39/85

IN THE PRIVY COUNCIL NO. 28 of 1985

ON APPEAL
FROM THE COURT OF THE SUPREME COURT OF WESTERN AUSTRALIA

B E T W E E N :

HAMERSLEY IRON PTY LIMITED	Appellant (Respondent) (Plaintiff)
- and -	
1. THE NATIONAL MUTUAL LIFE ASSOCIATION OF AUSTRALASIA LIMITED, 2. LANGLEY GEORGE HANCOCK, 3. ERNEST ARCHIBALD MAYNARD WRIGHT, 4. HANCOCK PROSPECTING PTY LTD, 5. WRIGHT PROSPECTING PTY LTD AND 6. L.S.P. PTY LTD	Respondents (Appellants) (Defendants)

RECORD OF PROCEEDINGS

PART I
VOLUME I

Ince & Co.
Knollys House
11 Byward Street
LONDON, EC3R 5EN

SOLICITORS FOR THE APPELLANT (RESPONDENT) (PLAINTIFF)

WALTONS & MORSE
PLANTATION HOUSE
31-35 FENCHURCH STREET
LONDON, EC3M 3NN

SOLICITORS FOR THE RESPONDENTS (APPELLANTS) (DEFENDANTS)

IN THE PRIVY COUNCIL NO.

ON APPEAL

FROM THE FULL COURT OF THE SUPREME COURT OF WESTERN AUSTRALIA

B E T W E E N :

HAMERSLEY IRON PTY LIMITED	Appellant (Respondent) (Plaintiff)
- and -	
LANGLEY GEORGE HANCOCK, ERNEST ARCHIBALD MAYNARD WRIGHT, HANCOCK PROSPECTING PTY LTD, WRIGHT PROSPECTING PTY LTD AND L.S.P. PTY LTD AND THE NATIONAL MUTUAL LIFE ASSOCIATION OF AUSTRALASIA LIMITED	Respondents (Appellants) (Defendants)

RECORD OF PROCEEDINGS
INDEX OF REFERENCE

PART I
VOLUME I

IN THE PRIVY COUNCIL NO.

ON APPEAL

FROM THE FULL COURT OF THE SUPREME COURT OF WESTERN AUSTRALIA

B E T W E E N :

HAMERSLEY IRON PTY LIMITED — Appellant (Respondent) (Plaintiff)

- and -

LANGLEY GEORGE HANCOCK, ERNEST ARCHIBALD MAYNARD WRIGHT, HANCOCK PROSPECTING PTY LTD, WRIGHT PROSPECTING PTY LTD AND L.S.P. PTY LTD AND THE NATIONAL MUTUAL LIFE ASSOCIATION OF AUSTRALASIA LIMITED — Respondents (Appellants) (Defendants)

RECORD OF PROCEEDINGS
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Exhibits "8DFT2-11" to the affidavit of Douglas Frederick Tompsitt sworn 24th May 1983 were not documents but were samples of iron ore feed		
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IN THE SUPREME COURT

OF WESTERN AUSTRALIA

No. 2313 of 1982

IN THE MATTER of an Agreement between LANGLEY GEORGE HANCOCK, ERNEST ARCHIBALD MAYNARD WRIGHT, WRIGHT PROSPECTING PTY. LTD., HANCOCK PROSPECTING PTY. LTD., two other companies and HAMERSLEY IRON PTY. LIMITED

K

B E T W E E N:

HAMERSLEY IRON PTY. LIMITED	Plaintiff
AND	
LANGLEY GEORGE HANCOCK	First Defendant
ERNEST ARCHIBALD MAYNARD WRIGHT	Second Defendant
HANCOCK PROSPECTING PTY. LTD.	Third Defendant
WRIGHT PROSPECTING PTY. LTD.	Fourth Defendant
L.S.P. PTY. LTD.	Fifth Defendant
THE NATIONAL MUTUAL LIFE ASSOCIATION OF AUSTRALASIA LIMITED	Sixth Defendant

Let LANGLEY GEORGE HANCOCK of 49 Stirling Highway, Nedlands, ERNEST ARCHIBALD MAYNARD WRIGHT of 193 Stirling Highway, Nedlands, HANCOCK PROSPECTING PTY. LTD. of 49 Stirling Highway, Nedlands, WRIGHT PROSPECTING PTY. LTD. of 193 Stirling Highway, Nedlands, L.S.P. PTY. LTD. of 46 Terrace Road, Perth and THE NATIONAL MUTUAL LIFE ASSOCIATION OF AUSTRALASIA LIMITED of 111 St. George's Terrace, Perth within 10 clear days after the service of this Summons on them respectively exclusive of the day of such service cause an appearance to be entered for them to this Summons and thereafter attend before the Judge sitting to hear such Summons at such time and place as shall hereafter be fixed for such hearing.

This Summons is issued upon the application of HAMERSLEY IRON PTY. LIMITED of 191 St. George's Terrace, Perth which claims the determination of the following question of construction arising under the Agreement referred to above and in paragraph 2 of the accompanying Affidavit of Colin Roy Langridge and in the events which have happened, that is to say:

> At what time does beneficiation or other treatment of the Low Grade Ore referred to in that Affidavit begin within the meaning of Clause 9(b) of the Agreement?

and such further or other relief, including an order providing for the costs of and incidental to these proceedings, as this Honourable Court thinks fit.

DATED the 2ND day of SEPTEMBER 1982.

This Summons was taken out by JACK RAYMOND WOOD, solicitor for the said Plaintiff whose address for service is 18th Floor, 191 St. George's Terrace, Perth.

NOTE: If a Defendant does not enter an appearance at the Central Office, Supreme Court, Barrack Street, Perth within the time above mentioned, and thereafter attend before the Judge sitting to hear such Summons at such time and place as shall hereafter be fixed for such hearing, such order will be made and proceedings taken as the Judge may think just and expedient.

DOCUMENT 1* - Originating Summons dated 2.9.1982

CC91A. 12.41

OLNEY J. (Continuing): - - - his deposition or as his affidavit you can assume that I have read them myself and I am happy that they then be taken as read; unless counsel want it specifically read I do not think it is necessary to take the time in doing so.

MR HULME: Yes. That would be convenient, your Honour.

COLIN ROY LANGRIDGE, sworn:

EXAMINED BY MR HULME QC:

MR HULME: Mr Langridge, is your full name Colin Roy Langridge? ---Correct.

You live at 54 Fitzroy Crescent, Dampier, in Western Australia? ---I do.

You are the manager of production control and technical services for Hamersley Iron?---Correct.

Have you sworn two affidavits, one of which is dated 2nd September, 1982, and the other of which is dated 24th May, 1983?---I have.

To the best of your knowledge and belief, are the contents of those affidavits true and correct?---They are.

I do not know whether your Honour wants the affidavits separately tendered?

OLNEY J: I think perhaps it is convenient. We can then identify them by exhibit numbers. Perhaps my associate can delve through the file and have the witness identify the particular document as he goes.

MR HULME: The first one is 2nd September, 1982, and the second is the 24th May, 1983.

WITNESS: Yes. They are the affidavits.

EXHIBITS

EXHIBIT 1 .... Affidavit of 2.9.82 plus exhibits.

EXHIBIT 2 .... Affidavit 24.5.83 plus exhibit.

MR HULME: There are, your Honour, eight exhibits. There are seven exhibits CRL 1 to 7 to the first affidavit and CRL 8 to the second.

OLNEY J: That is right. There is an exhibit to the second affidavit - - -

OLNEY J. (Continuing): - - - second affidavit. If the affidavits, with their appropriate exhibits, are simply treated as a separate exhibit, we can then identify documents as exhibit CRL2, 3, or whatever it might be.

MR HULME: Yes. I thought it would be useful in understanding the matter generally if I asked Mr Langridge to explain to your Honour a little about the blending of ores for the purpose of sales contracts. I think we all know it and have assumed it, but I think it might be helpful. I do not think there is anything controversial in it but I will just ask him to explain the blending processes and the ore iron content and the impurity content.
TO WITNESS: Could you just give his Honour a short statement about that?---The matter of the concentrate of feed material being different from the high-grade material from Hamersley's mines has already been referred to. In addition to that difference- - Hamersley operate two mines, one at Paraburdoo and the one which has been referred to in this hearing which is at Tom Price. The Paraburdoo ore and the Tom Price ore are different in terms of the chemistry of those ores. The contaminants that are contained in those ores, phosphorus, alumina, silica and the like, are at different levels, and that is similarly the case with the low-grade ore compared to the high-grade ore within the one deposit at Tom Price.

You could regard the Hamersley system, therefore, as having three separate feed products to make its saleable ore blends at the shipping port of Dampier.

To meet the contracts or to meet the specifications on which the sales contracts are based, it is necessary to schedule and plan those different streams of material in respective ratios, to balance the chemistry of the three different types of ore and to come up with a final, saleable product which meets the contracts.

In that respect the concentrator material is an important stream because the grade of what would otherwise be low-grade ore has been enhanced and that ore therefore has blending power, which can accommodate some of the impurity levels in, for example, Paraburdoo ore; so it is an on-going equation and planning exercise to balance the material from the two mines and the products from the concentrator to achieve the specifications required in the sales contracts at the port.

OLNEY J: What you are saying is the product of the concentrate is used in blending?---Yes.

MR HULME: With the low-grade ore, you would have heard earlier that I said to his Honour there are times when you have to mine that ore even when you do not want it. Has that been the position over the years - - -

MR HULME (Continuing): - - - the years?---Yes, that is true.

What has been done with what was mined without being wanted at the time?---Prior to the construction of the concentrator, the low grade ore that had to be mined to enable access to the high grade areas of the deposit was stockpiled in discrete stockpiles in the pit at Tom Price, within the mine confines, and those stockpiles were called "low grade stockpiles."

I want to ask one or two questions, your Honour, about an exercise which forms part of exhibit NOB7 to an affidavit of Mr Boughton sworn on 20th October 1983. Mr Boughton refers to this matter in para.12 of his affidavit which refers to exhibit NOB7 as being a schedule of calculations and NOB7 itself makes plain on its first page that it is subject to a number of assumptions.

OLNEY J: Yes. The witness just needs to see that exhibit NOB7, does he, Mr Hulme?

MR HULME: He has seen it. He should see it just for a moment, I think; yes.
TO WITNESS: I will not be going beyond the first page of it, Mr Langridge. You now have exhibit NOB7 which in para.2.2 states an assumption as having been made that where several streams contribute to either a product or tails the FE grade of each contributing stream is the same as the whole of the product or tails.(Your Honour probably has noticed in the other documents FE, being a reference to iron.) There is that assumption that each contributing stream will have the same SE grade as the mixed mass to which they contributed. In the
TP58A case of the Hamersley streams being discussed in this paper, do data exist from which it is possible to say firmly whether that assumption is or is not correct?---No, there would not be, not to my knowledge. There would not be sufficient data to verify that statement.

What do you say as to the likelihood of that assumption being correct from your experience of iron contents of streams of different sizes of ore?---I would say the likelihood is that it would not be correct on the basis of work we had done on the original low grade, the total low grade stream that feeds the plant. There is a relationship between the sizing of material and its grade right down the spectrum of size fractions, and I would suspect that the same would apply within these streams but I do not have the data to substantiate that.

MR HULME: Could you return NOB7 please, Mr Langridge? TO HIS HONOUR: I see, your Honour, that it is virtually one o'clock - -

OLNEY J: Yes. This is a convenient place to adjourn until 2.15 p.m. I am wondering whether you or your junior could supply my associate with a list of the witnesses in the order you propose calling them so that he can have the documents marshalled in an orderly fashion.

MR HULME: Yes, your Honour.

LUNCHEON ADJOURNMENT

173B. 2.15

UPON RESUMPTION:

OLNEY J: Yes, Mr Hulme?

MR HULME: I have no more questions, if your Honour pleases.

OLNEY J: Yes, Mr Sher?

CROSS-EXAMINED BY MR SHER QC:

MR SHER: Mr Langridge, in these proceedings there are a number of affidavits which have been sworn and filed on behalf of Hamersley. I take it you are familiar with all those affidavits?---Yes. I am.

You have read them all?---Yes.

There have been perhaps not an equal number but a number of affidavits filed on behalf of in effect the Hancock and Wright group of defendants?---Yes.

You have read all those?---Yes, I think I have read the lot.

So you familiarised yourself in general terms with the evidence which is being put on, as it were, both sides?---I have.

Your position at Hamersley is presently the manager of the production control and technical services?---That is correct.

You have been with the company for many years?---Sixteen years.

In the course of that career you were, as you say in your affidavit, the senior project engineer for the concentrator construction project between November, 1976, and March, 1978?---That is correct.

That would cover the period during which the concentrator was designed?---Yes.

If not completed, at least a great deal of it was built?---Yes.

It being commissioned in the early part of 1979?---Correct.

Have you kept an eye on it, as it were, to see how it is going and what it does?---I had a close association with the concentrator until about March, 1982, at which time I took up the new position you mentioned a moment ago. Since that time one of my sections has had metallurgical involvement in the concentrator so I am broadly aware of developments in the plant.

Amongst the number of witnesses who have sworn affidavits in these proceedings for Hamersley there are two

other members of the staff, Mr Roberts and Mr Tompsitt I think it is. Is that right?---Yes.

MR SHER: So that comprises the three witnesses who are produced as it were from within Hamersley's own ranks?---Correct.

Are you the most senior of those three people?---No. Mr Roberts is.

Mr Tompsitt's specialty is in the field of metallurgical engineering?---Yes.

You have a much wider knowledge and experience than he, generally, about Hamersley's activities, I take it?---Yes.

In the course of your evidence in addition to the affidavit, you did speak about the need to blend the product from both Tom Price and Paraburdoo to meet specifications, I take it, for export contracts?---Correct.

So can we take it from that that you have a working knowledge at least of the export contracts Hamersley has?---No. I can comment on the meeting of the specifications which are set in terms of our production planning because I am responsible for that area, but in terms of the actual contracts written with our customers and the way they operate in the market that is a totally separate division which I am not very conversant with.

You have some knowledge of it, I take it?---I do have some knowledge of the chemistry of the contracts but I do not claim to be expert in that area.

No; but in so far as your job either has or does entail decisions about the blending of product from the two mines you are familiar with the contractual specifications?---Yes.

While I am asking about that, the fact is, is it not, that there are minimum requirements for FE content in some contracts?---There are.

Indeed, in all of them, I take it?---Yes.

There are, in effect, bonuses or higher prices obtainable if you can get the FE content above a certain level?---That is correct.

And, I take it, penalties for getting below it?---Correct.

So that from Hamersley's viewpoint - - -

MR SHER (Continuing): - - - Hamersley's viewpoint it is not merely a question of blending ore to meet a contract requirement. It sometimes has direct, financial benefits for Hamersley. They can, in effect, upgrade ore? ---That is the way it operates in terms of the contracts that are written with the customers. The main concern I would have in that area would be to optimise the ore bodies and that is slightly different.

I was going to ask you about that. There are at least two reasons why Hamersley might wish to beneficiate ore. One would be to improve the product so you would get some bonus, as it were, under a contract - is that right?---Yes.

Secondly, and perhaps more importantly, the capacity to use low-grade ore rather than concentrating as it were on just exploiting the high-grade ore, extends very substantially the life of both mines, does it not? ---It does.

Indeed, if one were to try and measure in terms of dollars and cents the benefits that flow from extending the life of the mine we would be talking in millions of dollars, would we not?---We certainly would.

Hundreds of millions of dollars?---I would be guessing on the absolute amount but it is a substantial impact.

Yes, and it is not only valuable to Hamersley to do it from the viewpoint of extending the life of the mine from the point of view of having something to sell over a much longer period but it enables the company to make use of the infrastructure it has built in relation to both the mines and the townships at Paraburdoo and Tom Price?---Yes.

And the railway which it built between the two and the port of Dampier?---Correct.

And the facilities at Dampier?---All of those facilities are designed for that.

So from the viewpoint of Hamersley the upgrading of low-grade ore has vast financial benefits, has it not?---Obviously, yes.

To be measured in terms of years?---Yes.

And in hundreds of millions of dollars?---Yes.

Tell his Honour if you cannot answer this question but when Mr Hulme was telling his Honour about the case and the fairness and reasonableness of the approach being urged on the court on behalf of Hamersley, the fact is, is it not, that since 1979 when this concentrator started producing, no royalties at all have been paid to my clients from ore produced through the concentrator? That is the

fact,is it not?---That is not my understanding. I may not be totally correct here but I thought there were royalties paid on a 200 by 80mm fraction that was crushed and screened through that concentrator.

MR SHER: I am grateful to you for drawing my attention to that particular matter. I have overstated the case. Apart from a percentage of ore which was the 200 by 80 size which did not go through the whole beneficiation process, no royalties at all have been paid by Hamersley to Hancock and Wright or their two companies, or indeed to anyone?---Not to my knowledge.

In respect of ore that has gone through the beneficiation plant? ---Other than that 200 by 80mm fraction, not to my knowledge.

Further, not only has Hamersley not paid any royalties to the contracting parties but it has saved vast sums of money in royalties payable to the West Australian Government, for the same reason, has it not?---I do not quite understand the question.

Let me put the matter to you more directly. Royalties are payable in respect of ore produced from the mine to both, in effect, Hancock and Wright and the Western Australian Government?---Yes.

In general terms, there is 2½ per cent payable to Hancock and Wright and 7½ per cent payable to the Government?--- I am not greatly familiar with the royalty question. It is not an area that I am involved in - - -

WITNESS (Continuing): - - - involved in.

MR SHER: You are only one of three people I can ask so I will see what I can find out from you if I can but do not tell his Honour anything about which you know nothing. The test of whether or not royalties ought to be paid to Hancock and Wright in relation to ore which has been officiated is the subject matter of this originating summons?---Yes.

In relation to the government, the question of whether royalties are paid at 7½ per cent or at a greatly reduced figure depends upon whether the ore has been processed; gone through secondary processing. Is that right?---I cannot really comment on the government royalties. I am not familiar with the details of them.

It is not the detail I am asking about; it is the general terms of it?---Yes, but - -

What I put to you is that if we look at the Iron Ore Hamersley Range Agreement Act - - are you familiar with that Act?---No. I am not.

Have you never seen it?---No.

Have you never heard it discussed?---I have heard of it. I have heard it discussed. As I said earlier, though, it is not an area in which I tend to get involved. I do not understand or know the details of those documents.

It is within your field of expertise to determine whether ore is put through a secondary processing operation, is it not?---Yes.

Is it not a fact that the government receives a much lesser royalty if ore is put through secondary processing? ---Yes.

Is not secondary processing defined in that Act and the agreement which is ratified by the Act as concentration or other beneficiation other than by crushing or screening?

MR HULME: Your Honour, he is now being asked whether or not something is in an Act which he has said he has never seen. My learned friend has the Act there. It presumably proves itself. He can read it. I can read it. Your Honour can read it. Why a witness who has not seen it should have it read to him passes comprehension. It brings into prominence the whole of what is happening at this point. Your Honour is being asked

to interpret some words in an agreement written in 1962. How that can be affected by what is in an Act of parliament, save for guidance as to terms as a matter of argument; how it can be affected by whether or not Hamersley has been paying royalties since 1979, whether there are disputes about royalties, whether an arbitration is being called for as to this matter, cannot affect the proper interpretation of an agreement entered into in 1962.

We took out this originating summons on that interpretation, that one question,in order to facilitate as we saw it the holding of the arbitration. It must, in our submission, be entirely irrelevant to any issue on that question. That contract meant something in 1962 and in later years. Mr Langridge's affidavit has put before the court as simply and factually as he was able what, in fact, is being done. The history of whether royalties have been paid and these present questions in our submission are entirely irrelevant to any issue. This is not grievance day for Mr Hancock and Mr Wright; it is interpretation day for a few words in the contract.

OLNEY J: Yes. I think there is some substance in what you say, Mr Hulme.

MR SHER: I would like to be heard on this question, your Honour.

OLNEY J: I think some of Mr Hulme's comments as to relevance also extend to some of the material, if not a lot of it, which has been put forward in the affidavits. It is there and whilst I am not all that keen on sifting through and ruling on each specific item I think one does at least get a bit of a background and feel for the matter by having a few odd nuts and bolts thrown in which may not be necessary. As to the particular questions you are asking is what the objection is about.

MR SHER: Yes. It is early days yet and the reading of the material - if one were to assume it was as it were for Hamersley alone to define the issues by issuing an originating summons, then there might be more to my learned friend's point - - -

MR SHER (Continuing): - - - point, but, your Honour, our submission is that it is absolutely basic to answering the question that your Honour has to interpret this contract and our basic contention is that there is a threshold question which will have to be faced before your Honour comes to the issues which have been outlined by my learned friend. The threshold question is this: It is our contention that clause 9(b) does not relate to iron ores which do not need to be beneficiated or otherwise treated to enable them to be sold or disposed of. If it were otherwise then the position would be that Hamersley could - and we intend to demonstrate this by evidence - unilaterally and unnecessarily beneficiate ore which does not need it and thereby, as they have in fact done, deprive not only us but the Government of royalties, which we say is precisely what they have been doing.

The issues as between us and the Government have an identity of interests, if we get to the stage of considering what crushing and screening mean. It is in that respect that what Hamersley does vis-a-vis the Government is relevant to what it does vis-a-vis Messrs Hancock and Wright.

We contend that the threshold question for your Honour to ask yourself in interpreting this contract is "What ore does this particular clause relate to?" Our submission is it does not relate to ore - on a proper interpretation of the contract it does not relate to ore - which does not need to be beneficiated to be sold. That, we say, is a fair, reasonable and proper interpretation of the contract.

If that is so, it becomes an issue in answering the question as to how much of the ore referred to in this affidavit, which is the only way it is defined by the summons--does your Honour have to actually go into this question of where in the process does the point of beneficiation begin? We contend at the outset--and I regret to say it is necessary to have regard to whether or not the course of conduct in which Hamersley have indulged is for this reason - that is to say, to avoid paying royalties and for no other reason, because there are hints in their material and certainly evidence from our material to suggest that a lot of this ore is unnecessarily beneficiated.

In relation to the particular point, once we get past that threshold point, the next question which your Honour will have to decide is what is picked up by clause 9(b) and what do the words "crushing" or "screening" mean within that particular clause. That is

an issue which is absolutely identical to the issue which would be faced by Hamersley in dealing with the Government because whilst precisely the same words are not used - that is to say the Government Act uses"secondary processing" and then goes on to refer to "beneficiation other than by crushing or screening" - the contract merely takes it up at the point of saying "beneficiation" and excludes crushing or screening.

The factual issues as between the royalty payments vis-a-vis the Government and Hancock and Wright were identical, therefore.

There are credibility questions in this case. There are witnesses who have been put on oath on behalf of Hamersley who swear, we say, to matters which can be contradicted and which are not correct, and whether or not they are saying what they say, particularly those people coming from the company, because they are seeking to sustain Hamersley's stance in this matter and their behaviour in the past and seek to protect it in the future - - it may depend on what really is at stake.

If the outcome of this case were connected solely to what they could save in dealing with my clients that is one thing, but if the outcome of this case also means that they can, by parity of reasoning, not pay massive royalties to the West Australian Government, that is another and it pro - vides a far greater incentive for them to seek to justify their behaviour and to argue that things mean one thing (and we submit they do not) than otherwise. In other words, it is directly relevant to the credibility of the whole case which Hamersley is seeking to make.

We would submit that Hamersley cannot, by issuing an originating summons which they drew, seek to confine issues to one simple question, as Mr Hulme put it. The summons itself indicates, if one looks at it, that there are at least four basic questions which your Honour will have to deal with in answering the questions asked in it. It starts off by saying, before the question is posted, "In the events which have happened" and we submit we are entitled to examine what are the events which have happened and why they happened. It then goes on to talk about the low-grade ore referred to in the affidavit and in our submission we are entitled to show that, in relation to at least a large part of that low-grade ore referred to in the affidavit, no beneficiation was needed at all; the contract does not require - - -

MR SHER (Continuing): - - - require a calculation under clause 9(b) in respect of that ore, and that ought to be the answer which your Honour should give to that part of the question. In other words, we are foreshadowing that we are going to be submitting to your Honour that the question should be answered in two parts. Firstly, as to low grade ore which does not need to be beneficiated and which is not picked up by clause 9(b), the answer is that clause 9(b) does not apply. As to the rest we will be submitting, as Mr Hulme has accurately predicted, that it starts at a different point than where Hamersley say it starts. So that is another question your Honour will have to look at.

Your Honour will also have to look at a factual issue as to where the beneficiation begins, and I do not think I need elaborate on that, and finally your Honour will have to look at the meaning of clause 9(b). That necessarily involves, we submit, as is recognised by my learned friend's opening, that your Honour has to look to the whole of the contract. Indeed not only that, if your Honour was referring in your Honour's comment to some of the evidence that surrounds the making of this contract in the first instance we will be inviting your Honour to rely upon the recent decision in the High Court in the Codelfa case to say that the court can look at the matrix of circumstances in which a contract is made to determine what in effect was achieved by it. In relation to construing the contract according to general principles - which involves concepts of fairness, reasonableness, the sorts of matters which are described by the phrase "commercial reality" or "business efficacy" and the like - your Honour has to have regard for the sorts of considerations which are now being touched on in cross-examination. I would remind your Honour that this is one of only three witnesses, and perhaps one of only two, to whom I can direct these questions.

It is recognised from Mr Hulme's opening that this is an issue because Mr Hulme urged upon your Honour as a consideration in construing this contract the fairness and reasonableness and practicability of the view that they were urging upon your Honour which would make the arbitrator's task so easy. We will be saying that the reverse is the case and fairness, reasonableness and practicability should result in your Honour answering the question as we would suggest it should be answered.

I do not want to take up too much time on this point but it is the first time I have had a chance to give any indication to your Honour of the issues as we see them to be, and contend that they are, and perhaps it is useful at this stage to just

read a short passage from the Chief Justice of the High Court's judgment in Australian Broadcasting Commission v. Australian Performing Rights Association. It is at 129 CLR at p.99, and the passage is at pp.109 and 110. The Chief Justice said this:

> "It is trite law that the primary duty of a court in construing a written contract ....(reads).... to be inconvenient or unjust."

Mr Hulme has conceded, I believe, that this is an"awkwardly framed clause" (to use his words) and we are going to be contending, your Honour, that it is not merely awkward but ambiguous and that the contra-preferendum rule if resorted to here would resolve that ambiguity in our client's favour. His Honour went on to say this:

> "On the other hand, if the language is open to two constructions ....(reads).... grammatically accurate (to use the words from earlier authorities cited in Lock v. Dunlop)"

His Honour went on to make further comments - - -

MR SHER (Continuing): - - - further comments. At the risk of repeating myself, the relevance of this cross-examination about the relationship between Hamersley and the government is to two issues: It is relevant as to the question of what is meant by crushing and screening, because exactly the same considerations apply vis-a-vis Hancock and Wright as they do with the government. It is also relevant, we submit, to the wider issue; that is, why has Hamersely done what they have done? How much of this ore really does need to be beneficiated? If our contention is correct, that the clause 9(b) only applies to ore which needs to be beneficiated to be sold, we submit it is relevant to show that Hamersley have a very real incentive to seek to avoid paying royalties to the government by putting ore through the beneficiation process which does not really need it - even more so if they get bonuses by upgrading the ore above the minimum requirement of the contract.

In those ways, we submit, this background is relevant to those issues and for that reason this cross-examination should be permitted.

MR HULME: Would your Honour permit me to say something?

OLNEY J: Yes, you may have a short reply.

MR HULME: It really is the most astonishing argument, if your Honour pleases, and astonishing to hear an originating summons for the interpretation of a few words of a 1962 contract turned into a kind of quasi Royal Commission as to the relationship between Hamersley and Mr Hancock and Mr Wright over the period of years long, long after 1962.

My learned friend puts it that he wants to argue that clause 9(b) does not apply to ore which does not require beneficiation. We say there are two things: Firstly, if that is the meaning of the words, one gets that out of the contract. If that is what the contract means it means that whether or not there is any ore which requires beneficiation it would mean it in relation to 1984 or in relation to 1985, years when one does not yet know. It does not make the slightest difference to the meaning of the contract whether there is any such ore or is not any such ore. Secondly, the issue as to whether or not 9(b) applies in respect of certain ore is not before the court. That may well be an issue at the arbitration, it may well be an issue in some other legal proceedings. It is not in issue in these proceedings.

My learned friend says, "I am going to ask for a two-part answer saying, 'This is what it means but do not forget, it does not apply to this ore or that ore or that ore in these years.'" That is not a question which is asked and it is not a question which it is appropriate to pursue on a simple originating summons. My learned friend says it is not for us to define the issue. The plaintiff has taken out the proceeding in relation to a matter which it deems relevant. My learned friend's clients are perfectly entitled to take any proceedings they want. They are entitled to sue, to do whatever they want. What they are not entitled to do is to come and turn this proceeding into something which it simply is not.

He says that it becomes an issue as to how much ore it relates to and we say there is not the slightest reason shown as to why that is something which it is necessary to know in order to answer it any more than the parties would have known in 1962. If it had that double kind of meaning it had that meaning long before anyone knew how much ore it would apply to.

He then says, "in the events which have happened - - -"

MR HULME (Continuing):- happened." That is a phrase which in the equity jurisdiction has previously been taken to mean "in the relevant events which have happened." It does not turn the hearing of each originating summons into an inquiry as to what has happened in the history of the world or since the contract was written. There is evidence before the court. Mr Langridge's affidavit showing what is being done, which we wrote as neutrally as possible, seems not to be under challenge from anybody as to what happens on the ground. That is why that affidavit intentionally avoids saying where beneficiation starts. Mr Langridge set out what happens, leaving it for others to determine the significance of that.

