorded less progress in the Warning Period than was actually achieved. What Mr Crane's graphical illustration of his findings also shows is that, throughout the Warning Period, the trajectory of SCL's progress was flatter than the planned rate of progress based on late

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[45] SABIC has not disclosed a log of DCS modifications; but I accept SCL's submission that there would have been one.
[46] At 5.4.14-5.4.19 of his first report -{D.1/4/6/482} ff

dates for remaining activities to be completed in the Completion Plan: in other words, SCL continued to fall off the curve.

267. PLL/SCL raise three points in explanation or mitigation of its performance. The first is the confiscation of its loop pack tests on 24 October 2008, which I have already held to have been an unwarranted interference and hindrance by SABIC: see [134-137] above. This interference does not affect the finding that SCL was falling off the curve before 24 October 2008, and the impact is relatively limited thereafter since (a) there was then only a short time to termination, (b) the period involved two weekends, and SCL had historically achieved few loop test completions at weekends, and (c) a suitable flow of loop test packs was restored to SCL by about the end of the month (although by then SCL's loop testers were thoroughly demotivated). However, it needs to be taken into account in forming an overall view of SCL's progress.

268. The second matter raised by PLL/SCL is that SCL was not given access to the Control Room until 24 October 2008. On 21 October 2008 SCL requested that it should be allowed to move into the Control Room from the RIB where it was working saying "we are now at the time where we should be in." PLL/SCL submit that SCL wanted to work there because it would stop Honeywell's personnel (who were working in the Control Room and were meant to be assisting with SCL's scope of work) from being distracted by SABIC and because it would give SCL access to more screens. In response, SABIC submits that the Control Room had not been handed over by SCL to SABIC and that it was therefore a matter for SCL to decide where its men worked. SABIC also points to the fact that, when SCL asked SABIC to provide an additional screen in the RIB room, SABIC did so. However, what is clear from SCL's letter of 14 October 2008 and the oral evidence of Mr Honeyman is that SCL was pushing SABIC to get the Control Room manned, powered up and fully functional.

269. On the specific (third) question, namely whether SABIC diverted Honeywell's engineers from assisting SCL with loop testing, PLL/SCL's evidence was less clear. Mr Honeyman's evidence was that SCL's engineers were diverted from assisting SCL to carry out work that was not within SCL's scope of work. However, Mr Summersgill accepted that Honeywell was there to work both on mod packs and on loop testing work, both of which fell within SCL's scope of work; and he was not able to identify precisely what Honeywell's engineers were doing at the times that SCL thought they may have been diverted.

270. On this evidence, I am not satisfied that there was any diversion of Honewell's engineers to work that was outside SCL's scope of work. In reaching this conclusion I take into account that, at the field level, there was still a significant degree of cooperation between SABIC and SCL and that there is a marked absence of reference to specific examples of the alleged diversion in PLL/SCL's evidence or contemporaneous documentation. Second, while I accept that SCL wanted to work in the Control Room earlier than it did, I am not satisfied that this slowed the process of loop testing to any material extent. There is, so far as I am aware, no specific contemporaneous complaint of work being delayed or prevented because SCL was working from the RIB and not from the control room. Had it been a major problem, I am confident that specifics would have been raised during the Warning Period even if not before. The overwhelming impression that I have is that, at their highest, these were niggles that would have been quickly forgotten on a contract that was running

smoothly and that they have been given disproportionate retrospective prominence because of the demands of this dispute and litigation.

Conclusions on Loop Testing

271. Drawing these strands together, I conclude that SABIC was correct not to put numerical progress at the forefront of its submissions on loop testing. While SCL's rate of progress was less than required by the Completion Plan, and the evidence shows that there was no material increase in resourcing by SCL during the Warning Period, loop testing was not regarded as being on the critical path and SABIC is not able to identify clear evidence of a failure to resource the activity adequately (in the sense of showing that there was a significant amount of loop testing available to be done and no personnel available or allocated to do it). Viewed overall, SABIC has not established that SCL's progress on loop testing during the Warning Period is of itself additional evidence of a failure to exercise due diligence in carrying out the Works (as opposed to being a reflection of the failure to progress the works overall with due expedition and assiduity). However, for the reasons set out above, I conclude that the difficulties experienced with the carrying out, recording and reporting of loop testing results justified SABIC's concerns about the quality of SCL's loop testing and its decision to carry out a thorough programme of retesting after termination.

Issue 3.5 – Mechanical Completion

272. SCL described Mechanical Completion as "the stage when the various construction sub-contractors have completed all discipline specific tasks relating to field installation and completed all associated documentation." It described the Mechanical Completion Turnover Certificate (MC) as "a certificate raised upon review and acceptance of system specific sub-contractor documentation. The certificate indicates that the system is deemed to be mechanically complete in accordance with the "issued for construction" design." Put more shortly, Mr Buckley said "Mechanical Completion is a generic industry term to describe the state at which construction and installation activities are complete." That said, as SCL's description makes clear, the provision of an MC certificate entails review and acceptance of system-specific sub-contractor documentation and the provision of such documentation is integral to the concept of Mechanical Completion. It is also important to note that Mechanical Completion is different from and precedes System Handover.

273. SSA2 included milestones known as "Mechanical Completion 1" or "MC1" which represented the point at which the system was mechanically complete and pre-commissioning works could begin. This issue is concerned with the achievement of MC1 milestones. Where a milestone has not been achieved, the evidence does not enable the percentage progress that has been made towards achieving the milestone to be estimated. However, the justification for adopting and reviewing a milestone approach is that, as Mr Teague said, "it is not possible to commission a 90% complete system." Therefore, although it is probable that systems that were recorded from time to time as not having achieved MC1 would have shown some progress towards the milestone, it remains relevant to consider the achievement of MC1s as a benchmark of progress, as the parties recognised and adopted at the time.

274. Issue 3.5 may be shortly stated: did SCL proceed with the work necessary to achieve the MCI milestones with due diligence?

The evidence

275. The Warning Letter included the allegation that "based on the early finish dates in the Completions Plan, 122 Systems should have … achieved MC1, as of the date of this letter, only 15 systems have achieved MC1."

276. SCL's Weekly Handover Statistics record the progress of MC1 milestones under the heading "Handover Hold Point (System)", listing the total number (122) and those offered and the total achieved to date as follows:

    i) 3 October 2008: 19 offered, 13 achieved;

    ii) 10 October 2008: 21 offered, 13 achieved;

    iii) 24 October 2008, 24 offered, 14 achieved.

277. The Weekly Handover Statistics for 24 October 2008 provide a graphical representation of System Mechanical Completion which records cumulative progress as 47% and the last two weeks each having achieved 4.3% progress. By contrast, 47% cumulative progress had been planned to be achieved by the week of 25 July 2008 and weekly progress at that point had been planned to be 12%.

278. This progress is represented graphically by Mr Crane[47], whose graph shows that from the outset SCL failed to progress in accordance with the early date curve in the Completion Plan and that by 3 October 2008 its rate of progress was well below any planned rates and was substantially below the late date curve. If the rate of achieving MC1 milestones during the Warning Period were to have been maintained, all MC1 milestones would be completed during the second half of 2009.

279. ABB's report dated 7 November 2008 stated in its executive summary that "having completed a comprehensive review of construction activities in our opinion the project has achieved substantial mechanical completion". It recorded that, as at 28 October 2008 72 (81%) of Mechanical & Piping ("M&P") content and 30 (29%) of Electrical & Instrumentation ("E&I") content had been declared complete by the construction contractor. In its Control & Instrumentation Summary ABB concluded that "the sample of systems indicates that the instrumentation mechanical completion is further advanced than indicated by the overall mechanical completion status statistics. … The study has identified that many instruments are being powered up and loop tested prior to official hand[over] of a system as being mechanical complete. This study … validates substantial completion of systems yet to be offered as mechanically complete."

280. Mr Buckley carried out an analysis of SCL's internal wall chart that was used to record progress on MC1 and subsequently handover to SABIC as at 17 October 2008:

    i) He identified that 64 out of 95 (67%) of M&P systems had been offered by Shaw as mechanically complete. He identified that Mechanical Completion

[47] First report at 5.7.16

was being delayed because Shaw was being obstructive about the release of QA documentation even at the point that Mechanical Completion was achieved: this slowed SCL's progress in achieving Mechanical Completion for systems;

ii) He identified that 23 out of 96 (24%) systems with E&I involvement had reached Mechanical Completion. Again, the achievement of Mechanical Completion was being held up because SCL's contractor, BK, was holding on to QA documentation and refusing to increase resources in the area despite being constantly instructed to do so and Mr Martin arranging meetings to apply maximum pressure to BK to relieve the backlog. Mr Buckley suggested that this refusal might be a result of collusion between BK and SABIC, but there is no evidence to support that suggestion and I reject it.

281. Mr Crossley carried out an analysis which led him to conclude in relation to E&I MC1 milestones that they were all due to be completed 6 days later than projected in the Completion Plan. But his analysis ignored actual progress during the Warning Period. It also ignored the fact that MC1 was planned to be achieved on all sub-systems except one by 20 October 2008, which SCL came nowhere near achieving. I do not find Mr Crossley's analysis either persuasive or helpful.

282. In closing submissions PLL/SCL relied upon evidence that SABIC had failed to cooperate in joint walkdowns prior to handover. As I have said, system handover came after MC1 and this submission therefore misses the mark. However, in any event, I am not satisfied that there was any material lack of cooperation by SABIC in relation to walkdowns. Once it was asked to stop issuing punch-lists of defects compiled on independent inspections it did so other than in relation to System 15 where an existing list was revised[48].

Due Diligence

283. On this evidence, the raw statistics, the graphic illustration of progress by the Weekly Handover Statistics for 24 October 2008 and by Mr Crane in his report, combined with Mr Buckley's evidence (about the fact of and reasons for delay) provide solid support for the conclusion that at no time did SCL manage to achieve the progress required by the Completions Plan and that no material improvement occurred during the Warning Period. By the date of the Warning Letter, SCL was not going to achieve EID by 5 December 2008, and some progress may have been made in relation to systems where MC1 should have been achieved (whether following the Completion Plan or subsequent SCL planning iterations); and SABIC does not rely upon achievement of MC1s as of itself being on the critical path. However, the failure to achieve MC1 in accordance with plan provides further evidence of SCL's failure to plan or progress the works in accordance with the Completion Plan or to achieve acceptable progress during the Warning Period. In my judgment the evidence supports the conclusion that SCL failed to exercise due diligence in relation to the achievement of MC1 milestones both before and after 3 October 2008.

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[48] See {O/5222}

Issue 3.6 – Civil Works

284. In its pleaded case and in opening, SABIC relied upon an alleged failure on SCL's part in relation to outstanding Civil Works. Its written closing submissions do not address the issue and no oral submissions were made on it. In the light of the evidence that had emerged at trial, SABIC's dropping of Civil Works from its list of complaints was realistic and correct. It is therefore not necessary to say anything further on the issue.

Issue 3.7 – the reactor bay

285. The issue is whether SCL carried out its work in the reactor bay with due diligence in terms of the quality and progress of its works.

286. Concerns about the quality of SCL's work in the reactor bay were first raised by SABIC in about January 2008. However, for the purposes of this judgment it is convenient to take SABIC's letter dated 1 October 2008 as a catalogue of items of complaint, supplemented by two additional issues and to consider each in turn.

(1) Completion of Thermal Insulation

287. I have considered this issue under Issue 3.2 above.

(2) Misaligned Reactor Piping Supports

288. In January 2008 SABIC emailed SCL pointing out that a recent inspection by EM had revealed that reactor anchors (i.e. fixed supports for the high pressure pipework in the reactor bay) had been installed incorrectly: the two faces of the flange that was to support the pipe had been bolted together so as to leave no tolerance, either because the fabrication tolerances were incorrect or because the support had been overtightened during installation. The potential consequence was to impart additional stress to the pipework that was wrongly restrained. The problem was exacerbated by the fact that only 87 QA forms (out of a theoretical 2500) evidencing correct installation could be identified[49]. SCL's Mr Wray was the High Pressure Equipment Engineer responsible for technical vendor liaison and was the appropriate SCL person to deal with the problem, but it was not brought to his attention until about August 2008. He was initially concerned that, as there were about 200 of the anchor supports in the reactor bay, if a substantial number were found to be wrongly installed, there could be substantial remedial work involved. However, when SABIC investigated the problem after termination, it emerged that the problem affected either 11 or 13[50] of the supports.

289. The supports had to be unbolted, measurements were taken and bespoke profiled plates were constructed and installed. No evidence has been given by SABIC about how long the defect took to remedy. Mr Martin's estimate was that it would have taken 22 man days of work. In any event, it was not done by SCL before termination.

[49] The absence of documentation was itself significant and Mr Martin agreed that it justified SABIC in re-checking all of the supports and producing the required documentation.

[50] SCL's evidence is that it was 11, supported by ExxonMobil; SABIC's evidence is that it was 13. It was probably 11, but the precise number does not matter: what matters is that it was not the widespread problem that had been feared.

SABIC carried out the necessary design work by 16 January 2009 and the repairs by 21 March 2009.

(3) Acoustic Orifices

290. In its letter of 1 October 2008, SABIC stated that 75 acoustic orifices remained to be installed and that the work would take between 300-400 manhours to complete. These had to be installed after cleaning and blowing, which had not yet occurred. There is no reason to suppose that the orifices would not have been installed once cleaning and blowing had been completed; but the work had not been done by termination. This is therefore a statement of outstanding work rather than a criticism of the quality of the work that SCL had carried out. It was completed by SABIC by 10 December 2008.

(4) Intercooler Supports

291. The letter of 1 October 2008 identified that there were over 300 inter-cooler supports to be inspected, with an unknown quantity to be rectified. After termination, SABIC had to tension at least 620 supports in the Intercooler and grid pipework. No estimate of time or cost is given for this work, but it was made more difficult by the fact that SCL's scaffolding had been removed.

(5) Grid Supports

292. SABIC's letter of 1 October 2008 asserted that grid supports needed to be inspected and rectified. Mr Tilley's evidence was that "several of the grid supports were incorrectly installed, especially around the high pressure valves where insufficient clearance had been provided to allow free expansion of the valves as detailed on SCL's installation drawings. These problems remained post-termination." Mr Martin's evidence was that the problem affected about 10 supports, though it could have been 13. He implicitly accepts that remedial works would have been required. There is no evidence about the time or cost of repairs or even of when the work was carried out by SABIC. The evidence on this topic is therefore lightly sketched.

(6) Slider Supports

293. Mr Tilley's evidence, which I accept, was that 20 fixed anchor supports for pipework (i.e. supports that gripped and restrained the pipe) had to be changed to be slipper supports (i.e. supports that provided vertical support but would allow the pipe to move horizontally on expansion or contraction) and that 13 anchor supports had to be repositioned after termination.

294. The problem arose because SCL had incorporated double adjacent anchor points that would not allow expansion of the reactor tubing between them. The potential consequence of this error was said by Mr Lumley (whose evidence I accept) to be stress fracturing of the pipework; and in his opinion it was a fundamental design error. Mr Laslett expressed the view that the problem was not one that should have been picked up in the course of construction but, when pressed, he accepted that he was not qualified to comment on the adequacy of the design of the supports. I do not accept Mr Laslett's evidence on this point, preferring the opinion of Mr Lumley. I find that

the configuration of the anchor supports was a serious design error which should not have happened and should have been picked up by SCL.

(7) Tensioning of Loose Supports

295. It appears from the evidence that SCL had left many supports without tensioning them by the time of termination: approximately 3000 bolts required tensioning and shimming with their stacks of specially configured "Belleville" washers. This had been identified in the letter of 1 October. PLL/SCL's response is that the tensioning should not happen until the acoustic orifices were installed. Mr Tilley accepted that supports near to the acoustic target plates might be left loose; but he rejected the suggestion that supports all along the 7km or so of reactor pipework should be left loose because of the double-working that would be involved in wholesale revisiting of the bolts. That appears to me to be a compelling argument, such that the wholesale leaving of untensioned bolts is properly to be regarded as a failure of good workmanship.

(8) Removal, testing, calibration and refitting of thermocouples

296. Although there was a dispute as to whether it was necessary to do so, I accept the evidence that SCL did in fact remove them. The process of testing, calibrating and refitting the thermocouples had not been completed by termination because the blowing work was not yet complete.

Anti-vibration collets

297. On 6 July 2008 Mr Tilley brought to SCL's attention that over 700 anti-vibration collets had been omitted from the autoclave pipework around the secondary compressor. Other defects were identified. SCL accepted at the time (and Mr Martin accepted in evidence) that the wrong collets had been used and that they needed to be changed. SCL did not carry out the work before termination. No estimate of the time to carry out the work has been provided by SABIC. Mr Martin estimated that with a four man team working a 7 hour day the work would be completed in two weeks.

UHDE Valves

298. On inspection after termination SABIC found that 9 UHDE high pressure valves had been damaged due to construction damage to the valves and the lack of preservation at site: the reason for the damage therefore meant that they could not be repaired as warranty claims. The cost of repair was in excess of €300,000. When the valves were removed, it was found that the valves' supports had been fitted incorrectly so that there was excessive pipe strain in the system. The remedial works were carried out over two weeks under the direct supervision of UHDE. In addition SABIC found that there was damage to several high pressure bursting discs and that two reactor bursting discs had been placed in the wrong location. The discs are the last line of defence and their failure could have had catastrophic consequences, including internal explosion.[51]

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[51] This summary is derived from paragraph 37 of Mr Tilley's first witness statement, on which he was not cross-examined, and the contents of which I accept.

The Significance of the Defects in the reactor bay

299. The matters I have reviewed above go to the question of the quality of SCL's work. Mr Lumley reviewed the defects that were outstanding at termination and gave as his opinion that there were 14 category 1 defects, 55 category 2 defects and 97 category 3 defects to the reactor bay systems. While the precise numbers may be arguable, I accept his evidence as indicative of a significant number of material defects that required to be remedied before EID. At a higher level, my assessment of the matters that I have reviewed above is that those under the headings of misaligned reactor piping supports, grid supports and UHDE valves were serious, having potential safety implications, while those relating to the tensioning of loose supports and intercooler supports, while not safety critical, are indicative of poor workmanship. The matters relating to acoustic orifices and thermocouples add little to the overall picture. Taken overall, the problems that I have reviewed support SABIC's case that the quality of SCL's workmanship was not consistent with the exercising of due diligence.

300. Apart from the progress of insulation, which I have considered elsewhere, SABIC has not formulated a detailed case on progress of the reactor bay works, save to point out that most of the matters I have reviewed were not remedied by the date of termination. In the case of the anchor supports, which were raised in January 2008 but not brought to Mr Wray's attention before August 2008, there is clear evidence of a failure to address issues promptly. SCL did not progress its works in the reactor bay so as to comply with the requirements of the Completion Plan and did not take any active steps to accelerate its works either before or after the Warning Letter. Otherwise, in my judgment, although there appears to have been a general absence of urgency on SCL's part, the evidence about reactor bay progress does not substantially advance SABIC's case that SCL failed to progress matters with due diligence during the Warning Period.

Issue 3.8 – The Emergency Vent Separator ["EVS"]

301. The EVS is a vessel located within the reactor bay that is designed to operate on emergency blowdowns by separating ethylene and steam from the polymer mixture and venting it out of its chimney, thereby avoiding uncontrolled reactions and explosion. When it operates, water rotates within the vessel, creating dynamic forces in the vessel by the swirling of gas and water. It was designed and constructed by SCL before termination. During commissioning tests between May and August 2009 the vessel vibrated dangerously. SABIC took expert advice from Foster Wheeler which led to progressive stiffening of the EVS and its support. At the end of those works, the EVS still vibrated, but its operation was underwritten by Ove Arup for 30 cycles (i.e. blowdowns or emergency vents) on condition that it is inspected after each blowdown. The remedial works involved significant costs valued by the quantum experts at £460,286. SABIC alleges that it also caused 42 days delay to commissioning, from 4 September to 16 October 2009, with equivalent delay to putting the Wilton plant into production.

302. This brief summary gives rise to the following issues:

i) Whether the reason for the vibration was that the EVS had not been adequately designed by SCL so that SCL is responsible for the consequences of the vibration including financial costs and delay;

ii) Whether the delays to commissioning the EVS held up work on the Secondary Compressor in May/June 2009;

iii) Whether the need to carry out repairs to the EVS caused 42 days delay to the commissioning and to production of LDPE;

iv) Whether SABIC is entitled to recover from SCL costs attributable to remedying the EVS.

Chronology

303. In order to resolve these issues, the chronology requires slightly more detailed examination. In May 2009 SABIC and EM carried out commissioning tests on the EVS. The tests were intended to take place with the reactor under progressively increasing pressures. On 28 May 2009, while still at a comparatively low pressure (150 Bar G), the EVS vibrated significantly. Foster Wheeler then advised SABIC to carry out remedial stiffening of the EVS stack. While this work was done, the EVS had to be isolated from the rest of the plant so that other commissioning could be done.

304. While the EVS was isolated, Hold Point 3 was approved, which allowed the nitrogen run of the Secondary Compressor with nitrogen from the Purge Primary Compressor. On 22 June 2009, with the EVS still isolated, Hold Point 4A was approved and ethylene was introduced to the Make-Up Ethylene (24.00) and Flare (14.00) systems. On 5 July 2009, Hold Point 4B was approved which allowed ethylene to be brought into all the Purge Primary Compressor systems. Hold Point 4C was approved on 21 July 2009 which allowed ethylene to be brought into the Secondary Compressor system and the Secondary Compressor Handover Completion Certificate was signed on 22 July 2009. At this stage the EVS was still isolated, with the result that it was not possible to send ethylene from the Secondary Compressor into the reactor and to commence hot work.

305. The first round of stiffening work to the EVS was completed by 4 August 2009, on which date further tests were undertaken. These tests were at higher pressure (1500 Bar G). Significant displacement was again seen with heave on the support feet and significant vibration in the adjacent pipe bridge structure. A further design review was undertaken by Foster Wheeler which led to further stiffening work. However, when the new works were tested at 300 Bar G displacement again occurred which, though reduced, was still excessive. SABIC then commissioned ABB to carry out a design assessment. ABB recommended further stiffening of the critical joints on the structure. An internal SABIC email on 22 September 2009 reported that the design of local stiffening was being completed, material being resourced, and that "installation expected to be complete in around 24hrs, after which a final test will be prepared for."[52]

306. A further internal SABIC email on 28 September 2009 stated that the EVS "has been passed fit for immediate service. … Further improvements at a later date to mitigate longer term fatigue cycling effects. Inspection revealed no damage to bolts or

[52] This indicates that the works, when executed, would take around 24 hours – not that the entire process described in the email would be complete 24 hours later.

structure." However, on the further testing at 1000 Bar G being carried out, the structure still moved. SABIC therefore instructed Ove Arup to advise on whether the EVS was fit for purpose. Ove Arup's conclusion was that the design life of the EVS could be underwritten for 30 cycles provided that, after every blowdown, there should be an inspection of the EVS before recommissioning.

307. SABIC's evidence is that it was only able to run ethylene through the full Wilton plant and to commence the production of LDPE in October 2009 after it had been advised that the EVS was no longer at risk of immediate failure and that the actual production of LDPE in October 2009 was dictated by the EVS remedial works. Its calculation of 42 days is most clearly explained in its Pre-action Letter of Claim dated 26 April 2010, where the following explanation is given:

> "Following termination, Ethylene in was not achieved on 5 December 2008. Ethylene was first introduced into the Process Plant for the purposes of commissioning on 22 June 2009, 28.3 weeks after the date agreed in SSA2. … Our client has incurred significant losses as a result of the delay in introducing ethylene into the Process Plant. Following ethylene in, it is accepted that our client had to undertake commissioning works prior to Polyethylene being produced. While SSA2 provided a commissioning period of 3 weeks, our client is prepared to accept that the commissioning period would have taken up to 6 weeks. In calculating its losses, our client will allow a 6 week period for commissioning following ethylene in. … If ethylene in had therefore been achieved on 5 December 2008, it is reasonable to expect that our client would have completed commissioning to have allowed Polyethylene to have been produced by 16 January 2009. Based upon the actual ethylene in date of 22 June 2009 commissioning should therefore have been completed to have allowed Polyethylene to have been produced by 3 August 2009. Our client would therefore be able to claim its losses for the period between 16 January 2009 (the date when commissioning should have been completed so that Polyethylene should have been produced following ethylene in on 5 December 2008) and 3 August 2009 (the date when commissioning should have been completed and Polyethylene produced following actual ethylene in on 22 June 2009). This is a period of 28.3 weeks.
>
> However, following ethylene in, further defects were discovered which delayed the commissioning of the Process Plant. Commissioning was not completed so that Polyethylene was produced, until 16 October 2009. Based upon the expectation that commissioning should have taken 6 weeks from ethylene in, this is an additional 10.4 week period from 3 August 2009. The extended commissioning period was due to the discovery and rectification of defects in the Engineering Works undertaken by you. However, our client does not seek to recover damages for the full 10.4 weeks. Our client reserves

> the right to claim additional damages for the full 10.4 week period if it considers it appropriate to do so.
>
> Our client does seek to recover damages for the period of delay attributable to the rectification of one major defect during the commissiong period. This was the rectification of the defect to the EVS Structure. Unless or until this defect was rectified, no further commissioning work could be undertaken. The rectification of the defect to the EVS Structure took 6 weeks to complete.
>
> If the EVS Structure had no defect, then the commissioning could have been completed and Polyethylene produced 6 weeks earlier than 16 October 2009 (on 4 September 2009). Our client would therefore be able to claim its losses for this additional 6 week period."