Questions arise, he says, whether witnesses are trying to protect Hamersley Iron; expert witnesses brought from abroad wanting to do only one thing - march at the head of the pack and protect Hamersley Iron. He says, "In order to show whether they are doing that or not I have to go back into the history and try to lead evidence in order to show that there is someone to be protected." The same argument could be put as to any witness who is brought and gives evidence, saying "Well, he might be protecting somebody so let us look at that man's whole history and see if there is something to protect." It is, in our submission, a laughable reason to be put forward as relevant on the hearing of an originating summons.

Codelfa says, and it was not new - judges knew this before - that in interpreting a contract you could look at the surrounding commercial facts and circumstances; the businessman's armchair something like the testator's armchair. How that, looking at facts in 1962 or the doctrine that one can, requires you to look at facts in 1979 to 1983 in order to interpret what was written then, my learned friend does not explain. The ABC v. Performing Rights case that you try to interpret according to the intention of the parties must mean in accordance with the 1962 intentions, and rendering the contract harmonious cannot require that these later matters - - and there have been disputations between the parties, there have been disagreements. Hamersley does think that Mr Hancock and Mr Wright are asking for more than they want; Mr Hancock and Mr Wright no doubt do think that Hamersley is calculating it at less. There are disagreements but this is not the day to attempt to pursue all those matters which have not been put before you. There is an arbitration clause - that will go to arbitration - let alone this standing in court saying, "It may be that we are not paying massive sums to the Western Australian Government" and

things of this sort. How that could be relevant to the meaning of the 1962 contract again passes comprehension.

I think my learned friend said two or three times that he has to do his best with Mr Langridge because he is the most senior man he is getting. We had thought that what was relevant was what happened there on the ground; that he was the most appropriate man. None of these other issues have been raised before today as far as these proceedings are concerned and the attempt to either turn it into a royal commission or to somehow exercise influence on Hamersley,or whatever else is in mind, ought not to be allowed to be persisted with.

OLNEY J: Thank you, Mr Hulme.

MR SHER: Your Honour, I do not want to keep bobbing up. I have had my say but this is so critically important - there are a number of matters my learned friend raised that I had not spoken of - that I would like leave from your Honour just to shortly say something about.

OLNEY J: Yes.

MR SHER: These proceedings we apprehend are to facilitate the arbitration, your Honour, and it is clear from correspondence between the parties, some of which is exhibited to the affidavit, and Mr Langridge himself, that the parties are not in agreement as to what the arbitrator can do, and indeed it has been Hamersley's stance that the arbitrator cannot resolve such questions as characteristics of the ore passing through the point at which beneficiation begins. That is exhibit CLR6, your Honour. The letter reads in the part that is relevant from the legal officer of Hamersley to my instructing solicitor:

> "We think it very doubtful indeed whether the arbitrator is authorised ....(reads).... We think it is clear, with respect, that the arbitrator cannot determine the tonnages of such - - -"

MR SHER (Continuing):"- - - such ore because he is concerned only with the price which, if positive, would be expressed in terms of dollars or cents per tonne" and Hamersley were not prepared to agree to extend the submission to the arbitrator, so if this is a proceeding designed to facilitate the arbitration we submit it is important that it do that and these are critical issues which we submit must be resolved at some stage and certainly before the arbitration.

The second point I would like to make is that it is wrong to assert, as my learned friend has done, that your Honour is confined to what happened in 1962 and what the contract meant in 1962 because the precise task which your Honour is asked to perform by my learned friend's clients' summons is to define, in terms of an agreement made in 1962, what is in effect happening now - that is in relation to the low-grade ore referred to in the affidavit which is described by Mr Langridge - and it is clear that what the court is being asked to do is to tell the arbitrator what the 1962 contract means as at this date in respect of what is happening now. So the present events are not merely relevant but are the very issue which your Honour is called upon to decide.

The really substantial question which this objection has given rise to is what is this summons all about? My learned friend submits that all it is about is a very limited proposition which Hamersley desire to have considered, but inherent in that proposition is, in our submission, a very real argument because the question is related to determining at what time beneficiation or other treatment begins in relation to what is said to be low-grade ore "referred to in that affidavit" - that is Mr Langridge's affidavit.

Your Honour, we say it is not clear from the affidavit what ore is referred to but if Mr Langridge's affidavit is referring to all the low-grade ore we say this clause does not apply to it and your Honour should say so. In so far as it does apply to it, we want to make our submissions.

We say that implicit in this question is your Honour's determination of what does clause 9(b) apply to? That is really the point of all this discussion, we say. Your Honour has to resolve that question and these issues are relevant to that question. We submit, therefore, that the events which have happened are relevant events to the questions which the summons poses and if my learned friend's assertion that it does not matter about our contention about 9(b) not applying - - I will rephrase that. We have submitted that clause 9(b) does not apply to most of this low-grade ore anyway

because it did not need to be beneficiated. Mr Hulme has answered that by saying it does not matter. Our submission is that if we are right in our contention,what ore was beneficiated and what ore needed to be beneficiated is absolutely critical to your Honour's decision.

We will be asking your Honour to give two answers to the question. The first one will be in these general terms; that the only low-grade ore to which clause 9(b) relates is low-grade ore which needs to be beneficiated to be saleable, and the second answer we will be submitting is this: As to such of that ore as can be identified, and it will not be for your Honour to identify it, it begins, and we contend at a particular point of time. They are, we submit, the two issues that this summons raises, but this objection really gives rise, your Honour, to the question of what is this summons all about. It is so important. If your Honour feels it is undesirable to race into a decision on that question without further consideration and even, perhaps, further argument, your Honour will not get any quarrel from me, but in the meantime I would be seeking your Honour's permission to continue on with the cross-examination.

OLNEY J: Yes.

MR HULME: Can I just add this? My learned friend cites CRL6, saying that Hamersley would not consent - - -

MR HULME (Continuing): - - - not consent to the arbitrator determining the characteristics of the ore. He did not refer to CRL7, sent shortly after, where Hamersley wrote and said:

> "Subject to agreeing on a precise amendment to the arbitrator's.... (reads)....for the arbitrator than for the court."

It went on:

> "We maintain our position that the arbitrator cannot determine the tonnages of ore - -"

because, as your Honour will remember, it is the price clause; he is there to determine the FOB price.

> "- - because he is concerned only with the price but we acknowledge ....(reads)....into account in determining the price."

It gives your Honour a completely unfair position to read that first letter without reading that follow-up letter. What my learned friend is saying, in effect, is "This is relevant because I am going to ask your Honour to answer a question no-one has asked;" (that is what it comes down to) "nor is any material before the court which would enable you to deal with those kinds of issues if these matters are sought to be gone into now." If you were going to determine that kind of issue does it apply to ore got out by beneficiation then seen as being separately saleable? Your Honour would need all kinds of evidence as to the whole of the economics of the beneficiation process. That is not before the court, because it is not an issue which is before the court. For those further reasons, therefore, we would ask your Honour to make it quite plain that the way to find out what the originating summons is about is to read it. What it does is asks a question which could have been asked and answered in 1963. The court would give the same answer today as it would have then, notwithstanding what has happened in the meantime with regard to royalties or anything else.

OLNEY J: Thank you, gentlemen.

I think this objection highlights a number of difficulties which I anticipated might arise when

I first read the papers. I think the real difficulty stems from the fact that the proceedings themselves are not really of the nature contemplated by Order 58, rule 10, which is claimed to be the basis of the originating summons and which, of course, deals with the making of a declaration of rights of persons interested in a contract. It had been my intention at the end of the day today to draw to the attention of counsel the fact that the relief sought is not claimed in terms of a declaration of right and I have some reservations as to whether the question actually asked can be answered in the form sought by either side without there being some declaration as to the rights of the parties interested. That, however, is perhaps something to which counsel can give some thought.

Another problem I would have thought should have been overcome before the matter got this far was determining the issues between the parties. There was a summons for directions before the Master, supported by an affidavit - I am not certain how many affidavits but certainly one of Mr Hasluck - in which it was indicated that there was only a very narrow factual dispute and in the circumstances it was considered that the pleadings were unnecessary. It seems to me that if what has now been said had been said earlier it would have been appropriate for there to have been pleadings - - -

OLNEY J. (Continuing): - - - been pleadings in order to enable this court to know what indeed are the issues, and I am now left somewhat in the air as to what are the issues both of fact and of--not so much the construction of the contract because those have been outlined to me but there do appear to be some issues as to fact which need to be identified and tried.

Could I perhaps just comment on the particular objection which was raised to the question relating to the Iron Ore (Hamersley) Agreement Act? I think there is some justification in objecting to a question being pursued where the witness has said he has no knowledge of the document or the Act concerned and he is then asked, in effect, to give his own construction of the statute. To that extent I think the cross-examination had probably gone as far as was reasonably possible.

However, as to whether the defendants here should be allowed to cross-examine as to matters such as what iron ore clause 9(b) applies to, I would take the view that the issue before me, to the extent that it has been determined or has been indicatedin the originating summons, does not touch upon that matter. It may be another question of construction that arises but it has not arisen in these proceedings. The question which has arisen relates to when beneficiation occurs in respect of whatever iron ore 9(b) applies to and I would not be prepared to allow the evidence to range over an area which is not encompassed within that very narrow question as defined by the originating summons.

Cross-examination as to credibility is, of course, permitted and it is not my practice to unduly restrict that; particularly where experienced counsel are engaged I prefer to trust the integrity of counsel to limit cross-examination as to credit to matters that are genuinely going to credit and I do not wish to unnecessarily interfere in that process. I think, however, that perhaps what I have said does give an indication as to the major complaint that has been raised, or the major issue that has been raised by the objection. I will have to leave it to counsel to raise, if the occasion arises, any objections that may later be thought justified in the light of what I have said.

Thank you, Mr Sher.

MR SHER: Perhaps now is not the time, your Honour, and I think it would be useful if my learned friend and I had a discussion in the light of your Honour's comments, but could I perhaps just mention at this stage that - - -

MR SHER (Continuing): - - - this stage that the concern we have is the definition in the question of the ore to which the question relates and it is defined by the words "The low grade ore referred to in that affidavit", so that really is going to be an issue about which we really will have to get some, as it were ruling, from your Honour. The noise at my left is suggesting to me, your Honour, that your Honour has ruled on that question but I do not apprehend that your Honour has ruled on this aspect of the question. Your Honour has said 'the low grade ore which is affected by clause 9(b)' but what that actually is in fact is, of course, another question and it is not defined by the question.

OLNEY J: I think the question perhaps may even demonstrate a misconception on the part of whoever drew it because one looks to the contract and finds that 9(b) refers to iron ore. I have been asked to determine when beneficiation in respect of iron ore to which 9(b) applies commences. I can understand the point you raise. You raise it because of the form of the question which has been asked. This is the problem I envisage or this is a result of the fact that the proceedings have not been couched in the terms of a declaration of right. Had they been, and it is still early days yet and I would consider any amendment which in effect remedied that position, in terms of a declaration of right as to the rights of the parties with regard to a particular set of facts, then one is better able to know with what we are dealing.

MR SHER: Our concern is that the question appears to be directed not to a purely construction point of a contract. What ore does clause 9(b) apply to? Where does beneficiation begin as to the ore to which clause 9(b)applies? That would involve not answering the question I posed to your Honour as to what ore does it apply to. That is an entirely separate question. As framed, however, it clearly is ambiguous and my learned friends may seek to rely upon an answer to the question as framed as picking out all that goes through the beneficiation plant whether it should or should not.

OLNEY J: As I understand this witness's affidavit, there is a paragraph in it in which he says that at some point or other some ore goes off to be sold and this application has nothing to do with that. What we are dealing with is the ore which was left behind.

MR SHER: The witness as I apprehend his affidavit in substance is saying that the low grade ore is all the ore that goes through the beneficiation plant.

OLNEY J: Perhaps it is the other way around - it is all the ore to which something else does not happen.

MR SHER: What he says in substance and in effect is the ore which goes through the beneficiation plant. The question therefore assumes the answer to what we say is a threshold question. The threshold question is does clause 9(b) apply to all ore that goes through the beneficiation plant? The question as asked assumes that it does. We submit that either the question ought to be changed or we ought to be allowed to argue that point. As framed, however, it assumes the point - - - 10

MR SHER (Continuing): - - - the point. I think it is para. 16 to which your Honour referred. Even as to some of the ore that goes through the plant, it does not all go through the whole beneficiation process.

OLNEY J: I do not think it is 16 that I had in mind, was it? It was earlier on.

MR SHER: Well, 16 talks of high grade and low grade ore and what happens, your Honour. It says in the fifth line:

> "Most of the iron ore sold by the plaintiff which comes ....(reads).... by crushing and screening."

Then he goes on to talk about it. In the middle of the paragraph the sentence commences:

> "In the course of mining its high grade ore the plaintiff has had ....(reads).... The better part" I do not know whether 'better' means the good part or means the most "of this material includes all the low grade ore the subject of these proceedings."

On one view that definition of low grade ore which is picked up in the question includes everything that is not high grade ore, including even that ore which is sized 80 - 200 and goes off to be sold without going through the beneficiation plant at all.

OLNEY J: Paragraph 8 is what I had in mind. That seems to me to be suggesting that the ore that went through the crushing and screening, and was then and there exportable, was not the subject of these proceedings. It is perhaps not said but is assumed that the proceedings relate to all the other ore.

MR SHER: Our difficulty is simply this, your Honour: If your Honour asks the question as posed by saying "at such and such a point" we apprehend that that could be construed by the arbitrator to mean every piece of ore that is not picked up and described in para.16 by Mr Langridge in the words "high grade ore." If that is so, we want to argue that that includes far too much to be included in 9(b). Indeed, we would say your Honour cannot answer the question because all that ore is not dealt with by 9(b). That is one of our basic arguments. We suggest, with respect, that there are two possible alternatives. One is that

your Honour should have the question re-defined so that it is clear, when your Honour answers at what point of time something begins, it is only the ore to which clause 9(b) applies - which your Honour may or may not care to define in some other way but certainly not in the words used here. That is one way out of the difficulty and that would then leave this other question totally unresolved and we would have to have other proceedings to resolve them. Alternatively, your Honour could decide this threshold question.

I apprehend your Honour has already ruled that your Honour did not apprehend that the threshold question was picked up by this summons, and accepting your Honour's ruling it is still our submission that you cannot answer the question in the terms asked because the words "the low grade ore" are ambiguous and pick up ore which we say is ore to which clause 9(b) does not apply. If your Honour is not going to let me argue that question, that would in our submission be quite unfair and your Honour should not, with respect, take such a course.

My learned friends cannot determine our rights by asking a question in this ambiguous form, and then say hereafter, "Well, the judge says that beneficiation begins at point X and that covers all the ore which Mr Langridge says goes through the concentrator which he cares to describe as low grade ore - - - "

MR SHER (Continuing):"- - - low-grade ore." They are two separate questions, as must now appear clearly to everyone.

OLNEY J: I think you are right, that there are two questions which now appear which did not initially appear (to me at least) on reading the papers.

MR SHER: We have come here to argue them both, your Honour.

OLNEY J: Yes. I do not know that Mr Hulme has come to argue both. As I see it myself, the words "of the low-grade ore" referred to in that affidavit really always struck me as being of no real relevance as to the question which I thought was the substance of the action, and that is determining the stage at which beneficiation commenced.

MR SHER: And not making any decision as to what ore it applies to.

OLNEY J: Yes, whatever ore is being beneficiated to which 9(b) applies, beneficiation commenced at a particular point. That does seem to be what one gathers in reading the papers too.

MR SHER: It is a strange proceeding and it is obviously inappropriate and I suppose we are as much at fault as anyone for not making the point earlier, but it is regrettable that these two substantive points, both of which must be decided before the arbitrator can do anything useful, cannot be decided now. We would contend that my learned friends, if they are not ready, ought to have been ready to argue that point because the order to which 9(b) applies is clearly implicit in the question.

I do not know whether, perhaps, there is some benefit to be obtained by an out-of-court discussion between the parties.

OLNEY J: I am quite happy to facilitate that if the parties would like it.

MR SHER: If your Honour is ruling that we cannot go into this question of what ore does 9(b) apply to - -

OLNEY J: That is my view.

MR SHER: Then I would urge your Honour to make it clear that your Honour is not making any decision, either now or hereafter, about what ore 9(b) does apply to.

OLNEY J: I will happily do that.

MR HULME: Your Honour, there is no argument about that. I am perfectly happy to let the answer say "In relation to such order as 9(b) applies to, as to which this court finds nothing, this is how it works." My learned friend

has the grace to come here today and say that this is a curuous proceeding. It is 12 months old. He has been in these proceedings a week. There has not been one word of criticism from any of the defendants as to the bringing of these proceedings and it is outrageous, after 12 months, to come and throw up his hands. He has a new point. The proceedings, he says, are curious. He says that for no reason at all. We are not trying to trick him into getting an answer which makes this court somehow answer a question we have not asked. He must know perfectly well that when this question was asked there was no dispute between the parties as to what it applied. The dispute was "When does beneficiation start?" and we decided to take out an originating summons and ask the court.

OLNEY J: I think we have sorted it out now.

MR HULME: We are not going to accept this criticism from him. I am more than happy to have the answer make it quite plain that this in no way determines what ore it is. It is simply whatever ore 9(b) applies to and if that is his only point there is nothing left to argue about.

OLNEY J: Mr Sher, I think I have indicated reasonably clearly - I hope I have - the view I have on this.

MR SHER: Your Honour has made it clear.

OLNEY J: Thank you. I will be happy for you to proceed with the cross-examination.

MR SHER (TO WITNESS): Some of these questions are relevant to another question in any event but your role in serving Hamersley involved between 1976 (November) and March 1978 some involvement in this concentrator project itself?---Yes.

Who were the people who were actually commissioned to design and, as it were, prepare all the specifications for this plant - - -

MR SHER (Continuing): - - - this plant?---Mitchell Cotts, a South African firm of consultants, in combination with Minenco, an Australian company.

So an expert firm, a South African firm, was engaged to in effect design this concentrator plant. Is that right?---Essentially, yes.

Of course, designers need instructions from their clients do they not as to what they are being asked to design?---Yes.

That was your role, was it not?---I had a part in that, yes.

Yes. You were, in effect, one of the senior spokesmen for Hamersley in conveying to the designers what it was that you wanted?---Yes.

That involved, I take it, detailed discussions?---It did.

Discussions about the purposes of the project?---Yes.

What objectives the concentrator was designed to achieve? ---Correct.

The characteristics of the ore?---Yes.

And all those sorts of considerations?---Yes.

I take it that there were working discussions with the designers from time to time as to whether the ore needed to be put through any particular process? ---Yes.

And what sort of process was the most desirable?---That is correct.

Whether a result could be achieved one way or another?---Yes.

Balancing the question of one process as against another by reference to I suppose cost facilities and many other considerations?---Correct.

I take it then that in the course of those discussions words such as scrubbing, washing, screening, concentrating and the like came up?---Yes.

Did you have any rigid understanding in your mind before those discussions commenced as to what those words actually meant in the iron ore industry?---Yes. I did.

Where did you get those rigid understandings from?---From a

general metallurgical background and from some eight or nine years' experience in the iron ore industry up to that point in time.

MR SHER: So it was, in effect, based on experience?---Yes.

And what you regarded as the common usage in the industry of certain words?---Yes.

Did you find that everyone used the words exactly the same as you?---No. I found there were differences of opinion in the terminology.

One man might use the word "washing" to mean something which another man would use differently?---Yes.

Did you find, for example, that some people regarded washing as meaning a process whereby not only was the ore subjected to a washing process but the waste was actually disposed of?---That is possible, yes.

You can remember, I take it, if not precisely, people using "washing" as meaning that?---Yes. I can.

Is that the way you understood the word washing to be used in the industry?---In the industry generally or in the concentrator - this concentrator specifically?

Just in the iron ore industry generally?---I understand washing as a general term to be a cleaning of the ore stage.

And this disposal of waste as part of that process?---Not necessarily. I would not understand it that way.

Did you mean sometimes it did, sometimes it did not?---Yes.

But you found other people meant sometimes that it did?---Correct.

So if in a conversation you used the word washing to find out whether the people to whom you were talking understood it to mean the same as you you really would have had to ask them?---If you wanted very clear specific understanding, yes.

What about the word "screening"; did that also have a number of different meanings which you found in practice amongst different people?---Not to the same extent. Screening is fairly universally understood as size separation.

Is that how you understand it?---Yes.

Do you understand it to mean only that?---Just the term screening, yes.

That is how you understand it?---Yes.

Did you find some other people thought of it as meaning something different from that - - -

MR SHER (Continuing): - - - different from that?---I cannot recall that being the case with that term "screening." It is a fairly specific term.

Did you, for example, think the word from your experience - "screening" - involved both wet and dry screening? ---I was well aware that there are wet and dry screening processes; yes.

The word "screening" to you, therefore, conveyed either one or the other?---Correct.

Did you find, in discussions with other people, that that was a commonly held view?---Yes.

So your experience in the industry was - and I put this question in relation to the whole of the period - that when somebody used the word "screening" they may have meant wet or they have meant dry screening?---Yes.

That was a common experience, was it not?---Correct.

Indeed at Hamersley the word "screening" means, to most people I suggest to you, either wet or dry screening?--- Within Hamersley the word "screening" to most people would connotate dry screening.

But there are many who thought of it as wet screening?---Those associated with the concentrator, certainly, but Hamersley generally - you know, historically - has been a dry-screening operation.

Have you talked to people outside Hamersley?---I have.

What about the Mitchell Cotts people? Have you talked to them about screening?---Yes.

Did you find the word was used ambiguously by them?---With the Mitchell Cotts people their experience range is broader, naturally, and it could mean either wet or dry screening.

So in your discussion with the Mitchell Cotts people, the use of the word "screening" you found with them could have meant either wet screening or dry screening?---Yes.

These were people whom you knew had had lengthy experience in the mining industry, going beyond iron ore processing into other field such as gold, diamonds and other minerals?---Yes.

They appeared to you to regard the word "screening" as equally applicable to wet or dry and if they wanted to distinguish the two they would use the adjective "wet"

or the adjective "dry"?---They would normally say so, yes.

MR SHER: What about scrubbing? Did you find that that word was used in the course of discussions with the Mitchell Cotts people?---Yes.

Was that always used to mean exactly the same thing by everyone?---The mechanism was pretty well understood and meant to be the same thing; yes.

What does it mean?---It means rubbing together of all particles in a usually aqueous solution to clean the particles.

You mean wet?---Wet.

What about dry scrubbing?---The common understanding of scrubbing, as I have discussed it with others and understood it more myself, is the wet process.

But were there occasions when it occurred to you that the speaker, or somebody to whom you were talking yourself, understood scrubbing to mean dry scrubbing? ---Within that project, we never had occasion to discuss dry scrubbing. It was never contemplated.

Is that in effect your experience in the discussions within the Hamersley group and the Mitchell Cotts people on this project?---Yes.

Have you talked to other people in the iron ore industry outside those two groups?---Yes.

Such as?---Kaiser Engineers.

That is an American company?---Yes.

An American company which has an interest in Hamersley?---They had a major interest; yes.

They had a major interest and were for many years associated with it right back at the outset?---Yes.

An American company, which was a large company to your knowledge?---Yes.

You would expect within the ranks of the Kaiser people there to be a wide general knowledge of the iron ore industry and the terminology used in it?---Yes.

Mr Langridge, in many of the documents produced by Hamersley, both for their own purposes and for public consumption, this particular plant about which we are having this argument, I suppose we could call it - - -

MR SHER (Continuing): - - - call it, is described variously but almost inevitably with the use of the word "screening", is it not?---You are referring to that section of the concentrator plant?

Yes?---Yes.

No, the plant in which the process of submitting the ore through this pulping box to some wet screens and dividing it up into a number of streams which are then conveyed out to other places?---The common term is "The washing and screening plant".

Yes, but on occasions it is just referred to as a screening plant?---It has been called that, yes.

Indeed, if you were a visitor to the Tom Price mine and went to the viewing platform overlooking the whole plant area,on the board which sets out what everyone is looking at it is referred to as the screen house? ---Correct.

On the control panel in the plant, this part of the plant is referred to by reference to wet screens, I think?--- Yes.

So you would agree, would you not, that by experience and observation the word "screening" at this plant and within the ranks of the Hamersley people can mean either wet or dry screening?---Yes.

And it has been so used, as far as you are aware, for years in that way?---It has.

If you saw a document involving Hamersley and the iron ore products from this mine referring to a screening process, you would have to inquire as to whether that was wet screening or dry screening to understand what precise process it was talking to?---I would.

If you just saw the word "screening" you would assume it meant either or both?---Yes.

Can I go a bit further, because this is an issue here of which others will speak? One of the leading men in this Mitchell Cotts group was a Mr Uys?---Correct.

Would you look at this copy of a paper? That is a paper which I am instructed was presented by Mr Uys and a Mr Bradford. Is Mr Bradford also known to you from Mitchell Cotts?--- Yes.

It was presented at an international iron ore symposium at Frankfurt in Germany in 1981. Are you familiar with that paper?---I have seen this paper some time ago.

MR SHER: Assuming that somebody in authority can identify it, would you accept for the purposes of my questioning that it is in fact a copy of a paper delivered by those gentlemen at that symposium?---It does appear to be that paper, yes.

I will tender it absolutely at this stage, your Honour. The witness has said it does appear to be that paper.

OLNEY J: Yes.

MR SHER: I am going to cross-examine the witness about the use of terminology in the document presented to an international symposium.

OLNEY J: He has identified it as appearing to be a paper presented by two persons known to him to be authorities in the field and you wish to ask him questions about the terminology used - -

MR SHER: That is right, your Honour.

OLNEY J: I think it can be tendered on that basis.

MR SHER: Yes.

EXHIBIT EXHIBIT 3 .... Paper presented by Mr Uys and Mr Bradford.

MR SHER: Mr Langridge, would you look at the following pages? Well, firstly, it actually discusses Hamersley amongst other things and I suppose that is one reason why you would have read it?---Correct.

Having read it you would agree, would you not, that in that paper the authors of it are using the word screening to mean either wet or dry screening, depending upon the context?---It is some time since I read this paper. I would really need to re-read it to be able to exactly answer that question.

What I suggest to you is that what they do when they want to distinguish wet from dry screening is they use an adjective - either wet or dry. Is that your recollection of the paper?---I would say that is probably the case, yes.

You found that these gentlemen used the word screening in that dual sense and when they wanted to distinguish one from the other they used the words "wet" and "dry"? ---Yes.

MR HULME: The witness has just said it is a long time since he read it. It will speak for itself or he can be given time to read it.

MR SHER: Yes, I consent to the objection, your Honour. I will not pursue that further with the witness.
TO WITNESS: Can I take you to the fifth page of the document? That is probably actually the sixth page. It is the one which has in the middle of it the heading "Beneficiation By Differential Crushing and Screening"?---Yes.

I just want to take you to the fourth paragraph in that discussion. I will just read it to you:

"Impurities also tend to concentrate in the fines. Some operators have thus been able to produce lump grade ....(reads)....This applies at Mt Tom Price, Hamersley."

Do you see that passage?---Yes.

MR SHER: Is the assertion of fact in that passage true?--- It would need to be read in its context.

Is not all the author is saying there that you have been able to get product, in effect, from low grade ore by screening only?---Yes.

That is what has happened at Hamersley on occasions, has it not?---Yes, well, you were referring to an earlier dry process - beneficiation screening. That did occur, though.

I suggest that is not right. It is not confined to just the dry screening. It has happened when you have been wet screening, has it not?---Certainly. I would not argue with that.

So Hamersley have actually produced saleable product from low grade ore by screening only?---Not in the concentrator wet screening process.

They have done it there too, I suggest? I would just ask you to think about that. Have they not (I will give you some assistance) diverted some of the 80 by 30 size ore directly to product?---Yes.

From the beneficiation plant?---Correct.

Have they not also taken 30 by 6 ore from the beneficiation plant and sent it directly to product?---Yes.

The plant is designed to enable it to do that?---The point is that - -

Would you please answer that question? The plant is designed, I would suggest to you, to enable all grading, all size 30 by 6 and 80 by 30, after wet screening, to be taken straight to product?---It is clearly designed to do that. I have said that in my affidavit.

Certainly. I am not suggesting for a moment that you have not. However, not only is it designed - - -

MR SHER (Continuing): - - - designed to do that but as this article suggests, and you have agreed with, it has in fact happened?---Yes.

Indeed, in the beneficiation plant not only can the 80 by 30, and the 30 by 6 be diverted direct to product but so can even smaller sizes without going through the whole beneficiation process?---That is correct.

The 6 by .5 mm can be so diverted, can it not?---No, it cannot.

Is it the smaller size?---Yes.

It is the half by .04?---Correct.

Has that happened in fact?---Yes.

So of the four streams of ore that come out of, in effect, the first screening process, three of the four, can be and have in fact been diverted to product without going through the rest of the beneficiation process?---That is correct but what I would like to point out is they are not being sold as that product. They are blended.

They are blended with others, yes, but blended or not they are still sold without further beneficiation?---Correct, but there is a time limit that that mode of operation could be accepted because of the blend constraints.

Leaving aside blend constraints and the fact of blending, you can produce from this plant - without going through the drums, the cyclones or the whims - product which is capable of being sold in that form?---As a blended product, yes.

And the plant is designed to operate in that fashion, if necessary?---Correct.

It is also designed to operate in that fashion for maintenance purposes?---That is the prime purpose of those bypasses.

I am quite happy to accept that from you, that that is the prime purpose, but whether it is the prime purpose or not it is being used otherwise as you have conceded. Is that so?---In the case of those streams you mentioned?

It has not only been used for maintenance, has it?---In the case of those streams, yes. In the case of the 200 by 80, which you have not mentioned, no.

Are you saying that it has only been used for maintenance?---To my knowledge, for maintenance. That is why those bypasses on those three streams are installed.

MR SHER: I am not suggesting that it has not been used for maintenance. What I am putting to you is that it has been used other than for maintenance, for example when you have a very high grade ore going into the beneficiation plant?---I cannot think of specific cases where it has.

Who would know?---The plant operators, the plant superintendent.

There would be somebody in control of it, would there not? ---Yes.

Who would that be?---The immediate most senior person would be the plant superintendent.

Whether it has in fact or not, you know that it can and it is designed to do it?---Yes, it can.

On occasions when this facility has been used for maintenance, the product has been used to blend with other product for the purpose of sale?---I am just wondering whether we are arguing at odds. The bypass facility that is provided in the plant for 200 by 80 mm secondary crushed material will direct product direct to lump stockpile for grade control reasons.

I am not talking about the 200 by 80. I have been asking you about the 80 by 30, the 30 by 6, the 6 by a half, and the half by .04?---Those bypasses are for maintenance purposes.

Yes, but when they have been used for maintenance purposes I suggest you have told us that the product of those sizes has gone into product and been sold? ---Yes, that is correct.

So whatever the reason was, the fact is that on occasions three of the four streams have not gone through the drums, cyclones and whims - - -

MR SHER (Continuing): - - - and whims and they have been sold without that further part of the process?---Yes.

I felt some ambiguity may have crept into our questions and answers. Assume for a moment that Hamersley decided that, for whatever reason, they did not want to put the ore that went through the beneficiation plant through the whole process and they wanted to stop it before any of it went to the drums, the cyclones or the whims. They could do that for all but the six by half, could they not?---Yes.

Who would be making the decision about whether they would do it or not? What sort of person in authority would make that decision?---I would say a decision of that level would be at or beyond the level of the mine manager.

A top executive decision?---Yes.

If it were thought beneficial to Hamersley for any reason to take ore 80 by 30, 30 by 6 and .05 by .04 and sell it, either blended or separately, without putting it through the drums, whims or cyclones, the facility exists to do that?---Yes.

In your affidavit sworn, I think, the 24th of May - your second affidavit - - I am sorry. It is the first affidavit I take you to, at the top of p.8. It might be best if we go back to the bottom of p.7, the last two words on that page in para.14. Do you have it there?---Yes.

It says: "Because it may not be and in the case of material between 80 and 30 ....(reads)....to avoid a closure of the whole plant."

What you are saying there as I apprehend - and correct me if I am wrong - is that not only is the plant designed to divert the 80 by 30 but it cannot cope with the whole of the 80 by 30 and it therefore has to be diverted, has to part?---No, that is absolutely incorrect. The 80 by 30 stream is the most lightly loaded part of the entire plant.

What do the words "is not possible" mean in that context?---It is not possible to divert the material to a spare module because there is no spare module. There is only a single module for the 80 by 30 material. For the 30 by 6 material there are two, for 6 by a half there are three and so on.

Are you not saying what I have put to you, that the plant cannot cope with the whole of the 80 by 30 product, so some of it has to be diverted?---Not in the normal mode of operation; on closure of the coarse drum module.

MR SHER: Let us go through it in a little more detail, perhaps. The 80 by 30 material, before it went through a drum of any kind - would that be further reduced in size - - -

MR SHER (Continuing): - - - in size?---Not before it goes through the drum, no.

That is the coarse drum?---Correct.

Does this affidavit mean that if a plant is operating at its usual capacity the amount coming through in the 80 by 30 stream would not all be able to fit through the coarse drum?---It can fit through with ease.

What do the words "is not possible" mean then?---What that whole section of the clause in the affidavit is referring to is the capacity in the different areas of the plant, in terms of separate modules, to accept material when one of those modules are down for maintenance. The point being made is that in the case of the coarse drum there is only one module.

So there is no spare?---So if it is down for maintenance there is no spare.

What do you do then?---That is when the bypass to which you referred earlier would be employed and that material would go direct to product.

Direct to product and crushed down to 30 by 6?---Yes.

When Mr Hulme told his Honour that ore in the larger sizes (I am not using exact words but in substance) - - Mr Hulme said, did he not, that when you get low-grade ore the bigger sizes can be in effect scalped or screened off and they are saleable like that, because in the bigger size you usually have more iron content?---There is a capability in that plant to run in that manner, yes.

What Mr Hulme said is correct, in fact, is it? In low-grade ore, if you can scalp off the larger sizes, because of their size they have more iron content because the iron tends to, I suppose, make a larger lump?---There is that relationship. The grade is normally higher in the larger sized particles.

So what this plant is designed to do amongst other things is to size material because in the larger sizes you are more likely to have a higher iron ore content?---That is partly the reason. The other reason material must be sized is that certain steps in that process are suited to a given size range and others are not.

I follow that but one of the essential parts of the whole operation is to size the material, is it not?---Correct.

And amongst other reasons because sizing alone is a sufficient beneficiation process?---In the case of the 200mm separation of the grizzly, yes.

MR SHER: There is no doubt of that because that never goes through the beneficiation plant?---That is right, but it is an example of what you are saying.

It comes out of the low-grade ore that is mined?---Correct.

It is scalped off to 200 by 80 and goes straight to product? ---Correct.

So out of low-grade ore you immediately get a body of ore in a certain size which is saleable because of its size?---I cannot accept that as a broad statement. It depends upon the ratio of the high-grade ore, the Paraburdoo ore and it gets back to the blending equation again. It depends, with our current mining situation, what grade we can produce in the total blend at the port.

Is it not a fact that all the over-200 from the low-grade mined ore goes straight to product anyway?---Yes, it does.

And the 200 by 80 - does that not all go to product at the present time?---No, it does not.

Where does that go?---It goes to the concentration.

But you could send it straight to product, could you?---Physically, you could; it depends whether you can accept the lowering of grade by doing that.

But it would not necessarily lower the grade, would it?---In the total blend, the fact that that material is concentrated improves the blending power of that stream. It means you can lift amounts of ore from - -

What you are telling his Honour, in other words, is that you choose to put it through the beneficiation plant because when it is crushed and made smaller and gets up into the other streams it improves the value in those streams. Is not that what you have just said? ---No. What I am saying is that if that material is concentrated and some of the shale that is travelling with it is - - -

WITNESS (Continuing): - - - with it is rejected, it increases the blending power of that end product. In other words, you can accept more ore in the high grade plants which may be of a lower head grade. You can optimise and control your blending operation for your final product.

MR SHER: I will just start again, if I may. Low grade ore mined and brought to wherever it starts off to be classified in any way can be sized and, without doing anything more, you can get marketable product out of that ore, can you not?---In the most coarse fractions, yes.

You can get marketable product virtually immediately with the over-200 size?---Yes.

You can get marketable product in most cases in the 200 by 80 size?---In many cases you could.

Yes. You could in many cases get marketable product in the 80 by 30 size?---Not so often, but the answer is yes on some occasions you could.

And you could even get it in the 30 by 6 size?---Well, the way that plant is running at the moment you could not, but - -

But you could alter the running of the plant and achieve that end, could you not?---No, that is simply the nature of the low grade material feed that we are receiving at the moment. The 30 by 6 does not make a saleable grade of product.

Might I just take you to a different topic for a moment? The relationship between Hamersley and those to whom royalties are paid is, in effect as Mr Hulme outlined it, a situation where they, having sold their interest, have no joint venture, no partnership and therefore no say in what happens. The decisions to build a concentrator plant were in fact Hamersley's alone, vis-a-vis the people entitled to royalties. The construction of the concentrator plant was Hamersley's alone?---Yes.

The way in which the plant is actually designed was Hamersley's alone?---Certainly.

The way in which it is operated is Hamersley's alone?---Yes.

And Hamersley can make decisions from time to time relevant to their interests which may or may not result in low grade ore either going through one or other of the processors which are all encompassed in the [illegible] "beneficiation plant"?---Correct.

MR SHER: But those decisions, I suggest to you, have significant financial repercussions for those to whom royalties are paid. Is that not right?---I can appreciate that, yes.

The fact is that since 1979, apart from this one stream of 200 by 80, no royalties at all have been paid to Hancock and Wright and their companies or any of the defendants in respect of any ore which has gone through the beneficiation plant, notwithstanding the fact that some of that ore may not have needed to have gone through it to be saleable. That is so, is it not? ---Is that a question?

That is a question?---Well, the only answer I can give is that I keep getting back to this question of needing to blend all of our streams. That is the basis of our planning system.

But the decision to blend a stream is Hamersley's decision, is it not?---Of course it is, yes.

And it is made with regard to a number of considerations?---The prime consideration is what the marketing department inform us we can sell.

It is also made with regard to extending the life of the mine? ---Yes.

And perhaps getting extra payments on contracts because you go above the minimum Fe requirement?---Above the minimum Fe requirement?

Yes?---If we were operating at near the minimum Fe requirement in the contract I believe we would be battling to sell any ore at all at the moment - - -

WITNESS (Continuing): - - - at the moment.

MR SHER: That is not really what I asked you though, is it? What I asked you was: The decision to beneficiate ore,or blend it and the like, is made by Hamersley from time to time for commercial considerations which are relevant to Hamersley in respect of which the royalty receivers are not consulted - is that right?---Yes, correct.

And amongst other reasons to enable Hamersley to get bonuses under contracts by getting above a minimum FE content?---What I am suggesting is - -

Would you please answer that question?---What I believe is no, we do not. We very rarely get into a bonus area with our contracts.

Who would answer that question authoritatively?---The marketing manager.

Who is that?---Mr Carbon is the manager marketing.

Certainly one of the reasons for blending would be to extend the life of the mine and all the financial benefits that flow from that?---That is certainly one of the objectives.

When Mr Hulme opened the case, he explained to his Honour about this clause - the beneficiation clause (b). What he said was that the intent of the clause was that the royalties were paid on what goes into the beneficiation plant. Is that right? Did you hear Mr Hulme say that?---Yes, I did.

Have any of the defendants been paid anything at all in respect of what went into the beneficiation plant since March 1979 when it was commissioned?---To my knowledge, no, other than that payment for the 200 by 80 mm material.

Apart from that one instance, about which I will ask you in a moment, Mr Hulme's suggestion that the royalties are paid on what goes in has in fact meant they have been paid nothing. Is that not right, Mr Langridge?---I am not an authority on the royalties side. I believe that what you are saying is correct, and I understand that.

So the working of this clause is this way has been, you would agree, financially advantageous to Hamersley and of no value whatsoever to the royalty receivers. Is that not so?

MR HULME: I do object, your Honour. The assumption is the fact that no royalties flow from this interpretation as opposed to flowing from a dispute as to

what the figures are and waiting for an arbitration. It is quite a wrong basis on which to put it. It does not flow. There is a fight and there may well be royalties payable but that will get determined in due course. My learned friend's clients,as Mr Langridge's affidavit says, have joined in appointing an arbitrator to determine what the price should be and he has not determined it; and the money is not payable until that price is determined.

MR SHER: Is it a fact, Mr Langridge, that Hamersley's contention is that nothing is payable because the oil is not saleable at the size it goes into the beneficiation plant and therefore it has no value? ---That is correct.

In case his Honour was wondering what this fight is all about, as to why somebody wants it at point A and somebody wants it at point B, the fight is because, I suggest to you, Hamersley say if you assess it at point A the value is nothing and Hancock and Wright say if you assess it at another point there is a marketable value. Is that so?---That would appear to be the basis of the argument.

You know that to be the argument, do you not? Would you please answer that?---Yes.

Not only has the payment of royalties on what goes in not so far resulted in any payment to the royalty receivers but the question of the sale of the product of the concentrator plant has affected the receipt of royalties in a negative way. That is a dreadful question; I will start again. I could not even understand it myself. The payment of royalties to the defendants in respect of high grade ore has been diminished, I suggest to you, by ore which is sold and said to have come from the concentrator plant - - -

MR SHER (Continuing): - - - concentrator plant. Is that right? ---Not to my knowledge.

Do you not know anything about this?---Not to my knowledge.

Is not this the way it is worked? Ore is sold from Dampier. Hamersley say that the ore is partly ore from high-grade on which royalties are paid and partly ore from the concentrator on which they say no royalties are paid. The more ore from the concentrator in the sale, the less ore there is from the high-grade ore; therefore the less the royalties. You know that to be the practice?---Yes.

Therefore the more ore said to have been sold from the concentrator plant, the less royalties are paid to those entitled to receive them?---That would be the way that formula would work, yes.

For a number of years Hamersley adopted the practice of saying that everything - everything produced, every single tonne of ore produced - from the concentrator plant was sold. Is that not right?---Yes.

Not only was it sold but it was the first ore to be sold?--- Yes. I understand that argument was correct by exchange of letters.

I know it has been corrected and corrected very recently, but until it was corrected by my clients that was the stance Hamersley took, was it not?---Yes.

So that not only were they paying nothing for the ore that went in to the concentrator plant, but they said that everything that came out was sold and was the first ore to be sold, thus taking that effectively off the amount available to be subjected to royalty payments?---I do not understand the detail of that argument but I realise there was contention about it and I understood it was agreed between the parties.

I have described in substance the argument, have I not, and what happened?---Yes.

What happened earlier this year, I suggest to you, was that there were some discussions between people from the defendants and Hamersley, which unearthed the fact that for two years some of this low-grade ore had been scalped off, had been sized at the 200 by 80 size, and that had gone straight to product?---Yes.

Because that had not gone through the beneficiation plant at all, Hamersley agreed that they had wrongly failed to pay royalties on it?---Correct.

And they then paid the royalties on that part of the ore that had been described as low-grade ore?---Correct.

MR SHER: In explaining why they had not done it in the past, they asserted in a letter which is exhibited to the affidavit of Mr Boughton, exhibit NOB4, that there had been a defect in the plant's measurement system? ---Yes.

That is not true, is it?---It is true.

Is it? The defect in the plant's measurement system would be something, in effect, under your control, would it not?---At that time, yes.

Where was the defect?---There were defects with the weightometers on the plant in-put belts.

What was the defect?---The defect was associated with surging of ore over the weightomoter weighframes and damaging the mechanisms on the weighers. It was discovered later those weightomoters were not sufficiently robust in their mechanism to cater for the surges of ore which came through the chutes under the stockpile.

When was the defect discovered?---I could not be precise but it was somewhere towards the latter end of that two-year period after start-up of the plant.

That would have been back in 1981?---No, it was earlier than 1981.

1981 or earlier - that is when the defect was discovered?---Around that period.

The royalties were then made up, were they?---Yes.

Have you had any defects since?---I do not run the plant now. I could not be precise.

Did the defects last the whole two-year period between commissioning of the plant and when it was in 1981 that they were discovered?---It was assumed there would have been defects because we had suffered problems with surges from that stockpile during that period.

How could the defect be so serious that it eliminated entirely this whole stream - - -

MR SHER (Continuing): - - - whole stream? You see, no royalties at all were paid?---I do not think there was any question of eliminating the stream. The argument there was on the absolute tonnage declared, was it not?

But no royalties at all were paid on this stream?---I do not think that that had anything to do with the defect argument; I think that was purely an oversight.

That is why I asked you about it - -?---I can't comment on that.

This letter suggests that the defect was the cause of over-statement of output and therefore the reason why the royalties were not paid?---No; it was over-statement of output - -

MR HULME: May he have his letter - -?

MR SHER: Of course he can be shown it if you want him to be shown it; merely ask me to. (Could the witness be shown NOB4, your Honour?)
TO HIS HONOUR: The letter speaks for itself, and if I have misinterpreted it this cross-examination is worthless, your Honour - but I do not believe I have.
TO WITNESS: The paragraph to which I am referring you is para.1, and perhaps I should read it so that we will all know what I am talking about:

> "As per our discussions in your office during April, you are aware that a recent.....(reads) .....during the period from May 1979 to February 1981."

Correct me if I am wrong, but was that not seeking to explain, in effect, the non-payment of royalties for the whole of that period?---No.

I see; I have misunderstood the letter, have I?---As I understand this correspondence, and you will note it is from Mr Much, Manager of Accounting, which is really nothing to do with my department although I do know a little about it, there were declarations of tonnage in that size range prior to this letter and there was some degree of argument on the actual tonnage figures, and that is what the defects in the weighers relate to; it is not the sudden appearance of all that tonnage, it is the accuracy of the previously-stated tonnage.

Mr Langridge, is it not the position that until this matter was cleared up in the early part of 1981, no royalties at all were paid on low grade ore which had been sized off in dry screens into a 200 by 80 size?---Yes. That has been established.

MR SHER: And this letter was seeking to explain that omission by reference to a technical assessment which had revealed the defect in the measuring system?---Yes, but as I understand it there was correspondence prior to that letter.

Do not worry about that for the moment. One could understand why a measurement could make it difficult to assess the tonnage, but it is difficult, I suggest, to understand why a whole stream of ore, whatever tonnage it was, could have been missed. Is that not really the position?---No, that is not the position.

Was there a stream or a conveyor belt of ore 200 by 80 coming out of the dry screening plant?---Yes.

Would not royalties have been normally payable on that if it went direct to product?---Sorry - if I could go back to the previous question: "No" was the answer to that question; the ore does not come out 200 by 80, it is crushed, so it is essentially - -

Ore comes out of somewhere 200 by 80, does it not?---It comes out of that crushing plant at nominally minus 80. It is the 200 by 80 feed to the plant which comes out as nominally minus 80.

Yes. Are you saying the feed is 200 by 80?---That is the stream you are referring to; that is the feed to the crusher, and then coming out of the crushing plant it is nominally minus 80.

Mr Langridge, I really just want to get you, if you would not mind, to simply answer this proposition. If I am wrong, please say so: One can understand why somebody might make a mistake about tonnages, but it is difficult to understand how they could avoid them altogether. Was there not a stream of ore 200 by 80 to which royalties should have attached and on which royalties were not paid for a period of almost two years?---Yes, and that was an oversight, as I understood it.

Was not Hamersley's stance that this was low grade ore and therefore not subjected to royalties at all?---I can't really comment because I am not involved in the argument of royalty questions - -

Is it wrong to put to you the proposition that what happened was that Hancock and Wright found out that of the low grade ore there was a stream of 200 by 80 being diverted to product, and when they raised it with Hamersley, Hamersley admitted they should have paid royalties on it and had not? Is that not what happened? ---I think that is the case.

Yes. This explanation about the defect in the plant's measurement system is just not accurate, is it - - -

MR SHER (Continuing): - - - accurate, is it? It is not a correct statement.

MR HULME: There is an objection on two grounds. It is another person's letter and if the content of the letter itself is looked at more carefully it will be seen that it is not a statement that it is measuring tonnages at the plant; it is measuring something else, namely dollars. That is why it comes from the accounting department. It is a badly expressed letter and we admit that but it is no use putting to this witness what someone else - -

MR SHER: All right, I accept that. It is not this witness I am interested in on these points; it is your client.
TO WITNESS: I want to go back to this question of the design and Mitchell Cotts and these different terms that I asked you about. I asked you really about the language. I now want to ask you about the actual items - washing, scrubbing and screening. There is a vast range of equipment, is there not, available - not just confined to the iron ore industry - to carry out all these functions?---Yes.

And there are some notorious (notorious meaning well-known) manufacturers such as Allis-Chalmers in relation to screens?---Yes.

Indeed, you call on Mr Pritchard from that company to in effect support your case by swearing an affidavit? ---Correct.

In relation to washing and scrubbing, there are well-known manufacturers and distributors. Is that right?---Yes.

And an ample supply of promotional material and publications which people can look at it to see all the different sorts of equipment that are available? ---Yes.

I will take you to some of it perhaps tomorrow but would you agree generally that there are machines specifically designed to carry out scrubbing functions?---Yes.

And they are different from what we have in this concentrator plant, are they not?---Correct.

There are machines designed specifically to carry out washing functions, are there not?---Yes.

They are different from what is to be found in this concentrator plant too, are they not, at the point where we are talking about the wet screens - the first lot of wet screens?---Yes. There are dedicated washers.

MR SHER: You know from your experience in this material, and no doubt from conversations with the gentleman from Mitchell Cotts, that if you wanted to scrub this ore or wash this ore firstly there were specific machines available for use for both those purposes?---Yes.

Some of them are quite enormous?---Correct.

And they are effectively all different from what has been designed here?---Yes.

So that in so far as this installation at Hamersley washes or scrubs - and I just use those words loosely for the moment - they are unique arrangements, are they not?---Those other machines?

Yes?---Yes.

The design here at Hamersley to carry out any washing or scrubbing effect on this ore that goes into this wet screening plant, in so far as they are scrubbers or washers, they are unique scrubbers and washers, are they not?---In a sense, yes.

Can you think of a commercially sold scrubber or washer like you have at this wet screening plant?---No. In answering that question, I would like to say that I think the thing that is critical is to understand there is a scrubber and there is a scrubbing action which can occur in other devices.

We will come to that, and that will be tomorrow, but we are just talking about machinery for the time being. In so far as this plant has a scrubbing effect or a washing effect, it is really unique, is it not? It is a one-off design?---In answering that, I would just say it does occur in other plants to greater or lesser extents depending upon the nature of the ore.

But the design here is unique, is it not? In so far as it causes any washing or scrubbing, this is a unique system at Hamersley?---I would not say it is unique.

Can you tell us of one like it? I am confining you to washing and scrubbing at the moment; leave screening aside? ---As far as the wet screens are concerned - -

Leave the wet screens out of it, please. I am talking about the washing and the scrubbing effect.

MR HULME: You cannot leave screens out of washing. You really cannot when you are washing on the screens.

MR SHER: Well, I am quite happy to hear that said by my learned friend.

MR HULME: Perhaps if my learned friend would let a technical man explain on a matter like this we might get on a bit faster.

MR SHER: All right. I have a bad habit; I tend to interrupt too much.

OLNEY J: Perhaps you might just answer the question as you started to. You were asked about the washing and scrubbing process in this plant and you made reference to the wet screens. What were you going to say?---What I was about to say, your Honour, is that there is a scrubbing mechanism which occurs on those wet screens as distinct from having a scrubber, a dedicated item called a scrubber, installed in that plant; which we do not have.

What you are saying is that on the wet screens what you describe as a scrubbing action takes place?---Yes, but there is no dedicated scrubber in that plant.

MR SHER: Nor is there, to use your words, a dedicated washer either?---Not in the sense of a washer per se; no.

OLNEY J: Thank you, Mr Sher. We will resume at 10.30 a.m.

HEARING ADJOURNED UNTIL 10.30 A.M.

TUESDAY, 8TH NOVEMBER, 1983

COLIN ROY LANGRIDGE:

OLNEY J: Yes, Mr Hulme?

MR HULME: Sir, before my learned friend continues , I thought it would convenient to say to your Honour something in response to your Honour's comments yesterday, as to the form of the proceedings. In particular, your Honour will recall raising the question of the declaration of right, etc.

As regards the form of the originating summons as it stands, it is necessary to see it in its context, that context being set, as was later stated by Mr Hasluck, the defendants' solicitor, by a letter dated 5th August 1981, from Mr Fieldhouse, the solicitor to the principal defendants, which is CRL5. If your Honour looks at that letter you will see that it starts by raising the issue which finds its way into the originating summons, Mr Fieldhouse saying:

> "In order to clarify the ambit of the proposed arbitration....(reads) ....contends that beneficiation or other treatment begins?"

There is a clear delineation of the issue and the defendants have said where they think it is.

> "2. If 'No' to our clients' contention, does your client.... (reads)....in the course of determining the assumed FOB price."

It then turns to two other questions.

> "3. Does your client agree that the submission to arbitration ....(reads)....in respect of which royalties are claimed."

Four, obviously envisaging that 3 might be answered "No":

> "If 'No' to any part of questions 2 and 3, does your client agree ....(reads)....to resolve each of these matters?"

Then: "To enable appropriate proceedings to be taken....(reads)....and an open reply is requested."

There is the statement, back in 1981, do we agree and if we do not "Note that this is an open letter because we, the defendants, are going to take appropriate proceedings to get matters which have not been agreed, agreed."

We wrote back a few days later with CRL6 - September 11th - and referred to their letter CRL5 and said:

> "My client does not agree with your clients' interpretation....(reads) ....it begins at the wetting stage in the wetting and screening house."

That was clear - - -

MR HULME (Continuing): - - - was clear, therefore. Implicit, "Yes, that is an issue to be determined"; explicit, "We disagree with your suggested answer". We go on to deal with the other two matters.

> "We think it is very doubtful indeed whether the arbitrator is authorised ....(reads)....a conference with counsel for both sides."

There in 1981 were those issues. In September 1982 it was the plaintiff, Hamersley Iron - the defendants not having taken any proceedings as envisaged in their letter of 5th August 1981 to get those matters dealt with - which took out an originating summons asking for determination of the precise question raised in exhibit CRL5, the point at which beneficiation or other treatment begins.

You Honour has, we have just discovered, CRL7, which is the letter sent with that originating summons, which is in fact slightly inaccurate. What has been photostated is the draft. Could I hand your Honour a photostat of the actual letter of 6th September 1982 to Mr Fieldhouse? The defendants, no doubt, will have it. It is a letter to their solicitors. It is the letter which was in fact sent to Mr Fieldhouse.

> "I refer to my letter of the 11th September 1981....(reads).... That seems to be common ground."

I just observe at that point that it is perfectly plain - Mr Fieldhouse's letter had raised several questions, we had expressed differing views on them, and we are saying we have put one of them in the originating summons, not the others, because we think that is basic and proper to be determined by the court. We then go on to deal with characteristics.

> "Subject to agreeing on a precise amendment to the arbitrator's terms....(reads) ....for the arbitrator than for the court."

We have moved away from what we said earlier and we are saying that can go to the arbitrator and indicated willingness to talk on an amendment to the arbitrator's terms of reference, and I would observe, your Honour, no-one has ever been back to us on that. That was September 1982. No draft terms or anything have ever been sent for our comment.

> "We maintain our position that the arbitrator....(reads).... the issued raised in your letter of 5th August 1981."

V115. 10.40

MR HULME (Continuing): No dissatisfaction was indicated, and it is clear that the parties were treating the originating summons as raising what may be called the technical matter, seen in a technical context applying the words of the contract to it, of where does the beneficiation begin? Your Honour yesterday mentioned Mr Hasluck's affidavit in support of the summons for direction. That affidavit was dated 30th May and, I may say, was first used on 2nd June; there was a first hearing before the Master as is shown by a short order, and it then remains the affidavit in support of the summons for direction heard on the 30th. If your Honour looks at para.4:

> "I am informed by senior counsel for the defendants and verily believe.....(reads).....and that there is no need for the parties to exchange pleadings."

That had been agreed. We were here on a construction matter with technical evidence there, and it was agreed that there was no need for pleadings - and there would most certainly have been need for pleadings if there were going to be allegations of improper conduct. That is the very time you do need to know what is going to be said:

> "(b) That although the central issue gives rise to differences between the parties.....(reads) .....and is appropriate for resolution by way of originating summons."

If there is one ;thing that is clear about originating summonses, they are not a proper vehicle for allegations of improper conduct; that is what one uses a writ for. This is what was agreed between the parties:

> "(c) The differences between the parties in regard to matters of fact.....(reads).....by the summons for directions and referred to hereafter."

Paragraph 5 sets out the question, without any criticism I may add - Mr Hasluck thinks he knows what the question means. I do not think 6 and 7 carry the matter any further. In para.8:

> "As appears from the affidavit of Mr Langridge the plaintiff began working its iron ore mine..... (reads).....disposal within the meaning of clause 9(b)."

What is clear is that at this point the defendants, with all the advice they have had over the years, were satisfied that there was an issue and this was the way of determining it. What was concerned was a conflict of technical concepts, to use Mr Hasluck's phrase:

> "9. The parties wish to adduce evidence from mining and engineering experts.....(reads).....Tom Price in the course of determining the issue."

MR HULME (Continuing): That was a clear indication of the defendants as to what they saw as the range of the evidence - the range of the issues.

Then 10: "The differences between the parties as to the matters of fact ....(reads).... or other treatment not being screening."

I may add, in relation to allegations of delay, that one of the orders sought was an order for a fixed and early date. That was sought by the defendants. Hamersley went to the trouble of sending counsel over from Melbourne to consent to the order, which could have been done by someone here in Perth but it thought it might assist the defendants to get the early hearing that they sought. They sent counsel over for no other reason than that. So the summons as originally drawn was drawn against the background that we have indicated and until yesterday no dissatisfaction of any kind had been expressed in relation to that matter.

In relation to the declaration, your Honour - and the rule does provide for the construction and declaration - we would have taken the view that the "and declaration" words at the end of the rule enable the party to seek both but will entitle him to seek one if that is all that is sought. It is always possible to put a declaration at the end but in many cases it would be simply tautologous. Let us say you have a question arising under a will where there is a gift to the child of So-and-So, and there is the question, "Is John Jones a child of that testator?" You can ask the question, "Is John Jones within the word 'child' in clause 8 of the will?" The court would normally answer "yes" or "no"; his treatment as a child or not as a child would follow. If you made a declaration you could go on but you would only repeat it and declare that he is entitled to be treated as a child within clause 8 of the will.

That is the only kind of declaration that could have been sought in relation to our construction of summons because, as was common ground between the solicitors, there were a number of other questions which were not being brought before the court. Tonnages had not been agreed; characteristics had not been agreed. We were saying, "It is easier to do that when we know the point at which we are looking." So the only declaration we could have sought was one in the form that answered the question that "beneficiation begins at such and such a point and the parties are entitled to have the arbitration conducted on the basis that beneficiation begins at that point." It would be one of the tautologous kind; it might be none

the worse for that but we do not see that it could have added anything in the circumstances, the agreed circumstances, that there were a number of other facts still to be determined and which could not then be determined.