Adequacy of Design of the EVS

308. PLL/SCL accepts that work was necessary to prevent excessive vibration of the EVS and that it was reasonable to carry out local strengthening work in order to achieve this. These concessions are properly and inevitably made upon the evidence. On the evidence, the design of the EVS was inadequate. I accept the evidence of Mr Hargreaves of Ove Arup that the inadequacy stemmed from a failure by SCL to carry out any adequate assessment of the dynamics or the dynamic loads of the EVS system and its support structure or the interaction between those dynamics and the dynamic loads caused by blowdown. The immediate cause of the problem was the placing of the inlet nozzles, which SCL failed to investigate or resolve. I reject the evidence of Mr Laslett (who acknowledged that he had no relevant structural engineering qualifications) who attempted to justify SCL's design.

Effect on the Secondary Compressor

309. I consider the history relating to the Secondary Compressor under the next sub-issue. PLL/SCL's approach has been to put SABIC to proof of this area of its case. For present purposes, it is sufficient to say that I accept the evidence of Mr Tilley that the secondary compressor was ready for commissioning in May 2009, but that the commissioning and ultimately operation of the machine was delayed by the problems with the EVS. The chronology that I have outlined above shows that some commissioning works could be carried out while the EVS problems were investigated and resolved. However, I accept Mr Tilley's oral evidence that, while some cold commissioning was possible after the EVS had been isolated, hot commissioning and the production of LDPE could not commence until it was back on stream, since it was an integral part of the plant's safety systems. Thus, although it was possible to introduce ethylene into the Secondary Compressor on 21 July 2009, ethylene could not be sent from the Secondary Compressor into the reactor for the commencement of hot work. On this issue I also accept the evidence of Mr Farrar that the date of actual production of LDPE in October 2009 was dictated by the EVS remedial works.

Delays to Commissioning and LDPE Production

310. Similarly, I accept the evidence of Mr Tilley and Mr Farrar that the problems with the EVS were an effective source of delay to commissioning and LDPE production. SABIC's evidence did not directly address the period of 42 days that is claimed. However, the chronology that I have set out above, when read with the explanation set out in the Pre-action letter of claim, justifies the conclusion that 42 days is a reasonable assessment of the delays caused by the problems with the EVS between May/June and October 2009.

Recovery of Losses

311. I return to this issue when considering quantum. For present purposes it is sufficient to say that the losses attributable to the defects in the EVS were the contractual responsibility of SCL.

Issue 3.9 – The Secondary Compressor

312. The Wilton plant included a Secondary Compressor, the function of which was to compress ethylene from about 300 Bar G to a pressure of about 3500 Bar G, that being one of the highest pressures required in any petrochemical manufacturing process. The plungers are made of solid tungsten carbide, which is extremely hard and wear resistant, but also extremely brittle and therefore susceptible to accidental damage. The Secondary Compressor therefore needs to be manufactured and assembled to fine tolerances, particularly in relation to its crosshead alignments. It was manufactured in two stages by Nuovo Pignone ["NP"] in Florence, and constituted System 27 of SCL's Works.

313. Part of the system (System 27.07) was handed over to SABIC on 17 September 2008. After it had been handed over, SABIC decided to undertake works to adjust and improve the crosshead alignments. That work was largely finished by early January 2009; but it was not finally completed until May 2009.

314. In those circumstances (which are set out in greater detail below), PLL/SCL's case is that about 100 loop tests related to the Secondary Compressor could not be undertaken until it was operational; and that 160 loop tests related to the Secondary Compressor could not be commenced "until the compressor was in one piece and incorporated its cylinders." In its pleaded case PLL/SCL allege that SABIC did not reassemble the Secondary Compressor until 20 January 2009, so that it could not have commenced the 160 loop tests before then. By a subsequent letter of clarification PLL/SCL asserted that the realignment of the crossheads was not complete before 4 March 2009 and that the Secondary Compressor was on the critical path to EID at 3 November 2008 and remained so until EID.

315. The issues that arise in relation to the Secondary Compressor are therefore:

i) What were the contractual tolerances for the crosshead alignments?

ii) Did the crosshead alignments comply with the contractual tolerances?

iii) Was it reasonable for SABIC to carry out the work it did on the crosshead alignments?

iv) Did SABIC's work on the secondary compressors prevent the commencement of loop testing for 160 loops, as PLL/SCL alleges?

v) Was the alignment work to the Secondary Compressor on the critical path to EID either before or after termination?

vi) What implications, if any, does the Secondary Compressor hold for the case on due diligence?

Chronology

316. The contract for the supply of the Secondary Compressor was originally between SABIC and NP, the purchase order being placed by SABIC with NP on 22 July 2005. The purchase order attached various documents including the Material Requisition (Revision B) for the Secondary Compressor, which listed EM's Polyethylene Specification ["EPS"] as one of the applicable standards. The EPS provided a dynamic tolerance for the plunger run-out, but not for absolute alignment of the crossheads. The purchase order stated that it was governed by various documents, including "Suppliers standard engineering practice." At the time of contracting, and until the correspondence identified below, NP's standard engineering practice was to manufacture the crossheads with tolerances applicable to the plunger in its vertical position of 0.02 to -0.16 mm.

317. On 19 October 2005 EM issued its "Approved Best Practice Guides" to SABIC by email, copied to SCL. These included an alignment procedure for the crossheads of NP hyper compressors. A copy of the CD containing the same information was provided by SABIC to SCL on 9 February 2006. Also on 9 February 2006 the contract for the supply of the Secondary Compressor was novated from SABIC to SCL. EM's tolerances applicable to the plunger in its vertical position were more demanding than NP's and were 0.02 to -0.06 mm.

318. The second stage of the Secondary Compressor was constructed first. Alignment readings were taken at NP's premises between 8 and 11 September 2006 which were recorded as being within NP's tolerances and either within or very close to EM's.

319. On 12 September 2006 EM emailed NP noting that, based on these results, it was clear that NP could change its alignment specification to bring it into line with EM's tolerances and requested NP to do so. NP responded the same day saying that it would do so, that it would apply the new (EM) values to the first stage of the Secondary Compressor, and that it would rectify the second stage of the Secondary Compressor on site to bring it into line with the EM values. EM forwarded this exchange to SCL and SABIC stating that NP would change its alignment specification and apply it to the first stage Secondary Compressor. EM recorded that it had not requested NP to amend the vertical crosshead alignments for the second stage but that NP had said it would correct them on site. The second stage Secondary Compressor was delivered to site on 24 October 2006. The journey from NP included a stormy passage across the Bay of Biscay which caused damage to packing cases and some visible parts.

320. The alignments for the first stage Secondary Compressor were checked at NP's premises in December 2006. SABIC did not attend; but the measurements were witnessed and certified by WISco, an independent quality house. NP again applied and tested against its tolerances and did not apply the EM ones. This came to the attention of SABIC who noted that the readings were within the NP spec and had therefore been passed. EM complained to NP on 29 January 2007 that it had not adopted EM's tolerances as agreed. In response, NP assured EM that "the runouts will be rectified on site." EM duly forwarded this assurance to SABIC and SCL. SCL's response was to make plain to NP that the readings complied with NP's specification and that SCL would not be responsible for the cost of any remedial work to bring them into line with the EM specification.

321. The question of achieving the EM tolerances was raised again in mid-2007. SCL carried out some investigations and asked for a variation order to cover that work. On 12 November 2007, SABIC accepted that there was a variation to the contract in principle; and on 22 November 2007 it issued a variation order to cover SCL's investigatory work.

322. A meeting was held at Wilton on 5 August 2008 attended by representatives of SABIC, SCL, NP and EM. It was agreed that 10 crossheads would be checked, it being anticipated that two would require remedial work. NP was to supply laser alignment equipment (though this did not happen). The minutes also recorded that four resistance temperature detectors ["RTDs"] were broken and should be replaced. The cylinder heads would require to be removed to check the crosshead alignment: on the evidence this was, however, required in any event for safe storage.

323. SABIC undertook the work, issuing a Purchaser Variation Notification to SCL on 22 October 2008 stating that it was undertaking the work on behalf of SCL. The PVN stated that SABIC was undertaking the work "to bring the tolerances from … [NP] standard to [EM's]. … However, there are a number of cross-heads that have been discovered to be outside of the NP tolerance." Mr Madioni and others from NP were present on site from mid-September until December 2008, advising SABIC on what to do, directing the taking of measurements, and determining what remedial work was required to the crosshead alignments. SABIC recruited technicians from machine-fitting backgrounds, two of whom had previous experience of working on NP hyper compressors when at ICI. Initially the readings obtained were not consistent on repetition, at least partly because (as was discovered) a number of the crosshead thrust boreholes were themselves out of tolerance, which affected the readings. By about mid-October 2008 a procedure had been developed which gave Mr Madioni confidence that the alignments had been measured correctly. The procedure was further developed in November 2008. Once Mr Madioni was satisfied that they had reliable readings, NP made calculations and Mr Madioni decided upon the necessary remedial works with support from NP in Italy.

324. Mr Tilley's evidence (which I accept) was that the technicians recruited by SABIC were suitably skilled to carry out the alignment readings. Mr Madioni did not at any stage suggest that he had concerns with the quality of their work. On the contrary, on 2 October 2008 NP's supervisor told Mr Bown of SABIC that NP's shop readings were sometimes poor and that he had confidence in SABIC's readings despite the lack of laser alignment equipment. This is consistent with the comment in an internal SABIC email on 8 December 2008 which said that Mr Lanini of NP had gone back to

Florence with the view, based on his experiences at Wilton, that in future NP should routinely do cross head alignment checks on site "because things "move whilst in transit"". On a separate occasion, Mr Madioni of NP and Mr Cornelissen of EM told Mr Tilley that the magnitude of the misalignments was such that, if not corrected before start-up, it would have resulted in the setting off of alarms and, at worst, the tripping of the machine.

325. When the work started in mid-September 2008, it was known that progress would be affected by cleaning and blowing work which SCL had to undertake. This work was in respect of other sub-systems comprising the Secondary Compressor, but SCL had not by then provided SABIC with a programme for the works. There were other causes of delay. In addition to the problem of the out of tolerance boreholes and plunger guide rings and the need for chemical cleaning to be undertaken, other causes of delay intervened which put back the completion of all works on the Secondary Compressor. The four broken RTDs had to be replaced, which occurred after SCL's cleaning and blowing was complete. Hydrotesting was being carried out by SCL's subcontractor. NP's replacement plunger guide rings, supplied in March and April 2009, were themselves out of tolerance, so that SABIC commissioned a local firm to fabricate them in early April 2009. There was a problem with the alignment of the driveshaft between the main crankcases and the Secondary Compressor motor. In February 2009 it was discovered that oil resistant paint needed to be applied. Electric trace heating and insulation was required: the need was discovered in February 2009 but not resolved until May[53]. In the result, the crosshead alignment works were substantially completed by the end of January 2009. By 4 March 2009 they were complete apart from the reaming of two dowel holes, which could have been done in under an hour. Work on the Secondary Compressor was complete by May 2009.

326. When SABIC notified SCL that it intended to reclaim the costs of work to the Secondary Compressor, SCL prudently wrote to NP alleging fault on NP's part and promising to pass on any costs to NP. Little can be read into this correspondence beyond the fact that SCL was keeping its routes for contractual recovery open.

What were the contractual tolerances?

327. It is (correctly) common ground that the contract with NP required that NP comply with its standard tolerances. The dispute has been whether or not the more demanding EM vertical alignment tolerances became a contractual requirement. By the time of oral closing, SABIC accepted that there was no contractual requirement for NP to have applied the EM tolerances to the second stage Secondary Compressor (though it maintained that it would have been good practice for NP to have done so); but it submitted that the position was different in relation to the first stage Secondary Compressor because of the exchange of correspondence between EM, NP, SABIC and SCL on and after 12 September 2006. I disagree. Although NP agreed to incorporate the EM tolerances for the first stage Secondary Compressor, and later agreed that it would do the necessary realignment on site, there was no consideration for this agreement and it did not amount to a contractual variation so as to impose a contractual obligation upon NP (or, by extension, on SCL) to apply the EM tolerances. Therefore, NP and SCL's obligation at all material times was to deliver

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[53] This brief summary is a paraphrase of the summary chronology set out at paragraph 19 of SABIC's Supplemental Closing Submissions {T.3/1.1/6}, the factual basis of which I accept.

the two stages of the Secondary Compressor such that it complied with NP's tolerances but not those of EM. For that reason, SABIC was right to accept in November 2007 that investigative work directed to achieving EM's tolerances amounted to a variation to the contract.

Did the crosshead alignments comply with the contractual tolerances?

328. SABIC's final position on the readings was not evidenced until Mr Tilley's fourth statement was produced in May 2013. His evidence is that:

i) 2 cylinders on the first stage (Cylinders 1 and 6) were outside NP's vertical tolerance;

ii) 7 cylinders on the second stage (Cylinders 2, 6, 9, 13, 14, 16 and 19) were outside NP's vertical tolerance, while 9 (Cylinders 2, 3, 4, 8, 10, 15, 18, 19 and 20) were outside NP's horizontal run-out tolerances.

329. The readings evidenced by Mr Tilley differed from those recorded in Florence before shipment, which indicated that the alignments were within NP's tolerances. The first question is whether those differences arose because the Secondary Compressor was in a different condition when the readings were taken in Florence and Wilton respectively, or whether the differences are a function of technique in taking the readings. PLL/SCL submit that the readings take in Florence were accurate and that those taken in Wilton were not, so that the Court should conclude that there was no failure to comply with the NP tolerances. SABIC suggests that the crosshead alignments may have shifted in transit, specifically suggesting that the storm in the Bay of Biscay may have affected the second stage Secondary Compressor; alternatively, it submits that Mr Tilley's evidence is reliable and that, if anything, the readings taken in Florence were not.

330. It seems unlikely that the alignments shifted in transit. The Secondary Compressor is a large and robust machine and the alignment surfaces are securely bolted in place to withstand the substantial forces that are applied during operation. Although damage to cylinders to the compressors was noted after the Bay of Biscay storm, no damage to the crankcases was apparent, and the cylinders were packed separately. Furthermore, if shifting in transit had been the explanation, it is unlikely that it would have been unique to the Wilton machines; yet there is no hint of such movements being a recognised problem. SABIC has not provided any quantitative assessment of the forces that would have been required to cause the alignments to shift, or of the forces that would have been imposed on the Secondary Compressor in transit. I therefore reject the suggestion that one or other set of crosshead alignments shifted in transit.

331. The question therefore arises whether SABIC's readings are reliable or whether those from Florence are to be preferred. PLL/SCL advances substantial arguments in favour of the Florence readings: they were taken by experienced technicians who were familiar with the machines; the dummy plunger used at Wilton to take the readings was not the same as that used in Florence, which may have affected the results; difficulty was experienced at Wilton with the seating for the dummy plunger, which necessitated refinement of the measurement techniques; the measurements in Florence were checked by laser; NP carried out the measurements to its own

techniques; and Mr Tilley's evidence as to the correct readings did not settle until a late stage.

332. SABIC responds substantively: the readings taken at Wilton were supervised by NP; the technicians who did the work were competent, to the satisfaction of NP; appropriate steps were taken to cater for the difficulties in seating the dummy plunger; NP expressed itself satisfied with the readings after the necessary refining of technique despite the absence of laser technology; and Mr Tilley's evidence, though late in its final formulation, is coherent. In addition, SABIC may reasonably point to the observation by NP that in future it was always going to check readings on site and its acknowledgement that readings taken in Florence may not be reliable despite the use of laser technology.

333. What tips the argument for me is the involvement of NP at Wilton. First, the Wilton readings were carried out under the direct supervision of NP using techniques that NP had developed and approved. No rational argument has been advanced to suggest why NP would have approved the techniques (including those adopted after refinement in October/November 2008) if they were not in fact reliable, to the extent of being satisfied with the readings despite the absence of laser technology. Second, NP had no interest in declaring the Wilton readings to be reliable if they were not because, if correct, the Wilton readings meant that NP's machine was out of tolerance and required remedial works. Yet it is clear on the evidence that NP was satisfied and was prepared to develop remedial works on the strength of the Wilton readings. Third, there is evidence that Mr Wray of SCL had a meeting with NP. Yet he did not suggest that there was any lack of assurance on the part of NP, nor did he observe or develop any compelling reason to think that the readings were not reliable.

334. I therefore prefer the evidence and arguments of SABIC and conclude that the crosshead alignments were out of tolerance as summarised by Mr Tilley. The discrepancy between the readings in Florence and the readings at Wilton are attributable to differences in technique, but SABIC's technique survives PLL/SCL's challenge.

Was it reasonable to carry out the crosshead alignment works?

335. The short answer is yes, since SABIC was entitled to remedy the failure to comply with contractual tolerances. The remedial steps it took were determined by advice from NP and were reasonably undertaken in the light of that apparently competent advice.

Did SABIC's realignment work prevent the commencement of loop testing?

336. PLL/SCL's case that a proportion of the loop tests which remained to be completed at termination could not be undertaken because of the works to the Secondary Compressor is supported by the evidence of Mr Summersgill. However, Mr De Main carried out an analysis for SABIC of the loop tests that were associated with the Secondary Compressor. His evidence (which I accept) was that there were 243 loops associated with the entirety of the Secondary Compressor systems which had been handed over by BK to SCL to test and that SCL claimed to have tested 229 of them completely at termination. His exhibit JDM15 shows that many of those loop tests were claimed by SCL to have been done while the alignment work was being carried

out and to have been completed between August and October 2008. SCL has carried out no similar exercise to contradict Mr De Main's evidence and there is no contemporaneous evidence of SCL asserting that it was being prevented from carrying out any significant number of loop tests because SABIC was carrying out the alignment works. Instead, PLL/SCL points to the dates in programmes when the cylinders were required to be installed However, this argument is based on the premise that the cylinders had to be installed for the loop tests to be carried out, which assumes the very fact that PLL/SCL seeks to prove and which Mr De Main's evidence directly contradicts. Mr Lumley agreed in cross-examination that the cylinders to the Secondary Compressor would be taken off and placed in storage, being reinstalled shortly before commissioning. But the evidence was that this was as a matter of protective routine, to prevent damage occurring on a working construction site. It does not follow that the absence of the cylinders would prevent loop testing. Mr Crossley was unable to assist PLL/SCL on this issue: he accepted that he was not qualified to give an opinion on whether it was possible or not to do the loop tests in the absence of the cylinders and plungers being installed. Counsel for SABIC carried out a further filtering analysis on Mr De Main's evidence which showed that, while some of the claimed loop tests recorded the existence of faults, none of the faults appear to be related to the carrying out of the alignment works.

337. On this evidence I reject PLL/SCL's submission that SCL was prevented from carrying out any significant number of loop tests by the carrying out of the alignment or other works on the Secondary Compressor. Furthermore, since the reinstallation of the cylinders was, as a matter of routine, carried out immediately before commissioning, the actual date on which they were or were planned to be reinstalled does not assist in determining the causes of any delay: while there may be an association between a period of delay (however caused) and the date on which the cylinders were reinstalled, it does not follow that the reinstallation of the cylinders was itself the cause of such delay.

Was the alignment work on the Secondary Compressor on the critical path to EID?

338. PLL/SCL's case is that the alignment works were on the critical path from 3 November 2008 and remained so thereafter. So, it is alleged, the effective cause of delay to EID on and from the date of termination was the works to the crosshead alignment.

339. There is no evidence that the crosshead alignment works were thought to be critical either during the Warning Period or thereafter. The only document that has been identified which suggests that they might be is an internal SABIC email from Mr Corking dated 16 December 2008 which said "Looking at the plan this morning there has been a delay of 3 days to EID, this related to the impact of Crosshead alignment work on the Secondary Compressors to Oil Flushing, speaking with Louis Malan he indicates that a mod can be instigated to work around this." In his oral evidence, Mr Corking confirmed that a workaround had been developed by creating a bypass with flexible hoses. There is no other contemporaneous evidence of the crosshead alignment works being or remaining critical and I accept Mr Corking's evidence that the workaround was effective.

340. SABIC's witness evidence on criticality was given by Mr Tilley and Mr Farrar, both of whom gave evidence that there was work other than the crosshead alignment work

on System 27.07 that was equally or more critical to achieving EID and that the realignment of the crossheads did not affect EID[54]. No current programme showed the crosshead alignment works to be on the critical path. In evidence and closing submissions, PLL/SCL suggested that the 3 October 2008 version of SAB1 showed the crosshead alignment work to be on the critical path, but this was wrong as both Mr Crane and Mr Crossley agreed: the programme showed the critical path going through system 27.01 and not through system 27.07 or the crosshead alignment works. SABIC's position was supported by Mr Crane who, on the basis of his extrapolations of progress, gave as his opinion that the crosshead alignment works were not critical. Mr Crossley expressed a contrary view; but, it was based upon a comparison of the planned progress shown in programme 31JL with the actual progress achieved in relation to the Secondary Compressor. For the reasons that I have already given in relation to his evidence on criticality[55], I do not find his evidence helpful or persuasive.

341. I prefer SABIC's evidence and submissions. I found Mr Tilley and Mr Farrar to be good and reliable witnesses and accept their factual evidence. It is supported by the absence of any planning evidence indicating that the crosshead alignment works were on the critical path and by the absence of any contemporaneous indications that they were thought to be on it. I therefore find that the crosshead alignment works were not on the critical path at any material time before or after termination.

342. Had I held that the crosshead alignment works were on the critical path it would have been necessary to consider whose responsibility it was that the works had to be carried out. As I have said, the works were required because the alignments were out of tolerance, which was SCL's responsibility. PLL/SCL submit, perhaps rather half-heartedly, that the works were SABIC's responsibility because it had taken over system 27.07. In doing so it relies upon Clause 18.1.7 of the EPC contract ("Effects of Handover") which states that upon the approval by the Project Director of a Hand-over certificate the relevant System shall be at the risk of SABIC who shall take possession of it; and that SABIC shall thereafter be responsible for the care, safety, operation, servicing and maintenance of the relevant System of the Process Plant. However, while the system is at the risk of SABIC from the time of handover and future care, operation, servicing and maintenance is SABIC's responsibility, that does not relieve SCL of responsibility for defects in the system handed over, as the contract in general and Clause 19 of the EPC contract in particular makes clear.

The Secondary Compressor and the Case on Due Diligence

343. The history relating to the Secondary Compressor provides little or no assistance in relation to the parties' respective cases on due diligence. PLL/SCL may fairly point to the fact that, when System 27.07 was handed over, the only available readings were those from Florence, which indicated that it complied with NP's tolerances. It had made clear that it would not accept any financial consequences flowing from the failure to comply with EM's tolerances, but that was a contractually justified stance to take since it was not obliged to comply with them. In the event, the Wilton readings showed that the alignments did not comply with NP's tolerances either. However, the most that can be said is that SCL did not check the tolerances itself, although it knew

[54] Summarised at [325] above.
[55] See [168-169] above.

of the correspondence in and from September 2006 indicating that further tests and checks were likely to be carried out. I do not consider this to be a significant criticism of SCL's diligence. Accordingly I find that the Secondary Compressor does not advance SABIC's case on due diligence.

Issue 3.10 – Damage to Cooling Water System Pipework and Plinth

344. The cooling water system incorporated three pumps, each of which was capable of pumping 5,250 cubic metres of water per hour, or 1.46 tonnes per second, through the 30 inch pipework of the system. SCL's design included the installation of a 24 inch flexible bellows in the pipework just downstream of one of the pumps. The cooling system was handed over on 17 September 2008 and SABIC started to commission it on 25 September. About 20 minutes after startup an incident occurred when SABIC personnel noticed that the bellows was deforming. In response to that observation, SABIC shut down the pump. It is common ground that when the pump was shut down, a non-return valve closed and water hammer caused damage to a concrete plinth.