With regard to the actual form of the summons and the reference to low grade ore, and Mr Langridge's affidavit, we would point out that this is not a case - - -

MR HULME (Continuing): - - - a case where one can simply ask as to the meaning of clause 9(b) in the abstract. Sometimes one can do that. We cannot here because we have to bring those words to a particular process. We cannot say "When does beneficiation begin?" We have to say something like "When does beneficiation begin in this process?" because there are many processes. It has to be linked in that sense, therefore, to the facts.

OLNEY J: The process has to be identified, does it not? I really have to make a finding of fact as to what is being done with this ore and then say that at a point in that process beneficiation commences for the purposes of a construction of 9(b), because, as was indicated yesterday, Hamersley could adopt any means they liked in treating or dealing with their ore, some of which may be beneficiation while some may not be.

MR HULME: Remembering that I am first seeking to explain why it was done in this form - this other issue had not been raised - questions were seen as arising but easily answered, "Has the ore been beneficiated?" If it goes through all the processes then, yes, it has been beneficiated. What the parties were at odds about was at what point had that process of beneficiation begun within 9(b).

The reference to the events which have happened brings one to the description of those events as set out in Mr Langridge's affidavit. On that system, where is beneficiation beginning?

OLNEY J: That is how I understood the reference to the events which had happened. It is really saying that, given the particular process which has been used since 1979, in that process when does beneficiation begin, because after all if I declared that beneficiation begins when ore enters a particular part of this process, it may be that next year in some other process there is that particular aspect but many other things happening before it.

MR HULME: We would agree with that entirely. There are a number of processes of beneficiation. If you have a different process, it may be a different point. We would agree with that and that is why I have said we had to refer to the affidavit and to the events which have happened, and they are the events which Mr Langridge sets out. It means the present system.

I said yesterday and I just confirm today that we are perfectly happy for any answer that is given - - to make it perfectly plain that the court is in no way pre-judging the question as to the range

of ore to which clause 9(b) applies. Very often in originating summonses you ask a wide question and the court answers something within it and says otherwise it is unnecessary to answer. That is decided, that is not decided - whatever. We are perfectly happy, we remain happy, to make it plain that your Honour and the court are not pre-judging that question.

My learned friend has raised a matter of whether the clause applies - putting it very broadly - to ore which is saleable. That is the kind of way it is put. That, your Honour, is not something which - - - 10

MR HULME (Continuing): - - - something which can be decided in these proceedings, not simply because it is not at present asked but it would involve a lot of facts which are not before the court; it could not be answered in the proceedings as they stand because it raises so many questions as to what is meant by "saleable", the relevance of blending; the whole process of running the mine becomes relevant in that respect and there would be a substantial body of evidence which would have to be put before the court. We are anxious to get this matter processed; we are anxious to get the question, which we have been saying for a year or more is crucial to letting the parties prepare the arbitration, answered, and we for our part would be quite unwilling to seek what would be the necessary adjournment in order to add further questions, questions which have been raised so far as we are concerned for the first time yesterday. We have, as have the other side, experts brought in from various places in the world, and we want them to deal with the matter which is on the originating summons. We do not wish to send them all back again without that being heard. It is therefore not just a stubborn refusal to answer that question; we say it is quite inappropriate to attempt to deal with it at this point.

As far as the declaration is concerned, the circumstances as we see it remain, that the only form of declaration we could have would be of a "tautologous" type, and indeed the very answer to the construction question could take the form of a declaration.

OLNEY J: I would think so. I would think the answer would be in the form that upon the proper construction of 9(b) the defendants are entitled to be paid royalty on the assessed price as at whatever point might be described in the process. That, I would think, would comply with - - I think the basis of this rule is, of course, the statutory power of the court to exercise jurisdiction simply by way of making declarations, and it is not something different from the jurisdiction that the court has in an ordinary action commenced by writ to make a declaration; it is just a convenient way of exercising that jurisdiction in a limited sphere.

MR HULME: Yes.

OLNEY J: As I understand the rule, the court is empowered to determine the construction and, having done that, to declare the rights of the parties or of the persons interested. That, of course, has some bearing on something which was said yesterday where it was put that I may be determining the rights of the government to royalties. That of course is not so, and anything that is declared in these proceedings would not be be binding on anyone else.

MR HULME: Yes, and we would have no objection to the form of an answer in that kind of form, as long as it would, in the interests of both sides, make it plain that this was the answer to this issue. There might in fact be no royalties payable. If you bring down a feed which, as it stands, cannot be sold it may be the answer is nil, but the calculation would have to be done on the basis that it is at that point that you would look to inquire as to that. We would be perfectly happy with a declaration in such a form - - -

MR HULME (Continuing): - - - a form. I do not know whether your Honour takes the view that we should add words to the originating summons "and declaration accordingly" or whether your Honour says "Look, that is the way in which I would answer the question of construction"?

OLNEY J: I do not think there is any need to amend the originating summons in that way, as long as the parties understand that it is my view, which at this stage is a fairly tentative one but I think not unreasonable, that the result of the proceedings ought to be a declaration affecting the rights of the interested parties to the contract.

MR HULME: Yes.

OLNEY J: Unless that is done, the arbitrator probably has nothing to work on anyhow.

MR HULME: Yes. I will not carry it any further. Simply, as your Honour had raised those questions as to form, I thought I should be express about them.

The only other thing I wished to raise is a purely procedural matter. Our note suggests that in relation to exhibit numbers the kind of form which is in the transcript at p.56/57 - - one of the affidavits became exhibit 1 and I said that there were exhibits to that and we thought your Honour said that would become exhibit 1CRL1, exhibit 1CRL2. Our note suggested you said that but we may be wrong?

OLNEY J: I think that as each affidavit is identified and verified by the witnesses, the affidavit complete with its exhibits will be marked in a numerical sequence as an exhibit - 1 through to whatever we get to. Where it is intended to refer to an exhibit to Mr Langridge's affidavit, which may be marked CLR1, if it is simply referred to as exhibit 1, CRL1, then I will know and the transcript service will record it in that way.

MR HULME: Yes, from which actual affidavit it comes. Our note was right then. Its full title is exhibit 1, CRL1.

OLNEY J: Yes.

MR HULME: I follow. The reason we raised it was that the fifth line of the transcript at p.56/57 simply describes it as exhibit CRL2 and that was not in accordance with our note.

OLNEY J: I see.

MR HULME: It was for that reason that we wished to raise it, so we would be ensuring we were doing what your Honour intended.

OLNEY J: I think we have that sorted out now and I think the transcription service will be able to follow that now.

There is one other matter, while you are on your feet. I am not sure who entered this matter for hearing? Was it your client?

MR HULME: I believe - -

OLNEY J: I only wish to refer to para.5 of the order made by the Master, which related to papers being supplied to the judge, an indexed book of papers which no doubt were supplied in accordance with the order at the time of entry, but as I understand it, and I only found out for the first time yesterday, other affidavits have been filed to which reference has already been made and these are not in the papers that I have. I am just wondering if, perhaps, at the end of today's proceedings you could have your solicitors check with my associate - - -

OLNEY J. (Continuing): - - - my associate what papers I do have, and supply me with copies of those that I do not. It is most inconvenient to have to keep sorting through these court documents to find exhibits and the like, particularly when the witness wants to use them himself.

MR HULME: This will be primarily the responsibility of the defendants. I think it is their affidavits that your Honour does not have. I think you have ours.

OLNEY J: We usually take the view that the party that enters the matter has the responsibility of complying with that, but anyhow no doubt you can take it up with your friends.

MR HULME: Yes, sir. I am sure we will get them from him.

OLNEY J: Mr Sher, you are cross-examining. Is there anything arising out of Mr Hulme's comments which needs any observation on your part at this stage?

MR SHER: I have been sitting here debating whether I should say anything, your Honour, because I do not want to be accused hereafter, either publicly or privately, of pouring petrol rather than oil on troubled waters. However, I feel constrained to make a few short observations, if I might, your Honour, because the picture is, certainly as to the facts, we would contend, a little different and there is room for debate about some of the matters my learned friend put to your Honour. I would just quickly mention a number of matters.

I feel I provoked some of what happened this morning by some choice of language yesterday when I referred to the proceedings by a particular adjective which I dare not repeat - so I will not. The suggestion that there has been some consistently adopted stance on the part of both parties at all times to these proceedings is not in accordance with some of the material before your Honour. I will not go through it in detail, but I refer in particular to the correspondence exhibited to Mr Boughton's affidavit, exhibits NOB9, 10, 11 and 12, which reveals that as late as 30th August of this year the stance being adopted by Hamersley as to where beneficiation begins changed, and they then began to contend (rather than what they had contended earlier) that beneficiation or other treatment began, as they put it, at an even earlier stage than the pulping box. Subsequent correspondence revealed that they were leaving their options open to argue that it began, if necessary, at the grizzly, as the ore was being stockpiled or as the ore was leaving the stockpile - so they were in

effect adopting four mutually inconsistent stances and they were not prepared to reveal which of them was their case. As to that factual issue, therefore, there was a change of stance by Hamersley as recently as the end of August this year.

The other point I want to make, your Honour, is this: Those associated with this summons - - I might say that the form of the summons was not agreed upon; it was issued by the plaintiffs and there was no discussion about the terminology to be used; indeed, there was no discussion about the issuing of an originating summons, it was issued by Hamersley without, as I am instructed your Honour, any discussion with the defendants; it just appeared. We do not criticise them for that, but it certainly would be wrong to suggest that we were agreeable to its terms or that it was appropriate. However, we would submit that the matters which were raised yesterday by me and upon which your Honour has ruled - and I do not challenge your Honour's ruling - were legitimate issues because it was necessary, in looking at the question, to determine what precisely was being referred to in the factual context. When the only description of what ore the question was related to is to be found in the words "the low grade ore referred to in that affidavit", and that low grade ore referred to in that affidavit was, certainly on one reading of the affidavit, every piece of ore that went into the beneficiation plant, we submit that it was not unreasonable to adopt the stand that one of the issues which would have to be determined by your Honour as a factual issue (and a legal issue, as well as the nature of the process) was: What ore did that apply to? Whilst my learned friends have no doubt carried on without appreciating that that was seen to be an issue by the defendants, we submit it was not unreasonable for the defendants to take the view, as we did yesterday, that one of the questions to which this summons gave rise was: Did all the ore that went to that beneficiation plant get picked up by clause 9(b), or was it some limited part, and if so what part?

Your Honour has ruled against the proposition that I put - - -

MR SHER (Continuing): - - - I put yesterday in relation to the question arising out of the summons. I accept your Honour's ruling of course. My learned friend has indicated that they do not want to add it to the summons. We do not agree that it involves factual issues of the kind my learned friend referred to because we submit that that, more than the question before your Honour, is purely a matter of construction. Perhaps some facts are needed and as your Honour is against me, and my learned friend will not agree, there is not much we can do about it. So, as it were, we are stuck with it but I would not like your Honour or anyone else to think that what happened yesterday was anything other than a legitimate attempt to raise what we saw to be proper issues arising out of this summons. I think that is perhaps all I need and ought to say, your Honour.

OLNEY J: Thank you, Mr Sher. Certainly I have a clearer view in my own mind as to the ambit of the present proceedings, and that will be a help I think.

MR SHER: If your Honour is going to make it clear, as I apprehend your Honour will in answering this question or making a declaration that the answer applies only to such ore to which 9(b) applies,without determining what ore it applies to,then we would just have to wait for another day, your Honour, to resolve that particular issue.

OLNEY J: Yes. Thank you, Mr Sher.

Mr Templeman, I take it that you are happy to let these matters be answered in the way that Mr Sher has answered them. You have no separate view, have you?

MR TEMPLEMAN: No, your Honour. Your Honour will have observed, of course, that the interests of the defendant whom I representare apparently the same as the interests which my learned friend represents. The position of the sixth defendant is that it has always wanted to be represented separately, as of course it is entitled to be, and that is why it has pursued that course in these proceedings.

OLNEY J: If I appear to ignore the sixth defendant, it is not done intentionally and you will no doubt make your presence felt when you feel it appropriate.

MR TEMPLEMAN: Thank you, your Honour.

MR SHER: I was going to go back to something in any event, because of the overnight break, Mr Langridge, but it seems appropriate that I do so now in any event. May I just take up with you two matters that we

discussed yesterday other than the topic I had got on to towards the end of the day? You will recall that I asked you about the terminology used by Hamersley itself in describing this particular plant and you conceded I think, and I am just putting it in general terms now, that it referred to this plant as the screening, or washing and screening plant?---Washing and screening plant.

MR SHER: I think you also conceded that it referred to it as "the screening plant" on occasions?---At times.

I just want to get before his Honour some actual hard evidence of those concessions, if I can get you to identify them for me. Would you just look at this photograph and I will tell you what I suggest it is and you tell his Honour, if you would not mind, if you agree? This is a part of the control room mimic panel which relates to what you I suppose in these proceedings would prefer to call the washing and screening plant or house. Would you just look at that? Do you recognise that to be what I have suggested it is?---Yes, I do.

Would you tell his Honour what description is given to the parts of the plant on that control panel - the actual names that are printed on the panel?---I am having a little difficulty reading the ones on the top photograph.

I think you will find they are large enough if you deal with the major ones?---Certainly on the bottom photographs, the left-hand side one -"vibrating feeders, spray water, primary screens, secondary screen." The one opposite - "vibrating feeders, spray water, primary screens."

That is sufficient, I think, Mr Langridge. The point is that they are not called washers, scrubbers or cleaners, are they?---No, they are not.

They are called "screens"?---Correct.

And they are not called wet or dry screens?---No.

They are called "screens." I will tender that, your Honour. Would you Honour ignore the typing on the top of the document; it is not part of the panel. It is only the photograph that I am tendering.

OLNEY J: Do you intend putting a number of photographs in?

MR SHER: Yes, another set of photographs and then some manual reports of Hamersley Iron - - -

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MR SHER (Continuing): - - - your Honour.

OLNEY J: Do the photographs relate to the control panel?

MR SHER: No, the next photograph relates to the display panel on the concentrator plant look-out.

EXHIBIT EXHIBIT 4 .... Page of three photographs of control room mimic panel.

MR SHER: I hand you at this stage what I suggest to you is a photograph of the display panel in the concentrator plant look-out, which is situated - - we are up the hill overlooking the whole beneficiation plant area? ---Yes.

Do you identify it as being that panel?---I do.

I would just direct your attention to those parts on it which refer to the screens in the beneficiation plant. Would you agree that they are described as "primary wet screens" and "secondary wet screens"?---Yes.

There is no reference to washer, scrubbers, cleaners or anything like that?---No.

I tender that, if your Honour please.

EXHIBIT EXHIBIT 5 .... Page of three photographs of concentrator plant look-out display panel.

MR HULME: Sir, we have not seen these photographs, my learned friend doubtless not having known about Order 36 rule 4, which provides for us to be shown them beforehand. We do not seek to make anything of it other than to reserve our right, when we do see the photographs, which we are not seeing even under the present procedure, and if there are more photographs or plans to come it might be helpful if they could be shown to us over the adjournments.

OLNEY J: Thank you for drawing our attention to that, Mr Hulme.

MR SHER: I am not familiar with the rule but a quick looking at it suggests to me it does not apply. This is not the trial of an action, your Honour, as I understand it.

OLNEY J: No doubt, in the nature of these proceedings, it is convenient if you could supply some advance notice to Mr Hulme. It certainly helps getting through.

MR SHER: Yes.(I am always grateful for assistance from junior counsel.)
TO WITNESS: Would you like to have a look at some of the annual reports of Hamersley Holdings Ltd? (I daresay you have not seen these either.)

MR HULME: No.

MR SHER (TO WITNESS): I have handed you annual reports of the plaintiff company for the years 1976, 1978, 1981 and 1982. I wonder if you would just identify that they are in fact what I have suggested they are?---Yes, they are.

I take you to 1976 firstly and ask you to open up the report at pp.10 and 11?---Yes.

It is not actually a photograph but does that show, in effect, the beneficiation plant at Mt Tom Price?---It is a photograph of a 1 in 250 scale model of that beneficiation plant.

But it represents the real thing, does it not?---Yes.

Because, indeed, in 1976 it was on the drawing boards and had not yet been built?---Correct.

That is looking down on it. It would not be actually from the look-out platform, would it?---From the opposite side; from the east.

Would youjust point with your finger to what you say is the washing and screening plant? It is the one on the extreme right-hand side of the - - what will I call it - a photograph?---Yes - - -

MR SHER (Continuing): - - - a photograph?---Yes.

So it is a separate and distinct part of the plant, the washing and screening plant - and separate and distinct part of the beneficiation plant?---Yes.

And that accurately represents the set-up there?---Yes.

How is it described in that annual report to the shareholders? ---On the photograph?

Yes?---Screens.

Screens - not washers, scrubbers, cleaners or anything; just screens?---No, screens.

Yes. I would ask you to direct your attention to the description in this report of the concentrator project appearing on p.11, and would take you down to the paragraph commencing in the middle of the first column: "Ore will be withdrawn..." Do you see that?---Yes.

Does that paragraph read, in describing what the concentrator project is going to do, as follows:

> "Ore will be withdrawn from the primary stockpile and separated into four basic size fractions for subsequent treatment."?

WITNESS: Yes.

MR SHER: Is that a correct description of what the screening plant does - the washing and screening plant? It separates it into four basic size fractions for subsequent treatment?---It does do that.

Yes. The emphasis there is on separation into four streams? ---Yes.

And "for subsequent treatment"?---Yes.

There is no reference to washing, scrubbing or cleaning?---No, by omission.

By omission - well, the only thing it says to the shareholders that this project in this part of the plant is going to do is to separate this ore into four streams for subsequent treatment?---Yes, that is what it says.

That is all it says, and that is precisely what it does, is it not?---No, it does more than that.

It does more than that?---Yes.

I see. I dare say you did not write this report?---Not that

I am aware of, no.

MR SHER: Do you think you might have?---I could have - - I can't recall, really.

I will tender these as a group, if I may, your Honour.

OLNEY J: Yes.

MR SHER (TO WITNESS): I will take you now to the 1978 report and ask you to look at p.13. Is that a photograph?---That is a photograph.

Is that the real thing?---Yes.

If we look at the description under the photograph, does it read: "The concentrator plant at Mt Tom Price. Foreground from left, water storage, screening plant, secondary and tertiary crushers"?---Yes, it does.

So after it was built it was still referred to as the screening plant?---Yes.

What we see there is not like the last photograph; that is the real thing, is it not?---Correct.

Yes. I would take you now to the 1981 annual report and ask you to look at p.3. This report was for the year ended 1981, was it not?---Yes.

So that by the end of the year 1981 the contest between Hamersley and the defendants was, I suppose, notorious knowledge within the company?---You are referring to the royalty matter?

Yes?---It would have been known down to a certain level in the company, yes.

You were one of those who knew about it?---I was aware of it, yes.

And top management would have been aware of it?---Yes.

And people responsible for this report would have been aware of it?---Yes.

Would you look at the bottom of column 2, that is the second column, under the heading "Concentrator"? Does it there say, discussing the concentrator: "Fine ore circuit capacity continued to limit the overall plant throughput rate as did the performance of the washing plant when treating some of the refractory ore types"?---Yes.

Is that a reference to what was previously described as the screening plant?---It would be the same plant. Those terms were used one or the other.

MR SHER: Can you explain to his Honour why it changed in this report from "screening plant" in the previous report to which I referred you?---They were either/or terms. Washing and screening plant was used back in design days, as was screening plant.

The point is that in one report it is called "screening" - - -

MR SHER (Continuing): - - - called "screening" and in another report, once this contest is known to top management, it is called "washing". Is that just coincidental, is it?---I would say it is.

Would you look at the 1982 report, and I direct your attention to p.3, at the third column and the very first paragraph? Does it read:

> "Metallurgical trials were conducted to examine limitations in the washing and screen plant when processing refractory ore types."

Do you see that?---Yes.

Are we talking about the same plant?---We are.

Can you explain why, it having been described by the words "screening plant" in one, "washing plant" in another, it was now being called "washing and screening"?---The occurrence of these problem ore types drew more attention to the washing function which was carried out in that same plant. I would imagine it became more common to use that alternate expression.

That was an event which occurred when - in the early 1980s, was it?---That was when these more refractory ore types lower in the ore body became more problematical.

Would you agree that if those problems had not arisen you might have continued to use the word "screening" to describe this plant?---That may have been the case but, as said earlier, the term "washing and screening plant" was used equally back in design days.

I tender those four report.

EXHIBIT — EXHIBIT 6 .... Four annual reports, years 1976, 1978, 1981, 1982.

MR SHER: Can I also, on this topic, direct your attention to one of the exhibits, I think to your own affidavit, the isometric drawing? (It might be exhibit 4? Could the witness be shown that?) This isometric drawing was drawn, I take it, by the Mitchell Cotts-Minenco consortium people?---The original drawing was produced by a firm called Technical Illustrators, under the direction of Mitchell Cotts and Hamersley.

Would you tell his Honour the words used to describe what we have been discussing, which is described as "screening" or "washing and screening" plant?---The words used on this isometric for that area of the plant are "screening, washing and dry screening plant".

If we look up the drawing about 3 inches and about 4 inches to the left, to the fines treatment plant, we see it shows

that feed from the screening, washing and dry screening plant enters that particular plant? ---Yes.

MR SHER: So it is twice referred to as the screening, washing and dry screening plant?---Yes.

Would you agree that in that context the word "screening" is used to denote wet screening?---Yes.

Because dry screening is specifically described as dry screening? ---Yes.

In exhibit CRL6, to which my learned friend Mr Hulme referred this morning in the discussion he had with his Honour, which is the letter from Mr Paterson dated 11th September 1981 to Mr Fieldhouse - - would you just look at that? This letter was written in response to a letter from Mr Fieldhouse asserting that Hancock and Wright contended that the beneficiation began at a certain point. The reply from Mr Paterson, the legal officer of Hamersley, was to say:

> "My client does not agree with your client's interpretation....(reads) ....at the wetting stage in the wetting and screening house."

WITNESS: Yes.

MR SHER: Is "wetting and screening house" a descriptions used within Hamersley to describe this plant?---No, not normally - "washing and screening".

It does describe what it does though, does it not?---It does do that, among other things.

Yes. Can I just take up another point which was touched on yesterday when - - -

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MR SHER (Continuing): - - - on yesterday when I asked you about this question of diversion of ore entering - - if I use the wrong words it might be taken against my clients, and if you do it might be taken against Hamersley; can we agree on a neutral term? Can we just call it "the plant" for the time being, meaning what you would call the washing and screening plant? ---Yes.

Remember me asking you about diversion of ore once it has entered the plant but before it goes through the drums, cyclones and whims?---Yes. Well, there was a little bit of a problem there yesterday in understanding whether you were referring to the crushed 200 by 80 ore or the other by-passed material.

Can we just clear that up, then? The 200 by 80 ore did not, up until 1981 in March or April, go into that plant at all, did it?---Correct.

After some discussion with Hancock and Wright, royalties were paid on that ore which had not gone through that plant? ---Yes. Is that the stream you are now referring to?

I am not, but let me just ask you about that: After that discussion which revealed that royalties had not been paid on this ore, that ore was then diverted into the plant, was it not?---That is correct.

Why was that?---For several reasons. In the initial years of concentrator start-up the plant experienced commissioning problems. Early in the start-up of that plant those problems were more of an engineering nature than anything else. Towards the latter end of that period, late 1980/early 1981 and as mentioned a moment ago, the nature of the low grade ore was changing and we were having problems handling that low grade ore. Both of these effects reduced the throughput capability of the plant and running in that mode with that 200 by 80 crushed material going direct, if you like, to product stockpile reduced the load on the concentrator plant proper, and that was of assitance in sorting out some of these commissioning problems. That is reason number one. Reason number two: While the output of the concentrator was relatively down the designed tonnage scale for that plant (we were not making as much as the plant had been designed to make) the impact of a lower grade product in the total Hamersley system was less. As the throughput rate of that plant slowly increased, the impact of a lower grade product became more pronounced and more evident in terms of the blending potential of that product. That was reason number two. Reason number three: Associated with the low grade ore types, late 1980/early 1981 and even now, were increasing amounts of fines causing

hang-up in bends, difficulty of ore to flow through chutes and general low "flowability", if you wish to use that term, of the ore mass. The fact that that coarsening agent was added into the fine end of the ore spectrum assisted in sorting out some of those problems.

There is one other point. The final point: The lump product from the concentrator - if we run in that mode which was used in 1979 and 1980, the fines in the lump is far greater than running in the mode in which we run now, because that direct product is not screened over 6mm screens; it is only screened over 30mm single deck screens. We do have a specification for fines in lump ore and as the output of the concentrator was on the increase, the effect of that high fines in the lump product was becoming more pronounced.

MR SHER: Is it just a coincidence that this ore was diverted into the concentrator plant round about the time it was discovered that royalties had not been paid on it? ---To my knowledge the reason for running in the alternate mode is due to the - - -

WITNESS (Continuing): - - - to the array of reasons that I have just explained.

MR SHER: Was the timing coincidental?---Certainly the increasing occurrence of the problematical low grade ores were around that time and as a matter of fact it was not long after that time that we mounted a major programme of research into those low grade types.

Was the fact that royalties would have to be paid on this ore if it was not put through the plant, one of the considerations that influenced the decision to put it through the plant?---Not in discussion with myself or to my knowledge.

MR HULME: The claim of Hancock and Wright is that royalties are payable on ores that go into the beneficiator and their contract so provides, and it is quite untrue. It is true that royalties at that time are in dispute. From time to time, depending on prices, royalties may or may not be paid. The whole of this claim is on the basis that royalties would be payable on that ore whether it went through or not.

OLNEY J: I think in terms of evidence you have just about exhausted the witness's personal knowledge of it, Mr Sher.

MR SHER: Perhaps I might ask him that.

OLNEY J: I think he was in the process of saying he had no knowledge. I think the question put to him was inconsistent with your client's case anyhow.

MR SHER: Apropos of Mr Hulme's objection, if I understand it correctly, Mr Hulme is now saying that there is no dispute that royalties are payable on that ore even though it goes through the concentrator plant.

OLNEY J: No. I thought he said that your client's case is that.

MR SHER: But I gather it is not Mr Hulme's client's case.

MR HULME: My position is plain on that. I have said it depends on values and prices from time to time. There is to be a calculation on all ore which goes into the beneficiator; we admit that. That calculation, if that feedstock is of value nil it will yield a nil result. That is the result of the royalty calculation. It is a royalty situation with the whole stream of ore that goes into the concentrator. That is what we say 9(b) means.

OLNEY J: It is misleading to suggest that the mere putting of ore into the plant avoids the payment of royalties. That really is the way the question seems to have been put to this witness.

MR HULME: If the question is simply, "Were royalty questions taken into account?" or something, I would have no objection but when it is simply assumed that if it is treated in one way no royalty is payable it is contrary to what my learned friend says is the fact and contrary to what we say it means.

MR SHER: The position is, as has already been established by evidence, that Hamersley's case is and the fact is that it has paid no royalties on this ore since it was put through the plant. For my learned friend to suggest that it is subject to royalties under clause 9(b),when his client is denying that and not paying it, in our submission is not a point upon which he is entitled to rely in objection to a question. It is inconsistent with his client's case and behaviour. My submission, your Honour, is that I am entitled to press this witness on this question to determine whether in fact ore is put through this beneficiation plant unnecessarily with a view to later arguing that the proper interpretation of this contract requires your Honour to determine a just and fair result and not enable royalties to be avoided by, as it were, unilateral action on the part of Hamersley.

OLNEY J: I think you can test the witness's knowledge as to the reasons for a course of conduct being adopted if he knows those reasons.

MR SHER: That is what I was endeavouring to do, your Honour.

OLNEY J: Very well.

MR SHER: Mr Langridge, whether or not ore goes into the concentrator plant or not is a matter in which you play an active part in making such a decision?---Not now.

You did then?---I did then, certainly.

So the reasons which you elaborated on at some length, the four reasons, were reasons that you knew of personally as to why ore went through the concentrator plant which had not previously been put through it?---Correct.

I am asking you whether one of the reasons,so far not stated by you, was also the added benefit to Hamersley - namely that even if the first four reasons were good ones there was still yet a fifth, also a good one, which was that - - -

MR SHER (Continuing): - - - was that, from Hamersley's viewpoint, it avoided the payment of royalties?---That was not discussed with me and was not part of the reason for the change in operating mode in that plant.

As far as you are aware?---Technically speaking, I would imagine that plant would continue to run in that mode because of the constraints we have in terms of making grade and making physical sizing.

Yes, but those four reasons you gave are all reasons which have some benefit to Hamersley in some way or other - is that right?---Yes, certainly; they allow us to achieve our product specifications.

Let us take the third one, for example. The third reason you gave, as I recall it and I am now using shorthand, was in effect to facilitate the actual, mechanical flow of the ore through the plant?---That is correct.

The addition of 200 by 80 size ore in some way assisted the flow of ore through the plant?---It has a scouring effect, yes.

The reason why this ore was put through the plant was not because it - that is the 200 by 80 - needed beneficiation but because it helped to facilitate the beneficiation of the other ore which did need it. Is that not right? ---That is correct.

So Hamersley - and I am not suggesting for a moment this was an improper reason - because it assisted their mechanical processing, decided to put ore through the plant which did not need to be beneficiated? ---When you say "did not need to be beneficiated" I could agree in terms of that single stream.

That is what I am asking you?---The reality of the situation is that it is the total product output that has to be planned and controlled to make specification onto ship.

Be that as it may, that particular ore, that stream of ore, did not need to be beneficiated to increase its FE content and make it saleable, did it? I am only asking about the 200 by 80 ore. That ore did not need to be beneficiated to make it saleable, did it?---No, but it needed to be beneficiated to control to our specification the total ore to be shipped.

It had the beneficial effect for Hamersley of enabling it to produce from the beneficiation plant a higher quality product?---Which is what the plant is designed for. Yes.

I am not suggesting it was not, but it really amounted to using ore that did not need beneficiation as a better

product at the end of the process?---That is correct.

MR SHER: I take you back to this paper by Mr Uys, which was tendered in evidence yesterday, to a passage which I overlooked. It is on the thirteenth page. "Hamersley concentrator" is referred to at the bottom of the page. It is actually the twelfth page. Do you see that?---Yes.

Turn over to the next page, which is the thirteenth. Towards the bottom of that page you will see a discussion of the modular design concept of this particular plant

MR SHER (Continuing): - - - particular plant?---Yes.

This is a discussion by two of the designers of the very plant which is at Hamersley. That is what the paper is about. I took you to the heading on the previous page: "Hamersley Concentrator", and then the discussion flows on from there?---Yes.

So they are describing the Hamersley plant?---Right.

I will just read to you what they there say:

> "The modular design concept allows independent operation of the different plant modules contingent upon operation of equipment items common to all the process plant."

He is talking there, I suggest, about the fact that the plant is designed in modules so you can deal with parts of it separately?---That is correct.

It continues:

> "The design incorporates plant by-pass facilities on the minus 80 plus 30 and the minus 30 plus 6 fractions during the period when the ore grade as mined is high or during extended shut-down periods resulting from scheduled maintenance requirements."

That means, does it not, that what the author of this document is saying is that there are two reasons for the modular design of this plant. One, the first one mentioned, is that when the ore grade as mined is high, and the second is for the purposes of maintenance?---Correct.

Do you agree that this plant was designed so as to enable, in certain circumstances named there - one of them being when the ore grade is high - the diversion of the ore without going through the whole process?---That possibility exists, yes.

It is not only a possibility; that was the actual design of the plant?---That is correct.

As stated by the designer, with whom you collaborated?---Yes.

And you know, I suggest, that this plant was deliberately designed to enable the beneficiation process to be halted, as it were, and ore diverted for two reasons - one being when the ore grade was high; second for maintenance purposes?---Yes.

MR SHER: Indeed that is what happens, is it not?---No, that does not happen. Those by-passes are used for maintenance and the demands in that plant have been such that we need the grade contribution in our stream.

Mr Langridge, there have been a number of inspections of this plant - four in fact, I believe - by legal representatives of the defendants in the last year or so. On a number of those occasions - and this is in Mr Boughton's affidavit, which you have read - -?---Yes, I did.

He has observed, as have others, that ore was being diverted and there was not maintenance going on?---I am not aware of that operating procedure having been used over the last few years since I have been out of that plant. I assumed that it was only used for maintenance, but we do need the grade - -

So your answer, that it is only diverted for maintenance, is an assumption?---I have not been operating or running that plant for the last two years.

So as far as you are aware, in the last two years there could have been diversion of ore within the plant without it going through the whole process, not for maintenance but because the ore grade was high - as far as you are aware?---As far as I am aware.

Just so that is clear - when you say "as far as I am aware", you are agreeing with me that it may have happened?---It may have happened; I could not say. I have not been there.

If it has happened it would be consistent with the actual design of the plant as described by Mr Uys?---It could occur in terms of the plant design, yes.

If I suggested to you that on the last inspection, which from memory was on 1st November, very high grade ore appeared to be going through the plant - very high, so the waste was minimal - and most of the ore was going to product, would that be a description of events you yourself have observed?---You can certainly observe high grade ore slugs going through that plant. It depends upon the layering on the stockpile and the arrival of trucks and the number of low grade faces being worked in the pit.

You dropped your voice at a critical time for me; you said - -? ---It depends upon the number of low grade faces which are contributing to that plant from the pit at the time - - -

WITNESS (Continuing): - - - at the time, and you can get higher and lower contributors to the total low grade headstock.

MR SHER: It would be a fairly simple operation, would it not, for the people actually physically operating the plant if they suddenly found themselves with a lot of high grade ore coming into the plant to divert it without putting through the whole beneficiation process?---It would be possible.

The plant is designed to do it?---But the plant is not designed and meant to accept high grade ore.

Are you not now contradicting what you said earlier when I put to you what Mr Uys said?---There are higher and lower grade fractions and contributors within the average headgrade of the low grade feed.

Is not what Mr Uys is saying there that when the ore that goes into this plant is of a sufficiently high grade you can stop the beneficiation process, as it were, in mid-stream and bypass certain parts of it?---You can bypass certain of those top size fractions which would be of a grade suitable for inclusion in high grade, but it would not normally be run that way because - -

Whether it is normally run that way or not, the plant is designed to do it. Is that not so?---Yes, I agreed to that.

If the occasion arose when you had a particularly good grade of ore going through the plant you could, by pressing a number of buttons, divert that ore from going through the drums, cyclones or whims?---That is possible except for the cyclones.

Right, apart from the cyclones. Once that stream that has to go through the cyclones is on stream it has to go through the cyclones?---It must go through the cyclones.

It must, yes, but the other three streams can be diverted?---Yes.

For whatever reason, whether they have been diverted- - and I am not asking you to concede anything by this answer about the reason for the diversion. For whatever reason, ore diverted since the concentrator plant commenced operation up to the time when you lost contact with it there have never been any royalties paid on that, has there?---Not to my knowledge; no.

The stance that Hamersley have adopted, I suggest to you, has been that once ore goes into that plant, whatever

happens to it - whether it be diverted or not - it has no value and therefore no royalties are payable on it?---Yes.

MR SHER: So if it were decided, for example, that ore that had not gone through the drums, whims or cyclones was not being beneficiated because all that had happened up to that point of time was that it had been screened, are there any records at Hamersley available which would enable the calculation to be made as to the royalties on such ore?---I think it would be terribly difficult, the way the weightometers are positioned. I am not sure whether that could be accurately defined.

So if Hamersley are shown to be wrong, what you are saying is that in fact you do not believe the royalties could be calculated by reference to actual product?---There may be ways. I am not sure on that point.

I think I asked you this yesterday but in case I have not I just want to get something clear. All the decisions about what goes into this plant, what happens to it within the plant and what happens to it after it comes out, are all made by Hamersley without reference to any of the defendants?---Yes.

I was just taking up a couple of matters I did not finish off yesterday. I come back to what I was talking to you about when we adjourned with regard to this question of scrubbing and washing and cleaning. You recall you agreed yesterday that there are particular forms of scrubbers and washers and the like, special equipment designed to carry out those sorts of functions? ---Yes.

Just so his Honour - - -

MR SHER (Continuing): - - - his Honour and others will know what we are talking about, would you just take this publication? It is the 1976-1977 Pit & Quarry Handbook and Buyers Guide, the sixty-ninth edition in fact. Have you ever seen that publication?---Not that particular year but I have seen the publication, yes.

Just so it is clear to everyone what we are talking about, can you look at the first flagged section, part 3, "Washing" (B170 I think it is)?---Yes.

Are there a number of pages, eight altogether, following,which show illustrations of different types of scrubbers and washers?---Yes.

They are varied in many ways - in size and the way in which they operate?---Yes.

But when we were discussing yesterday scrubbers and washers, these are the sorts of things you had in mind, I suppose?---Yes.

I tender that publication, your Honour, as illustrative of the matter.

EXHIBIT EXHIBIT 7 .... Pit & Quarry Handbook & Buyers Guide, 69th ed.

MR SHER: I think yesterday you agreed with me that Allis-Chalmers were very well-known people in the screen business?---Yes.

World-renowned experts?---Correct.

Producers of screens for all sorts of purposes?---Yes.

You would expect them to be as authoritative as anybody about screens and their uses?---I would.

I will give you this publication to look at. Would you go firstly to the section headed "Vibrating screen theory and selection" and look at p.3?---Yes.

That introduction there describes screen uses, does it not?---It does.

Is one of the uses described as "Washing or rinsing material with water - for example, wet dust removal"?---Yes.

Do you agree with that as an accurate description of screening? ---Yes, wet screening.

Can I take you then to p.17 where there is a detailed discussion of surfacemoisture? I seem to have misplaced a copy that I have scribbled all over, for a moment - - -

MR SHER (Continuing): - - - the moment. It does not matter, your Honour; I think I know what I want to do. TO WITNESS: At p.17 we find a very substantial discussion of what really in effect is wet screening? ---Yes.

Perhaps we could go through it, because I want to ask you some questions arising out of it. What it says in this section, s.5, is as follows:

> "Surface moisture carried by the material if screening is to be done dry or the amount of water with the feed if screening is to be done wet." (That is the surface moisture)

It then describes wet screening with sprays:

> "The number and size of water sprays and water pressure on a vibrating screen depends on the application and the physical dimensions of the screen.....(reads).....is required they should be grouped near the feed end."

On and on it goes, and describes the way in which you go about wet screening material. Is that description consistent with your experience in the iron ore industry, as a description of wet screening?---Generally, yes.

Is it also your experience that normally speaking the best way to wet screen is to make in effect a slurry so that the material being screened comes onto the screen in a sort of a liquid form?---I would agree with that.

That is a normal part of a wet screening process?---That is very often the case in wet screening, yes.

That would therefore involve the wetting of the material before you actually get it onto the screen, so you can make your slurry?---Correct.

And in any wet screening operation you would expect there to be a wetting or pulping box before the screen?---Normally, yes.

It goes without saying that wet screening involves wetting the material?---Yes.

And wetting it sufficiently to make it a slurry means making it very wet indeed?---Yes.

Therefore you need a great deal of water?---Yes.

MR SHER: Mr Langridge, it is inevitable, I suggest to you, when you put a lot of water on a material such as iron ore that there will be some sort of cleansing effect as a result of the water going on?---Yes.

That is a necessary and inevitable part of wet screening, is it not?---Correct.

Similarly, as you feed a material onto a wet screen through some chute or box, and it gets onto the screen and it is bounced around on the screen - because we are talking of a vibrating screen, are we not?---We are, yes.

There is going to be some abrading effect by the material rubbing against itself - - -

MR SHER (Continuing): - - - itself?---Yes.

That is other parts of it, and the feedbox and the screen itself?---Correct.

So some degree of abrading,or I suppose you could even call it scrubbing if you wanted to, is inevitably part of wet screening?---Yes.

Indeed it would be virtually impossible to have wet screening without some degree of scrubbing or abrading and cleansing?---I suppose it would.

If somebody said to you in describing a process in an iron ore beneficiation plant, "We have a wet screening device" you would assume from that description that that wet screening device was carrying out a number of functions in relation to the ore?---Yes.

It would be doing some cleaning?---Yes.

It would be doing some abrading or scrubbing?---Yes.

And it would certainly be separating the material by size? ---Correct. I would add there that it would be necessary to understand what was being talked about to ask other questions.

Yes, but speaking in general terms within the industry the use of the terminology "wet screening",or screening if you assumed to be wet, would carry with it those consequences that I have discussed with you as an inevitable part of screening?---To greater or lesser degrees depending upon the duty specific that you were talking about.

If you really wanted to wash ore you can get specific machines or plant for that purpose?---Yes.

Indeed, if you are really interested in washing ore it is best to soak the ore for some appreciable period, is it not?---It is; yes.

We are not talking of a split second; we are talking of seconds, if not minutes?---Yes.

If you wanted to scrub ore, using that technical expression, and you really wanted to do it well you would get a scrubber?---It depends upon the ore.

If you wanted to scrub any ore well you would have to get a scrubber, would you not?---If you had an ore type that was weak to the extent where it virtually disappeared to ultrafines in the process of scrubbing, you may not.

MR SHER: Is that what happens to this ore?---That happens to a lesser degree to this ore.

In any event, if you wanted to scrub ore within the technical meaning of that word you would use a scrubber, would you not?

MR HULME: I object to that, your Honour. I do not know what that means and I do not see how anyone can know what "technical" means in one thing this material shows. People have different technical views as to what is scrubbing, and they have different views as to what is a scrubber. Certainly it has to be something but the witness is entitled to have the meaning of the question put rather more clearly than with that word.

MR SHER: I am only seeking this witness's opinion as to what he understands, your Honour, because he is an expert adduced by the plaintiff to prove certain facts.

OLNEY J: I think the question was understood in that way.

MR SHER: I am just asking you what you believe - what in your opinion was the answer to the questions. If you wanted to scrub ore within what you understand to be the meaning of that word in the iron ore industry, you would use a scrubber, would you not? ---Not necessarily. If I wanted scrubbing action to occur on an ore, and if that action was to be slight to achieve some end purpose, it is possible to create that extent of scrubbing as we do in our case on a screen.

But then that is really encompassed in wet screening, is it not?---And it is encompassed in the wet screening step. If a more aggressive scrubbing action is required, yes, you would buy a proprietary scrubber.

In relation to this particular plant, the ore comes into the area of the wet screens,the first lot of wet screens - - -

MR SHER (Continuing): - - - wet screens, on a conveyer belt and then goes down through a device which you call a pulping box, onto the wet screen?---It goes through a bin system ahead of the pulping box, yes.

I am sorry. It sort of gets into a bin which holds it so you have what - a constant stream of feed going into the process?---Yes.

The purpose of that particular bin is to ensure that you have a sufficiently consistent supply - that it goes, as it were, in a regular stream?---Correct, yes. It is surge centre in the system.

There is no water added to this at this particular point, is there? ---No.

To get it onto the screen it goes through a "thing" which you call a pulping box?---It goes over a vibrating feeder and then into a pulping box.

The vibrating feeder is to get it into the pulping box, which is in turn to get it onto the screen?---Yes.

The pulping box here really is sort of open-ended, is it not? It has a hole at the top and a hole at the bottom. I know it has other things in it but essentially it goes in the hole at the top and comes out the hole at the bottom?---Well, it certainly goes in the hole at the top. To get out the bottom it must impact on a rock ledge.

What you have built into the bottom of this particular thing is what you call a rock ledge, which breaks the fall of the ore so it does not go straight to the screen?--- It does two things. It certainly does that but it also turns the direction of the ore back towards the rear end of the screen, so that the ore has maximum time on the screen.

That is thepurpose of this particular rock ledge, and the reason you break the fall is if you had this ore just falling onto the wet screen without breaking its fall it would wear it out quickly?---It would certainly do that.

Yes, so that is why you break the fall?---That and also to turn the ore and to put it at the back end of the screen.

Dealing with each in part, it is clear I think to everyone why you divert it to the back - so you get it onto the back and you get the whole of the screen?---Correct.

But the reason you break the fall is to stop the screen wearing out?---That is part of the purpose, yes.

As it goesin, as it falls onto the rock ledge, somewhere down the fall it is hit by water sprays?---It is about midway down the chute. It has to pass through an area where water sprays combine from either side of the chute.

MR SHER: That is part of the process of turning it into a slurry, so it will come onto the screen as a slurry?---That is correct.

What is the total distance between where it goes in and where it sort of hits the bottom?---It is about a metre and a half.

That is pretty close to five feet, and the spray is about half-way down that distance?---Yes.

So the time between when it gets wet for the first time as it hits the sprays and when it gets onto the screen as a result of the fall could be measured, if we used the appropriate formula, as something less than a second?---Never having measured it - - it would certainly be a short period of time.

If somebody who knows the formula said they had worked it out and the distance - - -

MR SHER (Continuing): - - - the distance - - it is falling to a gravity, is it not?---Yes.

The distance according to the formula would work out about .55 of a second; would you quarrel with that?---That may be so. I would not argue the point if it has been properly calculated.

In any event, your observation as somebody knowing the plant is that it gets wet for a very short space of time indeed before it is onto the screen?---That is correct.

I think I may have put to you that .55 was after it was wetted, but I think it may have been the whole of the fall. I will clear that up later, but anyway you would defer to expert opinion on that, would you - someone who knew the formula about how to work out how long it takes something to fall with gravity?---Yes, I admit it was a very - -

What I was going to ask you was this: Your affidavit calls this particular thing (trying to use that neutral term) a pulping box?---Yes.

Up until these proceedings had you ever heard it called anything else? That was a bad question; I will withdraw it and put it differently. Before this royalty dispute with Hancock and Wright broke out had you heard it described at Hamersley as anything other than a pulping box?---Well, it is again an area where a number of terms have been used since day one, and are commonly used. It has been called a screen feed chute, a wet screen feed chute, a pulping box - various terms.

Actually the people who designed it and who drew up the plans had a specific name for it, did they not? Would you have a look at exhibit NEG3, the third exhibit to Mr Grosvenor's affidavit? It is a drawing of the wet feeder, is it not? That is how it is so described? ---That is how it is so described, yes.

The wet feeder?---Yes.

If we want to look at the thing we have been talking about, where the ore comes off the vibrating feeder and goes down this pulping box onto the screen, we will find it on the bottom half of the left-hand side, just to the left of the middle of the exhibit, will we not?---Correct.

Would you turn it around so that everyone knows what we are talking about, and would you point to it there on the drawing?---In cross-section we are talking about that chute there, or in side elevation there.

MR SHER: Just show us where it is on the side elevation, would you?---Looking at the front of the chute, that is the chute through there, and above it the feeder. On this cross-section the feeder is the angled piece there and the chute is there.

Right. What you have done is what I was hoping you would do, if I may say so. You are calling it a chute - - -

MR SHER (Continuing): - - - a chute, are you not?---Yes.

Because that is what it is, is it not?---It could be called a chute.

It is called a chute on this very document, is it not?---It probably is.

I will show you four places where you will find the word "chute" if you look carefully. Just a moment - I might have to retract that and say "three." No, I can see four; I can see five actually. I will turn it round so that you can see it and let me suggest to you that you will find the word "chute" in at least the following five places. If you go to the left of the centre of the page, alongside the side view, do you see where it says "chute side liners"?---Yes.

Then down underneath that, about four lines down, "chute front liner"?---Yes.

If we go over the page to the other view (actually we have found six), do you see where it says "access door"? ---Yes.

Go to the right of that and then up a bit. It says "outside chute and skirt"?---Yes.

Go over to the right and it says, "Rubber seal fixed to chute bottom and sides and contoured to feeder"?---Yes.

If you go down to the very bottom of the page, just to the right of the centre, it says, "Inside chute" and "10R chute"?---Ten plate chute.

It is consistently referred to in the design drawing as a chute, and that is what it is - is it not?---It is a chute, yes.

I would just take you to a few more matters arising out of your affidavits, if you would not mind. (Could the witness be shown his two affidavits, your Honour?) I take you to p.6 of your first affidavit, that is the longer one. This is the affidavit sworn on 2nd September 1982?---Yes, I have it. What page?

Page 6 is the one I am directing your attention to but the paragraph starts on p.5. You were there, in those paragraphs, describing what happened in this beneficiation plant?---Yes.

When the ore goes through the drums - I will just confine it to the drums for the time being because I am not sure what happens elsewhere - through this ferro-silicon and water mix which has lifted the specific

gravity of the substance so that the ore sinks and the waste floats and it gets disposed of like that and they both come out (that is both what we would call the floats and the sinks) they are both subjected to a washing process are they not, to remove the ferro-silicon?---Commonly referred to as washing and rinsing; yes.

Mr SHER: The point is that there the whole object of the exercise is to get the ferro-silicon off so you can recover it because it is a very expensive material?---That is correct.

That really is truly a washing process, is it not?---That is a washing process.

Because you are getting rid of, you are separating out and getting rid of some of the substance that is adhering to the - - -

MR SHER (Continuing): - - - to the tailings, the floats or the sinks?---Yes.

That is why it is called washing, because you really have this concept of getting rid of some object?---Yes.

Going back to the wet screens, nothing is got rid of through the wet screens at all. All that happens is that what goes in comes out in a series of different streams?---Material that is entering the screening system, to put it that way - the primary screen, the secondary screen and its associated sieve bend - - some of that material is displaced out of its originally sized stream into a stream further down that sizing range.

There is no quarrel with us about that?---Nothing is thrown away out of that.

That is the point I was making. Mr Hulme has told his Honour that there are five points at which there is a discard, but that is all after the drums, the cyclones and the whims. Up until then, what has happened through these primary screens and secondary screens is really the redistribution of the ore body that goes in into different-sized streams? ---Yes, the weaker particles are broken down and moved down the succession of sizes.

Certainly, and as you go on through the process you are getting more of the waste into the smaller sizes?---That is correct.

But you are still retaining, until the point of discard, everything that went in, waste or ore?---At one place or another.

That is right, but until you get to the discarded waste or tailings you have exactly what went in, except that it is now divided into different streams?---That is correct.

The difference between what happens at the primary screens and the secondary screens with what happens at the time this material is being subject to the further jetting of water you refer to at the bottom of the eleventh paragraph on p.6, is that particular process is actually washing ferrous silicone off the ore and waste and recovering it as a separate thing?---Are you referring there to the screening step mentioned at the start of clause 11?

I am referring to the screening step about which you are talking in the sentence:

> "The ferrous silicone is itself later retrieved from both concentrate and tailings by further jetting with water on recovery screens."

That is what I am talking about?---I am just trying to find it?

MR SHER: It is the very last sentence on p.6, the very last sentence of para.11?---Yes.

That process described there is a screen process?---Yes.

But the difference between that and the screening process of the two other screens is that here there is something actually taken way, separated out from what goes in. It is not merely diverted into different sizes. It is actually taken away and recovered as ferrous silicone for further use?---Yes, it is.

That particular process, that is this process described in this last sentence on the recovery screens, could really be described, firstly, as being to that extent different from what happens on the other screens?---It is certainly different. It is a totally different duty.

You would use the word "washing" in relation to that with quite a degree of confidence, I suppose?---Yes.

Indeed, if we go to the very next page of your affidavit, para.13, you refer to what has happened after the ferrous silicone has been washed off?---Yes.

That is what you really meant to describe in that sentence in para.11?---Correct.

Can I take you to p.10, para.17? Paragraph 17 (perhaps you did not understand it at the time - - -)

MR SHER (Continuing):(- - - at the time, but Mr Hulme will correct me if I am wrong) was designed to show that there was the need for arbitration because there had been no sales of a particular grade quality or condition of ore. What you were saying there was that since a certain date in September the plaintiff, that is Hamersley, had not sold or disposed of any iron ore of a grade, quality or physical condition the same as or similar to that fed into the concentrator?---Yes.

What you are really directing your comment towards was the ore in exactly the same condition as it was as it was fed into the concentrator?---Yes.

What point were you referring to there - as it was fed into the surge bin above the first or the primary screen? ---No. I am speaking about from the primary stockpile.

What happens to it between the primary stockpile and the point that I just mentioned, other than going on a conveyor belt?---The crushing, the scalping crushing circuits, intermediate in that system before it reaches the washing and screens.

Then perhaps I had misunderstood what you were saying there. The point of time to which you were referring when you say there had been no sales, and fed into the concentrator, was before it went through the scalping process which is, I think, described on the isometric drawing as the secondary and tertiary crushing plant? ---Yes.

What size ore is that?---It is 200mm top size down to zero.

So it is 200 by nothing?---Yes.

So you picked the point which you described as being fed into the concentrator as the point where it came onto the primary stockpile, shown on the isometric drawing there, and as it went into the secondary and tertiary crushing plant there?---That is the stream that I would always refer to as concentrator feed.

I am not criticising you; I am just trying to find out what you meant when you used this description. We are talking about the ore coming off this pile as it goes into the secondary and tertiary crushing plant? ---Yes, that is what I mean by concentrator feed.

We have a much bigger plan which has all sorts of colours on it. I gather there is a pin board behind the witness box. TO HIS HONOUR: Could we put this up, your Honour, and use this?

OLNEY J: What is this?

MR SHER: It is a blow-up.

OLNEY J: It is a blow-up or the original of this particular exhibit, is it?

MR SHER: It is a blow-up and it has some writing on it and some colours. I would ask your Honour to ignore all that for the time being.

OLNEY J: Very well.

MR SHER: This is a blow-up of CRL4, your Honour.

MR HULME: Well, it is something more than that because it has things on it - -

MR SHER: You may not have heard what I said. I told his Honour that it has writing on it and some colours, and I am asking everyone - -

MR HULME: It has some figures, 50032343 on the right-hand side which are not on my CRL4, so it is not just a blow-up of CRL4. It may be a blow-up of something CRL4 plus, a different version; it cannot be CRL4 itself. Go ahead and use it, but we had better identify what in fact it is.

OLNEY J: The witness could probably identify it for us.

MR SHER: You can probably help us on this, Mr Langridge. It was meant to be a blow-up of CRL4 and it looks very much like it to me - - -

MR SHER (Continuing): - - - to me but as Mr Hulme has pointed out it has some buildings in the top, left-hand corner, which are not on the exhibit. Ignore those, if you would not mind. It has a number on it which does not appear on the exhibit. Do not worry about the number. Does that look to you as if it is, in fact, a copy, with those changes (and ignore the handwriting on it and the colours), of an isometric drawing of the plant similar to CRL4?---It is the same basic drawing, yes.

You are picking as your point for saying there have not been any sales, the point between the primary stockpile and what is described there as the secondary and tertiary crushing plant?---Yes. I am saying that stream is what I would refer to as concentrator feed.

Would you point it out to us, please?---The extreme end of the plant.

What you say is there have been no sales of ore in a condition similar in grade quality and physical condition to ore coming off that primary stockpile and going into that part of the plant?---Yes.

That would be ore which is generally described as low-grade ore, 200 by nothing?---Correct.

Have there ever been any sales by Hamersley of that sort of ore, to your knowledge?---Yes.

How long ago?---I could not put precise dates on it but the original contracts with Kobe Steel Company were - -

Back in the early 1960s?---Yes - - were for or of that nature.

How many years would it be, as far as you are aware, since there has been any contract for the sale of ore of 200 by nothing? ---Not in that size range at that grade, at that chemical grade.

I am not quite sure what you are saying now. I will have to take you back a little. You said there have been no sales within a period of ore of the grade, quality and physical condition the same as or similar to that fed into the concentrator, meaning that grade and quality of ore and size of ore, at the point you have identified?---Yes.

Have there ever been any sales of that grade, quality and size of ore?---To my knowledge, not at that size.

In so far as-- assuming Hamersley's case to be correct, there has never been a sale whereby clause 9(e)(i) of the contract could be fallen back on?

OLNEY J: I do not really think it is a question for the witness to answer.

MR HULME: I must object to that.

MR SHER (Do not worry. His Honour has already upheld your objection and I will not press it.)

MR HULME: It must have been a bad question.

MR SHER (TO WITNESS): What about further down the path of this particular ore - what about at the point where it enters the screening, washing and dry screening plant, as it is called on the drawing there? That would be ore which is 80 by nothing, would it not?---Correct.

Have there been any sales of ore in the period to which you referred of that grade, quality and physical condition? ---Not to my knowledge, no.

Might there have been?---I am not sure of the size and detail of the earlier Kobe contracts. They were not the same as our normal lump sizing. It was a coarser-sized ore sold.

Is this the position - you can speak with some - - I mean, you have obviously had to satisfy yourself about the accuracy of what you have said in this affidavit before you swore to it?---Yes.

So you have acquired the knowledge which enabled you to swear the affidavits?---Yes.

But is that the only knowledge you have sought to acquire - that is, from 22nd September 1978 ore 200 by nothing, low-grade - - is that the only ore you inquired about? ---I did not go back into history, in terms of details on previous contracts.

Leaving aside history, you did not go back and inquire about any other size ore either, did you?---Not really, no.

I take it then you cannot speak as to that fact?---No, not in detail - - -

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WITNESS (Continuing): - - - in detail.

MR SHER: Can you at all?---I am not quite clear on what detail you are seeking.

I am taking up the point you make in para.17 - that since a certain day ore of a certain grade quality and physical condition has not been sold or disposed of. We have established that that ore is low grade ore, 200 by 0. That is the only ore in relation to which you can speak with any authority as to whether there have been any sales?---That is the ore I am referring to in that, yes.

As to whether ore of other sizes or grades or quality have been sold within six months, you cannot say, I take it?---No.

I think there might have been something I wanted to ask you about your other affidavit. I will just take up one matter to see the extent of your knowledge, (c) at para.5?---Yes.

There you talk about:

> "To the best of my knowledge and belief the sale or shipment of iron ore ....(reads).... or shipped in slurry form."

WITNESS: To the best of my knowledge, yes.

MR SHER: Did you make any inquiries about the Marcona mine in Peru as to sales in slurry form from that mine? ---I had an understanding that the Marcona mine was developed much later than 1962.

Are you saying that you did make inquiries?---I was aware of the Marcona situation from reading the literature.

And you are aware that it sells some iron ore product in slurry form?---Yes.

How long has it been selling ore in that form so far as you are aware from reading the literature?---I cannot recall exactly but it was well after that date, to my knowledge - after 1962.

You are only relying upon what you have read somewhere, are you not?---Yes.

Just perhaps to pick up a few loose ends - you have written an article that was published in the Sir Maurice Moreby memorial volume about the actual concentration plant at Hamersley, have you not?---Yes.

Would you look at p.81 of the volume?
TO HIS HONOUR: I think the extract is an exhibit

to an affidavit, your Honour - one of Mr Boughton's exhibits, NOB1 I think it is.
TO WITNESS: Is the article at pp.81 to 83 your article?---It is.

MR SHER: At page 82 in a flow sheet, did you describe the screens that you have referred to in the washing and screening plant as the wet screens?---I did.