345. The parties are in dispute about the causes of this incident. SABIC's case is that it started up the pump properly, that the deformation of the bellows was attributable to deficiencies in SCL's design or installation, and that its operatives' decision to shut down the pump was a reasonable response to the emergency that confronted them as a consequence of the failure of the bellows. Accordingly, SABIC places responsibility for the incident at SCL's door. PLL/SCL's case is that the failure of the bellows was caused by SABIC allowing the pump to run with excess air in the system and that SABIC's turning off of the pump was deficient because it made inadequate allowance for the risk of water hammer and the damage it might cause.

346. The issues arising are therefore:

i) What caused the failure of (a) the bellows and (b) the plinth;

ii) Whether the failure of the bellows and/or the plinth was the responsibility of SABIC or SCL; and

iii) Whether the water cooling system was on the critical path to EID.

The Evidence

347. The contemporaneous report of the incident states:

> "Cooling Water Pump stopped during flushing of Cooling Water Supply and Return Header. Delivery NRV shut as designed, but resulting pipe work movement damaged a support on the Cooling Water Pipe work system.
>
> Commissioning activities suspended. Area made safe and technical team called to investigate.
>
> Pump stopped due to concerns about delivery pipe work bellows distortion. Pump ran well for 20 mins."

348. The incident was investigated by Mr Tilley and Mr Farrar of SABIC. Their investigation established that the installation of the bellows was incorrect. First, there should have been four tie bars running between the flanges at the opposite ends of the bellows. The purpose of the tie bars was to control the expansion and movement of the flexible bellows when the system is under pressure. SCL had installed only two rods and the two that had been installed had been set to different lengths. Second, the nuts on the inside and outside of the tie bars were set at incorrect clearances because SCL had omitted necessary spherical washers. Their investigation also established that the pump had been started up and the system had run without any unusual noise or other evidence of poor priming of the pump for 20 minutes before the bellows distorted; and that the damage to the plinth occurred when the non-return valve closed on the shutting down of the pump.

349. Mr Martin recorded in his diary that on 29 September 2008 Mr Daren Smith of SABIC had agreed with him that the incident had been "operations error". However, Mr Farrar questioned the basis upon which Mr Smith might have made such a comment since he had not been involved in investigating the incident and would not have had knowledge of the full facts since he did not discuss them with Mr Farrar at any time.

350. The manufacturers of the bellows, Posiflex, investigated the failure. In addition to identifying the absence and mis-setting of the tie bars, Posiflex identified that the joint had been installed with a face to face dimension of 350 mm which was in excess of the standard dimension of 275 mm. Posiflex found that the joint had been elongated over twice its design limit of 32 mm[56] before any flexion occurred in operation.

351. For SABIC, Mr Lumley's opinion as stated in his report was that shutting down the pump was a reasonable reaction to the distortion of the bellows in an attempt to prevent catastrophic failure of the bellows and potential personal injury or damage to property. He concluded that the subsequent damage to the plinth was consistent with the effects of water hammer caused by the shutting down of the pump. He criticised SCL for its installation of the bellows and for failing to contemplate sufficiently the consequences of shutting down the pump, including the risk of water hammer. As a result, the plinth was not strong enough to resist the effects of the water hammer. He rejected the suggestion that the incident was caused by a failure on SABIC's part to vent the system. His opinion was that the bellows as installed was not fit for purpose. In his oral evidence, while accepting that the damage to the plinth was caused by water hammer, he maintained his opinion that the damage to the bellows was not. He accepted that, in the event of water hammer such as occurred during the incident, the presence of bellows would not prevent damage to the pipe supports. He explained that if there had been significant quantities of air in the system, the operators would have become aware of it during the 20 minutes of operation before the bellows distorted, either because of noise, or because of instability or fluctuating pressure in the system; and he gave as his opinion that if a "bubble" of air had become trapped somewhere remotely in the system it would act as an accelerator once the pump was shut down (in the sense that, if the pressure in the system reduced, the air would tend to expand) but pointed out that this was different from water hammer (which is the passing of a shock wave on the termination of flow and not the physical moving of a slug of water).

[56] i.e. (350-275) mm = 75mm

352. For PLL/SCL Mr Payne took a different view. In his report, while recording the fact that the tie bars were intended to withstand the forces due to normal bellows system operating pressure, that some were omitted and incorrectly set and that the Face to Face dimensions were outside those specified by Posiflex, he suggested that the movement of the bellows may have been due to water hammer which may have involved forces that would have exceeded the capability of the tie bars even if they had been correctly installed. In doing so, despite rejecting as unlikely the possibility that pump induced vibration may have caused the failure, he ignored the clear evidence that distortion of the bellows occurred before the pump was switched off. He concluded that the most likely cause of the failure of the bellows was "trapped air somewhere in the pump or pipework system."

353. When he gave oral evidence, Mr Payne developed his theory that a bubble of air may have become trapped in the system (perhaps in a "branch" line) which, upon the pump being shut down, would have expanded and caused a slug of water to circulate back along the system, causing an effect similar to water hammer that would have damaged the bellows even if installed correctly. He accepted that the bellows were incorrectly installed in the respects identified above and that it was not surprising, given the manner in which they were set up, that the bellows distorted under normal operating conditions; but he questioned whether the distortion made it necessary to shut the pump down in an emergency, commenting (correctly in my view) that "only those who were there could answer that question. I can't answer that question" and agreeing that those on site should be given a degree of tolerance when making that judgment. Realistically he accepted that if the operators on site were confronted by what appeared to them to be an imminent failure of the piping system, it was hardly surprising that they would shut down the pump immediately. Turning to the period before the bellows failed, he accepted that the operation of the system for 20 minutes without incident suggests that there was not air circulating with the water round the system, so that his final position was the suggestion that there may have been a pocket of air under compression which would have expanded when the pump was shut down and pressure in the system reduced.

What Caused the Failure of (a) the Bellows and (b) the Plinth?

354. The evidence establishes that the bellows failed about 20 minutes after startup and that there had been nothing untoward noticed during the previous 20 minutes. There is no direct evidence to support the suggestion that SABIC failed to vent the system properly and no circumstantial evidence in the form of unusual noises or fluctuations in pressure in the period before the incident. Mr Payne's evidence goes against a finding that SABIC ran the system with air circulating with the water. As a result, his final position was that there may have been a bubble of water, possibly stuck up a branch line, which only expanded or came into play when the pump was switched off. By then, the bellows had distorted. In my judgment the reason for the failure of the bellows is clear: SCL inserted them incorrectly as described above, so that they were liable to distort under normal operating conditions, as Mr Payne accepted. In the absence of any evidence to support the theory that some other mechanism operated to distort the bellows, I find as a fact that the bellows distorted because of the failure by SCL to install them properly.

355. To my mind, the reason why the plinth failed is equally plain. The operatives reasonably considered that they were confronted by an emergency, namely failure of

the bellows, which could have had severe implications for both persons and property. In those circumstances, they acted reasonably in shutting down the pump immediately. That caused conventional water hammer and the closing of the non-return valve, the combined effect of which was to transmit forces to the pipework that were sufficient to cause the damage to the plinth. There is no need or justification for a theory based upon the expansion of a bubble of air that had previously been parked in a branch line, and I reject it. Even if the theory were sound, the root cause of the damage would still have been the operatives' decision to turn off the pump as an emergency which, as I have said, was reasonable in the prevailing circumstances.

Responsibility for the Failure of the Bellows and Plinth

356. SCL's inadequate installation of the bellows caused their failure which in turn caused the failure of the plinth in the manner I have just described. Legal responsibility for the entire incident rests with SCL because of its failure to install the bellows properly. It is no answer to say that the cooling water system had been handed over since that cannot and does not relieve SCL of its responsibility for defective workmanship carried out before handover.

Was the Cooling Water System on the Critical Path to EID?

357. There is no evidence that the parties considered at the time that the incident affected the critical path. Neither Mr Crane nor Mr Crossley thought that the Cooling Water System was on the critical path. I find that it was not. Even if it had been, the consequences of any delay would have been SCL's responsibility. As it is, the incident is relevant to an assessment of the quality of SCL's workmanship and not directly to the question of delay.

<u>Issue 3.11 – General Progress during the Warning Period</u>

358. Looking at the individual areas identified by the parties does not provide the full picture. Viewed overall, when the Warning Letter was sent the contract was considerably in delay with EID likely to be achieved in early February 2009. During the Warning Period SCL took no effective steps to recover any of the delay that had occurred and, as identified above, further substantial delay occurred in critical areas. On Mr Crane's analysis, which was performed using SCL's progress data, the contract as a whole slipped by a further 18 days during the Warning Period. As already noted, Mr Crossley was instructed to consider progress during the Warning Period and could readily have done a similar exercise but did not do so. Mr Crane's analysis is therefore uncontradicted and, in my judgment, PLL/SCL made no significant inroads on his conclusions. While there may be scope for argument about whether Mr Crane's figure of 18 days is precisely correct, I find as a fact based upon Mr Crane's analysis that during the Warning Period, progress on the works slipped by about a further 18 days. The only unwarranted hindrance by SABIC during the Warning Period was the raid on 24 October 2008. The effects of that raid on overall progress would have been minimal since loop checking was not considered to be (and was not) on the critical path to EID at that point. I therefore conclude that either all or the overwhelming majority of the slippage during the Warning Period was the responsibility of SCL.

Issue 3 – Conclusions

359. The central issue is whether SCL exercised due diligence during the Warning Period; and it is to be answered by reference to the principles that I have discussed earlier in this judgment. In particular, even if by 3 October 2008 it was not feasible for SCL to achieve EID on 5 December 2008, that did not empty the obligation to exercise due diligence of content or render it less onerous.

360. The relevant evidence points overwhelmingly to the conclusion that SCL failed to exercise due diligence during the Warning Period. Far from maintaining the rates of progress that had been indicated by the Completion Plan, further slippage occurred to the works overall and specifically in relation to those areas which were thought to be critical and which should therefore have been given primacy, namely PFP, Insulation, and Cleaning and Blowing. In each of these three areas there was an apparent lack of urgency and an absence of the decisive action that was required to turn the contract round and achieve satisfactory progress. As I have set out in more detail above, in the area of PFP SCL was unable to procure the necessary progress from Cape and effective negotiations with Hertel did not happen until towards the end of the month. In the area of insulation, SCL was unable to procure the necessary progress from Cape; and it did not formulate any coherent plan either for the use of temporary insulation or for omitting insulation until after EID. The net result was slippage of 3 weeks on the insulation subcontract during the Warning Period. In the area of cleaning and blowing, as much energy appears to have been devoted to attempting to reduce the scope of SCL's work (in the hope of achieving the consequential savings that were driving SCL's thinking) as to planning how to carry out the full scope of PI 092 works. This led to the unsatisfactory result that SCL was issuing instructions to Halliburton to carry out a reduced scope of works which was not justified by a proper appreciation of the correct scope of SCL's obligations. The evidence does not justify a clear finding of fact that these instructions caused slippage. It does, however, justify the finding that SCL did not do what was necessary to ensure that satisfactory progress was achieved and that the progress during the Warning Period was not sufficient for SCL to have achieved the target EID of 7/9 February 2009 that was in contemplation at the start of the Warning Period.

361. Other areas also demonstrated inadequate progress though in some cases (as with loop testing) this may have been largely a reflection of the general lack of progress across the works. Mechanical completions did not achieve rates of progress consistent with the Completion Plan, with Mr Buckley's analysis revealing a backlog caused by the sub-contractors' unwillingness to provide QA documentation – the restriction which led to his disastrous decision to move documentation off site. The work in the reactor bay was of an inadequate standard that was not remedied in the period to termination. Neither the EVS nor the Secondary Compressor provides an explanation or justification for SCL's inadequate performance. The Cooling Water System does not specifically relate to the Warning Period.

362. The overall effect was that SCL failed even to maintain the delayed EID that was in contemplation at the start October 2008. Instead, about 18 days further slippage occurred during the month of the Warning Period. On any view, that performance was dismal.

363. I have reached the clear conclusion that SCL failed to get any sort of grip on the contract during the Warning Period. In part, at least, this was because of the absence of Mr Martin during the critical central part of October 2008. That is not to say that all would have been well if he had been there. It is likely that he would have pursued his objective of retrieving SCL's financial position by pursuing the tactics outlined earlier; and his fundamental misjudgement of SABIC's conduct would have made relations during the Warning Period particularly fraught. However, in his absence Mr Buckley was unable to make any significant progress in retrieving the situation. The fact that Mr Buckley was not up to running such a difficult contract was doubtless the reason why PLL put in Mr Martin in the first place. Whatever the reason, during the Warning Period, SCL floundered.

364. I therefore find myself driven to the conclusion that SCL substantially failed to proceed with the Works with due diligence during the Warning Period. Its failure persisted to 3 November 2008 so as to entitle SABIC to terminate its employment under clause 27.2.10 of the EPC contract on that day on the grounds that SCL was persistently in material breach of its obligation to proceed with due diligence.

Issue 4: Financial Deterioration.

365. In the Warning Letter, SABIC asserted that it would have been entitled to terminate then and there on the basis that SCL's financial position had deteriorated to such an extent that its capability adequately to fulfil its obligations under the contract had been placed in jeopardy. When it terminated the contract a month later, SABIC relied on the deterioration of SCL's financial position as a discrete ground entitling it to do so, relying on Clause 27.2.5 of the EPC contract.

Clause 27.2.5

366. Clause 27.2.5 gave SABIC the right to terminate forthwith by notice in writing if "the financial position of the Contractor deteriorates to such an extent that the capability of the Contractor adequately to fulfil its obligations under the Contract has been placed in jeopardy".

367. Five points arise on the interpretation of Clause 27.2.5. First, having correctly identified that the clause only operates when there has been a deterioration in SCL's financial position, PLL/SCL submit that on the facts of this case the only period that is relevant is the period from SSA2 to termination, on the grounds that "the purpose of SSA2 was to re-baseline the parties' relationship and enable completion in accordance with the Contract as varied by SSA2. It would be perverse if SABIC was entitled immediately to terminate the Contract after SSA2 had been entered into on the basis of SCL's financial position, known about and partly necessitating SSA2." This submission faces a number of difficulties. Clause 27.2.5 was in place from the original execution of the contract. It is implicit in PLL/SCL's submission that, if SSA2 had not occurred, the relevant period would be the period from the original execution of the contract: I agree that this would be so because there is nothing in the clause to limit the relevant period to be one that is shorter than the duration of the contract as a whole. Why then should SSA2 make a difference? There is nothing expressed in SSA2 to vary the meaning or effect of Clause 27.2.5; nor is there anything in SSA2 which necessarily implies that the effect of the clause is varied. PLL/SCL's submission that "the purpose of SSA2 was to re-baseline the parties'

relationship" is opaque. It is true that it provided for additional payments to be made and for past claims to be compromised; but otherwise it is not clear what is meant by the word "re-baselining" in this context. The second purpose of SSA2 is submitted to be to "enable completion in accordance with the Contract as varied by SSA2." It was certainly the hope (as well as the contractual obligation) that the works would then be completed in accordance with the Contract as varied by SSA2; but that begs the question whether Clause 27.2.5 had been varied. Nor do I understand why it should be held to be perverse if SABIC could have terminated immediately after SSA2 on the basis of Clause 27.2.5. On the contrary, if SCL's financial position deteriorated to such an extent that, even with the agreement for the injections of cash provided by SSA2, the capability of SCL to fulfil its obligations was placed in jeopardy, it seems to me to be acceptable that SABIC should retain the protection of Clause 27.2.5. In the absence of any express term or necessary implication varying the effect of Clause 27.2.5, I reject PLL/SCL's submission on this point.

368. Second, when considering SCL's financial position it is necessary to take into account any external support that was available to it. Specifically, as recorded in the judgment of Sir William Blackburne in *Carillion Construction Ltd v Hussain & Ors* [2013] EWHC 685 (Ch), PLL provided letters of support addressed to the directors of SCL dated 12 May 2008 and 14 May 2009, the first of which stated that PLL would "provide the necessary financial and business support to [SCL] to ensure that the Company continues as a going concern" and the second of which stated that PLL would "provide sufficient funds to the company …, to enable [SCL] to continue operating and to meet its liabilities as and when they fall due for the period until May 2010, to ensure that the company continues as going concern." As the judgment in *Carillion* establishes, these letters were not enforceable by third parties; but PLL did in fact provide financial support to SCL until July 2011 when it notified the Bombay Stock Exchange that it was withdrawing financial support to SCL, having by then provided support in the form of unsecured loans to the tune of about £240 million.

369. Third, the mere fact that PLL was providing support to SCL does not necessarily mean that SCL should be treated as if it were invested with all of PLL's financial strength for the purposes of Clause 27.2.5. What financial support was in fact provided from time to time is a question of fact, as is the question whether SCL's financial position (as a result of any deterioration but with the benefit of that support) meant that SCL's capability adequately to fulfil its obligations under the Contract has been placed in jeopardy.

370. Fourth, the reference in Clause 27.2.5 to SCL "[fulfilling] its obligations under the Contract" is unqualified. However, it would be unreasonable to interpret the clause as giving SABIC a right to terminate as soon as SCL's financial position had any adverse effect on is ability to fulfil its obligations. Given the draconian nature of the right of termination, the better view must be that the financial deterioration jeopardises the fulfilling of SCL's obligations under the contract to a substantial extent. It is not possible to lay down bright lines in advance to define when Clause 27.2.5 would or would not apply. So, for example, if SCL's financial position were shown to have caused a one week delay in completion of the works, the Court may well decide that liquidated damages would be the appropriate contractual remedy and that Clause 27.2.5 was not applicable; but there may come a time where the delay

attributable to SCL's financial position was so extreme as to justify reliance on Clause 27.2.5. Equally, the risk must be significant as opposed to fanciful or theoretical only.

371. Fifth, at one point PLL/SCL submitted that SABIC had lost its right to rely upon Clause 27.2.5 by 3 November 2008 because it said in the Warning Letter that it would have been entitled to terminate on the basis of the financial deterioration that had taken place by 3 October 2008. If persisted in, I reject this submission. There is nothing in the provisions of the contract that required SABIC to exercise the right to terminate pursuant to Clause 27.2.5 at the earliest possible moment. To the contrary, Clause 40.3 of the EPC contract provided that "failure [by SABIC] to enforce or partially enforce any provision of the Contract will not be construed as a waiver ofany of its rights under the Contract." To my mind, that provides a complete answer to the point.

Chronology

372. SCL first started referring to its financial difficulties in about March 2008. Mr Teague's evidence was that SCL started to down-man at about the beginning of March 2008 and that, when he challenged Mr Buckley and Mr Leggett about it, they made clear it was because of SCL's financial issues. I have summarised the position for most of the period before the Warning Letter was sent[57] and I have concluded that SCL's failure to make the necessary progress during that period was the result of its financial difficulties, strategic decisions at board level, management weakness at site, and a lack of planning capability[58].

373. The autumn of 2008 saw world markets heading for crisis. This compounded SCL's financial difficulties. Although SCL managed to extend its borrowing facilities with ICICI it had to pay through the nose to do so. On 1 October 2008 Mr Leggett was provided with flash financial results for September which showed a loss of £500,000 in the month. Once again Mr Leggett looked for costs that could be deferred. A contract cost report on the same day forecast a total contract cost of £195 million with a contract price of £156.5 million and additional "target revenue" of £6 million, giving a projected loss of £32.7 million. By this time, even Mr Leggett and the SCL board were obliged to accept that the notion of the contract breaking even was "hopelessly optimistic". SCL's response was to prepare aggressive claims against suppliers and sub-contractors. Mr Leggett's evidence was that there had been an actual deterioration between 1 and 15 October 2008 when he reported to the SCL board.

Discussion

374. On the evidence, SCL's financial position deteriorated during the course of the contract such that, by the end of April 2008 it could only continue trading as a going concern on the basis that it was supported by PLL. The financial losses being incurred on the Wilton contract were a substantial contributor to the progressive deterioration. The effect of the deterioration was that, from April 2008 at the latest, SCL's consistent strategy on the contract was to reduce costs and it was this, rather than the need to fulfil its contract obligations, that drove its strategy of demanning.

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[57] See in particular [52-69, 98-100, 105-108, 121]
[58] See [150].

The need to reduce costs also largely explains why SCL took no accelerative measures: it was not in a position to pay for them. What emerges with clarity from the evidence is that, although PLL was ensuring that SCL could continue to be treated as a going concern, it was not providing funding that would enable SCL to progress the works with due diligence. That is borne out by the fact that, despite repeated requests from SABIC, SCL did not at any stage put forward proposals for mitigating the delays that were occurring, resorting instead to a claims strategy directed against SABIC that was unjustified. The fact that PLL was not going to let SCL go into administration at this point is irrelevant to the conclusion that the contract was and remained underfunded from March 2008 to the time of termination as a result of the deterioration in SCL's financial position and its inability to resource it more fully.

375. PLL/SCL submit that there has been no detailed analysis of any delays attributable to lack of funding. That is true. However, the evidence of financial constraints is plain; SCL used it to frighten SABIC into providing partial funding of its contract losses on the basis that it could not conclude the contract without a substantial cash injection; and the demanning and failure to apply further resources was primarily driven by SCL's financial constraints. In my judgment, the inference that the slippage in the period before the Warning Letter and the further slippage in the Warning Period was in substantial measure attributable to SCL's financially constrained approach to resourcing the contract is irresistible, as is the further inference that such slippage would probably have continued after 3 November 2008 if the contract had not been terminated. Thus the deterioration in SCL's financial position during the period of the contract (and, if this is a necessary finding, the continuing deterioration after SSA2) was a direct cause of SCL's substantial failure to discharge its contractual obligations properly.

376. On these findings, I conclude that the deterioration in SCL's financial position jeopardised the fulfilling of SCL's obligations under the contract to a substantial extent. SABIC was therefore entitled to rely upon Clause 27.2.5 as a separate and discrete ground for termination on 3 November 2008.

Issue 5: Repudiatory Breach.

377. By the time of trial, SABIC maintained the case that SCL had been in repudiatory breach as a fall-back position in case there was some technical objection to its termination of the contract on the basis of failure to exercise due diligence. It recognised that, if the case on due diligence were to fail on the substantive merits of SCL's performance, the case on repudiatory breach would also be bound to fail.

378. Since I find in its favour on the primary case on termination for failure to exercise due diligence, SABIC does not need to rely upon repudiatory breach. But since the point has been argued fully on both sides, it is right that I should set out briefly why I would in any event have found against SABIC on repudiatory breach.

379. SABIC's pleaded case is that, by 3 November 2008, SCL was in repudiatory breach of contract because it had deliberately failed to propose or implement any measures to mitigate the delay that had occurred, had decided not to instruct its subcontractors to provide sufficient resources to comply with the Completion Plan, had deliberately over-reported its progress, and had carried out loop testing inadequately, despite the inadequacies being pointed out to it. By the time of Closing Submissions, the

catalogue of matters upon which SABIC relied had increased to include the demanning in June 2008, the taking advantage of SABIC's dependency upon SCL to exercise leverage in relation to its claim for £4.7 million, further demobilising at the end of September 2008, instructing Halliburton to proceed with a reduced scope of works, and "the sheer scale of the delay by SCL in the progress of its works." It is said that SABIC accepted the repudiatory breach by its termination letter on 3 November 2010 or its subsequent letter on 10 November 2010.

380. PLL/SCL's short response is that, whatever its failings, they do not demonstrate that SCL was evincing an intention no longer to be bound by its contractual obligations since SCL remained committed to completing the Project even if it as substantially in delay by 3 November 2008. As a secondary point, SCL submits that SABIC did not accept any breach that it may prove as being repudiatory.