Did you describe the plant feed at p.81 by reference to test work in these terms?

"Test work indicated that
sizing heavy medium
separation ....(reads)....
concentrating this ore."

WITNESS: I did.

MR SHER: Is that an accurate description of what happens in this plant?---It is accurate within the constraint of a heavily precis-ed summary; yes.

The point you emphasised in relation to the work of the primary screens was the sizing aspect of its work?---Within the text?

Well, in this very sentence. The point you emphasised was the sizing. That is right, is it not?---Yes.

The reason you did that, I suggest, is because it is the most important thing that happens at the primary screens?---Sizing must occur for the processes to be applied - - -

WITNESS (Continuing): - - - applied.

MR SHER: Yes; it is absolutely vital to the process to have this sizing, is it not?---I don't think there is any argument.

Well, not from you perhaps but from other witnesses there might be, Mr Langley. Your opinion, as the man collaborating with the actual designers about this plant, was that sizing of the material was absolutely vital to the function of the beneficiation plant?---I am not arguing that fact. You must size the ore into its respective streams to steer it through its treatment processes.

Exactly; you would have to have it sized properly to make effective use of the drums, the cyclones and the whims?---That is correct.

And indeed, one of the reasons you need to have it sized is if you have the wrong size iron ore going through the drums you will lose that iron ore?---Yes.

So you do not size it merely to get rid of waste; you size it to make sure you do not get rid of iron ore as well? ---You size it to have the correct fractions going to the correct treatment areas.

And if you do not you might lose iron ore as well as waste if the wrong size ore goes into the wrong drums?---That is correct. That doesn't address the question of why you wash it.

We will come to that in a moment, if we need to, but just talking about sizing - if you put the small ore into the coarse drums you will lose it, will you not?---If it is extremely small, yes.

Because it will float rather than sink, because it is too small?---That possibility exists, yes.

So sizing is not merely important to get rid of waste; it is also important to make sure you do not get rid of iron ore?---Yes, I would agree with that.

But the point is that in this article in which you were in precis form saying what happened in this plant, the one aspect of the activities that you emphasise before discussing the actual treatment, which is heavy medium separation, was sizing?---Yes.

Would it be fair to say because you regard it as more important than washing or cleaning?---That's a difficult question to answer. They are obviously important as well, but sizing has to occur; it is fundamental. It is number one.

MR SHER: I would take you to p.83. I have already asked you (and perhaps it would be correctly asserted by my learned friends) ad nauseam about the 200 by 80 stream, but I now want to ask you about the 80 by 30 stream. No, perhaps I do not. In that second paragraph, where you refer to the scalping screen, sizing the material at 80mm, "the oversize does not require concentration" - was that the 80 by 200 to which you referred there? ---Yes.

You were saying there what you have told his Honour, that that does not require concentration, certainly at the time you wrote this article?---At the time I wrote the article, yes.

It has changed, has it?---Yes. As I said it is a heavily precis-ed article and there was not space there to go into details such as by-pass amenities and their reasons for being, and we had operated in that mode up to that point of time, and therefore I used that expression.

But, Mr Langridge, I suppose it would be fair to say that the changes which you detailed, which is now why you put the 200 by 80 through the beneficiation plant, could change back, could they not?---That is a possibility.

That is, as you go on through the mine?---That is possible, yes.

So what you are doing with that stream at the moment may only be temporary in the long run?---From my understanding of our remaining low grade ore I would very much doubt it.

Are you able to speak about that with any authority, or would you have to fall back on others to answer that question?---I would prefer other opinion on that, yes.

Thank you, Mr Langridge.

OLNEY J: Mr Sher, the document of which you tendered a copy, "The Vibrating Screen, Theory and Selection" - I take it that is the same as exhibit NEG4 to Mr Grosvenor's affidavit?

MR SHER: Yes, I think it is, and I think that is the document I was looking for before — It is, your Honour.

OLNEY J: Very well.

MR SHER: It is somewhat superfluous to tender it twice. Does your HOnour think it appropriate to tender that book at which the witness was just looking? The extract is an exhibit already and will go in.

OLNEY J: If you have only referred him to the part which is already exhibited, I do not propose reading any other articles unless they are referred to in the evidence.

8.11.83

RE-EXAMINED BY MR HULME QC:

MR HULME: You were asked some questions yesterday about - - it was being put to you that you seemed to be trying to so run affairs as to extend the life of the mine; things of that sort. Do you remember those questions yesterday?---Yes.

Is extending the life of the mine something which is present in the planning of how to administer the operation of the mine?---It is key to the planning of the mining engineering function.

One way of mining might be to take out all the good ore first, send that away and then come and deal with the bad ore later. Do you follow?---Yes, I follow.

Would that seem to you to be a very sensible way of going about affairs?---No, it would not.

It was also suggested to you that one way you can get extra money is by what might be called "bonus hunting" - trying to send away ore of a higher grade than the contract calls for and earn a little bit of bonus for doing so. Is that something which Hamersley commonly does?---No. Hamersley reacts to market demand essentially and, within that constraint, tries to optimise its ore bodies and extend their life.

When you say "optimise its ore bodies" as contrast to bonus hunting, could you just explain why the one is the opposite of the other?---Yes. Using your term "bonus hunting", what that connotates is that you selectively mine the richest areas of the ore bodies, which leaves you with an across-the-board lower head grade to then contend with, which would mean in future years, in my opinion, it would be extremely difficult to sell that lower-grade product.

If you are seeking to extend the life of the mine as far as possible, will that kind of policy stand in the way of what I have called "bonus hunting"?---It certainly would. They are opposing concepts.

Just to get this concentrator plant into some kind of financial scale, are youable to give us a broad figure of the cost of the plant as we see it - that much of that plant as we see on that CRL4 blow- ? I am not after anything at all

8.11.83

precise - the scale of things?---The "of-order" cost of that plant, which included the new section of load-out area - - -

WITNESS (Continuing): - - - area in the stockpile part of the plant was around $125 million - $130 million at that time.

MR HULME: You have said that the control of the mine is in the hands of Hamersley and that control has not been shared with Mr Hancock and Mr Wright and all their companies?---Yes.

Are you aware of any requests by Mr Hancock and Mr Wright to shorten the life of the mine by going for the best ore and getting that out first, and forgetting the future?---No, I am not.

As far as you are aware, their royalty rights persist while the life of the mine persists?

MR SHER: I do not apprehend that this witness is qualified to answer those sorts of questions, your Honour.

OLNEY J: I do not really think he is, Mr Hulme. It is all in the contract anyhow, is it not?

MR HULME: Yes, except to the extent that you are engaged in settling the actual mining policy. One might well have to take something into account if the royalty right was going to stop at some time because then the basis for making decisions might be different. Can I perhaps ask this, your Honour?
TO WITNESS: To the extent that you have been making decisions have you proceeded on the basis that the royalty rights continue as long as the mine does?---Really I have no involvement with the royalty question at all.

Yesterday you were asked a number of questions in terms of streams going to product. When you say, "Yes, that stream is going to product" can you just explain precisely where physically it goes as it comes out of the beneficiation plant?---In the case of the lump product, which is 30 by 6 mm, it goes to what we call the inner loop lump stockpile, which is the stockpile in the centre of that drawing.

Would each of them go to a stockpile?---In the case of fines it goes to a similar fines stockpile.

From there you have said it would be blended with contents of various stockpiles and in that way sent out?---It is in fact blended on those stockpiles with other products and then re-blended at the port with Paraburdoo product.

Does the saleability of the stockpile as a whole, the contents of the stockpile - - no, I withdraw that. I think - - -

MR HULME (Continuing): - - - I think that is obvious. In the pulping box, the water is put on and water continues to be put on?---Yes.

You have spoken of the washing function which begins at that point? ---Yes.

How important is the washing function in relation to these streams of ore?---I believe it is very important.

As far as what has been called "stream A" is concerned, that is the 30 to 80, is it not? Is it called stream A in the plant or is that just us?---No, it is just in terms of the affidavit and your discussion.

What falls through the screen - is that then separated from stream A forever?---I do not quite understand?

Stream A, from the time it leaves the screen - does it ever mingle with streams B, C or D?---Yes, that material remingles.

Where?---On its way to the product stockpile.

In that plant, when the material falls through that first screen - - you have the 80 by 30 sitting on the first screen and everything else from 30 down falls through onto the next screen?---Yes.

That includes the rubbish, the shale and everything else of less than 30 - that will fall through that screen?---That is correct.

Does what falls through come back into stream A anywhere inside the beneficiation plant?---No.

Then, at the next screen, the minus 6 separates from the 6 to 30, CC91A . does it not?---Yes.

That minus 6 will contain the fine shales and fine ores?---Yes.

What is going to constitute streams C to D?---Yes.

Does what goes down there into C to D,the less than 6 - does any of that ever come back in and join stream B inside the concentration plant?---No.

Then we go a further stage through the sieve bends and we separate streams C and D?---Yes.

Does anything of what goes down into stream D ever come back in and join stream C inside the concentration plant?---No.

Can you tell me this? With the preparatory screens we have here, with the drums and the cyclones, the hydro-cyclones - there is a preparatory screen just before in each case, is there not?---For the drums and the cyclones, yes.

MR HULME: Is there a pulping box before those screens?---Yes. The ore is put onto the screen wet, with the addition of water in a box.

LUNCHEON ADJOURNMENT

200. 2.13

UPON RESUMPTION:

MR HULME: Mr Langridge, I would take you back to the streams A, B, C and D that we were talking of earlier. At that first screen stream A has lost everything below 30mm?---That is correct.

It has been subject to sprays in the pulping box and in its journey across the screen?---Yes.

When it leaves the screen as stream A, now existing for the first time as a separate stream, is it likely to be a better quality product than the average of what came onto that screen?---Yes, it is. The shale, the top-size shales, are likely to have been altered and some of them lost.

Can you just bring together the principle factors which make that stream a better product than the mass which was coming down through the pulping box onto the screen? ---Due to what I would refer to as a scrubbing action and a washing action on the top deck of that screen and in the pulping box leading that screen, with the action of the water and with the agitation.

In your usage of the terminology, would you describe what has happened to it as beneficiation?---Yes, I would.

In your understanding of the expression as used in the industry would you describe that as beneficiation?---Yes, I would.

Stream B is the 6mm to 30mm, coming off the second screen and existing as a separate stream for the first time? ---Yes.

Having gone through the pulping box and the first screen and having stayed on top of the second screen subject to sprays again?---Yes.

Is that likely to be a better product than that part of the mass which has fallen through the second screen?---Yes. The same principles would apply.

In your terminology would you describe that stream as having gone through a beneficiating process?---I would.

And in your knowledge would industry usage be the same?---In my opinion, yes.

Is Pilbara ore easy or hard to dry screen?---That is a very wide question. I take it you are speaking of the total range of Pilbara iron ore types?

Yes; are there any features of Pilbara ore which make it easy or harder than other ores to dry screen?---No. The ore which is dry screened is not really a great problem

in terms of the screening operation.

MR HULME: Why is the system there so arranged that the dry ore coming in is wetted and then wet screened rather than dry screened?---With this particular ore, which is what is termed low grade ore, at Tom Price and which is destined for - - -

WITNESS (Continuing): - - - for heavy media treatment in the coarser fractions and magnetic treatment in the finest fraction. The clays and the shales which are associated with that low grade ore can be problematical in the process unless the ore is cleaned sufficiently prior to concentration.

MR HULME: With the high grade direct shipping ore, there are processes of crushing and screening?---Yes.

You have said, I think, that they are all dry processes?---Yes.

Are those ores subject to any further processes after screening? ---No; unless you regard blending as a process - that is mixing of those ores on a stockpile.

Other than in the blending, no further processes - - ?---No.

Thank you, Mr Langridge.

WITNESS WITHDREW

OLNEY J: I take it that the witnesses will not be required any further if they wish to depart. Is there any view about that? It is my practice to excuse witnesses once they have given their evidence unless either counsel think they ought to be asked to remain.

MR HULME: Thank you. The next witness will be Dr Tompsitt with the photographs. I will ask my learned friend, Mr Callaway, to examine.

MR CALLAWAY: Mr Tompsitt's affidavit is a short one and it largely consists of exhibiting material. Subject always to your Honour's wishes, I think it might be helpful if I read the affidavit before calling Mr Tompsitt.

OLNEY J: Yes.

MR CALLAWAY: It is an affidavit sworn on 24th May, 1983. Mr Tompsitt is a metallurgical engineer and deposes:

> "(1) I hold the degree of Bachelor of Chemical Engineering 1970 from the University ....(reads).... The samples were taken under my supervision."

M73B. 10.34

MR HULME: Your Honour, we have Mr Langridge here at my learned friend's request. There is one matter which is to do with water on which I would seek your Honour's leave to get Mr Langridge to give some figures and to update his affidavit as to events which have happened since his affidavit. I do not think it is controversial.

OLNEY J: Very well. Do you wish to further examine in-chief on this subject matter?

MR HULME: Yes.

OLNEY J: And on the other matter of the flow chart?

MR HULME: Yes.

OLNEY J: Is it convenient that you do that first and then Mr Sher has the opportunity of cross-examining on those matters as well as the other matter about which he originally asked.

MR HULME: And anything he wishes. It is more convenient for him to have heard what is said on this first matter, rather than having to split his cross-examination.

OLNEY J: Are you happy with that, Mr Sher?

MR SHER: Yes, sir.

COLIN ROY LANGRIDGE, re-called:

OLNEY J: Mr Langridge, you have already been sworn in these proceedings and the oath still applies to you.

FURTHER EXAMINED BY MR HULME QC:

MR HULME: (Could Mr Langridge please be shown NEG1?) These are the figures on which Mr Boughton made calculations. Do you see in that exhibit some figures set out called "Design pressures and feed rates for water" and there are then set out four feed rates in cubic metres per hour? ---Yes.

Can you indicate to his Honour what happens in practice compared with those figures?---Yes. The first set of figures, which are given below the heading "Pressure" and against the heading "Feed rate" are the water volumes which we essentially use in the plant at the moment, and have used since the plant was commissioned.

Can that vary from day to day?---It does vary slightly, depending on wear in pump impellers and wear in pipes and things of that nature.

MR HULME: Further down in the letter there is reference to a trial basis of No.4 module and rates are given for that trial basis. Do you see that?---Yes.

In para.6 of your second affidavit you refer to the trial installation for enhanced water injection in one of the six modules?---Yes.

Has anything happened in that regard since you swore that affidavit in May of this year?---Yes. That trial has in fact been conducted and a decision was taken to adopt the water volumes which are contained in the second set of figures in this exhibit. The decision to install the pool decks which I also mentioned in my affidavit has been decided against for the time being. We are going to go ahead with the increased water volumes but at this stage not with the pool decks.

Is the work made necessary by that decision in course of progress?---Yes, the work has commenced for installation of pump bases for the new bases in the washing and screening area - - -

JW. 10.39

WITNESS (Continuing): - - - and screening area. That will assist in that additional water delivery.

MR HULME: The last question I have, Mr Langridge: I think it is already in, but can you indicate the approximate specific gravity of the feed which comes into the concentrator?---The iron ore mix?

Yes?---It is variable, but the average would be 3.7/3.8.

Thank you, Mr Langridge.

FURTHER CROSS-EXAMINED BY MR SHER QC:

MR SHER: Mr Langridge, on this matter about which you have just been asked, the water pressure - the trial referred to in respect of washing module No.4 started in 1982, I take it, because the letter is dated October 1982 and refers to: "Module No.4 was modified earlier this year"?---Yes, that is correct.

Is it some 18 months later that a decision has been made to extend that trial to other modules?---No. The purpose of the trial as such was to assess whether additional water would be beneficial in terms of getting a scrubbing action, a better washing action, on the low grade ore.

I did not really ask you about the reason although I am sure we are all interested; I am merely trying to establish that the trial which is said by inference to have commenced "earlier this year", meaning earlier in 1982, has, you say, resulted in a decision being reached which is now in course of being implemented to affect the other modules?---Yes.

The only point I am seeking to establish is that the trial went on for about 18 months before that decision appears to have been reached?---The thing is the trial needed to - -

Do not worry about why; it is just the timing I really want to get from you?---The only point I wanted to make was that there is a wide range of low grade types and it is necessary to treat a spectrum of ore types to get substantial figures from the trial.

That is the explanation, then, but - -?---But the answer to the question is "Yes".

Thank you. I would just take up what you told us about then: The ore types which are fed into the concentrator plant vary sufficiently for you to need a period like that of abut 18 months to form an informed judgment as to whether increased water supply is a desirable step?---Not totally; the other reason for that lapse of time is the normal procedures of writing up a specification, capital application, getting approvals

and all that sort of thing.

MR SHER: It is a large company; it is, I suppose, unfortunately a bit like some departments run for the public benefit - a little slow in the moving?---Correct.

Nevertheless the point is still valid, is it not - that the feed, the ore types, vary so much that you needed a lengthy period of time to assess whether or not you needed to increase the water flow to improve the performance of the beneficiation plant?---Yes.

I would just like some assistance to be reminded; you refer to module No.4; how many modules are there?---Six.

There are five intended to be operated normally and one spare module; is that the situation?---Correct.

Is it therefore your plan to modify all the modules, or just some of them?---All of the modules.

As a matter of interest, was Dr Batterham involved in any of these tests?---Yes, he was.

He was? Then you would expect him to know all about water pressure and the actual water pressure being used and the water pressure and volume which was tested as an alternative?---Well, he was remotely involved. He was aware of what was going on by communications.

But would you normally expect him to have been aware of the finer details concerning both pressure and feed rate? ---Not necessarily.

However, the information was there for him to get if he had asked for it?---Yes.

I would, whilst Mr Langridge is here, like to take up with him this flow chart which was introduced yesterday by way of cross-examination of Mr Boughton, your Honour, although that was not one of the reasons I asked to have him returned - but while he is here - - -

MR SHER (Continuing): - - - he is here.

OLNEY J: I think it is quite legitimate.

MR SHER: Did this become an exhibit, your Honour?

OLNEY J: No, it was marked for identification.

MR SHER (TO WITNESS): Just look at this document, marked for identification, would you? Is this a flow chart of the medium drum plant?---Yes.

Does that show, if I can summarise it, that after the medium feed, which has been dealt with in the primary screens and separated into four streams, 30 by 80, 30, by 6, 6 by 0, which is eventually turned into 6 by ½ and ½ by 0 - - does the 30 by 6, which I take it is the medium feed, after going through the preparation screens then go through some further processing before part of it joins stream C which is on its way to be dealt with in the cyclones?---That ore is screened over the degradation fines removal screens which are the initial screens in this flow diagram.

We have become used, during your absence, to using a certain terminology, so can we deal with essentially the two screening groups as the primary screens and the secondary or preparation screens? I think that is how we have got to understand them in the court? ---That is the washing and screening plant. Yes.

Is that not right?---Yes.

Anyway, there are two groups of screens before you get to the drums, as the primary screens?---Yes.

Then there are the preparation screens?---There are what I would term the primary screens and the secondary screens in the washing and screening stage and then, geographically remote from that are the feed preparation screens in the drum plant.

That will do. Streams A and B, the 30 by 80 and the 30 by 6, at the preparation screens have screened off from, in one instance the 80 by 30 and the other the 30 by 6, the under-6 size?---Correct.

That then drops onto a conveyer belt, does it not?---It does not directly. It then goes through further treatment.

That is what I wish to ask you about, but eventually that screened-off minus-6, from streams A and B at the preparation screens rejoins stream C, does it not? ---Correct.

Before it rejoins stream C (I think we all learnt this clearly for the first time yesterday) it goes through some further processing after the preparation screens?--- That is correct.

MR SHER: It goes through some cyclones?---That is correct.

Where it is sized, is it not, into 6 down to .04 and under .04?---There are two purposes for the cyclone stage. That is one of them, to reject the less than .04mm material. The second reason is to discard the bulk of the water that is contained in - -

In that water you have some waste and slimes and that stuff that is under .04?---Yes, there is some.

So there is in fact another discard point in this process which had not been mentioned until now, which is in the cyclones after the preparation screens for streams A and B?---Correct.

Where you get rid of the less than .04 size?---Yes.

OLNEY J: Geographically, where are those cyclones?---They are in those plants there, your Honour - the nature of the drum plants.

They are housed in the same structure?---They are in the same building and they are a separate circuit, if you wish to look at it that way, within those buildings.

MR SHER:
Once they have gone through that cyclone process, which I take it applies to both stream A and stream B - -?---Yes.

- - what then rejoins stream C is 6 down to .04?---Correct.

So any photograph taken of the feed into the cyclones of stream C, after that part has rejoined it would - - -

357. 10.49

MR SHER (Continuing): - - - rejoined it would show, apart from the 6 by ½, that came out of the first bunch of screens 6 down to .04 which has come from the processes that go onto screens A and B in and following the preparation screens?---That material would be contained in stream C.

So that when we look at stream C as it goes into its cyclones it has in it, as a deliberate choice, material that is down to .04mm or 4 microns?---Correct.

That would be well known within the plant amongst those familiar with its operation?---Yes.

You would expect Mr Tompsitt to know that?---Yes.

And you would expect Dr Batterham to know that if he had taken any interest in the process of what goes on in the concentration plant?---I am not sure that Dr Batterham would know that but possibly he would,yes.

It would not be hard for him to find out though, would it?---No.

And if he was instructing somebody to take photographs showing, in effect, before and after, had he asked he would have learnt of this additional process to streams A and B following the preparation screens?---Yes, I guess so.

I suppose that flow chart ought to go in absolutely now, your Honour.

OLNEY J: Yes. The witness has identified it for what it is.

EXHIBIT EXHIBIT 43 .... Flow chart.
(Formerly MFI 43)

MR SHER: I will now get around to asking you what I had you brought back for, Mr Langridge. Have you had a chance to read this article in Skillings Mining Review and the reprint from the edition of November 1977?---Yes, I have.

That purports to be a description of the whole of the concentration project that involves the concentration plant about which we have been talking for some days now?---Yes.

You have read it, I take it, to see whether or not it is accurate or whether it contains errors of fact?---Yes.

Does it contain any errors?---Not that I can determine.

So that you would regard it as an accurate description of the process that the concentration project performs? ---Depending on which degree of detail you want it to go to, yes.

MR SHER: Perhaps it may not be as detailed in parts as it might be and perhaps it is more detailed than it needs to be but in so far as it says what happens, it is accurate?---Yes.

There are just two things in particular to which I wish to direct your attention. The first thing is that if you look at it, and perhaps it would be best if you did, you will see that as in the Ace Bradford article which you identified for us, it says on the second page: in the second column, the second paragraph:

> "The design incorporates plant bypass facilities for the 80 by 30mm and the 30 by 6mm fractions....(reads).... resulting from scheduled maintenance requirements."

Do you see that? It is the one with the isometric drawing at the top of the page. Do you see it?---Yes.

Would you just read that to yourself?---Yes.

PR17. 10.53

MR SHER: That is an accurate statement, is it not?---It is not totally accurate today.

It talks about the design of the plant, in other words the reason for the design of the plant?---It does.

And in so far as it talks about the reason that the plant is designed as it is, it is an accurate statement, is it not?---That is correct.

What you are saying is that whilst it has been designed to that at the present time it is not being used for high grade ore, is it?---Yes. I did say in earlier evidence that the 80 by 30mm and 30 by 6mm by-passes could be used to change grade. They exist and that would be the effect of their use.

Yes, but they are not being used like that at the moment?---Correct.

But it does indicate clearly that this concept of by-pass had at least two reasons, and they are stated in this article?---Yes.

The other thing to which I want to draw your attention is this: If you turn over to the next page, p.4 (which is not very interesting because it has no pictures or drawings, just all print) and if you go to the third column you will see in the second paragraph the following:

> "The rotary drying circuit is complete with surge bins, fuel pumping, two stage dust scrubbing and feed and product disposal facilities."

Do you see that?---Yes.

There is there a reference to the concept of scrubbing in the drying facility, and the actual type of scrubbing referred to is "dust scrubbing"?---Correct.

That is, I suppose, a well-known process?---It is.

Mr Langridge, you probably noticed, and I ask you to accept this to be the fact, that that is the only reference to scrubbing of any kind in the whole of this article? ---It is.

So that you would agree that in the description of the process and the plant and the reason for its design there is no reference to any wet scrubbing or the necessity to scrub the low grade ores?---There is no reference to that, no.

I take it that Hamersley had an interest in the sort of publicity it was getting in international journals and magazines

about this concentrator plant?---Certainly.

MR SHER: And you would have seen this article in Skillings Mining Review round about the time it was printed? ---Yes.

And as far as you know, Hamersley did not seek to correct it in any way?---No.

Not only did it appear in this particular article, but will you have a look at this magazine? I am showing you the London published magazine, Mining Magazine, for January 1978, and in particular pp.46, 47 and 48. That is another article about the beneficiation plant for Hamersley, discussed in detail?---Yes.

You have seen that before, have you not?---I imagine I would have; it doesn't come directly to mind.

But it is virtually identical, word for word, with the Skillings publication, is it not?---I would have to read it through to verify that, but it does seem similar.

Would you accept from me that, having read them both, they are virtually identical?---It does seem similar, yes.

As far as you are aware Hamersley did not seek to correct that in any way?---Not if it has been printed, no; it would have been vetted at some stage.

I tender that article, too, if your Honour pleases. I do not know if I put the Skillings one in absolute, your Honour?

OLNEY J: It has been tendered on the basis that it should be used as evidence of usage.

MR SHER: Yes. I now seek to tender it for all purposes.

OLNEY J: Very well. Exhibit 24 is tendered for all purposes, and this other publication, Mining Magazine, January 1978, pp.46 to 48 will be exhibit 47.

EXHIBIT — EXHIBIT 47 .... Mining Magazine, January 1978, pp.46 to 48

MR SHER: If your Honour pleases, that is all I have.

FURTHER RE-EXAMINED BY MR HULME QC:

MR HULME: Mr Langridge, if you look at the first page of the Skillings article, in the second column, it says that some 30 million metric tonnes of low-grade ore have been stock-piled at Tom Price?---Yes.

As at 1977, no doubt. Can you tell us why that material had been stock-piled?---The low-grade ore referred to there had been mined in the course of normal mining and pit development and, without the amenities to treat that material, it was unsaleable; therefore it was held as stock-pile material.

At the bottom of that first page and leading on to the second page is a passage which ends in the sentence:

> "The coarse ore fractions, therefore, need no beneficiation."

Do you see that passage?---Yes.

To what fractions do you understand that to refer?---I understand that to refer to the minus-200mm separation stage at the primary crusher, where the plus-200mm always goes to the high-grade ore stream.

At what point does that ore fraction leave the stream and go to the high-grade product?---That is at the tip head at the primary crusher, where the ore is screened on the grizzly screens, the large grizzly screens.

The tip head is going into what we have called the grizzly?---Yes.

Is that the tip head?---Yes.

Then lower down that column it says:

> "The concentrator has been designed to enable Hamersley....(reads).... and physical properties of Hamersley's total production."

Do you see that passage?---Yes.

Could you perhaps explain the significance of the improving of the grades and physical properties of the total production?---I think in previous evidence this matter was mentioned. Concentrator product is not separately stock-piled at the port or sold as a separate product. It is necessary as a blending material in the total blend between the Tom Price and Paraburdoo total products to produce the blended lump end fines at the ports for sale. It is a necessary component of that overall blending exercise. That is what that refers to.

You see there the reference to grades? We have heard a lot about ore Fe grades. Are there any other grades which are important?---In terms of quality control the contaminants, if you wish to call them that - - -

WITNESS (Continuing): - - - call them that, the alumina and phosphorus, are probably more important than the iron grades. The main thrust of control is to control those contaminants to within their specification levels, and when that is done usually the iron grade is at a satisfactory level.

MR HULME: In para.4 there is the passage to which my learned friend referred you. Do you have any function in Hamersley which has to do with how the plant is instructed to be operated?---No. I no longer have any direct responsibility in terms of the operation of the concentrator plant, but I do have an involvement in that sense in terms of setting production monthly plans, annual plans, which involve the blended grades which are achieved out of the system and the respective tonnages from different areas of the system, and those grade and tonnage targets include concentrator production so there is an involvement in that sense.

We have been told that there can be by-passing due to maintenance purposes?---Yes.

Other than for maintenance purposes would the setting of the grade at the present time be consistent with simply by-passing? ---No. The policy at the moment, as I mentioned before, is that we require the best grades possible from the concentrator plant to assist in the blending of ores from Paraburdoo and from the high grade plant at Tom Price.

What ultimately controls the grades of iron that you seek to get?---Well, the market.

Are you able to tell his Honour whether there has been any change in recent years in the demands of the market regarding the iron ore product?---I am not terribly involved in the marketing side but obviously do communicate with the marketing people, and it seems to me that there has been increasing demand from the marketplace for higher grade products generally in terms of iron ore.

In the first column of the next page, the page numbered 4, in the second-bottom paragraph in the left-hand column there is a reference to - - -

MR HULME (Continuing): - - - reference to:

> "The secondary crusher project, during normal production, is conveyed to tertiary sizing screens....(reads)....in the heavy media separation plants."

I am just trying to understand, Mr Langridge, precisely what is being said there. The secondary crusher project is what, in the terms that we have been using?---It is the material in the incoming feed which would normally be originally in the 200 by 80mm size range and which had then passed through the secondary crushers and been reduced to nominally minus 80mm.

That would then go where in what this calls the normal production?---In what the article calls normal production - that is the mode where that material goes directly to dry screens and from thence straight to stockpile.

Is that then the mode that you had until February 1981?---Correct.

Is what you at present have within the next five lines, what is called here high concentrate grade production?---That is the other mode to which I was just referring, yes.

Do you have any comment on the use of the phrase "normal" in relation to what happened up to 1981 and does not happen now?---In terms of normal mode as used there? The only comment I would make is that the article was written with the knowledge gained from low grade ore samples but not with the prior knowledge of plant operation behind the author. I can only construe that normal mode was based on the results that were obtained from those original samples.

The article having been written before the plant was in operation - I think that is apparent?---Yes.

Towards the top of the second column on that page we get the phrase "treatment by washing and screening"?---Yes.

And reference to the washing and screening plant. Would you, in the normal usage there, refer to what happened at that point as scrubbing?---No. The common term used there was always washing and screening but I think it was always realised that a scrubbing action did occur in that process - - -

WITNESS (Continuing): - - - that process.

MR HULME: What is dust scrubbing?---Dust scrubbing is one form of airborne dust collection. There are a number of forms of airborne dust collection. Dust scrubbing usually refers to the removal of airborne particles of dust by means of water sprays.

Does that kind of scrubbing have anything in common with the scrubbing action in a wet plant?---Not in terms of the ore treatment and mineral dressing scrubbing, no; it is a different process.

Your Honour, I have not yet looked through the second article. I am willing to accept my learned friend's assurance that what it says is the same as the first one. I will just run my eye down it, your Honour. It looks very much like it.

OLNEY J: If you take his word and I take his word, neither of us will have to read it.

MR HULME: Yes. That is a good situation.
TO WITNESS: There is one figure I wished to ask you about. Would you go back to the Skillings article on numbered p.4, centre column, the second complete paragraph beginning "Each stream is fed" and it says:

> "The rated capacity per screening stream is 352 tonnes per hour."

Is that ore that is being referred to there?---Yes.

Do you in fact attain 352 tonnes per hour? What is the normal figure?---More normally 338-340 tonnes an hour; a little below that figure.

To help us in certain conversions, can you confirm that a cubic metre of water weighs a kilotonne, by definition?---Yes.

So that 91 cubic metres of water is 91 tonnes of water?---Yes.

WITNESS WITHDREW

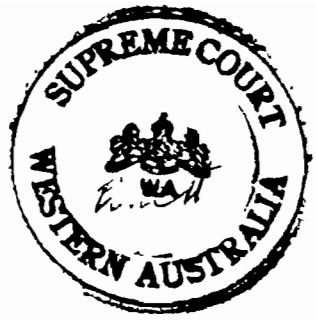
OLNEY J: That then concludes the evidence, does it?

MR SHER: Yes. I do not intend to adduce any further evidence on the part of the first five defendants.

OLNEY J: I take it, Mr Templeman, you are not proposing to adduce any evidence?

MR TEMPLEMAN: I am not, your Honour; no. That, therefore, will put me in the position of being able to have the last word, under the rules.

OLNEY J: Yes.



36A. 2.23

DOUGLAS FREDERICK TOMPSITT, sworn:

EXAMINED BY MR CALLAWAY:

MR CALLAWAY: Is your full name Douglas Frederick Tompsitt?---It is.

Do you live at 649 Kestrel Way, Karratha?---That is correct.

Are you a metallurgical engineer?---Correct.

In the employ of the plaintiff, Hamersley Iron Pty Ltd?---Yes.

Did you swear an affidavit in these proceedings on 24th May this year?---Yes.

(Could the witness be shown that affidavit, please?) Is that your affidavit?---Yes.

Except for one slight misdescription of one of the photographs, are the contents of that affidavit true and correct? ---Yes.

Your Honour, I propose, purely by way of explanation in the hope that it might be of assistance to your Honour, to take the witness through the exhibit which will be the photographs. Perhaps I should first tender the affidavit so it can receive an exhibit number, and then I was going to ask your Honour's leave to hand a copy of the photographs to the witness, so that the witness can have the same material as your Honour has?

OLNEY J: Yes, the affidavit, which will, of course, include the exhibits, will be marked as exhibit 8 in these proceedings.

EXHIBIT EXHIBIT 8 .... Affidavit of witness, including exhibits.

OLNEY J: I have the folder containing the photographs. Is that the actual exhibit, or is there another copy on the record?

MR CALLAWAY: I believe the copy your Honour has is the actual exhibit, which would become exhibit 8,DFT1.

OLNEY J: I have the exhibit here. Do you have a copy for the witness?

MR CALLAWAY: Yes, your Honour. I am instructed this is, in fact, identical with what your Honour has on the Bench.
TO WITNESS: Will you turn to the first place and extract the description of the photographs, so that you can have that on one side as you turn the pages?
TO HIS HONOUR: I express the hope that your Honour's folder is mechanically more reliable than mine.

OLNEY J: This one is. The others were not too good.

MR CALLAWAY (TO WITNESS): Would you turn to the first photograph, which, as I apprehend it, should be viewed that way? Is it correct that that shows the material between 80mm and zero, after the scalping?---That is correct.

The description in the index to the photographs mentions belt 14C. That is the belt on the isometric drawing, one version of which is sdisplayed behind you? Is that correct? By all means check that that is so?---It looks like it, yes.

OLNEY J: Perhaps you could just point to 14C if you would not mind? Thank you.

MR CALLAWAY: Then if you turn to the second photograph, which should also be viewed in that fashion, does that show the 80 by zero mm feed going into - - -

MR CALLAWAY (Continuing): - - - going into what has been described as the pulping box?---Yes, it does.

Turning to the third photograph, which should be viewed in the same way, does that show the washing and screening primary screen and the feed end of the top deck? ---Yes.

So that that is the 80 by zero feed going onto the upper deck of the primary screen?---Yes.

The next photograph shows it coming off the top deck of the primary screen?---That is the 80 by 30.

The 80 by 30, the less than 30 having fallen through the top deck?---Yes.

Your Honour, that should also be viewed in that fashion. TO WITNESS: Looking ror a moment at the index to the photographs, is it then correct to say that numbers 4 to 9, both inclusive, are concerned with the 80 by 30 mm material?---That is correct.

Following it through its progress?---Yes.

So that if we turn next to photograph No.5 (which is perhaps best viewed that way) that shows the 80 x 30mm feed having come off the top deck of the screen and proceeding along belt 22C?---Correct.

Perhaps you could point out belt 22C to his Honour again, using the diagram?

OLNEY J: Thank you.

MR CALLAWAY: Mr Tompsitt, while you are standing there could you also point out to his Honour belt 60C? Could you speak up for the benefit of the tape recording equipment? Would you point out to his Honour belt 22C again?---Belt 22C goes through underneath the screens there, denoted in blue.

And then go on to belt 60C?---This is 60C here.

Thank you. We had the photographs open at No.5, which was the 80 x 30 material on belt 22C, and then photograph No.6, which is best viewed vertically, shows the head of belt 60C?---That is correct.

Which in effect is the end of the belt, showing the material coming off the end?---Yes.

Then, turning over to the next photograph we see still the 80 by 30mm material, this time the photograph being of the coarse drum feed preparation screen showing the feed chute sprays, this being a view from above? ---Correct.

MR CALLAWAY: Photograph No.8 also shows the coarse drum feed preparation screen but from the feed end - - -

MR CALLAWAY (Continuing): - - - feed end?---Yes.

Your Honour, that is perhaps best viewed that way.
TO WITNESS: Last of all in this sequence of 80 by 30 material,photograph No.9 shows the discharge end of the coarse drum feed preparation screen?---That is correct.

Your Honour, that is best viewed in that fashion.
TO WITNESS: Looking back at the index for a moment, is it correct that photographs 10 to 15, both inclusive, show the progress of the 30 by 6 material? ---Yes.

Photograph No.10 is best viewed, your Honour, in that fashion.
TO WITNESS: That takes us back to the washing and screening primary screen only this time the bottom deck rather than the top deck?---That is correct.

We see the 30 by 6 material coming out of that. Is that correct?---That is at the end of the screen, yes.

Photographs 11 and 12 show its progress along two belts, 24C and 51C. Could you show those two belts to his Honour on the diagram?---This is 24C in green, the head of 24C; and this is 51C, also in green.

Could your Honour look, if it is physically possible, simultaneously at 11 and 12?
TO WITNESS: Mr Tompsitt, is there any reason for the difference in the appearance of the material shown in 11 from the material shown in 12?---Yes.

What is that reason? You might describe the difference first and then give the reason?---The difference to me is that the material in 12 has a muddier appearance to it.

Muddier than the material in 11?---Yes.

What is the reason for that?---The handling degradation between those two points and the breakdown of predominantly the shale component.

Mr Tompsitt, would you turn back for a moment to photographs 5 and 6 which showed the 80 by 30 material first on belt 22C and then on belt 60C? Does one see the same difference between 5 and 6?---Yes, but not to the same extent.

But to the extent that there is such a difference, is it the same or a different reason?---I see a difference there.

What is that difference?---That the ore in photograph 6 appears muddier in general than that depicted in 5.

MR CALLAWAY: Why does it appear muddier than in 5?---For the same reason that I stated previously.

Degradation and breakdown?---Correct.

We were up to 11 and 12. Turning to 13, that shows the 30 by 6 material at the medium drum feed preparation screen showing the feed chute sprays from above? ---Correct.

The next photograph, 14, shows the feed end of that - - - 10

MR CALLAWAY (Continuing): - - - end of that screen?---That is correct.

The last photograph in the series showing the 30 by 6 material, photograph 15, shows the discharge end of that same screen?---That is correct, yes.

Then is it correct that photograph No.16 takes us back again to the primary screen, only this time it shows the under flow which is less than 6mm?---Yes.

Your Honour, that is best viewed that way; it actually shows the under flow falling through the lower deck.
TO WITNESS: Photograph 17 is the feed end of the sieve bend and washing and screening secondary screen?---Correct.

The sieve bend being shown on the right of the photograph if one holds it horizontally?---That is correct.

The next photograph, 18, shows the discharge end of that washing and screening secondary screen?---Yes.

What nominal size is that material in that photograph?---It is 6mm by one half millimetre.

That material, 6 by one half, continues to be described in photographs Nos.19 to 24?---Correct.

Perhaps you could next point out to his H onour on the isometric drawing belts 28C and 41C?---No.28C is the belt here depicted in red, going back underneath the screens, and 41C is this belt here, also depicted in red.

Thank you. We were up to photograph No.19. Is that the 6 by one half material on belts 28C?---That is correct.

The next photograph, 20, shows the same material when it has reached belt 41C?---That is correct.

Again do you observe a difference between the material in photograph No.19 and the material in photograph No.20?---Yes, I do.

What is that difference?---The ore appears muddier in photograph No.20.

What is the reason for that?---There again degradation during the handling, predominantly the breakdown of the shales.

Then could you turn to photograph 21?
TO HIS HONOUR: In the index that is described as the Heavy Media Cyclone Feed Distributor, but I will ask Mr Tompsitt to describe it to your Honour because I understand that is not a satisfactory description.

WITNESS: It could be confused. Prior to that there is what is called a four-way distributor, and this is the feed launder to the sieve bend ahead of the feed protection screen, but it is also a distributor across the sieve bend.

MR CALLAWAY: Am I correct in thinking that on a flow diagram it would be a launder coming immediately after the distributor?---Yes.

Leading to the sieve bend?---Correct.

But still showing the 6 by one half material?---That is correct.

The next photograph, 22, shows the heavy media cyclone feed preparation screen and sieve bend - - - 10

MR CALLAWAY (Continuing): - - - sieve bend?---Yes.

(It is best viewed that way, your Honour.) The sieve bend is on the left?---That is correct.

The next photograph shows the same screen, showing the sprays from an overhead view?---That is correct.

The next photograph shows the discharge end of that same screen? ---Yes.

The next photograph, 25 (which, your Honour, should be looked at vertically) shows the minus one-half underflow from the stream we have just been looking at?---That is correct.

Your Honour, that is the stream C in the material.
TO WITNESS: The last photograph, 26, takes us back to the secondary screen, which was mentioned at 17 and 18? ---What was the question again?

Photograph 26 takes us back to the washing and screening secondary screen, which was also mentioned at 18?---It is the underflow of that screen.

It is the underflow of that same screen that we saw before?--- That is correct.

And that material is also minus one-half?---One half millimetre, yes.

Your Honour, as I understand it, that is the stream called D in the material. The purpose of the exercise was only to make the photographs more explanatory. If there were any aspect of the photographs on which Mr Tompsitt or I, or both of us in collaboration, could assist your Honour or answer any question which occurred to your Honour, we would endeavour to do so?

OLNEY J: Thank you. I have a better understanding now that they have been described to me.

MR CALLAWAY: Mr Tompsitt's other exhibit is somewhat more difficult to go through, if only because samples of feed do not photocopy, but fortunately there are not very many of them. They are in four canisters which are in the jury box. I suppose there is no option but to ask Mr Tompsitt to identify the contents. Perhaps we can begin with drum 1 and work through. There is only a total of 10 plastic bags which need to be taken out and identified. I do not apprehend that your Honour will be referring to these exhibits frequently but they at least illustrate the kind of material, in a sense. They could be described as a more comfortable substitute, as against a view - an easy way for us all.

TO WITNESS: Could you assist and take out the sample which is DFT2, which is exhibit 8, DFT2? Would you hold it up and just point to the label which is on that sample, so that his Honour can see the kind of label that is referred to - - -

MR CALLAWAY (Continuing): - - - referred to. I think it may be a metal label?---Yes. There should be one inside it. There does not seem to be one from the outside.

Are you able to say what the contents are without opening the bag? Is it DFT2? It should be drum No.1, DFT2?---That is correct.

You believe it has a label inside the bag?---It should have. As I recall, I put aluminium tags inside the bags as well as outside, I thought. But I see this one - - I did not tie it with that ribbon.

Are you able to tell his Honour what that is without opening the bag?---It is very hard to identify it.

You had better open the bag then?---Here is the label. I can see it. The label says 14C.

What kind of feed does that refer to?---That is the 80 by 0.

Your Honour, the labels in all cases are in an abbreviated form. They say things like "14C" when it would perhaps be more descriptive if they said "80 by 0 mm feed from belt 14C." Our instructing solicitor has prepared a list of the exhibits 8, DFT2 through to 8,DFT11 showing what the labels amount to when they are written out properly. I have provided my learned friends Mr Heerey and Mr Templeman with copies of them. With your Honour's leave, it might be convenient to hand a copy to your Honour and perhaps also to the witness to facilitate identification.

OLNEY J: Yes, that seems a good idea.

MR CALLAWAY: I am indebted to your Honour.
TO WITNESS: Mr Tompsitt, would you next look at DFT3, which will be in that same canister. That is exhibit 8, DFT3, and assisting yourself from the note I have just given if need be what is that a sample of?---It is coarse drum feed preparation screen feed.

So the "CD" on the list that has been handed to his Honour stands for "coarse drum"?---That is correct.

Can we now turn to drum No.2 which is also in the jury box?

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MR CALLAWAY (Continuing): In drum No.2 could you find exhibit DFT4?---This is exhibit DFT4.

Yes, this is exhibit 8,DFT4, and that is the coarse drum feed preparation screen discharge oversize?---That is correct.

In drum No.3 could you please find exhibit 8, DFT5?---This is DFT5.

Yes it is. Is that the medium drum feed preparation screen feed from belt 51C?---That is correct.

I am assuming your Honour does not wish to physically examine this material.
TO WITNESS: Returning to drum No.2, could you find exhibit 8,DFT6?---This is DFT6.

Is that the medium drum feed preparation screen discharge oversize?---That is correct.

We can then close up drum No.2, unless my learned friends wish the material to be kept out of the drums. Going back to drum No.3, could you find exhibit 8,DFT7?---This is DFT7.

That is the heavy media cyclone feed preparation screen feed? ---That is correct.

That is from belt 41C?---Yes.

Drum 3 can be closed up. The remaining four exhibits are all in drum No.4. Could you first identify exhibit 8, DFT8? ---This is DFT8.

That is the heavy media cyclone feed preparation discharge oversize?---That is correct.

Next DFT9?---This is DFT9.

That is a sample of water active shale clay material?---That is correct.

Is there any difference between 8,DFT9 and the other samples as to the way in which No.9 was selected?---Yes.

Would you tell his Honour what that difference is?---All the other samples, except this one, were sampled at the same time as the photographs were taken, on the same day. This is a hand-picked sample of water active shale to illustrate a particular point.

But it does come from the feed?---It does come from the feed.

That can be returned. Could you next identify exhibit DFT10? ---This is DFT10.

MR CALLAWAY: What is that?---That is the washing and screening secondary screen underflow.

MR CALLAWAY: The final exhibit in drum number four is 8,DFT11?
---This is DFT11.

That is the heavy media cyclone feed preparation screen underflow?
---That is correct.

CROSS-EXAMINED BY MR HEEREY:

MR HEEREY: Was there any particular reason why the phtographs were not taken on 9th March when Dr Batterham visited the plant?---Yes. I cannot recall exactly what happened but for some reason the plant went down and we were unable to take photographs.

You mean the plant was not working?---That is right.

Was there any reason why the photos were not taken until 23rd March?---The reason was that I am located at Dampier and I had to organise a photographer from Dampier to take those photographs.

So the portfolio of photographs deals with ore that was going through the plant on that one day, on 23rd March this year?---That is correct.

The ore which goes into the plant is inherently of a variable nature, is it not?---Yes.

So on any one day you might have ore going into the plant that might produce more degradation than shown in the photos or less degradation?---Yes.

Not only does the nature of the ore going into the plant affect the result but also the actual processes in the plant, in particular the application of water?---Could you just state that question again, please?

Yes. The degradation effect to which you point is also affected by the degree of application of water in the plant?---It can be, yes.

Broadly speaking, the more water that is used the more degradation?---Not necessarily.

It is affected by the nature of the feed also, is it?---Mainly by the nature of the feed, yes.

As a matter of fact, the quantity of water that has been applied in the plant at Tom Price has varied since the plant was commissioned, has it not?---The quantity of water would vary somewhat from day to day but there has not been a step change.

Do you know whether as much water is being used as was envisaged when the plant was designed?---Could you be more specific?

Do you mean the whole plant or just one particular section of the plant?

MR HEEREY: I refer to the building which I call the washing and screen plant. You know what I mean - where the first wet screens occur?---I cannot be sure but I would say it is less than designed rather than more than designed. It varies depending on water demand.

Is it a well-know mineralogical or geological fact that the application of water to - - -

MR HEEREY (Continuing): - - - water to clayey shales of this nature will result in degradation?---I would imagine so. I am not a geologist so I cannot answer that from the authority of a geological point of view.

Yes; but the effect of water on these ores is a matter within your field of expertise, is it not?---Yes.

I take it there is nothing new about the concept of water being applied to ores of this type with clayey shales and achieving subsequent degradation?---I do not think so.

It is a matter of expert knowledge, as far as you are aware, that has been around for a very long time?---It has been around for the time that I have been associated with this industry.

And how long is that?---It is six and a half years.

As far as you are aware, has it been well-known within those having technical expertise in this matter that ores in the Pilbara contain clayey shales?---It is now. Not to the same extent was it known, I think, when the concentrator was first designed. The problem is recognised to be worse now than was appreciated when the concentrator was designed.

So at the time the concentrator plant was designed, it was certainly known that that ore that would pass through the plant would have clayey shales although in retrospect the extent of those shales might not have been fully realised?---I would say that would be so because that material was not included in the test work; apparently so.

A number of the photographs refer to the feed chutes before the preparation screens - for example, Nos. 7 and 13. Do you have those in front of you?---Yes.

Can you describe to his Honour briefly the nature of that device that you refer to there as the feed chute? We will take photograph 7?---It is an inclined chute leading down on to the screen.

How high is it?---I cannot tell you offhand. It would probably be a bit higher than myself.

Would you be six feet?---I would be guessing to answer that question.

OLNEY J: Could I just ask you: You said it is an inclined chute - is that right?---Yes.

On the left of the photograph as I look at it, there seems to be a spray of water?---That is correct.

OLNEY J: On the other side of the photograph there seem to be lumps of what may be iron ore. Is the chute the left-hand section and is that where it - - ? ---No, it continues on down beyond the water there.

It continues beyond the water?---Yes. It is just that you cannot see through the water, I would say.

I follow. Thank you.

MR HEEREY: Is the water sprayed in part of the way down the chute?---That is correct.

OLNEY J: That is what I heard this morning then - about the water being sprayed about halfway down?---I think that was in reference to a different chute or whatever you call it.

A pulping box?---A pulping box, yes.

MR HEEREY: You referred to a different chute there, Mr Tompsitt, and you were referring, were you not, to the device - to use a neutral word - through which the ore goes before it goes on to what you would call the washing and screening primary screen?--- Correct.

So it would be fair to say, would it not, that that could be described as a chute and somebody knowledgeable in this industry would know what you were referring to - - -

MR HEEREY (Continuing): - - - referring to?---You mean the chute in the washing plant?

Yes?---Yes, it can be called a chute. That is correct.

From a construction point of view, it is not dissimilar, is it, to the feed chutes to the preparation screens, such as those depicted in photograph 7?---It looks quite different in construction.

What do you say the difference is?---It is inclined, to start with. These chutes in 7 and 13 are open, launder-type chutes.

Yes, but the ore descends simply by gravity?---That is correct.

Over a distance of, say, approximately 6 feet - something of that order?---Yes.

It is wetted by water part ofthe way down the journey?---Yes.

Is there some device at the bottom to arrest the fall before it goes off onto the preparation screens?---Yes.

What is that called?---It could be a rock box or - -

You do not refer to those devices such as are shown in para.7? as scrubbers, do you?---No, not as such.

Did you yourself prepare that list of the descriptions of the photographs?---Partly. I made a choice. In fact I chose more photographs. Some of them were excluded. I think some may have been included that I did not choose. I cannot remember.

Who was responsible for the terminology in the descriptions?--- I was.

At the stage you prepared that list of descriptions, were you familiar, in general terms, with the dispute between the parties in this case and what it was about?--- Yes.

So you realised then, I take it, that there was some significance from a legal point of view, perhaps, in the use of the term pulping box?---Yes.

NO RE-EXAMINATION

WITNESS WITHDREW

ALBAN JUDE LYNCH, sworn:

EXAMINED BY MR HULME QC:

MR HULME: Your full name is Alban Jude Lynch. Do you live at 41 Balatta Street, The Gap, in the State of Queensland? You are a Doctor of Science and the Director of the Krutt-schnitt Mineral Research Centre within the Department of Mining & Metallurgical Engineering in the University of Queensland?---Yes.

Did you swear an affidavit in this matter dated 22nd May 1983? ---Yes.

Would you look at that affidavit?---Yes, this is it.

And are the contents of that- - -

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MR HULME (Continuing): - - - of that affidavit true and correct? ---Yes, I believe that they are.

I tender the affidavit, your Honour.

EXHIBIT — EXHIBIT 9 .... Affidavit of Mr A.J. Lynch

MR HULME: With it, what will be 9,AJL1 and 9,AJL2.

OLNEY J: Thank you.

MR HULME: To just pick out the features of that affidavit, Doctor, the Julius Krutschnitt Mineral Research Centre is a research and post-graduate training institution in mineral engineering at the University of Queensland? ---Yes, it is.

Because of some cases we will be coming to, I point to paragraph (b) under your qualifications, that you were a visiting professor at the University of Minnesota in 1971/72 and have lectured at mining schools in the United Kingdom, Germany, France and Yugoslavia. Is Minnesota a mining area?---Yes, it is.

At the bottom of p.2 you say you have visited and studied most of the mineral processing plants in Australia as well as the iron ore processing operations of Yeerie Mining Company, United States Steel and National Steel in Minnesota, Amax and Asarco in the United States, Comenco in Canada, Union Corporation in South Africa and Bouganville, and you have twice been to the Hamersley high grade facility?---Yes, that is correct.

In para.3 you say that you agree with statements made by Mr Grosvenor and Mr Booth in their affidavits that the expressions "beneficiation", "treatment", "crushing" and "screening" have been for many years used in a technical sense - but you add "not universally or with constant meaning", and you give an example of beneficiation not being found as a term in Wills Mineral Processing Technology, which I take to be a standard text?---It is used as an undergraduate text, yes.

In para.4 you talk of the purposive connotation of the words "beneficiation" and "treatment". Would you perhaps expand that just a little?---With the broader meaning of beneficiation and treatment, both words have a meaning which relates to specific purposes so that beneficiation could well relate to the upgrading of an ore in terms of improving its value; "treatment" could be one of a series of processes which is involved in that upgrading of the ore, each process having a specific purpose.

MR HULME: You give a definition from Pryor's Mineral Dressing, a definition of beneficiation: "A treatment of crude ore in order to improve its quality for some required purpose". That accords with your understanding of the general usage of the word?---Yes, it does.

In para.5 you turn to iron ore processing - - -

MR HULME (Continuing): - - - ore processing and you say that the phrase "crushing and screening" is generally regarded as a composite process aimed at reducing the ore in size and separating the broken ore into size fractions. Can you expand on that a little? ---Might I talk a little bit about definition of terms, in order to be able to expand on this?

Yes?---The definition of terms in the mineral processing industry is, in my view, most imprecise. What particular terms might mean, what is used to describe particular processes, might change from region to region, it might change from time to time, it might change from the mineral with which we are concerned - from one mineral to another. The definition of a particular term, therefore, must in my view be looked at in the context of several things, the context within which that term is being used.

In iron ore pr ocessing I believe that the general term "crushing and screening" refers to a process which involves breakage units and which involves size separation units. When I think of a crushing and screening process, I think of these as two separate processes which are used together.

As you say in para.6 with the screening part referring principally to a size basis, rather than separating different materials, though that may happen?---In a crushing and screening process where they are used, in my view, almost as a collective description, the screening part of it refers to a separation of material by size.

OLNEY J: Presumably you would never crush without also screening?---It is possible to crush without screening. There are circumstances where this occurs. Might I just go one step further? There are certain types of crushers which almost have inbuilt screening actions within them, but it is very common to have the size separation process of screening attached to the general crushing and screening process.

MR HULME: In what kindof circumstances might you crush and then not screen? You said you can imagine cases? ---Very frequently, very coarse primary crushers might be used without screens. For example, underground crushers might be used without following screens, so that the ore would be delivered to the underground crusher, go through the underground crusher and from there straight to the bin and the shaft.

MR HULME: In that kind of situation, are you simply trying to make sure that nothing is too big?---Yes.

In para.6 you turn to mention the addition of water as described in Mr Langridge's - - -

MR HULME (Continuing): - - - Mr Langridge's affidavit (9, 10 and 11 being the pathway paragraphs of that affidavit, where he was explaining what happened), in particular the addition of water both in the pulping box and then, of course, in the sprays as they are described. The first effect, you say, is to break down the water-active clay material. I know you are not a geologist, but can you tell his Honour something of the nature of the materials and how it happens?---No. I repeat your comment that I am not a geologist, nor am I a mineralogist. The addition of water, however, would have these several effects: The first would be to wash away the very fine particles which are loosely adhering to the coarse particles, and that would be the application of extremely small forces in order to break the bonds. The second would be to remove and detach the particles of clay from the coarser particles of metallic rock, where the bonds might well be rather tighter where perhaps a greater force, but still light forces, are required to disintegrate the bonds.

What bonds are these? I appreciate that we do have Dr.Batterham later, but what kind of forces do you mean when you talk of "bonds" in this sense?---You are now asking me questions outside where I would consider myself to be technically competent.

Are you able to tell us whether some clays are more water active than other clays?---I have certainly observed some of the clays in the Pilbara as being highly water active, highly responsive to the addition of water and decomposing very quickly. Other clays I have observed to be less water active.

"Water active" - you use the words "responsive to water"; is that what water active means, a very significant response when one exposes it to water?---I have observed clays being immersed in water and disintegrating very rapidly indeed.

You say that technically these two effects you have mentioned, the breaking down of the clayey material and the separation, are both scrubbing effects and you add that "washing" is often used in the industry to include "scrubbing". What do you take as the technical sense of "scrubbing"?---I would agree with the definition used by Arthur Taggett in his Handbook of Ore Dressing.

Perhaps you would just identify the work which we refer to as "Taggett"? Would you give us the name of the book?---This is Taggett's Handbook of Mineral Dressing - - -

WITNESS (Continuing): - - - Mineral Dressing , s.10 on washing nd scrubbing. Taggett defines scrubbing as "Disintegration affected by forces which are relatively light" and then there are some additional words that he used. This is at chapter 10, p.1, so it is 10-01.

MR HULME: I take it Taggett is a work of authority in the area of science with which we are concerned?--- Taggett is and it has been for many years, in my opinion, the major reference text in mineral processing, mineral dressing.

You say the third effect is to accelerate the passage through the screen of particles which are separate?---Yes. That is a third effect which occurs.

In para.7 you say that the purpose of adding the water is to permit the further processing of the feed in the heavy media drums and cyclones and whims. The third effect in para.6 is less important. The scrubbing is not properly to be regarded as an integral part of crushing and screening. The act of screening takes place when the separated particles are presented to the screen apertures whereas the scrubbing begins in the pulping box. How long would you regard the scrubbing function - process - as continuing?--- I would consider that the scrubbing process, which in Taggett's terms is the disintegration which is caused by the application of like forces, continues virtually for as long as the ore particles are in contact with the water. It is a kinetic process. It occurs as a function of time, as do almost all processes involved in mineral processing.

When the ore is on the screen, already having been wet and with the sprays of water still coming onto it, a scrubbing function would be continuing?---It would be continuing.

When the ore leaves the screen and is on the belt going away from it, wet but not being currently sprayed, would the scrubbing function be continuing?---Again, I would believe that it would be continuing.