381. The principles relating to renunciation of a contract are conveniently summarised in Chitty on Contracts, 31st Edn, at 24-018 as follows:

> "A renunciation of a contract occurs when one party by words or conduct evinces an intention not to perform, or expressly declares that he is or will be unable to perform, his obligations under the contract in some essential respect. The renunciation may occur before or at the time fixed for performance. An absolute refusal by one party to perform his side of the contract will entitle the other party to treat himself as discharged, as will also a clear and unambiguous assertion by one party that he will be unable to perform when the time for performance should arrive. Short of such an express refusal or declaration, however, the test is to ascertain whether the action or actions of the party in default are such as to lead a reasonable person to conclude that he no longer intends to be bound by its provisions. The renunciation is then evidenced by conduct. Also the party in default:
> " … may intend in fact to fulfil (the contract) but may be determined to do so only in a manner substantially inconsistent with his obligations,"
> or may refuse to perform the contract unless the other party complies with certain conditions not required by its terms. In such a case, there is little difficulty in holding that the contract has been renounced. Nevertheless, not every intimation of an intention not to perform or of an inability to perform some part of a contract will amount to a renunciation. Even a deliberate breach, actual or threatened, will not necessarily entitle the innocent party to treat himself as discharged, since it may sometimes be that such a breach can appropriately be sanctioned in damages. If the contract is entire and indivisible, that is to say, if it is expressly or impliedly agreed that the obligation of one party is dependent or conditional upon complete performance by the other, then a refusal to perform or declaration of inability to perform any part of the agreement will normally entitle the party in default to treat himself as discharged from further liability. But in any other case:
> "It is not a mere refusal or omission of one of the contracting parties to do something which he ought to do, that will justify the other in repudiating the contract; but there must be an absolute refusal to perform his side of the contract." "

382. On my findings in this judgment, there were aspects of SCL's conduct which amounted to deliberate decisions not to comply with all of its contractual obligations, of which the decision to instruct its subcontractors to demobilise was perhaps the most obvious example. However, viewed overall it cannot be said that there was an absolute refusal by SCL to perform its side of the contract. At all material times it

protested its intention to bring the Project to completion and, although its failure to exercise due diligence was persistent and serious, mere delay – even when substantial – is not necessarily to be equated with a renunciation of the defaulting party's side of the contract: see *J M Hill & Sons v LB Camden* (1980) 18 BLR 31. In my judgement, SCL's conduct came close to the line of being repudiatory, but did not cross it.

383. Although it does not now arise, I would have rejected PLL/SCL's second point. The 3 November 2008 termination letter did not refer to repudiatory breach at all and cannot sensibly be construed as accepting SCL's alleged repudiatory breach, since it does not appear to have had it in contemplation. However, on 10 November 2008 SABIC's solicitors sent a further letter specifically alleging conduct on SCL's part amounting to repudiatory breach of contract and accepting it as such if it had not done so already. If, therefore, SCL's conduct had amounted to a repudiatory breach of contract, it was validly accepted by SCL on 10 November 2008.

Issue 6: PLL and SCL's Counterclaim.

384. By their re-amended Counterclaim PLL/SCL reclaim all or part of the £28,500,000 received by SABIC on calling the APG and the PG shortly after termination. PLL/SCL pleaded a number of points, including the following:

i) SABIC was not entitled to call the APG on 4 November because it had repudiated the contract and any call should have reflected the losses incurred by SABIC or alternatively the value of the work that had not been carried out to which the APG related. The call did not reflect loss incurred by SABIC and did not take account of the work carried out by SCL up to 3 November 2008. Additionally SABIC had no entitlement to reimbursement of the advance payment at the date of the demand as no certificate had been given by that date pursuant to Clause 30.1 of the EPC Contract[59];

ii) SABIC was not entitled to call on the PB because it had not complied with the provisions of Clause 36.4 of the EPC Contract notifying PLL or SCL 30 days before the call giving notice of an intention to make the call and identifying in what respect SCL was in breach. Furthermore, the call was made on the basis of the termination, which PLL/SCL contended was unlawful; and SABIC had not suffered any loss or incurred any liability justifying the call on 7 November 2008 when the bond was called[60];

iii) In any event, the damages suffered by SABIC were less than the £28,500,000 paid out under the securities[61];

iv) Accordingly, £28,500,000 was claimed in restitution, alternatively as money had and received by SABIC, because the calls were unlawful, SABIC had no entitlement to the monies at the time that the bonds were called, and because SABIC has been unjustly enriched by receipt of the bond monies[62];

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[59] Re-amended Defence and Counterclaim [41]
[60] Re-amended Defence and Counterclaim [42]
[61] Re-amended Defence and Counterclaim [43]
[62] Re-amended Defence and Counterclaim [171-175, 179(1)]

v) Alternatively, PLL/SCL claimed repayment of an amount representing the difference between £28,500,000 and any sum which SABIC might show represented a valid claim under the APG and/or PG on the basis of an implied term that SABIC would account to SCL for any overpayment of sums under the securities[63].

385. The nature and relevant terms of the APG and PG are set out under Issue 9 below and are not repeated here. The Counterclaim effectively falls away because of my finding that there is a substantial balance due to SABIC after taking into account the £28,500,000 it received as bond monies. PLL/SCL made no specific submissions on the basis of the Counterclaim in Closing Submissions and, for that reason combined with my findings about the balance due to SABIC, I deal with the other points raised by PLL/SCL very shortly:

i) As recorded under Issue 9, by the time of closing submissions, restitution was not being advanced as a basis for repayment;

ii) For the reasons set out in Issue 9, I reject the submission that SABIC had to have incurred losses before it was entitled to call either the APG or the PB;

iii) It was not a term of the EPC contract or of the APG that a termination certificate had to be issued before the APG could be called;

iv) The Warning Letter stated that SABIC's rights under the APG and the PB were "reserved in all respects". Although that did not expressly state that it intended to exercise the right to call the PB, the implication was clear;

v) The termination of the contract by SABIC was lawful for the reasons given elsewhere.

386. PLL/SCL's counterclaim therefore fails.

Issue 7: SABIC's Quantum Claim.

387. By section E of the Amended Particulars of Claim, SABIC identified two main heads of claim:

i) The first was based upon SABIC's costs of completion of the works, that being the basis of a claim under clause 30.9 of the EPC contract. The pleaded cost of completion was £42,134,010, with constituent costs being attributed to various different items of claim. Interest was claimed as an element of the loss based upon the increased capital sum required to complete the works over the extended time that it took;

ii) The second comprised two claims for delayed receipt of revenue attributable to (a) delays to EID attributable to SCL's failings and (b) delays to EID attributable to the problems with the EVS.

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[63] Re-amended Defence and Counterclaim [176, 179(2)]

388. SABIC's claim was summarised at [115(11)] of the Amended Particulars of Claim as follows:

i)	Contract Sum before Variations	£155,816,376
ii)	Variation Orders since SSA2	£ 35,497
iii)	Contract Sum (sum of (i) and (ii)	£155,851,873
iv)	Deductions for pre-termination events	£ 1,215,487
v)	Sub-Total (item (iii) less item (iv)	£154,636,376
vi)	Amount paid by SABIC	£140,816,376
vii)	Pre-termination balance	-£ 13,820,000
viii)	SABIC's costs to complete	£ 42,134,010
ix)	Additional interest	£ 2,355,174
x)	Damages due to SABIC	£ 9,257,191
xi)	Gross balance to SABIC (sum of (vii) to (x))	£ 39,926,375
xii)	Performance Bond	-£ 13,500,000
xiii)	**Balance due to SABIC ((xi) less (xii)**	**£26,426,375**

389. Two points require clarification:

i) SABIC's formulation refers expressly to the Performance Bond but not to the Advance Payment Guarantee. That is because SABIC has given credit for the APG against the Amount Paid by SABIC: it in fact paid £155,816,376 but has reduced the figure to £140,816,376 on account of the APG. Issue 9 addresses how the parties should account for the PB and the APG;

ii) The head of claim entitled "Damages due to SABIC" is the item in respect of the claims for lost revenue.

390. I deal with the sub-issues as follows:

Sub-issue	Paragraph Numbers
The Costs to Complete Claim – Procedure and Principles	391-396
Evidence of SABIC's Systems	397-405
The Basis of the Claim Under Clause 30	406-410
The Itemised Claim under Clause 30	411-508

Top Down or Bottom Up?	509-510
Collection – Items 1-19	511
Interest as a Constituent Part of the Clause 30.9 Calculation	512-515
The Lost Revenue Claims	516-519
Deductions for Pre-termination Events	519A

The Costs to Complete Claim – Procedure and Principles

391. PLL/SCL complained that it had inadequate information to enable it to address the Clause 30 (costs to complete) claim. The approach to the claim that was adopted was therefore as follows:

i) By its Defence and Counterclaim, PLL/SCL joined issue with SABIC's quantum claim at a high level of generality, maintaining its position that it could not respond in greater detail because of the lack of precision in SABIC's formulation and supporting information;

ii) On 9 November 2012 SABIC served a "Summary of SABIC's Revised Costs to Complete", which itemised the broad heads of claim and provided supporting schedules relating to those heads giving further breakdowns of costs;

iii) At the PTR on 1 March 2013, the Court directed SCL to "serve a document containing particulars of their case in relation to SABIC's alleged costs of completing the Works … . [SCL] shall, if so advised serve a document in response …" It was evidently the Court's intention that the process established by this order should set the scene for SABIC's costs to complete claim and establish what matters were in issue between the parties;

iv) On 12 March 2013 PLL/SCL served its "Particulars of Claimant's Costs to Complete and in Answer to the Claimant's Schedule of 8 November 2012[64]" ["the 12 March Particulars"]. The document identified issues and points that PLL/SCL took on the costs to complete claim;

v) SABIC responded by a further pleading and by serving a third statement from Mr Naisbitt, dated 27 March 2013, which dealt in detail with the points raised by the 12 March Particulars.

392. The three main issues raised by SCL in its 12 March Particulars were (a) whether the works for which SABIC claimed the costs fell within SCL's scope of work, (b) whether the amounts claimed were reasonable, and (c) whether the costs were reasonably incurred. Mr Naisbitt's response relied heavily upon the systems that SABIC put in place for allocating costs correctly to SCL's scope of work or elsewhere. He did not purport to have direct knowledge of all matters of which he

[64] That being the schedule served by SABIC on 9 November 2012

spoke but, where he lacked direct knowledge, he had consulted people who had it and had carried out reviews of the documents supporting SABIC's claim. He relied upon his reviews as giving assurance that the claim was properly founded.

393. The parties appointed experts to review the quantum claim, being Mr Walmsley for SABIC and Mr Brooker for SCL. They co-operated in an exemplary fashion in their approach to their task and, as a result of their investigations into the supporting documents, were able to reach agreement on a number of items "as figures", meaning that they had satisfied themselves that SABIC had incurred expenditure in relation to the sums claimed by SABIC. Since they had no personal knowledge of what had happened, the documentation with which they were provided determined whether they could form a view on whether given expenditure in fact related to work that would have been within SCL's scope of work.

394. This process set the scene for the trial of the costs to complete head of claim. The result of the process was that the evidence was in many respects lightly sketched, with the Court being required to draw inferences from evidence about systems without sedulous investigation of all individual items in the course of evidence and trial. This is not to belittle the considerable amount of work done both by Mr Naisbitt and by the experts. It was, in my judgment, a proportionate and reasonable approach to this head of quantum even allowing for the size of the sums involved and the importance of the issue to the parties. It is easy to conceive that the issues relating to this head of claim could in the past have been allocated weeks of Court time on their own, with minute examination of items and evidence from dozens of witnesses with first hand knowledge of what happened after termination. As it was, the oral evidence of Mr Naisbitt took well under a day of the trial and the combined oral evidence of Mr Walmsley and Mr Brooker just under a day.

395. This approach, though reasonable and proportionate, is not without its difficulties. The first area of tension goes to the question of the burden and standard of proof. PLL/SCL submit, without fear of contradiction, that it is for SABIC to prove its claim. It is also for SABIC to decide what evidence it wishes to call in its attempts to do so. However, the Court has provided the context for those decisions by allocating 20 days of Court time to the entire trial and also by its directions in relation to this head of claim at the PTR on 1 March 2013. The allocation of the Court's time means that it was out of the question to produce full and comprehensive direct evidence in support of every aspect of SABIC's quantum claim: the time available did not permit such an approach, however efficiently it might be pursued. Furthermore, the Court's order at the PTR was clearly intended to ensure that SCL identified the matters in issue so that the parties should then concentrate upon them. In these circumstances it would in my judgment be inappropriate for the Court to cavil at the approach adopted by SABIC, which was that Mr Naisbitt's third witness statement should address (and only address) the matters raised by SCL in the 12 March Particulars. On the contrary, the Court is required to make proper findings and draw proper inferences on the basis of the information that the parties have presented, including the important evidence of Mr Walmsley and Mr Brooker. Lest there be any residual doubt, I consider that the evidence presented is sufficient to justify findings of fact, as set out below, adopting a conventional approach to the burden and standard of proof that rests on SABIC. That said, the state of the evidence must inevitably be reflected in the findings that the court can properly make, with the result that I accept PLL/SCL's submission that it

may be necessary in some cases to take a broad brush approach to the figures. PLL/SCL also submitted that it would be necessary to adopt a "conservative" approach. I do not agree that "conservatism" is the correct description of the proper approach: the question will be whether and to what extent the evidence justifies a finding, given the limitations of the procedural framework established by the Court and of the evidence that is available.

396. A second area of tension arises out of SABIC's submission, based upon well known passages of high authority[65], that it should not be judged harshly when the Court is assessing its performance after termination because it had been put in a position of embarrassment by SCL's defaults. SABIC submits that its actions after termination should not be "weighed in nice scales" and that it should not "be held disentitled to recover the cost of [its] measures merely because the party in breach can suggest that other measures less burdensome to him might have been taken." There is substance in this submission, but it can be taken too far on the facts of this case. On my findings, SABIC was placed in the difficult position of having to take over the completion of the works after termination when it was not itself a construction company. However, it was a major organisation that had the opportunity to prepare for the possibility of termination, particularly during the Warning Period; and it is part of SABIC's case on quantum that it was in fact competent to carry the works to completion with the introduction of minimal additional project management expertise[66]. In my judgment, a suitable balance is struck by recognising that, although SABIC had significant expertise, much of which it had acquired during the Wilton project, it was primarily a chemical manufacturing company and not a construction business. Although in mid-October 2008 SABIC thought that the termination had been "technically well prepared"[67] the reality, when it came, was a major and unwelcome burden for it. In the event, while I have borne SABIC's submission on this point in mind in my approach to the evidence, it has not been necessary to resort to it to any great extent since I do not consider that SCL has shown SABIC to have behaved unreasonably so as to need to rely upon indulgence from the Court in making its findings.

Evidence of SABIC's Systems

397. Mr Naisbitt gave evidence of the systems adopted by SABIC in his first and third statements[68]. In summary, SABIC set up a system for recording post-termination costs under five basic headings (A. construction, B. rectification, C. pre-commissioning, D. commissioning, E. one-off costs associated with termination). Each subcontractor was instructed to allocate its costs on its daily log sheets for labour in accordance with these designations. The system was monitored by a team of quantity surveyors and the supervisory Construction Management Team was instructed to issue instructions adopting the same categorisation. Where work was outside the scope of SCL's work, it was allocated to a separate cost heading under SABIC's SAP accounting system. One of SABIC's project managers oversaw the development and approvals process for what were known as "Link Projects" (i.e.

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[65] See *Lodge Holes Colliery Co Ltd v Wednesbury Corporation* [1908] AC 323, 325 per Ld Loreburn LC; *Banco de Portugal v Waterlow and Sons Ltd* [1932] AC 452, 506 per Lord Macmillan
[66] See Naisbitt Third Statement at [23] and [53].
[67] See [139] above.
[68] See for example his first statement at [78-81], [131]; and his third statement at [5-7], [53(vi)], [61].

projects that were improvements on the currently agreed design, and therefore outside SCL's contracted scope of works); and SABIC's costs engineers set up a cost recording system to ensure that the costs were allocated to the correct cost codes. The costs engineers were directly employed by Balfour Beatty Management ["BBM"] and would have checked costs and payment applications.

398. Mr Brooker's evidence was that the approach adopted by SABIC was the sort of approach that he would expect to be adopted, while making the point that, as he would imagine to be the case on every such job, the application of the approach was not perfect. As will be seen, in the case of payments to AMEC he identified what he considered to be significant weaknesses; but his enquiries did not lead him to make general criticisms of the systems adopted. Mr Walmsley's evidence was that the approach adopted by SABIC and BBM allocated costs as accurately as they reasonably could.

399. Further assurance was provided by periodic audits. First, BBM carried out periodic audits. PLL/SCL rightly point out that these audits were not comprehensive in covering all contractors or all periods, though when they were carried out they could cover more than one period. It also points out that there is limited evidence of cost reductions being achieved in the light of such audits: this is also correct though it is a neutral finding since it is consistent with the costs not requiring reduction – and there are instances where reductions did occur. However, Mr Brooker accepted that the concept of auditing was appropriate and that the scope of the audits carried out was reasonable and covered most aspects that he would anticipate.

400. As elsewhere in the history of the Wilton project, Cape was given particular attention. Mr Wilson of BBM was asked to manage the account for SABIC at the beginning of 2009. Having spent two weeks studying the account he was asked to manage the costs of the account, which was by then being run on a net cost reimbursable basis, and he visited Cape twice to audit their systems in March 2009, each visit lasting about two hours. His audit involved analysing sample allocation sheets, costs reports and materials costs and resulted in a saving of approximately £70,000 which had been wrongly included by Cape. Thereafter he received weekly costs reports from Cape and continued to audit their account by checking allocation sheets, timesheets and clock records until July 2009. When Cape submitted its final account in August 2009 in the sum of £9.657 million, he negotiated a reduction to £9.6 million, which he did in the knowledge that there were further costs that Cape could have included and in the belief (formed on the basis of his previous checks) that a figure in excess of £9.6 million was likely to be the true value of Cape's final account. In closing submissions PLL/SCL pointed out that the two reductions achieved by Mr Wilson had not been as a result of the detailed studies that he had described; but it was not suggested to him in cross-examination or to the Court in closing submissions that there were other significant reductions that he should have been able to achieve. Mr Brooker had reviewed the Cape account with Mr Wilson and identified only a further £26,000 reduction, which represents 0.27% of Cape's final account figure of £9.657 million.

401. PLL/SCL maintained the submission that the sums claimed by SABIC included (or may have included) preferential items (i.e. works that properly should have been allocated to SABIC's account rather than to SCL's). With limited exceptions, no positive case has been advanced to establish that there was any substantial variation that was wrongly included in SABIC's estimate of the scope of SCL's works. In the

12 March Particulars, PLL/SCL criticised SABIC's general systems for allocating works to SCL or SABIC's account; and it identified two areas of costs which it asserted that SABIC had failed to exclude on this basis. The first was costs relating to the Secondary Compressor; the second was costs relating to an upgrade to the quality of the LDPE produced by the plant so that it would satisfy the requirements of the food market. Dealing with each in turn:

i) When considering Issue 3.9 above I have found that the crosshead alignments were outside NP's tolerances (which were contractual requirements) as well as the more demanding tolerances set by EM (which were not). SABIC was therefore justified in carrying out works to bring the alignments within NP's tolerances but would not be entitled to lay additional costs incurred in bringing the alignments within EM's tolerances at SCL's door. However, Mr Naisbitt's evidence in his third statement is that NP did not charge for the realignment work and that the only SABIC cost that has been charged to SCL is a proportion of the time of Mr Bown[69]. He was not cross-examined on that evidence and I accept it. On that basis, I find that SABIC has not claimed any material charge from SCL in respect of additional works carried out to bring the alignments within EM tolerances;

ii) Mr Naisbitt also gave evidence about food-grade LDPE in his third statement, on which he was not cross-examined and which I also accept. His evidence was that SABIC had not claimed any costs against SCL for any investigations into the food compliance issues, either generally or in relation to the upgraded oil proposed (and used) for the secondary compressor by EM. No claim has been made against SCL relating to the witnessing of tests or costs associated with obtaining food compliance certificates or raw materials. On the basis of this evidence, I find that SABIC has not claimed any costs relating to food compliance issues.

402. More generally, Mr Walmsley's evidence confirms that SABIC's claim excluded costs properly attributable to SABIC relating to link projects (over £700,000), Foster Wheeler design and inspection costs unrelated to SCL's scope (over £225,000), SABIC project management costs associated with commissioning (over £920,000), and some of the works associated with the LAB/LER rooms (almost £190,000). As my findings on the itemised claim below show, I am not satisfied that SABIC's evidence supports the entirety of the residual amounts that it has claimed. However, the evidence about systems that I have referred to above, together with Mr Naisbitt's detailed evidence in relation to the matters raised in the 12 March Particulars and Mr Walmsley's evidence to which I have just referred leads me to find that SABIC has, with limited exceptions, been successful in stripping out from its claim against SCL costs that should properly have been allocated to SABIC.

403. Mr Brooker expressed two further concerns about SABIC's approach and the information with which he had been provided that may be touched on here. First, he questioned whether work had in fact been carried out in respect of the works claimed. Apart from specific reservations in relation to AMEC, to which I return below, this concern was unspecific. It also appeared to be unwarranted since he accepted that he had in general been able to verify that the sums paid had in fact been paid in respect

[69] Mr Naisbitt's third statement refers to him as Mr Bown but it appears that it should refer to Mr Bown.

of the construction of the Wilton LDPE plant and the kind of work that was being charged for. His enquiries had involved following the progress from allocation sheets to payment, which he accepted gave him a reasonable and proportionate level of confidence. His second reservation was about whether the costs had been reasonably incurred. His concern appears to have been general and caused by the undoubted fact that the ultimate scope of work, duration of the works and amount of monies expended greatly exceeded the estimates that had been made in November and December 2008. However, subject to points made on particular items and discussed below, PLL/SCL has not shown that the increased scope and expenditure is because of a misallocation of expenditure or a mis-attribution of the expenditure to SCL's account; and, as touched on under Issue 3 above, I reject the submission that the increased period to EID was due to matters for which SABIC rather than SCL was responsible. Rather, the weakness in Mr Brooker's argument derives from the fact that the full scope of work was not appreciated in the November and December 2008 estimates upon which he founded his position.

404. PLL/SCL submitted that the increase in cost was in part attributable to the fact that, after termination, most of the works were let on a cost reimbursable basis. However, Mr Naisbitt explained in his second and third statements the cogent reasons why this was done and that SABIC negotiated fixed prices where it was able to do so. PLL/SCL's criticism appears to ignore the fact that SABIC generally retained the same sub-contractors as SCL had engaged before termination, in many cases on the same or similar terms as before. In the light of Mr Naisbitt's evidence, I reject the submission that it was unreasonable for SABIC to agree to cost reimbursable terms or that its doing so led to any unreasonable increase in costs.

405. In my judgment, PLL/SCL failed to make substantial headway in relation to the systems adopted by SABIC after termination for the allocation and reviewing of costs. As a result, when considering the disputed items that go to make up SABIC's costs to complete claim, I start from the position that SABIC's systems were generally sound and effective to exclude works that were not properly attributable to SCL's scope (either originally or by way of rectification of defects). That does not mean that all claimed costs are recoverable or that the Court should start with any form of predisposition to find in favour of SABIC on particular items: the experts are agreed that in many cases the sums pleaded by SABIC cannot be justified. I will therefore consider the constituent items in turn.

The Basis of the Claim under Clause 30

406. Clause 30.1 makes provision for the preparation of a Termination Certificate in the event of termination of the employment of the Contractor by the Purchaser pursuant to Clause 27.2. The amount to be certified is the amount of the Contract Price (plus or minus the value of any additions to or deductions from the Contract Price) *minus* the net amount of the saving of cost and expense to the Contractor by reason of its having been relieved by the termination of its obligation to complete performance of the Contract *minus* the total amount paid by the Purchaser to the Contractor under the contract. The resulting balance will be a balance due to the Purchaser or the Contractor depending upon the constituent amounts included in the calculation. Payment of the balance (in either direction) shall be paid within 14 days of the debtor's receipt of the Termination Certificate, as provided by Clause 30.5.

407. The Termination Certificate does not finally determine the financial consequences of termination. In particular, and without prejudice to its other rights, Clause 30.9 provides that the Purchaser may itself complete the works. If it does so it is not liable to make any further payment to the Contractor until the works have been completed and the expiration of the Defects Period "and until the costs of completion and making good and remedying Defects, damages or delay in completion (if any) and all other costs and expenses incurred thereof certified by the Purchaser." The clause provides that "if the total cost to the Purchaser reasonably incurred exceeds the total that the Engineering Works would have cost had they been completed by the Contractor (the Contract not having been terminated) the difference shall be recoverable by the Purchaser from the Contractor either by way of set off or as a debt." It is on this provision that SABIC founds its first head of claim.

408. SABIC's approach has been to calculate the total costs to it of completing the works, in which it includes the sums already paid to SCL and the cost of remedying Defects left by SCL at termination. It interprets the words "the total that the Engineering Works would have cost had they been completed by the Contractor (the Contract not having been terminated)" as meaning the total that the works would have cost SABIC had they been completed by SCL i.e. the contract price it would have had to pay had the contract not been terminated and had SCL completed the works. PLL/SCL submit that SABIC's approach is incorrect and that the words "the total that the Engineering Works would have cost had they been completed by the Contractor (the Contract not having been terminated)" means the costs that SCL would have incurred in completing the works (without the contract being terminated) from the point at which termination in fact occurred. In advancing this interpretation PLL/SCL submit that it is to be preferred because it is consistent with the approach adopted by Clause 30.1 in requiring the costs which SCL has saved to be the relevant measure when performing the calculation for the production of the Termination Certificate.

409. I consider that SABIC's approach is correct. First, the exercises being carried out under Clause 30.1 and 30.9 respectively are different so that it is not self-evident that the same measure of costs should be adopted in each. Second, the terms of the clauses are different: Clause 30.1.3 refers expressly to SCL's costs while Clause 30.9 does not. This difference does not support the submission that the different provisions of the two clauses should each be given the same meaning. Third, the purpose of the two clauses is different. Clause 30.1 provides the route for determining the amount outstanding at termination. At that point, a calculation which effectively entitles the contractor to be paid the contract sum less the amount that he would have incurred in bringing the contract works to completion has logic. However, Clause 30.9 applies where the purchaser has completed the works himself. At that point, there is a logic in entitling him to recover the reasonable costs that he has incurred in bringing the works to completion, subject to giving credit for the amount that he would have had to pay to the contractor (i.e. the contract price as amended) had the contractor completed the works in accordance with the contract. I therefore reject PLL/SCL's submission that the costs that it would have incurred had the contract not been terminated and if it had completed the works are relevant to the calculation under Clause 30.9.

410. PLL/SCL also pointed to the requirement under Clause 30.9 that the total costs to the Purchaser shall be "reasonably" incurred. The requirement is clear. Having reviewed

all of the evidence, including my findings that (a) the contract was properly terminated, (b) taking on the contract works imposed a substantial and unwelcome burden on SABIC, (c) SABIC acted reasonably in engaging (for the most part) the subcontractors previously engaged by SCL, (d) SABIC acted reasonably in engaging the sub-contractors on a cost plus reimbursable basis where it did so, (e) SABIC imposed systems for the allocation of costs that were reasonable in the circumstances, (f) SABIC imposed systems for the vetting of costs that were reasonable in the circumstances, (g) the progressive increase in cost estimates and outturn from the date of termination were substantially a function of the fact that the scope of work and extent of defects left by SCL was not known at the time of termination, and (g) the costs that I find justified in respect of the items of the Clause 30.9 claim were within the scope of SCL's work, I find that the costs that I allow below were reasonably incurred within the meaning of Clause 30.9.

The Itemised Claim under Clause 30

411. The respective positions of the two experts were conveniently set out in an attachment to their Third Joint Statement. For present purposes I identify the pleaded claim and the position of each expert at the head of each item.

Item 1 – Project management, engineering and completions [Pleaded £4,842,781; Brooker £4,756,460; Walmsley £4,756,460]

412. The claim is for the costs of project management, outstanding engineering, documentation and the completions work scope that had been SCL's responsibility. By the 12 March Particulars, PLL/SCL took general points to the effect that the personnel would have been on site for the period of SCL's completion in any event so that the costs would have been incurred whoever completed the works and that the sums were excessive. Mr Naisbitt's response was that the staff costs were in respect of staff who had to be brought in to replace SCL's staff when they went and that SABIC did not introduce more staff than were necessary. Dealing with the increase between the projected costs in the December 2008 estimate (upon which Mr Brooker relied in his first report) and the eventual outturn cost, he pointed out that the December 2008 report was not comprehensive in a number of material respects and was itself based upon an estimate made in November 2008 when the full scope of the work was not known. I accept his evidence on these points.

413. As elsewhere, the experts verified the claimed costs to SABIC's records while not being in a position to verify whether the costs were properly to be attributed to SCL. PLL/SCL take the general point that some of the people would have been on site in any event, even if SCL had taken the project to completion. However, it does not follow that they would have been engaged in work that should have been carried out by SCL. Their time was therefore diverted away from their proper SABIC-oriented work and is, in general, recoverable.

414. In closing submissions PLL/SCL criticised the inclusion of particular individuals:

i) The experts' verified figure of £4,756,460 included £104,557 in respect of 8 months full time employment of Nico Natzgam, who Mr Naisbitt described as a roving consultant. Mr Naisbitt's oral evidence did not support the conclusion that Mr Natzgam worked full time on the project for 8 months. On

Mr Naisbitt's oral evidence, it seems unlikely that Mr Natzgam spent more than about 2 elapsed months on the project;

ii) SABIC claims for 876 hours of Mr Naisbitt's time. In his oral evidence it emerged that, while he was directly involved for about two or three weeks after termination he was later transferred to other SCL-related matters such as the adjudication. He was later involved in the agreement of final accounts on completion of the works. The claim in respect of his time is therefore overstated for the period after the first two or three weeks and before his re-involvement with final accounts;

iii) In closing PLL/SCL took a point about the inclusion of costs for a permit to work team. This point had not been taken in the 12 March Particulars and had therefore not been addressed by Mr Naisbitt; and it had not been raised during evidence. However, Mr Justin Williams in oral evidence spoke of the existence of the permit to work team and I accept SABIC's submission that permits to work would be required on such a site. PLL/SCL's challenge on this point therefore fails as the evidence establishes the existence of the team and that it was carrying out work properly falling within this item;

iv) In closing submissions PLL/SCL also challenged the inclusion of Mr Bown (£103,920) whose work content was described as "project budget up to Ethylene In [then] Commissioning Budgets up to Polymer Out then ESS Budget thereafter" and Mr Chandramohan (£157,001), a Honeywell employee who PLL/SCL submits was involved in SABIC commissioning and modification packs for the DCS. Neither of these points had been taken in the 12 March Particulars, nor had they been raised in oral evidence or previously in submissions. Mr Chandramohan is mentioned in an appendix to the experts' second joint statement, but not in terms that enable the Court to determine with any confidence what his work involved. In these unsatisfactory circumstances, firm conclusions are out of the question: the description of Mr Bown's work suggests that not all of his time may have been spent on work that should be attributed to SCL's account, as does that of Mr Chandramohan. The evidence does not justify the conclusion that all of their time should be included.

415. In the light of PLL/SCL's objections, as summarised above, there is evidence of over-inclusion of individuals which is unlikely to be limited to those individuals identified by PLL/SCL. Some discount is therefore required to reduce the claim to a level where the Court can be confident (on the balance of probabilities) that it is justified. This is a typical example of the need for a broad brush approach. I am confident that SABIC should be entitled to bring into account £4,250,000 under this item.

Item 2 – Construction management and support [Pleaded £1,663,990; Brooker £1,657,540; Walmsley £1,657,540]

416. The Amended Particulars of Claim pleaded a composite figure of £2,868,537 for this and the next item. Item 2 excludes costs attributed to Foster Wheeler. No specific points were taken in the 12 March Particulars or in closing. The experts verified the sums claimed against supporting documents.

417. In the absence of specific challenge, SABIC is entitled to bring into account £1,663,990 under this item.

Item 3 – Foster Wheeler Engineering [Pleaded £1,204,548; Brooker £1,204,548; Walmsley £1,314,457]

418. This forms the balance of the composite figure of £2,868,537 for this and the previous item as originally pleaded in the Amended Particulars of Claim. The experts identified supporting documents to verify the figure adopted by Mr Walmsley of £1,314,457, but Mr Brooker was not prepared to go beyond supporting the pleaded figure of £1,204,548. SABIC submits that the Court should award the figure that has been verified by the experts, namely £1,314,457.

419. No specific points were taken in the 12 March Particulars, but the experts' second joint statement identified that a number of items on the summary spreadsheet that Mr Naisbitt had produced contained the words "modification" or "mod", which raised the possibility that the work content was additional to SCL's scope of work. The experts were not able to form a view on the basis of the information provided to them whether or not the questioned items were properly included within the scope of SCL's work. Mr Naisbitt had given evidence about Foster Wheeler's design input in his third statement and listed the hours attributable to various parts of the completion works. In cross-examination he confirmed that he had gone to the individual tasks listed in the spreadsheet of Foster Wheeler's work and had checked that they were properly allocated. I accept his evidence on these points.

420. On this evidence I am satisfied that the Foster Wheeler work was properly allocated as evidenced by Mr Naisbitt. SABIC is entitled to bring into account to the extent of its pleaded sum, namely £1,204,548.

Item 4 – Electrical & Instrumentation [Pleaded £3,298,239; Brooker £3,298,239; Walmsley £3,298,239]

421. Mr Naisbitt's first statement said that this and other claims in respect of the major subcontractors and vendors were calculated by using their final accounts, cross checked to entries in SABIC's SAP system. The 12 March Particulars took the point that the ultimate amount claimed was in excess of the amount forecast in December 2008, alleging that field instructions and miscellaneous amounts included in the sum claimed were likely to include preferential items. It also alleged that the amount claimed was in part attributable to "SABIC's misconceived decision to repeat basic loop tests which had already been completed".

422. In response, Mr Naisbitt's third statement asserted that SABIC preferential items would have been stripped out by SABIC's costs engineers either by providing a separate cost code for the works or by checking that the works being claimed by SABIC against SCL were removed prior to the submission of the Final Termination Certificate. The cost of re-testing the loops were included in the amount claimed (in the sum of £794k); and he referred to a detailed breakdown of the 78,450 manhours actually expended in completing the E&I scope on the project. I accept Mr Naisbitt's evidence on these points.

423. The experts agreed the sum claimed, noting that Mr Naisbitt had made an adjustment of £206,484 to exclude man hours which he had identified as being in connection with commissioning. This provides some endorsement of Mr Naisbitt's evidence that costs that should be excluded have been stripped out.

424. On this evidence, SABIC satisfies the burden of showing that the sums claimed were properly included as being attributable to SCL. SABIC is entitled to bring into account the pleaded sum, namely £3,298,239.

Item 5 – Access (Cape) [Pleaded £2,799,897; Brooker £2,743,739; Walmsley £2,743,739]

425. The 12 March Particulars raised the question why it was necessary to re-establish so much scaffolding, asserting that it was excessive and likely to impede contractors. They alleged that the scaffolding was maintained for longer than had been anticipated and the SABIC should demonstrate the reasonable need for it for so long.

426. Mr Naisbitt responded in his third statement. His evidence was that this item contained other forms of access provision than merely scaffolding; the need for access to the works was determined by their duration; he relied upon the fact that there were numerous defects (particularly in relation to insulation works) that required access to be provided; and the need for reinstatement arose because SCL had removed a substantial proportion of the scaffolding even though the works (and particularly the insulation works) were incomplete. His evidence was that SABIC removed scaffolds at the earliest opportunity as they would then be of no benefit; and the costs were audited and paid for on a net cost plus margin basis. He was not cross-examined on this evidence and I accept it.

427. The experts verified the figure of £2,743,739 without expressing any view on whether it was attributable to SCL. SABIC is entitled to bring into account the verified figure of £2,743,739.

Item 6 – Fireproofing (Cape) [Pleaded £1,362,004; Brooker £1,339,985; Walmsley £1,339,985]

428. The 12 March Particulars point to the increase between the sum estimated in December 2008 and the ultimate outturn cost, suggesting that this was due to the extended period over which the work was executed, difficulties of access and failure by SABIC to properly incentivise or manage the work, rather than to any increase in scope.

429. Mr Naisbitt responded in his third statement. Rix was engaged on a cost reimbursable basis for a number of reasons, including that, because of the delay that had already occurred, there was doubt whether Cape would agree to carry out the works for the lump sums they had originally quoted; the works needed to be accelerated; additional resources were required; and the works were in a state of partial completion. SABIC therefore took the view that the most pragmatic and appropriate manner of securing cooperation and progress was to work on a cost-plus basis. The final outturn cost was a function of Rix's lack of productivity, which was not demonstrably worse after termination than it had been before; and the scope of the work was well defined. He was not cross-examined on the substance of this evidence and I accept it.

430. The experts verified the figure of £1,339,985 without expressing any view on whether it was attributable to SCL. SABIC is entitled to bring into account the verified figure of £1,339,985.

Item 7 – Insulation [Pleaded £5,750,401; Brooker £4,950,110 (Cape) + £800,291 (Hertel); Walmsley £4,858,065 (Cape) + £800,291 (Hertel)]

431. The 12 March Particulars allege that the sums claimed are grossly excessive and take issue with any sum claimed for rectification, pointing to the fact that no sum was allocated to rectification work in SABIC's November 2012 costs to complete schedule.

432. Mr Naisbitt responded to these points in his third statement. He noted that the 12 March Particulars rely upon a December 2008 estimate which was based on pre-termination information provided by SCL and that the full scope and consequent growth in manhours became apparent after termination, not least due to the fact that SCL had not accurately tracked all aspects of the insulation work[70]. Rectification works were required; and productivity was less than hoped because the preceding works were in delay. I accept Mr Naisbitt's evidence on these points.

433. In the 12 March Particulars PLL/SCL asserted that it was "surprising" that SABIC chose to retain SCL's main subcontractors when it had been dissatisfied with progress under SCL, the stated disadvantage to SABIC being that it would limit any attempts that SABIC might make to establish any time or costs control over the Works. In Closing Submissions PLL/SCL criticised SABIC for retaining Cape without taking measures to incentivise them. Mr Naisbitt responded to the suggestion that SABIC might have engaged other contractors in his third statement. For the reasons he gives, it would have been highly disruptive to have attempted to assemble a new body of contractors. Quite apart from the uncertainty and time involved in attempting to identify, agree terms with and engage others, new contractors would not have the benefit of prior knowledge of the site and works and would have to make a standing start on a part-completed project. I accept Mr Naisbitt's evidence that the decision to retain existing sub-contractors was pragmatic and reasonable. In his first statement, on which he was not cross-examined, he had said that at the meetings on 12 August 2008, SCL had advised that the access contract was at the stage where it was only realistic to evaluate Cape's work on a reimbursable basis. It is also relevant to recall that, on 17 October 2008, Cape had asserted to SCL that completion of the straight runs would constitute substantial completion of its works, and that subsequent works should be done on a dayworks basis[71]. PLL/SCL has not provided any detailed suggestions about how Cape might have been incentivised in a cost-effective way, and I reject the criticism of SABIC on this point, such as it is.

434. The experts verified the Cape figure with minor differences and agreed the Hertel figure without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figures of £4,858,065 for Cape and £800,291 for Hertel, giving an aggregate sum of £5,658,356.

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[70] See [182]
[71] See [206]

Item 8 – Painting [Pleaded £642,069; Brooker £631,689; Walmsley £631,689]

435. The 12 March Particulars alleged that painting was largely complete by termination and that in December 2008 SABIC forecast a further 3,750 manhours at a cost of £112,500.

436. Mr Naisbitt responded in his third statement that the claim for painting included the cost of stand-by (the need to have an additional person present for safety reasons) within the scope of SCL's works. The breakdown of costs is £82,000 for painting (below the December 2008 forecast figure), £416,000 for stand-by and £144,000 for cleaning. I accept his evidence on these points.

437. The experts verified the sum of £631,689 without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figure of £631,689.

Item 9 – Chemical Cleaning [Pleaded £2,929,748; Brooker £2,929,748; Walmsley £2,929,748]

438. The 12 March Particulars took the point that the outstanding work at termination amounted to £2,499,834 and that PLL/SCL did not understand the reason for any increase above that sum.

439. Mr Naisbitt responded in his third statement. For his part he did not know the basis of the sum of £2,499,834, having not seen a breakdown of that sum. He referred to the fact that SCL may not have been basing estimates on the full scope of cleaning and blowing work, for the reasons set out in the discussion of issue 3.3 above. He had in his first statement confirmed that the sum claimed was based upon the contractor's final account and other supporting documentation. I accept his evidence on this item.

440. The experts verified the sum of £2,929,748 without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figure of £2,929,748.

Item 10.1 – Mechanical Completions: AMEC [Pleaded £5,877,859; Brooker £625,000; Walmsley £5,394,675]

441. This item generated a significant dispute on the figures. The 12 March Particulars alleged that, until termination, the mechanical completions work was being done by Shaw and that, post-termination, SABIC transferred a significant amount of that work to AMEC. It alleged that no breakdown between "remaining work" and "rectification work" was provided but that the claim suggested that approximately £3.5 million had been spent on rectifying defects. Overall it was said that the claim lacked any meaningful substantiation.

442. Mr Naisbitt responded in his third witness statement that SABIC had suggested the use of AMEC (who were then already involved with the IMS maintenance contract on Teesside) to support Shaw because of the difficulties that SCL was then experiencing with Shaw. AMEC labour was deployed from 7 July 2008 as agreed between SCL and SABIC. SABIC agreed to (and did) pay AMEC direct in order to assist SCL with its cash-flow difficulties, recharging SCL for the hours for which SCL had agreed to

pay. Rectification works which SCL might have been able to insist were done by Shaw free of charge were reimbursable by SABIC because it had not been a party to the original contract under which the defective work had been carried out. He referred to the documents which had been made available to the experts which, he said, showed the trail from labour allocation sheets to the costs claimed with appropriate allocation of costs. I accept his evidence in response to the 12 March Particulars in relation to Cape (and, so far as applicable, to Shaw – see below).

443. The experts reviewed the documentation. This gave rise to two issues:

i) There were discrepancies between the site gate entry records and the allocation sheets. Although BBM had carried out an audit of the AMEC costs, this point had not apparently been picked up. The discrepancy amounted to about 20% of the sum claimed;

ii) There were discrepancies between the hours allocated to commissioning in the allocation sheets and those so allocated in SABIC's calculations. Over three weeks that were sampled, SABIC had allocated 513 hours in aggregate to commissioning (which would not be attributable to SCL) while the allocation sheets allocated 1321 hours.

444. Dealing first with the gate entry records, the main points taken by Mr Walmsley were as follows:

i) He carried out an analysis which showed that about 20% of AMEC's labour was working in locations which would not require them to go through the main gate. His detailed analysis showed that 16.7% of hours were worked by off-site fabrication yard labour and 4.5% by store men and store drivers;

ii) When the gates were open, it was his experience that labour, for reasons of convenience, would enter through the open gates rather than logging-in through the gate entry system;

iii) Some AMEC supervisors were generally office based and would therefore not always be logged on at site;

iv) Accordingly, the allocation sheets would never reconcile;

v) He suggested that BBM may have made adjustments for gate entry records as they had done for other contractors, even though those adjustments were not apparent;

vi) For these reasons he made no adjustments on account of the discrepancy between the gate entry records and the allocation sheets.

445. Mr Brooker's approach to the gate entry records was different:

i) He had identified cases where named "AMEC" individuals had entered the gates under the name of other companies;

ii) He considered that there were clear errors on the gate entry records where there was no final exit or initial entry recorded for an individual. I note in

passing that this may tend to support Mr Walmsley's point that individuals were not rigorous in using the gate entry system on entering or leaving the site;

iii) He had identified and adjusted for some duplication between AMEC's records and those of its subcontractor SES;

iv) He had then compared the result of his exercise with the allocation sheets and the sums claimed: this revealed the 20% discrepancy;

v) For these reasons (and, presumably, because of the separate commissioning point) he felt unable to make any assessment beyond his previously made allowance of £625,000 (i.e. 9.4% of the sum claimed for this sub-item).

446. At most, the discrepancy between the allocation sheets and the gate records would require a reduction of about 20% of the sum claimed. However, such a reduction would be excessive unless it were to be concluded that the gate entry logs provided a full and comprehensive record of those working on the LDPE project, which they do not. First, the gate entry records were for security purposes and not for the formal purpose of logging men into and out of work. Second, I accept Mr Walmsley's evidence that labour would not be rigorous about logging themselves in and out of the gates; and I accept the general thrust of his evidence that about 20% of AMEC's labour worked offsite and would therefore not need routinely to go through the gates or to operate the gate entry system. In his evidence, Mr Walmsley took a conservative estimate of 14% of the workforce hours being attributable to those who worked off-site, though his analysis would suggest a higher figure. That was prudent, but it still makes a substantial dent in the gate entry point. In my judgment, essentially for the reasons given by Mr Walmsley, I consider that the gate entry point justifies a reduction of 5% on the basis that about 14% is explained by Mr Walmsley's analysis and a further 1% by the fact that people would not have been rigorous in their use of the gate entry system.

447. Turning to the commissioning point, Mr Walmsley made an adjustment of £483,184 based on assuming that the discrepancy between the allocation records and the sums claimed (808 hours over the three sample weeks) would be representative of the whole period. Mr Brooker made no specific adjustment on this basis. To my mind, Mr Walmsley's adjustment is reasonable since there is no reason to suppose that the three weeks in aggregate were unrepresentative (in either direction) of the whole period.

448. I reject Mr Walmsley's suggestion that BBM in fact made an adjustment in respect of the gate entry records even though none is apparent. There appears to be no evidence to support the suggestion and no reason why BBM would not have referred to the adjustment if it was being made.

449. The experts raised a further question about the treatment of lunch or rest breaks. There is no evidence on this point that justifies a further deduction from the hours claimed on the basis of the allocation sheets.

450. In the result, the calculation of this sub-item is as follows:

i) SES (agreed between the experts) £ 625,000

ii)	AMEC (£5,252,859 less £483,184)	£4,769,675
iii)	Sub total	£5,394,675
iv)	Less 5% (gate entry discrepancy point)	£ 269,734[72]
v)	Total	£5,124,941

Item 10.2 – Mechanical Completions: Hertel [Pleaded £119,319; Brooker £119,319; Walmsley £119,319]

451. The 12 March Particulars took no separate point on Hertel. The sum claimed was verified by the experts, without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figure of £119,319.

Item 10.3 – Mechanical Completions: Shaw [Pleaded 2,338,238; Brooker £2,333,316; Walmsley £2,333,316]

452. The 12 March Particulars took no separate point on Shaw beyond those made in relation to AMEC, to which Mr Naisbitt responded as above. The sum claimed was verified by the experts subject to minor reductions, without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figure of £2,333,316.

Item 11 – Trace Heating (Thermon) [Pleaded £276,570; Brooker £276,570; Walmsley £276,570]

453. The 12 March Particulars took no point on Trace Heating. The sum claimed was verified by the experts, without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figure of £276,570.

Item 12.1 - Civil Engineering Works (Tolent): Miscellaneous Civil Works [Pleaded £2,590,107; Brooker £2,590,107; Walmsley £2,590,107]

454. The 12 March Particulars allege that SCL had obtained a quotation including a lump sum quote for outstanding roadworks and a rate per linear metre for fencing. They question why SABIC undertook the work on a manhour/daywork basis and assert that the work would have cost no more than £500,000 if it had been tendered on a fixed price basis.

455. Mr Naisbitt responded in his third witness statement. He identified that the sum claimed covers more than just the roadworks and fencing identified by the 12 March Particulars, with the sum claimed for those items correlating well with the quotes that had been obtained by SCL before termination. He referred to and relied upon annotated timesheets, daily summaries, supporting invoices, checked measures (where appropriate) contained in SABIC's disclosure and he exhibited a spreadsheet

[72] The 5% reduction should in strict logic be made against the AMEC figure only. The deduction against both SES is designed to provide additional comfort and confidence in the light of PLL/SCL's objections overall that the final figure does not lead to overcompensation of SABIC.

produced from the Tolent daily labour allocation sheets which tabulated Tolent's daily manhour allocations by task from the day after termination to 31 July 2009 (the final date claimed by SABIC) and supports the figure claimed by SABIC. In response to the criticism that SABIC had engaged Tolent on a dayworks basis, his evidence was that this was the same basis as SCL's engagement of Tolent before termination and asserts that, because of discounts, Tolent charged SABIC less than it would have charged SCL. He gives cogent reasons why not all of the outstanding civil works could be tendered. I accept his evidence on this sub-item.

456. The sum claimed was verified by the experts in the amount of £2,590,107, without expressing any view on whether the sums were attributable to SCL. SABIC is entitled to bring into account the verified figure of £2,590,107.

Item 12.2 - Civil Engineering Works (Tolent): LAB/LER Room Refurbishment and Power Supply and Control Building [Pleaded £515,277; Brooker £138,107 (LAB/LER Refurbishment) + £66,783 (LAB/LER Power Supply) + £30,483 (Control Room); Walmsley £138,107 (LAB/LER Refurbishment) + £66,783 (LAB/LER Power Supply) + £30,483 (Control Room)]

457. The 12 March Particulars allege that this item is largely if not entirely preferential. As a separate point they allege that no particulars of defects that required to be rectified have been identified and that the claim is unsubstantiated.

458. Mr Naisbitt responded by his third witness statement. He asserts that the control building and laboratory required extensive works on them to make them function in accordance with the specification. He refers to the HVAC not functioning properly because the power cable was undersized, which was agreed by SCL. It is apparent from his witness statement that the majority of the £515,277 is said to relate to rectification works.

459. There is other evidence available in relation to these items.

i) Mr Whinn gave evidence for SABIC. He gave a statement which stated that one of his responsibilities after termination was to complete the outstanding Civil Works; and he gave details of his dealings with Tolent in relation to fencing and bitumen works. In cross-examination it became clear that he had also worked with Tolent in relation to the rearrangement of the LAB/LER room after termination: he said that he had not mentioned this in his statement as it had not been part of SCL's scope of works for completion. It became apparent that the rearrangement of the LAB/LER room was extensive[73], involving stripping existing insulation, replacing it with a new air conditioning system, installing new systems and new control panels, to the extent that Mr Whinn agreed that the LER room had been remodelled to a new design. All of this was new work carried out by SABIC after SCL had handed over the rooms. He did not give any evidence about work being carried out in the LAB/LER room or the control room that was within the scope of SCL's works;

[73] Described by Mr Whinn at [Day 7/123:12-128:17]

ii) An email from Mr John Kane, a senior SABIC cost engineer, dated 15 December 2008 identified the Control Building False Ceiling Project, the LAB & LER Room Refurbishment and the Control Building Additional Power Supplies as major contributing activities to the then suggested £5 million provision for "other work to complete" and commented that "other than the [control building additional power supplies], where a proportion of the costs may be recoverable from [SCL] these are SABIC generated "improvement projects" for want of a better term.";

iii) The experts had adopted three figures (£138,107 (LAB/LER Refurbishment) + £66,783 (LAB/LER Power Supply) + £30,483 (Control Room)) because Mr Kane had allocated them to SCL when reviewing Tolent's penultimate application[74]. The figures were derived by the experts from using the allocation table shown at the top of the Lolent LAB/LER variation/daywork schedule;

iv) In oral evidence, Mr Walmsley accepted that the variation daywork schedule was missing so that it was not possible for the experts to interrogate or go behind the figures that they had adopted.

460. On this material PLL/SCL submit that the Court can have no confidence that any part of the sums claimed is properly attributable to SCL. SABIC submits that the experts have taken a conservative approach, only accepting sums as verified where there is documentary evidence to support it, and that the figures verified by the experts are a reasonable estimate of what SABIC should be entitled to bring into account.

461. It is plain, not least on the evidence of Mr Whinn, that SABIC undertook major upgrading of the LAB/LER room. Equally, it appears that a system of categorisation was in place and some costs were allocated to SCL's scope of work. Mr Naisbitt's evidence is very limited on this item. I accept his evidence to the extent of accepting that there was some work within SCL's scope and some work required to rectify SCL's work. However, given the extent of the upgrade and the lack of detailed justification, the evidence adduced by SABIC does not justify any confidence about what particular sums should be allocated to SCL's account save for the cost of the electrical work upgrade required by the undersized power cable. Adopting a broad brush approach, I feel confident (on the balance of probabilities) that a sum of £100,000 should be brought into account, but have no confidence in relation to any greater sum.

462. I therefore determine that £100,000 may be brought into account for this sub-item.

Item 12.4 - Civil Engineering Works: Safety Officer [Pleaded £196,447; Brooker £95,736; Walmsley £95,736]

463. The 12 March Particulars took no specific point on this sub-item save possibly for a suggestion that the costs had not been specifically related to the completion of the project[75]. PLL/SCL took no specific point on this sub-item either in written or oral closing. The experts verified the figure of £95,736 by reference to monthly invoices

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[74] {D.3/15.24/317}
[75] Paragraph 21(1) of the 12 March Particulars {A/12/599}

for the provision of a civils safety officer without expressing any view on whether the sums were attributable to SCL.

464. On this material, SABIC is entitled to bring into account the verified figure of £95,736.

Item 12.4 - Civil Engineering Works: Initiator Storage Road [Pleaded £96,360; Brooker £96,360; Walmsley £96,360]

465. The 12 March Particulars took no specific point on this sub-item. PLL/SCL took no specific point on this sub-item either in written or oral closing. The experts verified the figure of £96,360, without expressing any view on whether the sums were attributable to SCL. Though not formally admitted, this sub-item does not appear to be substantially in issue.

466. On this material, SABIC is entitled to bring into account the verified figure of £96,360.

Item 13 – Fire Protection Systems [Pleaded £172,110; Brooker £172,110; Walmsley £172,110]

467. The 12 March Particulars assert that it is not clear what Tyco plc was claiming for or why it was being paid £100,000 for unidentified remedial work.

468. Mr Naisbitt responded in his third statement. The claim relates to three broad headings:

    i) SCL's base scope for fire protection. Tyco was required to design, procure and install deluge systems at a cost of £72,110;

    ii) Rectification works to installed works e.g. the Compressor House, safety showers, hydrants and other parts of the system, at a cost of £100,000;

    iii) Commissioning works which were not charged to SCL.

    His evidence was that a checking exercise was carried out by the project cost engineer which resulted in the allocation of the costs claimed, and exhibited the apportionment. He was not cross-examined on this evidence and I accept it.

469. No separate points were taken in PLL/SCL's written or oral closing submissions.

470. The experts verified the figure of £172,110, without expressing any view on whether the sums were attributable to SCL. Though not formally admitted, this sub-item does not appear to be substantially in issue.

471. On this material, SABIC is entitled to bring into account the verified figure of £172,110.

Item 14 – Craneage [Pleaded £286,618; Brooker £264,427; Walmsley £264,427]

472. The 12 March Particulars assert that it is unclear why craneage was required for completion activities and that PLL/SCL has seen no justification for the claim.

473. Mr Naisbitt responded in his third statement. His evidence is that craneage was required for pre-commissioning, rectification work, scaffold dismantling and demobilisation work, giving examples. He refers to and relies upon a spreadsheet listing the hours claimed. He was not cross-examined on this evidence and I accept it.

474. The experts reviewed the Mammoet account and verified the sum of £264,426, which excluded pre-termination costs and costs relating to commissioning, without expressing any view on whether the sums were attributable to SCL.

475. No separate submissions were made by PLL/SCL in written or oral closings.

476. On this material, SABIC is entitled to bring into account the verified figure of £264,426.

Item 15 – Plant Control Systems (Honeywell) [Pleaded £393,301; Brooker £393,301; Walmsley £393,301]

477. The 12 March Particulars took no specific point on this item. No separate points were taken in PLL/SCL's written or oral closing.

478. The experts reviewed the Honeywell account and verified the sum of £393,301, which was reduced from the total account by an adjustment made by SABIC for commissioning costs, without expressing any view on whether the sums were attributable to SCL.

479. On this material, SABIC is entitled to bring into account the verified figure of £393,301.

Item 16 – SABIC Vendors (pre-commissioning support) [Pleaded £2,085,423; Brooker £1,990,148; Walmsley £1,990,148]

480. The 12 March Particulars assert that the derivation of the pleaded figure is not explained and that it may include work on SABIC's commissioning activities. Some work (e.g. the DSC mod pack changes made to the high pressure condensate) are alleged to appear to be preferential and much testing is said to have been repeated unnecessarily because SABIC misunderstood the status of the loop testing that had been carried out by SCL. It asserts that staff costs are not recoverable because many of the individuals were employed by SABIC to witness tests during the SCL period and the sums claimed are not shown to be a reasonable cost to complete.

481. Mr Naisbitt responded to these points in his third statement. He gave detailed evidence to the effect that SABIC had excluded testing and commissioning costs that should be for its own account and that the claim being advanced includes vendor site attendances for pre-commissioning that was SCL's responsibility under SSA2. His response in relation to the DCS modpack example cited by PLL/SCL is that SABIC had a separate Purchase Order with Honeywell for its own modpack and commissioning work, which should therefore have been excluded. It appears that he does not have personal knowledge of the issue in question as he says that "if SCL are correct [in suggesting that the works have been misallocated] then this would only be clerical error by the Honeywell engineer in allocating his time." He also confirms

that the time costs for SABIC staff incurred in respect of commissioning have been excluded. He was not cross-examined in this evidence and I accept it.

482. By the time of their second joint statement the experts checked almost all of the 73 vendor invoices and were able to verify most of the sums claimed save for an agreed deduction of £562 in respect of work carried out by Endress + Hauser. By the time of their third joint statement they were agreed on their verification to the extent of £1,990,148, without expressing any view on whether the sums were attributable to SCL.

483. No specific submissions were made on this item in PLL/SCL's written or oral closing submissions.

484. I have considered loop testing in some detail under issue 3.4. For the reasons there set out, the decision to retest was reasonable and the costs recoverable.

485. On this material, SABIC is entitled to bring into account the verified figure of £1,990,148.

Item 17 – SABIC scope completion projects [Pleaded £1,671,264; Brooker £Nil; Walmsley £1,300,000]

486. This item relates to work that is alleged to be within the scope of SCL's work and which was left until after 31 July 2009 for SABIC to complete. As has already been discussed in relation to insulation, the possibility of leaving some work until after EID always existed, including the rectification of category 3 defects.

487. The 12 March Particulars did not take any point in relation to this item. That is particularly unfortunate given the dispute that emerged between the experts, since it has the effect that Mr Naisbitt did not deal with the issues that have now been raised by PLL/SCL in his third witness statement as he surely would have done if the matters had been raised in the 12 March Particulars.

488. The issue between the experts can be shortly stated, Mr Walmsley has reviewed the supporting documentation and, with adjustments, has verified the audit trail that is available. That process is sufficient for him to express the view that he has verified (as figures) the sums claimed under this item to the extent of £1,300,000. Mr Brooker, though he has reviewed many of the same documents, does not feel able to express any view at all, on the basis that the documents with which he has been presented to him are inadequate to enable him to do so.

489. In these circumstances PLL/SCL contest SABIC's entitlement under this head in its entirety.

490. The exercise undertaken by Mr Walmsley is described in the third joint statement. The adjustments he has made are set out in Attachment 7 to the joint statement and has been helpfully elucidated by Appendix 3 to SABIC's written closing submissions. In brief summary, Mr Walmsley sorted the Scope Completion SAP into 21 items of work. He then reconciled the costs against the items of work in SABIC's scope completion, finding them to be consistent. He then reviewed the available back up information, which he considered to be supportive of the claimed sums. Typically,

such a review would involve tracking individual costs from purchase order through invoice to inclusion in the SAP, verifying that there are purchase orders and invoices to support the entries that he sampled in the SAP. In carrying out this exercise he noted that SABIC had allocated certain invoices between various parts of the project: he made the assumption that these allocations had been properly made by persons having specific project knowledge. As with all other items which he and Mr Brooker reviewed, this process did not enable him to form an independent view on whether the items being considered were or were not part of SCL's scope of work. He then made adjustments, as set out in Attachment 7 to the joint statement and as elucidated in Appendix 3 to SABIC's written closing submissions, reaching a figure of £1,300,000 which he is prepared to support as a figure. In cross-examination he repeated that he could not form a view as to whether particular items were within or outside SCL's scope of work. He said that he had spoken to Mr Lumley to make sure that he had not included anything that was obviously outside SCL's scope of work and where Mr Lumley said that an item might be either within or outside the scope of work or was clearly outside it, he excluded it.

491. Mr Brooker described a similar process. However, he was concerned that the information provided gave him little indication regarding what the work actually comprised and its basis. He characterised it as "basic information that an accounts department would need to provide a paper-trail for amounts to be paid to a particular contractor/supplier. That is to say, it is not the quantity surveying detail which I would expect to see in order to properly verify and substantiate the basis to the amounts claimed by the relevant supplier/contractor and, more importantly, the back up details and calculations to the amounts paid by SABIC either based upon what has been applied for or, if different, to show SABIC's calculations." As a result "the only real check that can be made of the information supplied is a clerical-type process to see that monetary values trace across the documents provided on the basis of identifiable amounts on invoices (at best) or more often, from SABIC allocations of what an invoiced sum comprises… ." [76] He considered that the depth of information provided was less than that provided when he considered information in relation to vendors and suppliers on other parts of the claim. He too pointed to the fact that parts of invoices had been allocated to different places within the SAP system; and he noted Entry Codes on some invoices, which he understood to be the mechanism by which sums became allocated to the SAP. His conclusion was that "in view of the above problems, the paucity of the available detailed information, and the lack of any detailed engineering/scoping documents upon which to understand what work is actually being procured so that a quantify surveying evaluation can be made, I consider that I am unable to offer an assessment against these SABIC Scope Completion Projects."

492. Because the points being taken by Mr Brooker were not trailed in the 12 March Particulars, the only additional evidence comes from Mr Naisbitt's first statement at paragraphs 148 - 150. In that statement Mr Naisbitt said that:

i) The claim consisted of defined packages of work that were part of the original scope of work and therefore part of SCL's obligations, but which were not required before EID;

[76] Third Joint Statement at paragraphs 5.3.25 and 5.3.28.

ii) SABIC allocated approximately £2m for the Works "which were clearly defined as being part of SCL's scope, these were designated Scope Completion Projects, and cover the costs expended by SABIC executing SCL's scope after 31 July 2009";

iii) The claim is supported by timesheets produced daily by each team. He had reviewed them and had confidence that they were accurate. Other documents also supported the claim.

493. In their closing submissions, PLL/SCL essentially submitted that there had been a failure of proof by SABIC. The only item identified for individual criticism was the inclusion of £35,771 in respect of HVAC control in the Building Workshop which, in oral closing, was submitted to be part of the LAB/LER refurbishment which was SABIC's responsibility.

494. I have said that I consider the general approach to quantum adopted by the parties to have been reasonable and proportionate. In relation to this item it is most unfortunate that the issues relating to the Scope Completion Works were not formulated by PLL/SCL in the 12 March Particulars or at any time so as to enable SABIC to respond properly. In these circumstances, it seems to me that PLL/SCL's complaints of lack of proof on the part of SABIC lose the potency they might otherwise have. As it is, the Court is left with Mr Naisbitt's unchallenged evidence from his first witness statement and the clash of the experts. In my judgment, Mr Walmsley's approach is to be preferred as a constructive attempt to review a significant head of claim. While I accept that Mr Brooker did not have the full information that he would have wished from a quantity surveying perspective, it is to be remembered that the experts did not commit themselves to giving an independent opinion on whether items of work were within SCL's scope of work on any of the items that I have been considering in this section of the judgment. The inability to express such an independent opinion does not remove the desirability of at least verifying the audit trail so far as it exists. I am also influenced by my finding that the system established by SABIC for the allocation of costs was generally sound.

495. On the basis of Mr Naisbitt's first statement and the approach of Mr Walmsley, as elucidated by Appendix 3 to SABIC's written closing submissions, it would be quite inappropriate to value this head of claim at nil. That said, and without derogating from what I have said about the failure of SCL to raise issues appropriately, I cannot be confident that a figure of £1,300,000 is secure on the basis of the current evidence. I would therefore apply a further 10% discount to Mr Walmsley's figure of £1,300,000 and hold SABIC entitled to bring the sum of £1,170,000 into account for this item.

Item 18 – Repairs to EVS [Pleaded £712,091; Brooker £460,286; Walmsley £460,286]

496. The 12 March Particulars took no specific point on this item. No separate points were taken in PLL/SCL's written or oral closing.

497. The experts have verified the cost claimed in the sum of £460,286, without expressing any view on whether the sums were attributable to SCL.

498. For the reasons set out under Issue 3.8, SABIC is entitled to bring into account the verified costs of £460,286.

Item 19 – Contracted Scope Omitted [Pleaded £302,750; Brooker £Nil; Walmsley £210,00]

499. This item relates to category 3 defects that were not rectified until 2010. It is based upon a schedule of individual items and estimated costs prepared by Mr Naisbitt in discussion with the various discipline engineers. The estimated costs for items are rounded figures and range from £100 to £20,000, with many items having no cost attached.

500. No specific points were taken in the 12 March Particulars save that, under the heading "Punchlist Items" PLL/SCL challenged the number of items properly to be classed as defects, referring to an ABB survey conducted in April 2009. The 12 March Particulars asserted that "ABB considered a sample of 1,000 [punchlist items] of which it concluded that approximately 18.8% of the total were defects and 30% were outstanding work." The 12 March Particulars also asserted that some of the items would have arisen after November 2008.

501. Mr Naisbitt responded in his third statement. He pointed out that the term "defect" was contractually defined to include works that were not complete, whether that was because something was broken or something missing, or something that did not comply with the specification. He was not cross-examined on this item, either in respect of his original vouching for the claim in his first statement or in respect of the contents of his third statement and I accept his evidence.

502. No separate submissions were made on this item in PLL/SCL's written or oral closings.

503. At the time of their second joint statement, on 27 February 2013, the experts stated that they had seen no details of supporting information that would enable them to express an opinion at that time on the reasonableness of the costs being claimed. In his first report, dated 18 March 2013, Mr Walmsley noted that it was difficult for him "to reach a properly concluded opinion in respect of each claimed sum, since I do not know the scope of work or how the claimed sums have been calculated." However, he expressed the opinion that, if the defects were found to be the responsibility of SCL, it would be inappropriate to include £nil, since there must be a cost associated with rectification. He therefore (a) assumed that the defects were the responsibility of SCL, (b) noted Mr Naisbitt's evidence about how the list had been prepared, (c) expressed the opinion that there are likely to be instances where the discipline engineers have correctly identified the scope and the likely cost of rectification has been properly calculated, but recognised that there may be instances where the scope had been over-estimated and the likely cost of rectification over-stated. While recognising that his approach was based upon speculation, he applied an across-the-board discount of 30% to SABIC's claimed figures, resulting in a figure of £210,000.

504. Mr Brooker did not undertake any such exercise and allocated £nil to this item.

505. The ABB report (referred to in the 12 March Particulars) does not materially assist PLL/SCL. By the time that ABB carried out its assessment, 1,648 of the 11,677 items on the OSIRIS database (which SABIC used to record defects) had been cleared.

ABB reviewed the outstanding defects. As the executive summary makes clear, ABB concluded that "a very high majority (of the order of 95%) of defects in the defect register accurately describe non conformances with the contract project scope and contract project specifications" and "no evidence was found of defects that were attempting to modify the contract project work scope or project specifications." In other words, a very high majority of those items listed as defects were properly so categorised, having regard to the contractual definition of defects. The sub-categorisation to which the 12 March Particulars must be seen in this context. The categorisation of 28.2% as "construction not complete" and 18.8% as "inadequate construction" does not cast doubt on their being properly regarded as defects. Properly understood, the ABB report supports the validity of SABIC's system for identifying defects.

506. On this material, I consider that SABIC's approach to the evidencing of the item is reasonable and proportionate. Had SCL wished to descend to greater detail it could have raised points of issue in the 12 March Particulars or, at latest, by cross-examining Mr Naisbitt. In the absence of any challenge to Mr Naisbitt's evidence, I consider that Mr Walmsley's approach is reasonable. Whether it amounts to expert evidence, properly so called, is debateable: but I would in any event have approached this item by considering the possibility of applying a discount to provide confidence that SABIC was not being over-compensated. As it is, I agree that it would be inappropriate to award £nil for the item and endorse the discount of 30% as being ample to meet concerns about over-compensation.

507. I therefore hold that SABIC is entitled to bring £210,000 into account in respect of this item.

Item 20 – VOR 116 modifications to existing culvert on Plot 9 [Pleaded £6,000; Brooker £Nil; Walmsley £nil]

508. No details were provided to the experts that enabled them to verify the costs of this item. It fails for lack of verification.

Top Down or Bottom Up?

509. PLL/SCL criticise the "top-down" approach adopted by SABIC because "it starts with a total cost which includes elements which demonstrably should not form part of the claim. Such an approach is in principle, only permissible where there is some reliable means of adjusting the claim to exclude any out of scope items, preferential engineering and commissioning costs, as well as the separate SABIC projects such as the LAB/LER room." In my judgment, the submission provides its own answer because I am satisfied that the matters which PLL/SCL rely upon as rendering a top-down approach objectionable have been satisfactorily excluded and I have made relevant findings which exclude them on the basis of the evidence and submissions that have been made. In particular, I have found on the evidence that (a) SABIC generally excluded out of scope items and, where it did not do so, allowance has been made in my findings under Items 1-19, (b) preferential engineering and commissioning costs have been excluded, and (c) separate SABIC projects have been excluded. I therefore reject PLL/SCL's criticism of SABIC's approach.

510. Had I considered that a "bottom up" approach was the correct approach to be adopted, I would have rejected Mr Brooker's alternative calculation. He used as the basis of his calculation a Construction Cost Report produced by BBM on 7 December 2008 which did not reflect the full scope of the necessary works. He recognised the inadequacy of his approach in his observation that "this valuation does not necessarily equate to SABIC's reasonable costs of completing the works" while attempting to support it by saying that "it at least provides a rough order of magnitude to indicate what SABIC thought it was going to spend in December 2008." That is not a relevant or satisfactory basis for a Clause 30.9 calculation.

Collection – Items 1-19

511. I summarise my findings as follows:

Item	Description	Pleaded Value (£)	Entitlement (£)
1	Project management, engineering and completions	4,842,781	4,250,000
2	Construction management and support	1,663,990	1,663,990
3	Foster Wheeler Engineering	1,204,548	1,204,548
4	Electrical and Instrumentation	3,298,239	3,298,239
5	Access (Cape)	2,799,897	2,743,739
6	Fireproofing (Cape)	1,362,004	1,339,985
7	Insulation	5,750,401	5,658,356
8	Painting	642,069	631,689
9	Chemical cleaning	2,929,748	2,929,748
10.1	AMEC	5,877,859	5,124,941
10.2	Hertel	119,319	119,319
10.3	Shaw	2,338,238	2,333,316
11	Trace heating (Thermon)	276,570	276,570
12.1	Miscellaneous civil works (Tolent)	2,590,107	2,590,107
12.2	LAB/LER room refurbishment, power supply and Control Building	515,277	100,000
12.3	Safety Officer	196,447	95,736
12.4	Initiator Storage Road	96,360	96,360
13	Fire protection systems	172,110	172,110
14	Craneage (Mammoet)	286,618	264,426

15	Plant control systems (Honeywell)	393,901	393,901
16	SABIC vendors (pre commissioning support)	2,085423	1,990,148
17	SABIC scope completion projects	1,671,264	1,170,000
18	Repairs to EVS	712,091	460,286
	Contracted scope omitted (incl. category 3 defects)	302,750	210,000
	VOR 116 modifications to existing culvert	6,000	Nil
	Total	**42,134,010**	**39,117,514**

Interest as a Constituent Part of the Clause 30.9 Calculation

512. As part of the Clause 30.9 calculation, SABIC claimed interest on the increased capital sum required to construct the LDPE plant. It supported the claim with evidence from Dr Burgess who provided a calculation which ignored SABIC's receipt of the £28.5 million under the APG and the PB; his calculation was also based upon the assumption that the additional cost to SABIC of completing the works itself was the sum claimed in the Amended Particulars of Claim, namely £42.1 million.

513. SABIC accepts that Dr Burgess's calculations of interest are flawed because of the failure to take into account the receipt of the APG and PB monies. As a result, in closing submissions it suggested that the question should be revisited as a claim for statutory interest in the light of the court's other findings. PLL/SCL submitted in closing that interest is not recoverable under Clause 30.9.

514. In the embargoed draft of this judgment provided to the parties, and subject to the question whether a claim for interest (whether under Clause 30.9 or as statutory interest) is excluded, I accepted Dr Burgess' evidence that the spreadsheet setting out his calculation of interest could readily be adjusted to take into account the receipt of the £28.5 million. I also accepted that it could also be adjusted to take into account my findings on the amounts recoverable under the itemised Clause 30.9 claim and any further submissions on the appropriate rate of interest to be applied. Since PLL/SCL had not addressed SABIC's suggestion that the claim may be converted to be a claim for statutory interest, the parties were invited to make further submissions on interest.

515. In its further submissions, SABIC settled on a claim for statutory interest, to which PLL/SCL duly replied. SABIC's claim for statutory interest will be the subject of a separate judgment and no additional sum falls due under clause 30.9 of the contract.

The Lost Revenue Claims

516. SABIC presents the lost revenue claims as claims for damages by Section E.3 of the Amended Particulars of Claim. The basis of the allegation that SABIC has lost revenue is that there was an agreement between SABIC and SABIC BV pursuant to which SABIC BV was obliged to pay to SABIC a tolling fee, which was calculated as a multiple of the sum of purchased utilities, royalties, fixed costs and depreciation, with depreciation being the principal element. The tolling fee provided a margin on SABIC's costs of production. In 2009 the multiplier under the tolling agreement,

which generated the margin, was 111.11%; thereafter it was 105.5%. SABIC alleges that, but for SCL's failure to construct the EVS correctly, it would have started the 20-year depreciation period for the LDPE plan 42 days earlier and would therefore have received "lost earnings" in the form of tolling fees for depreciation, fixed costs and margin on production during that period of 42 days at the expense of losing depreciation tolling fees for an equivalent period at the end of the 20-year period. In respect of the general delay to EID which SABIC lays at SCL's door, SABIC claims "lost earnings" in the form of tolling fees of the same descriptions for a period of 199 days.

517. Once again, these heads of claim were supported by Dr Burgess. Once again, it became clear in cross-examination that his calculations were flawed. Although depreciation would in fact be calculated over a 20 year period, he had taken a lower than actual level of capital expenditure and then applied the actual depreciation charge that was applied in 2009/2010 (which had been calculated by reference to actual capital expenditure) and applied it until he had fully depreciated the assumed lower level of capital expenditure, which had the effect of depreciating the lower level of capital expenditure over 15 years, not 20. A second ground of challenge by PLL/SCL was that he had adopted a discount rate of 10.74%, which Dr Burgess described as a rate set by SABIC Capital "as the standard discount factor to use for project evaluation" whereas SABIC was prepared to lend money on an intergroup basis for capital projects at under 6%. Dr Burgess explained the difference as being a notional premium for risk but the basis for the actual figure adopted appeared tenuous.

518. On this state of the evidence, PLL/SCL take a number of points of variable strength, while SABIC offers a revised depreciation calculation with its closing submissions based upon a 20 year depreciation period; but it also recognises that any calculation is likely to be subject to further adjustment in the light of the findings of the Court on the level of capital expenditure that may properly be brought into account.

519. Because I have come to the clear conclusion under Issue 8 that these claims are excluded, I do not propose to address the technical arguments that have been advanced on the proper approach to quantification should the claim be admissible. I therefore make no findings on the correct approach to quantification. If it became necessary to revisit those questions, the base material for consideration can be found in the evidence of Dr Burgess and Mr Whinn, and the closing submissions of the parties including the original and amended Excel spreadsheets setting out various possible approaches.

Deductions for Pre-termination Events

519A(1). The draft of this judgment did not address SABIC's claim for £1,215,497 for "pre-termination events". The 12 March Particulars disputed this item, pleading that no basis for the claim had been pleaded and therefore it failed *in limine*. Without prejudice to that, PLL/SCL pleaded that "if the claim is for IMS labour procured by SABIC prior to termination it is denied that SABIC is entitled to recover the cost of the same save where it can prove that SCL agreed to pay for the assistance for which SABIC claims compensation".

519(A)(2). Mr Naisbitt responded in his third statement. He gave evidence that SABIC used Purchaser Variation Notifications (PVNs) as a method of notifying SCL of SABIC's

intention to re-claim costs expended on behalf of SCL by SABIC in assisting SCL with the completion of the contract scope of works. PVNs were then converted to Variation Orders by SABIC. The claim is based on the work carried out adopting this system and covers a range of work from design to work in support of pre-commissioning on site. Although initially SCL raised queries on the working of the system at the time, it did not question the principle that SABIC should be entitled to contra-charge for the work carried out in this way. SCL later disputed costs relating to some of the PVNs after the work began and the costs began to be notified. But Mr Naisbitt gave evidence that there had been an agreement between Mr Leggett and Mr Booth in July 2008 that resources would be deployed on behalf of SCL by SABIC and that SABIC would be reimbursed by SCL. Mr Naisbitt was not cross-examined on this evidence and I accept it.

519A(3). No submissions were made by PLL/SCL in closing on this topic. SABIC referred to Mr Naisbitt's evidence and maintained the claim. On the basis of Mr Naisbitt's evidence, this head of claim succeeds in the sum claimed.

Issue 8: Does the Contract Limit or Exclude All or Part of SABIC's Claims?

520. Two issues arise for determination:

i) Does Clause 35.2.4.2 apply to SABIC's Claim Pursuant to Clause 30.9 so that SABIC can recover no more than 20% of the adjusted Contract Price under that head of claim?

ii) Does Clause 35.1 exclude SABIC's claims for damages for lost revenue and its claim for interest on increased capital expenditure?

Does Clause 35.2.4.2 Apply to SABIC's Claim Pursuant to Clause 30.9?

521. PLL/SCL submits that Clause 35.2.4.2 limits the amount which it can be ordered to pay to SABIC to 20% of the Contract Price as adjusted for variations and, specifically, imposes that limitation on SABIC's claim pursuant to Clause 30.9. SABIC submits it has no application to the claim under Clause 30.9. In order to resolve this dispute it is necessary to look closely at Clauses 35 and 39 in turn.

522. Clause 35 provides a sequence of provisions concerned with the exclusion and limitation of losses. Clause 35.1 is considered further below. For present purposes it is sufficient to note that it is an exclusion clause in relatively familiar form which provides that "neither the Contractor nor the Purchaser shall be liable to the other (whether or not as a result of negligence and whether in contract, tort, or otherwise at law) for any consequential or indirect loss, expense or damage or for any loss of production or profit or of any contract that may be suffered by that other." Such a clause is familiar as excluding liabilities to pay damages that would otherwise flow from breaches of contractual or tortious obligations[77]: it is not clear what is added by the words "or otherwise at law" in clause 35.1.

523. Clause 35.2 deals with limitation of liability. Sub-clauses 35.2.1-3 are all concerned with limiting damages for breach of contract. Clause 35.2.1 imposes a limitation on

[77] See, for example, *Croudace v Cawoods Concrete Products* [1978] 2 Lloyds Rep 55 and *Deepack v ICI* [1999] 1 Lloyds Rep 387

the recovery of liquidated damages for delay; clause 35.2.2 imposes a limitation on the recovery of liquidated damages for non-performance; and clause 35.2.3 imposes an aggregate limitation on the recovery of liquidated damages for both delay and non-performance (18%).

524. It is relevant to note that Clause 31.6 makes provision for the purchaser to take steps that will lead to termination under Clause 27.2 if it becomes apparent that the contractor will fail to complete the works before the aggregate limit for liquidated damages for delay is reached; and clause 18.5.11 provides that if performance tests are not achieved as there set out, the purchaser may also terminate under Clause 27. Sub-clauses 35.2.1-3 do not expressly apply to damages for delay after termination in such circumstances: they only apply expressly to the imposition of liquidated damages. Accrued rights to impose liquidated damages are preserved after termination by Clause 30.6.

525. Clause 35.2.4.1 makes provision for where the contractor is obliged to hold the purchaser harmless against claims in respect of damage to property or injury to persons. The purchaser's claim in such cases will be claim for damages in respect of the contractor's breach of his contractual obligation to indemnify or hold harmless as the case may be. Such liabilities are excluded from the overall limit of liability imposed by Clause 35.2.4.2 where the contractor is indemnified by insurance against his liabilities.

526. Clause 35.2.4.2 limits the aggregate liability of the Contractor "under or in connection with the Contract (whether or not as a result of the Contractor's negligence and whether in contract tort, or otherwise at law) (and including for the avoidance of doubt the amounts referred to in clause 35.2.1 to 3.5.2.3) shall not exceed 20% (twenty per cent) of the sum of the Contract Price plus or minus the value of any Variations issued prior to the date of Mechanical Completion." It is subject to two exceptions, namely (a) as provided for in Clause 35.2.4.1 and (b) in respect of claims (for damages) by the Purchaser against the Contractor for breach of clauses of the Contract relating to intellectual property and secrecy.

527. This summary shows that SABIC's submission that Clause 35.2 is only concerned with liabilities incurred in respect of claims for damages is well founded. What also emerges is that Clause 35.2.4.2 uses the same phrase as Clause 35.1 when describing the liabilities with which it is concerned, namely that it applies to liability "whether or not as a result of the Contractor's negligence and whether in contract tort, or otherwise at law". This linking language is language typically associated with clauses referring to liabilities arising out of breaches of obligations, whether contractual or tortious.

528. Turning now to Clause 30, Clause 30.1 provides for the calculation of a termination certificate which may lead directly to the creation of an obligation to pay the certified balance within 14 days. It is not obvious why that balance should be limited to 20% of the adjusted contract price and, if the purchaser had made advance payments to the contractor that meant that a balance of more than 20% would otherwise fall to be repaid, it may be thought commercially bizarre that full repayment should be prevented.

529. Similar reasoning applies to Clause 30.9, although the function of clauses 30.1 and 30.9 differ, as noted above. Clause 30.9 might be triggered as a result of termination justified by reference to a breach of contract, but it need not be. For example, clause 27.2.2 permits termination after any distress, execution or other legal process is levied upon the assets of the Contractor; clause 27.2.3 permits termination if the contractor enters into any arrangement or composition with its creditors; clause 27.2.4 permits termination if the contractor merely threatens to cease to carry on its business; and clause 27.2.5 permits termination if the financial position of the contractor deteriorates to such an extent that the capability of the contractor adequately to fulfil its obligations has been placed in jeopardy: none of these require actual breaches of contractual or tortious obligations by the contractor. So the liabilities incurred by the contractor under Clause 30.9 need not include any liabilities deriving from a breach of contract or tort, though they may do so. Rather, Clause 30.9 may be seen as an accounting exercise on termination which may or may not include sums that naturally fall within the ambit of Clause 35.

530. For these reasons, I conclude that Clause 35.2 does not automatically apply to limit the sums recoverable from SCL to 20% of the adjusted contract sum. The better interpretation is that clause 35.2 applies to liabilities incurred as a result of breaches of contractual or tortious obligations. If and to the extent that they form constituent parts of the calculation under Clause 30.9, they may be limited; but that does not become a relevant issue on the facts of this case since the constituent parts of the Clause 30.9 calculation that might be affected by Clause 35.2 do not approach 20% of the adjusted Contract Price.

Does Clause 35.1 Exclude SABIC's Claims for Lost Revenue or Interest?

531. I have set out the material parts of clause 35.1 above. SABIC is right on authority to submit that the reference to "consequential or indirect loss" excludes those losses that do not occur naturally or directly from a breach of the Contract: see *Deepak v ICI* at 403. The real issue is whether SABIC's claims for lost revenue and interest are excluded as being liabilities for "any loss of production or profit or of any contract".

532. The lost revenue claims are correctly characterised by SABIC as such in its Amended Particulars of Claim. Its complaint is pleaded on the basis that it "did not earn revenue that it would [otherwise] have earned" and that these losses were "lost earnings". In closing submissions SABIC attempted to deflect the obvious consequences of its earlier characterisation by submitting that the consequence of SCL's breaches was that "SABIC did not begin production of LDPE until much later than the contractual EID. As a consequence the date on which it began to receive payment for the manufacturing process was delayed. The nature of the claim is delayed receipt rather than loss of production or profit." I am not persuaded. It may be said that the payments calculated by reference to depreciation were not payments for loss of production, but they would have contributed to the sums that SABIC would otherwise have brought into account in calculating its profits; and they were payments pursuant to the tolling agreement, which Dr Burgess described as providing a margin on production. Nor do I consider that it makes a difference to describe the claim as one in respect of delayed receipt: what is claimed is the lost revenue during the period of delay at the start of the plant's productive life, while giving credit for the value of revenue that would be earned at the end of its life, discounted to present day values. However it is described, the lost revenue claims are in my judgment seeking to

impose on SCL liabilities for loss of production or profit and are excluded by Clause 35.1.

533. Turning to the claim for interest on the increased capital cost of completing the works, whether it is formulated as a constituent part of the claim under Clause 30.9 or as a claim for statutory interest, the interest cost should be regarded as part of the cost to SABIC of completing the works. It is a direct loss naturally occurring and is not "consequential or indirect loss, expense or damage"; nor is it a claim in respect of loss of production or profit or of any contract. For these reasons, and because Clause 35.1 does not automatically apply to the constituent parts of a calculation under Clause 30.9, the claim for interest on increased capital expenditure is not excluded by Clause 35.1.

Issue 9: How are the APG and PGs to Be Brought into Account?

534. In the light of my decision on Issue 8, this issue does not affect the outcome of the case. However, since the parties have made detailed submissions on it, I deal with it in any event.

535. The parties are agreed that the monies paid to SABIC on calling the APG and PB should be brought into account. The issue is whether, on the assumption that the 20% limit on aggregate liability imposed by Clause 35.2.4.2 applies to SABIC's claim under Clause 30.9, the monies received by SABIC on calling the APG and PB should be brought into account before or after applying the 20% limitation. In other words, does the calculation of the "total cost to [SABIC] reasonably incurred" include or exclude the sums received by SABIC on calling the bonds?

536. Until closing submissions there was a suggestion that the answer might differ depending upon whether the exercise of bringing the APG and PB monies into account was founded in restitution or some other basis. However, by closing submissions, neither party maintained that restitution was the foundation for the exercise. That point therefore falls away.

537. The genesis of the two bonds differed. The PB was a creature of the original EPC contract. Clause 36.1 required SCL to provide to SABIC "a performance bond … for the due performance by the Contractor of all of its obligations under [the] contract" and that the performance bond was to be in the form specified in Appendix 4 to the EPC. The PB that was ultimately called, which was provided by Standard Chartered Bank on 21 July 2008, accurately followed the terms of Appendix 4. It was addressed to SABIC and stated:

> "We understand that you have entered into a contract dated 9th February 2006 with [SCL]. … In accordance with the terms of the contract the contractor is required to issue to [SABIC] a performance guarantee for the sum of GBP13,500,000 … being 10 percentage of the contract price.
>
> We, Standard Chartered Bank … give our guarantee and irrevocably undertake to pay any amount or amounts not exceeding in total a maximum of GBP 13,500,000 to you on receipt by us of your first demand in writing under the original

> signature accompanied by your signed statement certifying that the contractor is in breach of its obligations in the underlying contract and that you have served the required notice pursuant to clause 36.4 of the contract."

538. By contrast, the APG was not contemplated by the EPC Contract, as the question of advance payment of the Contract Price had not then arisen and did not arise until the discussions which were eventually formalised as SSA2. Early drafts of what became SSA2 included reference to the provision of the APG being a condition precedent to the advance payment of the balance of the adjusted purchase price; but the APG was provided by HSBC on 24 June 2008 so that there remained no need to refer to it in the executed version of SSA2 and reference to it was omitted. As executed, the APG followed closely the form that Clause 36.1 and Appendix 4 of the EPC Contract had laid down for the performance bond. After referring to the EPC contract and that it had been amended by the first Supplemental Settlement and Schedule Agreement the APG stated:

> "[SABIC] has agreed to make to [SCL] an advance payment of £14,338,609 … being the payment due up to and including mechanical completion, upon the issue to [SABIC] of an irrevocable on-demand bond in the sum of GBP13,000,000 … being amount equivalent to the advance payment contemplated and subsequent repayments.
>
> We, HSBC Bank plc, give our guarantee and irrevocably undertake to pay any amount or amounts no exceeding in total a maximum of GBP 15,000,000 … to you on receipt by us of your first. Demand [sic] in writing accompanied by your written confirmation certifying that [SCL] is in breach of its obligations in the contract."

539. The approach and general language of each bond is familiar. Although the APG referred to itself as an "on-demand" bond, each bond required SABIC's confirmation on making the call that SCL was in breach of its obligations under the contract. Neither stated that, in addition to confirmation of SCL's breach of its obligations, there should have been loss suffered as a result of such breach; but this is a reflection of traditional bond drafting and did not of itself exclude the need for the breach of obligations to have caused loss to SABIC. The stated purpose of the bonds differed. The PB was stated by Clause 36.1 to be a bond "for the due performance by [SCL] of all of its obligations under [the Contract]". There was no similar contractual explanation of the APG, but its name, the circumstances in which it came to be required and provided, and the recording in the bond that SABIC had agreed to make the advance payment to SCL "upon the issue" to [SABIC] of a bond in a sum which was stated to be "an amount equivalent to the advance payment contemplated and subsequent payments" all point to it being security against the advance payment not being earned in due course.

540. Ultimately, resolution of this issue depends upon the correct interpretation and application of Clause 30.9. However, the nature of the bonds themselves and the circumstances in which they came to be provided has some relevance. It is

convenient to start with the "see to it" nature of such bonds guaranteeing performance or advance payment:

> "By the beginning of the 19th century it appears to have been taken for granted, without need for any citation of authority, that the contractual promise of a guarantor to guarantee the performance by a debtor of his obligations to a creditor arising out of contract gave rise to an obligation on the part of the guarantor to see to it that the debtor performed his own obligations to the creditor. Statements to this effect are to be found in *Wright v. Simpson* (1802) 6 Ves.Jun. 714 , 734, per Lord Eldon and in *In re Lockey* (1845) 1 Ph. 509 , 511, per Lord Lyndhurst. These are the two cases which are cited as authority for this proposition by Sir Sidney Rowlatt in his authoritative work on *Principal and Surety.* They can be supplemented by other similar statements, including one in your Lordships' House, which confirm that it was taken for granted that this was the legal nature of the guarantor's obligation arising out of a contract of guarantee: *Mactaggart v. Watson* (1835) 3 Cl. & F. 525 , 540, per Lord Brougham. It is because the obligation of the guarantor is to see to it that the debtor performed his own obligations to the creditor that the guarantor is not entitled to notice from the creditor of the debtor's failure to perform an obligation which is the subject of the guarantee, and that the creditor's cause of action against the guarantor arises at the moment of the debtor's default and the limitation period then starts to run."[78]

541. In *Cargill International v Bangladesh Sugar & Food Industries Corporation* [1996] 2 Lloyds Rep 524 the performance bond referred to the need for a breach of contract but not to the need for loss to be caused before the bond could be called. The issues for determination were (1) whether the defendant was entitled to make a call for the full amount of the performance bond, if the breach or breaches of contract (a) caused no loss to the defendant, (b) caused some loss to the defendant which was less than the amount of the performance bond, or (c) caused some loss to the defendant which was equal to or greater than the amount of the performance bond; and (2) whether in the event of the defendant having obtained payment under the performance bond as a result of any such call it was entitled to make the defendant was entitled to retain (a) all of the moneys received by it, (b) only such moneys as was equal to the amount of the loss suffered by it, or (c) some other and if so what amount. In the course of an illuminating judgment Morison J looked to the commercial purpose of bonds, holding that such a bond was, effectively, as valuable as a promissory note and was intended to affect the "tempo" of parties' obligations "in the sense that when an allegation of breach of contract is made (in good faith) the beneficiary can call the bond and receive its value pending the resolution of the contractual disputes. He does not have to await the final determination of his rights before he receives some moneys". He noted that "the concept that money must be paid without question, and the rights and wrongs argued about later, is a familiar one in international trade and substantial building contracts"; and he held that it was implicit in such arrangements that "in the absence of some clear words to a different effect, when the bond is called, there will,

[78] *Moschi v Lep Air Services Ltd. and Others* [1973] A.C. 331, at 348A-C Lord Diplock

at some stage in the future, be an "accounting" between the parties in the sense that their rights and obligations will be finally determined at some future date. … The bond is a "guarantee" of due performance. If the amount of the bond is not sufficient to satisfy the beneficiary's claim for damages, he can bring proceedings for his loss."[79] Later in his judgment Morison J concluded that:

> "As a matter of general principle, therefore, in the light of the commercial purpose of such bonds, … I take the view that if there has been a call on a bond which turns out to exceed the true loss sustained, then the party who provided the bond is entitled to recover the overpayment."

542. Morison J found support for his approach in *State Trading Corporation of India Ltd v E.D.& F.Mann (Sugar)* CA 17 July 1981 where Lord Denning MR said:

> "If the seller defaults in making delivery, the buyer can operate the bond. He does not have to go to far away countries and sue for damages, or go through a long arbitration. He can get the damages at once which are due to him for breach of contract. The bond is given so that, on notice of default being given, the buyer can have his money in hand to meet his claim for damages for the seller's non-performance of contract. If he receives too much, that can be rectified later at an arbitration."[80]

543. The bonds in the present case both have characteristics in common with the bond being considered in *Cargill*, which may be regarded as typical. Their commercial purpose was that, if a dispute arose, SABIC should have immediate access to the funds without having to await the outcome of proceedings determining the contractual rights and wrongs of the dispute. So, although the certified breaches of obligation required some actual or potential loss to SABIC for the bonds to be called in good faith, proof of loss was not a prerequisite to a call on the bonds. On the contrary, the commercial purpose went beyond merely guaranteeing or providing security for due performance, having much in common with other types of financial instrument, such as promissory notes, the dominant purpose of which is to provide ready access to substantial funds. While Morison J referred to "accounting" at a later date and to the caller's "true loss", the fact remains that the calling of the bonds comes first and is intended to provide the beneficiary with an immediate buffer against financial outlay which he may incur. The commercial purpose of the bonds and the call may be said to be putting SABIC in funds with which to meet the anticipated expenditure or, as Lord Denning MR put it "the bond is given so that, on notice of default being given, the buyer can have his money in hand to meet his claim for damages for the seller's non-performance of contract." Technically, it is only if the potential claim for damages exceeded the value of the bond that a claim over (for the excess) would be brought by the beneficiary.

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[79] Page 528, cols 1 and 2
[80] Morison J's judgment was approved by the Court of Appeal in *Comdel Commodities Ltd v Siporex Trade S.A* [1997] 1 Lloyds Rep 424, 431 per Potter LJ.

544. SABIC submits that the APG and PB monies should be incorporated in the Clause 30.9 calculation (i.e. before the imposition of the 20% limitation) on the basis that credit can and should be given against the "total amount paid" by SABIC to SCL referred to in Clause 30.1.4, or that the total costs to the Purchaser reasonably incurred in Clause 30.9 should take into account the sums received pursuant to the APG and the PB. It points to what it submits would be unacceptable consequences of a contrary interpretation. In addition, in relation to the PB it points to the fact that Clause 36.2 provides for SABIC to have retained 10% of the Contract Price if SCL had failed to provide it in accordance with Clause 36.1. The effect would therefore have been that, if SCL had not provided the PB and SABIC had terminated the Contract pursuant to Clause 27, the Contract Price when calculating the Termination Certificate would have been taken to be reduced by 10% for the purposes of Clause 30.1.4.

545. PLL/SCL characterise SABIC's position as "applying part of the Bond monies to its irrecoverable losses." They submit that the bonds are ancillary to the Contract and payable in the event that SCL's performance is defective and this leads to a recoverable loss; and they submit that the purpose of the bonds was merely to secure the liabilities arising on non-performance.

546. I prefer the interpretation put forward by SABIC, for a number of reasons:

i) The first reason is based upon the terms of Clause 30.9, which requires the identification of "the total cost to [SABIC] reasonably incurred" and requires that cost to be compared with "the total that the Engineering Works would have cost had they been completed by the Contractor." When computing the cost that SABIC incurred, it seems unrealistic to ignore the fact that SABIC had the benefit of third-party funding from the proceeds of the bonds which reduced its outlay from its own resources (and therefore the cost it *incurred*) pound for pound. Also, if the two sides of the Clause 30.9 equation are to be made as nearly as possible to be like for like, it is to be remembered that if SCL had completed the works then, although SABIC would not have received the bond monies, it would not have had to pay out as it did after termination for the works to be completed, because it had already paid the contract sum in advance. Ignoring the receipt of the bond monies therefore renders the equation unbalanced;

ii) The second reason is based upon the nature of the guarantees provided by the bond, which was essentially the guarantee of performance by secondary means, or "see to it" guarantees. Thus the payment of the bond monies was to be a form of proxy for primary performance by SCL. It therefore seems counter-intuitive to assert that all of the expenditure on costs to complete the works was a "loss" without taking account of the fact that provision had been made in advance to obviate that loss;

iii) The third reason is temporal. As usual, the bonds were called in advance of either working through the consequences of termination or of determining the contractual rights and wrongs of the dispute between the parties, in accordance with the commercial purpose of the bonds. As a result, SABIC started with a fund which, in real terms and language, it hoped would prevent it from suffering a loss: hence it pointed to the need to be able to demonstrate "that it

was spending SCL's Bond monies wisely." To my mind, it is more realistic to regard what happened as being that SABIC exhausted the bond monies before itself incurring a loss rather than to characterise it as having incurred a loss with the bond monies only being recognised at a later date after calculating and fixing the loss;

iv) The fourth reason that I accept SABIC's submission is because it is appropriate to look at the consequences of competing interpretations[81]. The consequence of PLL/SCL's interpretation is that SABIC's ability to recoup the consequences of termination from PLL/SCL was materially affected (to SABIC's disadvantage) by whether or not an advance payment backed by an APG was made. If no advance payment had been made (and no APG provided) and SABIC had incurred a loss (calculated in accordance with Clause 30.9) of £40 million, it would have recovered about £31 million, the balance of £9 million being excluded by the operation of the cap. However, if exactly the same circumstances obtained but SABIC had made an advance payment (to SCL's advantage) of £15 million (with an APG provided), SABIC would only recover £16 million (£31 million capped liability less £15 million APG monies). This seems a perverse consequence of advance payment and one that requires clear words to be contractually justified.

547. For these reasons, if I had held that SABIC's claim under Clause 30.9 should be limited by the operation of Clause 35.2.4.2 I would have held that the bond monies should be brought into account when computing the total cost to SABIC reasonably incurred and before the application of the 20% limitation.

Conclusion: the Balance Due.

548. On the basis of my findings as set out above there is a balance due to SABIC of £11,797,514 calculated as follows (with statutory interest to be considered separately):

i)	Contract Sum before Variations	£155,816,376
ii)	Variation Orders since SSA2	£ 35,497
iii)	Contract Sum (sum of (i) and (ii)	£155,851,873
iv)	Deductions for pre-termination events	£ 1,215,487
v)	Sub-Total (item (iii) less item (iv)	£154,636,376
vi)	Amount paid by SABIC	£140,816,376
vii)	Pre-termination balance	-£ 13,820,000
viii)	SABIC's costs to complete	£ 39,117,514
ix)	Damages due to SABIC	£ Nil

[81] See *Gan Insurance Co v Tai Ping (Nos 2 & 3)* [2001] Lloyds Rep IR 667 at [16] per Mance LJ.

x)	Gross balance to SABIC (sum of (vii) to (x))	£25,297,514
xi)	Performance Bond	-£13,500,000
xii)	**Balance due to SABIC ((x) less (xi)**	**£11,797,514**

Annex A

GENERAL CONDITIONS OF CONTRACT

1.1 In the Contract the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:

(g) "Contract" shall mean the agreement between the Purchaser and the Contractor comprising the documents listed in the Memorandum of Contract.

(h) "Contractor" shall mean SembCorp Simon-Carves Limited whose registered address is at Sim-Chem House, Warren Road, Cheadle Hulme, Cheadle, Cheshire SKX 5BR.

(i) "Contractor's Representative" shall mean the person, firm, or company appointed by the Contractor as described under clause 5

(j) "Contract Price" shall mean the sum of £135 million (one hundred and thirty five million pounds sterling) as set out in Schedule 1

…

(q) "Documentation" shall mean all media which record or convey information relating to the Engineering Works in whatever form including but not limited to drawings, calculations, software, data sheets, material sheets, specifications, programmes, enquiries, purchase orders, correspondence and all other documents, models and other design aids, which convey information relevant to the Engineering Works and the subsequent operation of the Process Plants.

…

(bb) "Mechanical Completion" shall mean the situation when all the Sections of the Process Plant are complete except in minor respects as described in the Description of the Works.

…

(ss) "Sectional Completion" shall mean the situation when a Section of the Process Plant is complete except in minor respects as described in the Description of Works and has passed relevant System Hand-over Tests

…

(ddd) "System Hand-over Tests" shall mean those tests so described in the Description of Works

…

2. **RESPONSIBILITIES OF THE CONTRACTOR**

2.1 General Responsibilities

2.1.1 Save to the extent that the Purchaser has not complied with Clause 3 and such failure has affected the ability of the Contractor to comply with its obligations under the Contract, the Contractor shall, with due diligence, carry out and complete the Engineering Works in accordance with the Contract and the Regulations and to the reasonable satisfaction of the Project Director and provide all labour, materials, equipment, Contractor's equipment, transport to and from and in and about the Site and all other things, whether of a temporary or permanent nature, required for the performance of the Engineering Works insofar as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract…

3. **RESPONSIBILITIES OF THE PURCHASER**

The Purchaser shall be responsible for the activities ascribed to the Purchaser in the Description of Works which (save where the contrary is expressly stated in this Contract) shall be an exhaustive and exclusive list.

4. **THE PROJECT DIRECTOR**

4.1 The following provisions shall apply to the Project Director:

4.1.1 except to the extent otherwise stated in the Contract or notified by the Purchaser to the Contractor in writing the Project Director shall have full authority to act on behalf of the Purchaser in connection with the Contract;…

5. **CONTRACTOR'S REPRESENTATIVE**

5.1 The Contractor shall appoint Contractor's Representative who shall have full authority to act for it in connection with the Engineering Works and will usually be available during normal working hours throughout the duration of the Engineering Works and the Contractor shall appoint other key personnel in sufficient number and discipline to ensure execution of the Engineering Works in accordance with the Contract…

7. **CONTRACT PRICE AND ENTITLEMENT TO COSTS AND ADDITIONAL MONIES**

7.1 The Purchaser shall pay to the Contractor the Contract Price of £ 135 million (one hundred and thirty five million pounds sterling) as described in Schedule 1…

7.6.5 The following are the matters in respect of which the Contractor may be entitled to payment in excess of the Contract Price by way of Variation, Cost, damages or otherwise:-

7.6.5.1 Variations pursuant to clauses 1.3.7, 2.1.3, 2.1.4(b) 2.1.6(b), 2.2.4(b), 2.5.1, 2.8.1, 2.8.2, 9.3.1, 9.4.1, 13.3.1, 18.1.10, 18.5.3, 20.3

7.6.5.2 Claims in respect of Cost, damages or otherwise arising from clauses 3, 8.9, 9.3.3, 17.3.1. 17.3.5(b), 17.4.8, 18.1.9, 18.2.5, 19.7 and 29.2

7.6.5.3 Payment pursuant to clauses 8.7, 10.4.2, 12.4 and 31.5

7.6.5.4 The Purchaser's warranties pursuant to clause 22

7.6.5.5 The Purchaser's obligations pursuant to clause 25.4

7.6.5.6 Payments pursuant to clause 33 and 34

7.6.5.7 Payments following termination

7.6.5.8 Release of payments pursuant to clause 36

7.6.5.9 Interest awarded by an adjudicator

7.6.6 The Contractor's full entitlement to payment over and above the Contract Price in respect of Variation, Cost, damages or otherwise is set out in 7.6.5 and the Purchaser shall have no further liability to the Contractor in respect of payment arising in Contract tort or otherwise at law.

…

9. **VARIATIONS**

…

9.3 Purchaser's Variations

9.3.1 The Project Director may order in writing Variation at any time up to the issuance of the Final Certificate and the Contractor shall carry out such a Variation with due diligence.

…

9.3.3 Contractor to assist in preparing Variations

The Project Director may at any time instruct the Contractor to prepare, or to assist in the preparation of, a potential Variation and the Contractor shall with due diligence comply with such instruction to provide to the Project Director its proposals for the form and scope of the Variation in such detail as the Project Director shall require and provide to the Project Director a quotation as described in clause 9.3.2.

16. **PROGRESS AND EXPEDITING**

16.1 The parties shall endeavour to progress and expedite all Plant and Constructional Plant to achieve the optimum delivery to Site in accordance with the Master Programme.

16.2 The Contractor shall agree with the Project Director the degree of expediting and inspection to be carried out on each order for Plant and Constructional Plant.

…

17. **CONSTRUCTION**

…

17.2 Setting Out

17.2.1 The Contractor shall be responsible for the correct setting out of the Engineering Works and provide all things whatsoever necessary for the setting out of the Engineering Works, but the Contractor shall not be liable for errors which are due to inaccurate information provided by the Project Director for the purposes of such setting out save insofar as any such inaccuracy should have been reasonably apparent to an experienced contractor or shall have been detected by the Contractor and the Contractor fails to bring it promptly to the attention of the Project Director and shall be responsible for the correctness thereof notwithstanding any checking or approval by the Project Director of the setting out of the Engineering Works.

…

17.3 Possession of Site and Facilities to Others

17.3.1 The Purchaser shall, in accordance with the Master Programme, provide the Contractor with possession of so much of the Site as is necessary for the performance of the Engineering Works, but such possession shall not be exclusive of the whole or any part of the Site to the Contractor…

17.3.2 Reasonable facilities for access

The Contractor shall permit the Project Director and persons properly authorised by the Project Director and their respective servants and agents to enter the Site for any purpose during Site working hours (and outside normal working hours in emergencies). The Contractor shall (without prejudice to the generality of and to the extent anticipated by clause 2.1.1) in accordance with the requirements of the Project Director permit the Contractors and workmen of the Purchaser and of any other property authorised authorities or statutory corporations or statutory bodies who may be employed in the execution on or near the Site of any work not in the Contract or of any contract which the Purchaser may enter into in connection with or ancillary to the Engineering Works to enter the Site, subject to their compliance with Site safety procedures.

17.3.3 Liaison with other Contractors

The Contractor shall (without prejudice to the generality of and to the extent anticipated by clause 2.1.1) provide such services as are set out in the Description of Works or such information as may be required from time to time by the Project Director to enable such other Contractors and workmen to meet their own programmes. …The Project Director shall instruct other Contractors to co-ordinate their work with that of the Contractor.

17.3.4 Restrictions on entry

The Contractor shall not permit other persons whose presence on the Site is not necessary for the execution of the Engineering Works or for the execution of other work on behalf of the Purchaser to enter into or visit the Site without the prior consent of the Project Director (such consent not to be unreasonably withheld or delayed).

…

17.4 Site Regulations

…

17.4.2 The Contractor shall comply with the Site rules as agreed with the Project Director and the statutory and safety requirements applicable at any time, and shall procure that its employees and the employees of any Suppliers and Sub-Contractors so comply.

17.5 Constructional Plant

17.5.1 The Contractor shall procure that no Constructional Plant, Plant, stores or other things are removed from the Site without the consent of the Project Director, which shall not be unreasonably withheld.

…

17.9 Services to be Provided by the Contractor on Site

Without prejudice to the generality of clause 2.1.1, the Contractor shall provide such services as are set out in the Description of Works.

17.10 Services to be Provided by the Purchaser on Site

The Purchaser shall provide such services as are set out in the Description of Works

18. **HAND-OVER, ACCEPTANCE AND CERTIFICATION**

18.1 Hand-over and Certification

18.1.1 The Contractor shall provide a programme for System Handover in accordance with the Description of Works and when any System(s) of the Process Plant has achieved the state of System Completion, and is ready for the commissioning programme (except in minor respects agreed to by the Project Director which do not affect the readiness of such Systems(s)), the Contractor shall present for the Project Director's approval a certificate of Hand-over for any System thereof stating the date of Handover and that the System(s) has been completed in accordance with the Description of Works and has passed such tests and inspections as may be required by the Contract to be carried out prior to Hand-over. Such certificate of Hand-over may include a list of minor items or defects agreed to by the Purchaser still to be completed by the Contractor.

18.1.2 The Project Director, without lessening the Contractor's obligations to complete any outstanding work, shall, if the System(s) (which is the subject of the request for approval of certificate of Hand-over), has achieved System(s) Completion and the necessary Documentation has been made available at least 5 days prior to the date of application, approve the certificate, as of the date of application within 7 days and any System(s) so certified shall transfer to the care and operation of the Purchaser. …

18.1.7 Effects of Hand-over

Upon the approval by the Project Director of a Hand-over certificate the relevant System of the Process Plant shall be at the risk of the Purchaser who shall take possession thereof. The Purchaser shall thereafter be responsible for the care, safety, operation, servicing and maintenance of the relevant System of the Process Plant.

18.1.8 Prevention by the Purchaser

If by reason of any wrongful act or omission of the Purchaser, or of some other contractor employed by the Purchaser, the Contractor shall be prevented from carrying out any Hand-over procedure as provided in clause 18, then for the purpose of approval of Hand-over certificate such Hand-over procedure shall be deemed to have been completed, and the Contractor may give the Purchaser a notice stating the Contractor's claim to the approval of Hand-over

certificate as soon as all other relevant Hand-over procedures have been successfully completed, as provided in clause 18.1.1, 18.1.3 and 18.1.5…

18.1.13 All uncompleted work shall be completed as soon as practicable after the approval of the certificate pursuant to clause 18.1.2, 18.1.4 or 18.1.6 in respect of Hand-over, Sectional Completion or Mechanical Completion.

…

19. **RESPONSIBILITY FOR DEFECTS**

19.1 Defects in the Engineering Works

19.1.1 Without prejudice to any other remedy which the Purchaser may have under the Contract or otherwise, the Contractor shall at its own cost and expense be responsible for the correction, with all reasonable speed and using best endeavours (both before Hand-over and within the Defects Period), of any Defect in the Engineering Works…

…

19.2 Defects after Hand-Over

If a Defect is made good after the approval of Hand-over certificate the Purchaser may require the Contractor to carry out any appropriate test (including, if necessary, any System Hand-over Test) following the making good of any such Defect for the purpose of establishing that the Defect has been made good. The cost and expense incurred by the Contractor in carrying out any such tests shall be borne by the Contractor.

19.3 Failure to remedy defects

If the Contractor shall neglect or refuse to make good any Defect (so far as practicable) within period of 14 calendar days or such other period as may be reasonable in all the circumstances from being notified thereof by the Purchaser then the Purchaser may, without prejudice to any other remedies or relief available to it under the Contract, proceed to do or employ other contractors to do the work, provided that the Purchaser gives at least 14 calendar days' notice of its intention in writing.

19.4 Reimbursement of Purchaser's costs

If the Purchaser has made good the Defect in pursuance of clause 19.3 then the Contractor shall pay or allow to the Purchaser its reasonable cost and expense of so doing.

…

20. **TIME AND DELAY**

20.1 Time for Completion

Subject to the provisions of Clause 20.2 the Contractor shall complete the Process Plant or any Section so as to permit the issue for approval of a certificate or certificates of Sectional Completion by the Sectional Completion Date(s) in Schedule 3.

20.2 Adjustment of Sectional Completion Date(s)

20.2.1 Upon it becoming reasonably apparent to the Contractor that the progress of the Engineering Works is likely to be delayed by any event which would entitle the Contractor to an adjustment of Sectional Completion Date(s) the Contractor shall give notice of such event as soon as reasonably practicable and in any event no later than 28 calendar days after the event.

20.2.2 The Contractor shall at all times use its best endeavours to avoid or mitigate any delay to the Engineering Works but without being required to increase the resources of the Contractor, or its Sub-Contractors or Suppliers engaged in the physical execution of the Engineering Works.

20.2.3 Subject to clause 20.2.7, the Contractor shall deliver to the Project Director full and detailed particulars of any claim for the adjustment of the Sectional Completion Date(s) in order that such claim may be investigated at the time, and the Contractor shall update such particulars as further information becomes available and the Contractor shall make such further enquiries as may be reasonable and timely in the circumstances. To enable the Project Director's review of the claim the Contractor will provide supervised access to his logic linked level 3 programme.

20.2.4 Upon application by the Contractor the Project Director shall grant such adjustment of time to the Sectional Completion Date(s) as may be reasonable in all the circumstances...

20.2.5 The grounds entitling the Contractor to an adjustment of the Sectional Completion Date(s) are

(a) a breach of the Contract act of prevention or default by the Purchaser its servants or agents

…

20.4 Delays by the Contractor

If the Project Director is of the view that a delay has been or will be caused by reasons attributable to the Contractor or any Sub-Contractor or supplier, the Project Director shall so advise the Contractor and the Contractor shall thereupon take such action, as is necessary to avoid or minimise the effect of the delay including, without limitation, to increase its labour force, work extra

overtime, sublet work or increase progressing effort, whichever may be appropriate. The Purchaser shall not be liable for any additional cost thereby caused. The Project Director may consequently accept a revised programme but without relieving the Contractor from responsibility for such delay.

21. **PROPERTY AND ALL INTELLECTUAL PROPERTY**

…

21.2 The property and all intellectual property in Documentation and all information provided by the Contractor under the Contract shall be vested in the Purchaser and/or (where appropriate) the Licensor.

21.3 All Documentation and all copies thereof (apart from the agreed exceptions under clause 23.7) shall be handed over to the Purchaser on demand and in any event upon completion or earlier termination of the Contract.

…

27. **TERMINATION**

27.2 The Purchaser shall have the right at any time by giving notice in writing to the Contractor to terminate the employment of the Contractor under the Contract forthwith if:

27.2.1 the Contractor commits a material breach of any of the terms and conditions of the Contract which is not rectified within ten working days of notice from the Project Director to take such steps to rectify such breach as shall reasonable satisfy the Project Director; or

27.2.2 any distress, execution or other legal process is levied upon any of the assets of the Contractor; or

27.2.3 the Contractor enters into any arrangement or composition with its creditors, commits any act of bankruptcy or (being a corporation) if an order is made or an effective resolution is passed for its winding up (except for the purposes of amalgamation or reconstruction), or if a petition is presented to court, or if a receiver and manager, receiver, administrative receiver or administrator is appointed in respect of the whole, or any part of, the Contractor’s undertaking or assets or any equivalent event occurs in any other jurisdiction; or

27.2.4 the Contractor ceases or threatens to cease to carry on its business; or

27.2.5 the financial position of the Contractor deteriorates to such an extent that the capability of the Contractor adequately to fulfil its obligations under the Contract has been placed in jeopardy; or

…

27.2.10 despite previous warning by the Purchaser in writing the Contractor is failing to proceed with the Engineering Works with due diligence or is otherwise persistently in material breach of its obligations under the Contract; or

…

30. **PAYMENTS BY THE PURCHASER FOLLOWING TERMINATION PURSUANT TO CLAUSE 27.2**

30.1 In the event of termination of the employment of the Contractor by the Purchaser pursuant to clause 27.2, within 90 days after termination, the Purchaser shall issue to the Contractor a certificate (the 'Termination certificate') which shall state:

30.1.1 the amount of the Contract Price;

30.1.2 the aggregate amount to be added to or deducted from the Contract Price by virtue of additions thereto or deductions there from (and any other sums to which the Contractor is entitled or would have been entitled but for the termination);

30.1.3 the net amount of the saving of cost and expense to the Contractor by reason of its having been relieved by the termination of its obligation to complete performance of the Contract;

30.1.4 the total amount paid by the Purchaser to the Contractor under the Contract, and

30.1.5 the balance due to the Contractor or to the Purchaser as the case may be.

The amount to be certified shall be the amount of clause 30.1.1 plus or minus, as the case may require, the amount of clause 30.1.2 minus the amount of clause 30.1.3 and minus the amount of clause 30.1.4. Should the resultant amount under clause 30.1.5 be a minus amount it shall constitute a balance payable to the Purchaser, otherwise it shall subject to clause 30.9 constitute a balance payable to the Contractor.

30.2 Damages included

For the purposes of the preceding clause only, additions to and deductions from the Contract price shall include any damages (including liquidated damages) due from one party to the other in respect of any breach of the Contract committed before the Contractor's receipt of the order to terminate or costs incurred by the Purchaser pursuant to Clause 30.9.

…

30.5 Payment of balance due

Payment of the balance due in any provisional or final Termination Certificate shall be made within 14 days of the debtor's receipt thereof.

30.6 Termination not to affect accrued rights

Termination of the employment of the Contractor under the Contract shall be without prejudice to the continued rights and obligations of the parties hereto with regard to secrecy as provided by clause 23, and the rights and remedies of the parties hereto which have accrued prior to such termination.

30.7 The termination of the employment of the Contractor under the Contract, however arising, will be without prejudice to any other rights which the Purchaser may possess. The terms and conditions which expressly or impliedly have effect after termination will continue to be enforceable notwithstanding termination.

…

30.9 Without prejudice to any other of its rights the Purchaser may itself complete the Engineering Works or have them completed by a third party using for that purpose all Plant, which has become the property of the Purchaser under clause 13 and Constructional Plant which it has the rights to so use under clause 17 and the Purchaser shall not be liable to make any further payment to the Contractor until the Engineering Works have been completed and the expiration of the Defects Period in accordance with the requirements of the Contract and until the costs of completion and making good and remedying Defects, damages or delay in completion (if any) and all other costs and expenses incurred thereof certified by the Purchaser. If the total cost to the Purchaser reasonably incurred exceeds the total that the Engineering Works would have cost had they been completed by the Contractor (the Contract not having been terminated) the difference shall be recoverable by the Purchaser from the Contractor either by way of set off or as debt.

31. **LIQUIDATED DAMAGES FOR DELAY**

31.1 If the Contractor shall fail to carry out the Engineering Works such that the Sectional Completion Date(s) specified in Schedule 3 (or any adjusted dates pursuant to clause 20) are not achieved, the Contractor shall pay to the Purchaser on demand or (at the Purchaser's option) allow to the Purchaser by way of deduction from the Contract Price an amount or amounts calculated in accordance with Schedule 3 by way of liquidated damages and not as a penalty.

31.6 Notice to complete

If it becomes reasonably apparent that the Contractor will fail to achieve Mechanical Completion in respect of the Process Plant on or before the date on which liquidated damages shall wholly cease to be payable by virtue of the provisions of clause 35.2.1 (the "LD Expiry Date"), the Purchaser may give the Contractor not less than 7 calendar days notice to achieve Mechanical Completion. Such notice shall not expire prior to before the LD Expiry Date. If Mechanical Completion has not been achieved within the period specified by the Purchaser, the Purchaser may terminate the contract pursuant to Clause 27.2.

35. **LIMITATION OF LIABILITY**

35.1 Exclusion of consequential loss

Notwithstanding anything to the contrary in this Contract (but save to the extent that the Contractor receives actual payment by way of proceeds of claims against policies of insurance effected by the Contractor and Purchaser pursuant to clause 34.2 in the case of the Purchaser and 34.2.4(f) in the case of the Contractor), neither the Contractor nor the Purchaser shall be liable to the other (whether or not as result of negligence and whether in contract, tort, or otherwise at law) for any consequential or indirect loss, expense or damage or for any loss of production or profit or of any contract that may be suffered by that other

35.2 Limit of contractor's liability

Notwithstanding anything to the contrary in this Contract

35.2.1 The total liability of the Contractor for liquidated damages under clause 31.1 shall not exceed the amounts stated in Schedule 3 in respect of each Section

35.2.2 The total liability of the Contractor for liquidated damages under clause 18.5.10 shall not exceed an amount equal to 10% (ten per cent) of the sum of the Contract Price plus or minus the value of any Variations pursuant to clause 9 issued prior to the date of the relevant Sectional Completion.

35.2.3 Notwithstanding the provisions of Clauses 35.2.1 and 35.2.2 the aggregate liability of the Contractor for liquidated damages under clauses 31.1 and 18.5.10 shall not exceed an amount equal to 18% (eighteen per cent) of the sum of the Contract Price plus or minus the value of any Variations issued prior to the date of Mechanical Completion.

35.2.4

35.2.4.1 Where the Contractor

(a) is liable to the Purchaser in respect of loss or damage pursuant to Clause 33 and

(b) is entitled to be and is indemnified by way of proceeds of claims against the policies of insurance effected by the Contractor and Purchaser pursuant to clause 34.2 in the case of the Purchaser and 34.2.4 (f) in the case of the Contractor

then such liability in respect of which the Contractor has received money from the insurer (but only to the extent that the Contractor has received money from the insurer) shall not count towards the calculation of whether the limit of liability set out in 35.2.4.2 has been reached

35.2.4.2

Save

(a) as provided for in Clause 35.2.4.1 and

(b) in respect of claims by the Purchaser against the Contractor for a breach of clauses 22 and 23

the aggregate liability of the Contractor under or in connection with the Contract (whether or not as result of the Contractor's negligence and whether in contract, tort, or otherwise at law) (and including for the avoidance of doubt the amounts referred to in clause 35.2.1 to 35.2.3) shall not exceed 20% (twenty per cent) of the sum of the Contract Price plus or minus the value of any Variations issued prior to the date of Mechanical Completion.

36. **BONDS AND GUARANTEES**

36.1 Forthwith and upon execution of the Contract the Contractor shall provide to the Purchaser a performance bond and upon Mechanical Completion a retention bond for the due performance by the Contractor of all of its obligations under this Contract in the forms set out and from the banks identified in Appendix 4 or a bank acceptable to the Purchaser. Such performance bond and retention bond shall be for 10 per cent of the Contract Price and 8 per cent of the sum of the Contract Price plus or minus the value of any Variations issued prior to the date of Mechanical Completion respectively. All cost and expense of obtaining the bonds shall be borne by the Contractor.

36.2 Unless a performance bond is provided in accordance with clause 36.1 the Purchaser shall be entitled to retain out of monies becoming due to the Contractor a sum equal

to 10 per cent of the Contract Price (£135 million pounds sterling). Any amount so retained shall only become due for release to the Contractor once the above mentioned bond is provided, or if none is provided, on the date on which the bond in terms of the draft contained in Appendix 4 would have expired.

36.4 Unless a performance bond is provided in accordance with clause 36.1 the Purchaser shall be entitled to retain out of the monies becoming due to the Contractor a sum equal to 10 per cent of the Contract Price (£135 million pounds sterling). Any amount so retained shall only become due for release to the Contractor once the above mentioned bond is provided, or if none is provided, on the date on which the bond in terms of the draft contained in appendix 4 would have expired.

38 **ENTIRE UNDERSTANDING**

The Contract embodies the entire understanding of the parties and there are no other arrangements between the parties relating to the subject matter of the Contract intended to form part of the Contract and no amendment or modification of the Contract will be valid or binding on any party unless the same is made in writing and refers expressly to the Contract and is signed by the parties concerned or their duly authorised representatives