If one takes particular events in its life, as if it comes off the end of a belt and falls several feet onto some other surface or something of that sort, can that introduce a different kindof scrubbing activity?---What occurs then is where the forces that Taggett referred to as relatively light would be enhanced at the point of impact and at the point of abrasion.

In 8 you say that the scrubbing effected by the water - - I am sorry. Could I go to the end of 7 first and just point out you say there that you are not aware of any

iron ore processing plant in Australia or overseas where a wet process was in use in 1962 or is in use now solely as an adjunct to crushing and screening without some further process in view. I just mention at the moment that statement that is there. We will come back on to it again in a few minutes?---Yes.

MR HULME: In 8, you say that the scrubbing effected by the water is a step essential to the preparation of the ore for the drum cyclones and whims and you say it is crucial to get rid of the contaminants before those units. Can you tell his Honour why it is essential to the preparation and why it is crucial to get rid of those contaminants?---The drums and the cylones work with a pseudo high density fluid. The ferro-silicon is added to the water, and the ferro-silicon has a higher specific gravity when it is mixed up with the water; then instantaneously the mixture will have a specific gravity of around about 2.9 or thereabouts which is intermediate between the specific gravities of the valuable mineral containing iron and the waste mineral. If the clay particles are not removed then they will enter this fluid. They will have two effects: They will join with the ferro-silicon in forming this pseudo liquid which will have a specific gravity other than the required specific gravity. They will also have a significant effect upon the viscosity of the fluid. This will affect the rate at which the particles will differ- entially settle.

So the presence of fine particles, the presence of clays, will affect both the specific gravity and the viscosity of the fluid and therefore will affect the separation. Consequently, it is important that they should be removed.

You mentioned also the case of the whims. Is it important in the whims?---It is important with any magnetic separation process which will act upon any particle that is magnetic. It is important, consequently, to be able to wash or remove by scrubbing the clays from the particles in order that those particles which have a magnetic susceptibility should be reclaimed without being contaminated by the clays which might otherwise, if not removed, contaminate them and therefore dilute the concentrate.

In the last sentence of para.8 and the first sentence of para.9, you say that the initial addition of water back in the pulping box must be viewed as the first step in the process which is concluded in those later drum cyclones and whims. That is your view?---It is my view that the process starts - the process of washing and scrubbing - at the point at which water is added to the ore, and that is back in what is known as the pulping box.

Then in para.9 you refer to some statements by Mr Booth's affidavit that the pulping box arrangement is standard and you say that that is correct only - - -

MR HULME (Continuing): - - - correct only where a scrubbing effect is desired prior to the screen? Do you see that last sentence, at the end of 9 on p.6?---Yes. I beg your pardon; I would believe, yes, that the nature of the box would be standard only if some type of scrubbing and washing action is required.

Were you shown an affidavit of Mr Beukema?---Yes, I was.

Your Honour, there are several statements by Mr Beukema on which I wish to ask Dr Lynch to comment - if he could have a copy of that affidavit?
TO WITNESS: Dr Lynch, I would take you to para.9 of this affidavit. Mr Beukema has said in para.8 that he referred to your affidavit, para.7, the last sentence - that is the one to which I drew attention - "where Dr Lynch said he was not aware of any iron ore processing plant in Australia or overseas where a wet process was in use in 1962, or is in use now solely as an adjunct to crushing and screening without some further process in view". Paragraph 9 of Mr Beukema says:

> "If the passages to which I have referred are intended to convey the impression.....(reads)..... and refers particularly to p.112 and figure 19."

MR HULME (Continuing): You got the exhibit with the affidavit, did you?---Yes.

Perhaps before we go to the article, look at para.10 of Mr Beukema:

> "Sometimes the process....(reads) ....until the ore was loaded into railway trucks for shipment."

If one goes to p.108, first of all, of Mr Sullivan's articles, there is a section on concentration and log washers are the first item mentioned. If one looks at figure 14, which is a generalised flow sheet for washing Måsarbi ores, on the left-hand side conveyer we have the ore coming into the system?---Yes.

Falling onto a vibrating screen, from which some is falling through into a log washer and what stays on the screen is taken across to secondary crushers and back into the log washer?---Yes.

Can you just indicate to his Honour briefly, so that this can be understood, what happens in that log washer? ---What happens in the log washer is that we have the coarse lumps, and we have the coarse, heavy lumps and we have the finer and the lighter particles. These are effectively discharged into a tank. They are continuously discharged with water into the tank as a result of which, because the tank is a fixed volume, there is an upward current of water. The lighter and the smaller particles are suspended in the upward current of water and overflow from one side of the tank. It is then necessary to remove the coarser particles which would tend to accumulate on the bottom. In order to do this there is a type of screw, if you like. There is a long slide, which enters the tank. You can imagine one wall of the tank being removed and a long ramp replacing it, with walls. Parallel to this ramp is an axle - it used to be a log - built around the log - - -

WITNESS (Continuing): - - - the log are types of screws. These continually rotate and in rotating will drag the coarse lumps up the ramp and discharge them at the top of the ramp. In doing this they will apply significant forces to the particles, significant abrasive forces to the particules, and this will assist in the removal of the clay. That is the general principle of a log washer.

MR HULME: If one looks at the drawing here and has the log washer on an angle in the picture with the overflow point being at the left-hand end which is lower, the light materials and the fines will be tending to flow over that end and down into the next?---Yes.

The forces of the screw or the paddle, or whatever is used, will be tending to take the heavier ores up the sloping bottom line to the right and there will be some system at the top of that to take out those ores as they are in effect scraped up along the bottom part of the log washer up to the top end of it?---Yes.

That, from the nature of it, of course is a further process necessarily involving water?---Yes.

Water is your medium, yes. The overflow in this particular system goes into a concentrating classifier which again seems to have an overflow at the left-hand end, and good product, the heavy fines, being dragged in some way up the bottom of it towards the right and falling into the concentration bin and into the waiting railway truck sitting underneath in the picture? ---Yes.

Is a concentrating classifier again an item necessarily involving the use of water something akin to the log washers that you mentioned earlier?---Yes. A concentrating classifier is in principle virtually identical with a log washer, it is just that the forces involved are appreciably smaller. The fine particles which overflow the log washer - because the forces of agitation in the log washer tend to be relatively strong - will contain particles of iron or particles of the iron mineral, so these then overflow to a similar type of unit where the amount of agitation involved is appreciably less. The physical mechanism of separation by suspending the fine, light particles in the fluid which overflows the weir is precisely the same but the amount of agitation involved is appreciably less, so in this case the larger iron mineral particles which appeared in the overflow from the log washer are now given the opportunity to settle to the bottom of the concentrating classifier and therefore may be removed again in that coarse product.

MR HULME: If we come forward next to p.111, figure 18, we have two flow schemes for merchantable ore, the left-hand one, the mine material going into a feeder, scalping screen, the undersize falling down into a loading bin and the oversize going to secondary crushers and thence into the loading bin and thence into the railroad cars. Is that a simple crushing and screening flow sheet with no sign of water? ---I would regard it as such, yes.

Then at the bottom of p.111 Mr Sullivan quotes Mr Erickson, turning to wash ores - - -

MR HULME (Continuing): - - - wash ores:

> "Grouped by Erickson to include true wash ores and also a small tonnage ....(reads).... done to recover such values." He describes the general operation for simple wash ore treatment in the following paragraph.

The following paragraph is describing what will be set out diagrammatically in the flow sheet figure 19, at the bottom of that column?---Yes.

The simple wash ore treatment is as follows:

> "The scalping screen usually is a vibrating screen with openings from four to six inches ....(reads) .... undersize is minus 28 to 65 mesh."

Before we get on to the substance of it, for very fine material is screening not effective? Is there difficulty with screens for very fine materials?---For very fine material there is certainly difficulty with screening. Screens have been developed now which can operate reasonably efficiently at a much finer size than might have been the case 30 and 40 years ago, but there is still very considerable difficulty with very fine screens.

Which is why we have been hearing of whims and hydrocyclones and things of that sort. These have been traditionally used for the very fine material?---The hydrocyclones are used for size separation of very fine materials; yes.

If one looks then at figure 19, at the bottom we have the mixed material going into the top, into the feeder; through the feeder to a scalping screen and the oversize going to waste. "In the Pilbara we seem to like it being big; we say it has more iron in it." In other places very large apparently means rock and waste?---Yes, that exemplifies the fact that ores have their own characteristics.

So it is the undersize which is kept in this flow sheet. That goes to a washing screen which is what we are being told is the water being wet for the washing with no further process in view. The oversize, on the right, OS, goes down to the loading bin and the undersize goes to a mechanical classifier from which the undersize goes to waste and the oversize goes into the loading bin?---Yes.

MR HULME: The mechanical classifier, you have told us, is a water processor of the type that you outlined earlier?---Yes.

Do you regard that example as in any way showing that you were wrong in saying that you do not have a wet process - that you were not aware of anywhere where there is a wet process solely as an adjunct to crushing and screening and without some further process in view?---In my view, in the diagram - the flow diagram that you have just described - there is certainly wet screening. There is equally, certainly, a wet concentration process which follows the wet screen - - - 10

WITNESS (Continuing): - - - the wet screen.

MR HULME: According to Mr Sullivan quoting Erickson he has used "because proper screening suitable at that size have not been developed"?---Yes; that is what he has said.

Mr Beukema, if one can turn to para.10, continues by saying:

> "Thus anybody familiar with iron ore operations in the ....(reads)....oversized ore prior to shipment."

Putting to one side the oversized ore for the moment, the diagram that we have seen contemplates washing by wet screening for the undersize; a process after the wet screening?---Yes.

If you are going to need to wet ore after screening is it, in your view, likely to be found to be sound practice to wet it prior to the screening, if you are going to have to wet it later?---If the ore contains a clay fraction, if the ore requires washing, it is a very good reason to add the water at the screening.

Mr Beukema says next:

> "Often the only further treatment of the undersized ore was ....(reads)....equipment competent for this purpose such as - -"

and he names what apparently are more modern screens. Where that is done, it is a further treatment and it does involve water?---The action of the mechanical classifier certainly recovers the iron ore finds from the wash water. It also, in the other stream, recovers and separates from the iron ore the low specific gravity contaminants - the silica, the clays and the like - so that the mechanical classifier in these terms has the dual effect and it acts as a concentrator.

Then Mr Beukema said:

> "If scrubbing was to be introduced into the process it would usually....(reads)....the screens at Tom Price."

Do you have any comment on that statement?---Yes. This could very well be so with regard to the clays in the Minnesota ores. Ores, however, have their own characteristics and I believe it is true to say that each ore is unique in its characteristics with regard to the processing. A scrubbing process that might be

optimum with regard to the clays and the ores in the Pilbara in a particular unit, may not be optimum with regard to the ores in Minnesota or elsewhere in the world. Similarly, a scrubbing process carried out in a particular unit such as a log washer in Minnesota or elsewhere may well not be optimum with regard to the ores in the Pilbara - - -

WITNESS (Continuing): - - - in the Pilbara. The particular unit that is selected for any concentration process is dependent upon the characteristics of that ore.

MR HULME: Could I take you to para.12 of Mr Beukema where he names certain iron ore plants where wet screening he says is used without further processes? Are you familiar with any of the ones he mentions here? ---I have not personally visited any of those which have been mentioned here. I have looked at the literature in so far as I have been able to obtain descriptions of those plants.

In relation to which of them does the literature give you any guidance?---The literature describes the mine in Brazil, the two operations in Liberia, the mine in Venezuela. The information I have upon the two mines, the U.S. Steel Sherman screening plant and the pioneer mine in Minnesota is incomplete. Of the other operations, in every case wet screening is followed, in my opinion, by a wet concentration process.

MR SHER: Your Honour, the witness is now giving not expert evidence but his analysis of some documents he has recently seen and he should produce those documents in my submission. They will speak for themselves. He cannot, in my submission, give hearsay evidence of the contents of documents in the capacity of an expert. He has already admitted he had no knowledge of any of these plans and had to search out material to try and equip himself to say anything about them.

OLNEY J: I think you are straying beyond this - -

MR HULME: I will not push it tonight. It may or may not be the position but experts often do refer to the literature of their business. I will look at it overnight.
TO WITNESS: In para. 13 reference is made to a number of affidavits - I think they include yours - and as to the process in the chutes immediately before the wet screening at Tom Price which can be described as scrubbing. You have said that is your view. He says:

> "In my opinion these chutes would not normally be described as scrubbers, or considered as involved in a scrubbing process."

Do those two things necessarily run together - that if you are involved in the scrubbing process you would be described as a scrubber?---A scrubbing process

would be carried out in a machine which could, in my view, be described as a process. I think the first thing, the basic principle, in my view, would be to consider the actual scrubbing process. I refer again to the definition of Arthur Taggart - it is disintegration affected by forces which are relatively light. So we have the scrubbing process; then we have the equipment within which that scrubbing process might well be carried out. There might well be a range of equipment in which that process could be carried out both commercially available and specially made for the purpose depending upon the characteristics of the ore. It is not unusual for mineral processing companies specially to make equipment for processors which is most appropriate for the characteristics of the ore they treat - - -

WITNESS (Continuing): - - - they treat rather than to purchase that equipment off the shelf. In my view, therefore, the basic principle is the scrubbing process and certainly the equipment in which it is carried out, whatever that may be, might be described as a scrubber.

MR HULME: Then in para.16 we are told that in 1962 the known technology of iron ore production involved"the following types of beneficiation processes" and seven are set out. In para.5 of your own affidavit you discuss grinding as well as crushing, both forming part of a more general term comminution? ---Yes.

If, as is done in item A here, one has crushing - if this list was to be exhaustive - would you add, firstly, grinding?---The list is, I would consider, incomplete. I would certainly add grinding and others.

Scrubbing?---Scrubbing, classification.

Thickening?---Thickening.

You will notice para.16 then says:

> "All those processes including crushing and/or screening.... (reads)....would be commenced by crushing and wet screening."

Looking at that last sentence there, do you have any comment on that sentence in relation to what you regard as the start of the beneficiation process?---I would agree, in heavy media separation plant the ore treatment would be commenced by a crushing and a screeningprocess, and immediately prior to heavy medium separation the type of wet screening - and I use that as a very general description - which is practised at Mt Tom Price is the type of process that precedes, I think, all heavy media separation processes that I can think of. I would agree with that completely as a general statement.

C27A

Then in para.17 there is reference made to the fact that it is a short period of time when scrubbing does take place in the chute, but only to a limited extent. I am sorry -

> "I do not think it takes place in the chute. It does take place to a limited extent on the screens ....(reads)....means the scrubbing effect is minimal."

He goes on to say that when the ore is on the screen "I cannot see how the treatment can be regarded as anything other than wet screening, however much the ore is cleaned." Do you agree with that?---I have problems with this paragraph. I return to the definition by Taggart that scrubbing is disintegration effected by forces which are relatively light. It would take place almost always in the presence of water. The scrubbing process would commence at the point at which the water is added and that is added at the box ahead of the screens. I think there are several points which I might like to make about this.

As the ore tumbles through what is known as the pulping box, irrespective of the time that it is in the pulping box, the scrubbing process and the washing process has commenced. The extent to which it has proceeded by the time it emerges from the end of the pulping box I would regard as being somewhat immaterial. It has commenced and there has been the abrasive effect when the ore hits that plate at the bottom of the box.

As it is flowing across the screen, in my view there are several sub-processes occurring; as in several mineral treatment processes which are known by a single name there are several identifiable sub-processes occurring.

The process of scrubbing will occur as the particles bounce up and down on the screen deck. The forces are being applied. The particles are being detached - particles of clay are being detached - from the hematite and that is occurring as the particles are bouncing up and down on the screen deck as they are being hit by the jet of water.

The process of screening then occurs when the particles are presented to the aperture. As a result of that trial of presenting them to the aperture, either the particles go through or they do not, and thatis the process of screening.

I would hold, therefore, that the process of scrubbing, irrespective of the extent to which it proceeds, commences at the point at which water is added in what is known as the pulping box. It proceeds all the way through the pulping box, through the blank plate from which it falls from the pulping box onto the screen, all the time it is passing across the screen.

Several other processes occur simultaneously. There is the process of washing. There is also the process of disintegration of the competent shales, which is to be minimised and to a smaller extent the process of disintegration of the hematite.

We have, therefore, several sub-processes occurring and the objective of the entire assembly of these processes relates to optimising, in economic terms, that assembly of sub-processes.

HEARING ADJOURNED TO 10.30 AM

WEDNESDAY, 9TH NOVEMBER 1983

C8A. 10.30

OLNEY J. Yes, Mr Hulme?

MR HULME: If your Honour please, there are two matters arising out of the transcript. One that I will just mention is at p.117 - and I do not think your Honour will need it - where I was reported quite accurately but I was speaking inaccurately. I referred to a summons for directions on a date referred to there as the 30th after there being an earlier hearing on 2nd June. In case anyone starts searching for orders conforming to what I said, there was an abortive hearing on 26th April; the 2nd of June was the actual order for on the summons for direction. I had mistakenly taken a date from a certificate of readiness and I do not want anyone to look for the wrong order.

OLNEY J: I see.

MR HULME: The only verbal matter that I have which is of significance in the very good transcript we are getting is at p.206 in almost exactly the middle of the page, the question beginning, "In para.7 you say"; the fifth last line says, "Caused by the application of like forces" and it should be "light forces". I make that correction because the wrong version does make apparent sense and might be misunderstood later.

OLNEY J: Yes, I see, thank you.

MR HULME: May Dr Lynch please have Mr Beukema's affidavit for the moment?

ALBAN JUDE LYNCH:

EXAMINED BY MR HULME QC (Continuing):

MR HULME: Dr Lynch, would you look at the last sentence of para.16 on p.9 where it says, "Certainly in heavy media separation the ore treatment would be commenced by crushing and wet screening"?---Yes.

Do you have any comment on that statement?---Yes, I do. The crushing process would be, in my experience, associated generally with a dry screening process as a result of which the ore would be reduced to less than a certain size and then following upon this there would be the process that is described by wet screening which would result in the separation, washing and scrubbing processes.

In the Hamersley system at the present time after the scalping screens we have been told that the over 80 mm ore goes to crushers and goes around in a closed circuit until it comes out as minus 80 and goes off at that point?---Yes.

MR HULME: Is that system consistent with the kind of thing that you would expect?---Yes. That would be a conventional crushing, screening process.

In the middle of para.17 Mr Beukema says, "When the ore is on the screen I cannot see how the treatment can be regarded as anything other than wet screening - - -"

MR HULME (Continuing):"- - - than wet screening; however much water is used or however much the ore is cleaned." Do you have any comment on that?---I would take the view that when the ore is bouncing up and down upon the screen the scrubbing process, the disintegration process, is continuing. It is as a consequence of the small particles being detached from the large particles through the scrubbing, through the washing process, then being presented to the screen aperture. The actual size separation occurs as a consequence of that. I would take the view, therefore, that the two processors must be considered as part of this overall process which is described by wet screening.

OLNEY J: The wet screening is, in fact, causing the ore, the pieces of material, to change in size by the separating of smaller portions off. That is one of the things which happens, is it not?---No.

What is it, then?---The generic name "wet screening" is used to describe what occurs on this equipment which is described as a wet screen in this total mass of equipment. The change in nature of a total particle where a particle might well consist of a piece of hematite and an attached piece of clay-- the change in nature of that particle from one particle of a particular size to a large number of particles, one being of a substantial size and the others being smaller particles detached from it; that is the scrubbing process. The screening process, which is a separation process, occurs when all these particles are subjected to the apertures, as a consequence of which the small particles will pass through and will be permanently separated from the large ones.

So the scrubbing process is removing material that is other than the hematite from the hematite?---In the scrubbing process it can also be that the hematite itself will suffer degradation but the purpose of it is essentially to remove material which is other than hematite from the hematite.

So the purpose of the scrubbing is to remove the other material but one of the effects of the scrubbing may be to reduce the hematite into smaller pieces of hematite? ---That may well occur, yes.

MR HULME: If,instead of bringing it out onto a screen with apertures,you brought it out onto a tray which did not have apertures - you have the ore coming onto it, it is vibrating, sprays are coming onto it - would scrubbing take place?---Precisely the same scrubbing effect would occur,as indeed it does occur at the top of the screen where there is such a tray which has no apertures.

MR HULME: So if the scrubbing occurs then on that tray, particles will be separated from each other?---Yes.

But leaving them in the same physical area?---Leaving them in the same flowing stream, yes.

If, instead of the tray, you now have the screen, does that enable the particles which have been separated to be taken away - - -

MR HULME (Continuing): - - - taken away?---It enables the separation to be made - a permanent separation to be made - and the particles separated into different streams.

Can I take you then to para.18, that part of it which is on p.10? You might wish to read the three or four lines before the fourth line, which is what I am going to ask you about, where Mr Beukema says:

> "The introduction of water is to make the screening process.... (reads)....the separation of ore particles by size."

Do you see that passage?---Yes.

Do you have any comment on that?---Yes. I do not agree with the comment as it is given here. The introduction of water to a wet screening process above about 4000 microns, above about 4mm, is to enable, in my experience, a series of sub-processes to occur and one is the sub-process of washing, the second is the sub-process of scrubbing and it, to a minor degree, also on coarse screens, assists in the sub-process of screening.

I might refer then to the sentence following, "The objective of wet screening is no different from that of dry screening in that it is the separation of ore particles by size,"and here I must refer once more to our lack of precision in terminology. The objective of the wet screening process itself, that is the process of presenting particles to an aperture as a result of which particles will pass through the aperture or not pass through the aperture, is indeed no different in the case of wet screening than in the case of dry screening. The objective of the process which carries the generic name, if you like, "wet" screening, which consists of a series of sub-processes occurring within that general piece of equipment which is called a wet screen,and related housing, is, in my view, quite different from that of dry screening.

The objective of dry screening, in my view, is related to the separation of particles by size. For particles where the separation is above about 4000 microns then, in my view, the objective of wet screening - what we generically call wet screening - is rather more comprehensive.

Could the witness please have the second affidavit of Mr Peter Forbes Booth, sworn 30th June 1983? There should be two exhibits with that. Could he have the two exhibits?

OLNEY J: I will just locate this one amongst my papers first.

MR HULME: Yes.

OLNEY J: It is Mr Booth's second affidavit?

MR HULME: Yes; probably No.6 on that - -

OLNEY J: Number 6 in this volume, yes.

MR HULME: It should be followed immediately by exhibits PFB 1 and PFB 2.

OLNEY J: Yes. I have them. Thank you.

MR HULME: Dr Lynch, in para. 3 of that affidavit Mr Booth refers to para.9 of your affidavit and says that if it was desired to maximise the scrubbing effect in the Hamersley chutes, good engineering practice would have dictated a different design and PFB 1 contains some alternative conceptual designs Mr Booth tells us would fit into the Tom Price wet feeder chute location. Do you have the various pieces there?---Yes.

Do you have any comments on the statement in Mr Booth's para.3 and these alternative conceptual designs? ---Yes. There are some comments. I commented that, to use the words of Mr Booth - - I do not have my own affidavit in front of me.

You certainly may have it?---Thank you. The pertinent sentence in my own affidavit is that the pulping box - - "I would add that the pulping box would not have been designed the way it is if it were not for the purpose of maximising the scrubbing effect of the water before the feed moves on to the screen deck - the scrubbing effect of the water with regard to metallurgical advantage." They are the words I would add which would clarify my reference to the scrubbing effect - - -

R67. 10.50

WITNESS (Continuing): - - - scrubbing effect of the water. Mr Booth has commented that good engineering practice would have dictated a quite different design and there is no evidence to suggest that the conceptual designs which he has produced would have given better results. Let me refer to the nature of the scrubbing that is required. During the scrubbing process the ore can be regarded in a very simple approximation as containing three components. One component is the valuable hematite, a second component is the competent shale and the third component might be the clays and that is a very gross simplifying approximation.

During scrubbing the requirement, the desire, is to detach the clay from the valuable hematite and this will proceed at a certain rate and this is advantageous. At the same time also proceeding but at lower rates will be the degradation of the competent shale,and this is a disadvantage, and the degradation of the hematite and this is also a disadvantage; so the requirement of scrubbing in terms of the metallurgical requirement is to strike the best possible compromise of getting rid of the clay without degrading the other components which I have so grossly approximated for purposes of discussion.

There is, in my view, no evidence presented that an alternative design to the one that was prepared and was installed in the Hamersley concentrator would have given superior results. They are the comments that I would have to make on attachment PFB 1.

MR HULME: I will take you then to para.4, PFB 2, where Mr Booth says:

> "I agree with Mr Beukema's opinion that these chutes would not normally be described as scrubbers or considered as being involved in a scrubbing rather than wetting process."

Do you have any comment on that sentence?---I think we have to look at the processes which are occurring and distinguish that from the units in which the process occurs. In terms of the definition that I spoke about yesterday and submitted by Arthur Taggart in his Handbook of Mineral Dressing. I would regard the process which is occurring in those chutes as a scrubbing process. Might I refer again to that handbook and read out a few sentences following from the one that I referred to yesterday, your Honour?

OLNEY J: Yes, go ahead.

WITNESS: In the section - - -

WITNESS (Continuing): - - - section, and this is chapter 10, p.1, the division on scrubbing and then s.1 is "Principles of scrubbing", Taggart writes that if the clay is tough, adhesive and water resistant, the stone must be tumbled until most of the surface concavities are eliminated since only thus can such clay be removed.

> "On the other hand, the clay bonding in many so-called 'cemented' gravels may be removed by even such a light - -"

MR SHER: Read it all, please, doctor. Do not leave out bits.

WITNESS: I beg your pardon. Let me go back.

> "If the clay is tough, adhesive and water resistant and if standards of purity are high ....(reads)....particularly if subjected to vigorous sprays."

My interpretation of that is that scrubbing, in terms of Taggart's discussion, would occur in chutes and on vibrating screens.

MR HULME: Is it possible to design equipment for these kinds of purposes, other than in relation to the ore with which one is dealing? I do not think I have expressed that very well. How important is it in designing equipment for these kinds of purposes and in deciding what is appropriate to take into account the particular ores you intend to put through them?---It is absolutely necessary in designing a process for the beneficiation, for the treatment of any ore - particularly with regard to physical separation - to take into account the physical characteristics of the ore.

Mr Booth goes on to illustrate his point by showing on PFB2, in simplified form, the Tom Price chute and the Mt Newman chute, which he says is almost double the height and the ore stream is split and tumbled, exposed to more sprays and spends longer time. Do you see those two chutes?---Yes.

Is it possible to compare those two chutes in the manner we are doing without taking into account what is put through them?---I have not inspected the concentrator at Newman, Mt Newman. My only knowledge of the concentrator comes from reading flow sheets; in this particular case of looking at the drawing that has been presented. However, in terms of the information that I have obtained from reading of flow sheets, I believe - and I repeat I have no direct evidence at first hand about this - that up to this point, up to

the point at which the ore enters - -

MR SHER: I have an objection. This is the same objection as I raised yesterday.

MR HULME: I will put it a different way.

MR SHER: I want to be heard on this.

MR HULME: I withdraw the question.

MR SHER: If the question is withdrawn, I will have nothing to object to.

OLNEY J: Yes, thank you, Mr Sher.

MR HULME (TO WITNESS): Would you assume that what is coming into this feeder is less than 6mm? We are going to have Mr Booth and we will find out. Would you make the assumption that the ore feed, instead of being minus 80 is minus?---On the evidence presented to me I cannot make any assumption about the size of the ore.

Assuming that the feed is a minus 6 feed, could that difference is size call for different treatment in the chute - - -

MR HULME (Continuing): - - - the chute?---Making that assumption, and recognising that it is a question, could it call for it, the answer is yes, but I repeat that at firsthand I know nothing about the history up to this point. I cannot comment on the characteristics of the feed.

If you were yourself being asked to design a screen feed chute of this general kind, what kind of information would you need to have in order to go about that task?---If I were to be involved in the specification of a scrubbing process of the type which is carried out and enhanced in this chute as I believe such a process does occur, I would require experimental information which told me something about the rate at which disintegration occurred. That would be experimental information, the rate of which disintegration of the clays from the valuable mineral occurred and the rate at which the other types of disintegration occurred. I would require that type of experimental information. I would also require information about the previous history of the ore in terms of it being subjected to wetting processes.

Could you put those affidavits to one side? Thank you. (Could Dr Lynch please have the affidavit of Mr Grosvenor, sworn on 27th October, 1982, which will be No.3 in Vol. 2, I believe?) Could I ask you, doctor, to go over to para.12? In the second sentence there Mr Grosvenor says, "In this context, washing means the separation on a size basis between particles differing so widely in size that - - -"

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MR HULME (Continuing):"- - - in size that the smaller are readily carried away in a fluid current", so that seeming to be the carrying away in the water?---Yes.

That part of it is something different from what you have described as the scrubbing?---The scrubbing and the washing frequently proceed simultaneously. Taggart makes a distinction between scrubbing and washing and I would subscribe to his distinction. I would hold that the application of water causes the effect of scrubbing and causes the effect of washing. At this moment I would not wish to add to that comment.

Mr Grosvenor goes on to say:

> "Screens are a common form of apparatus used for washing....(reads)....to lead away slurry, undersized and confined splash."

That second sentence beginning, "In this context" and that fourth sentence, "A washing screen is an ordinary screen" etc. are both, I think, unacknowledged quotations from Taggart in the section 10 that you have referred to?---Screens, I would agree, are a unit upon which washing is frequently carried out and which makes permanent the separation between the fine particles and the coarse particles. I would believe, however, that the processes of washing and the processes of screening must be regarded as distinctly different processes. One involves differential behaviour between particles of different sizes. The other involves making the separation that does occur permanent.

Then Mr Grosvenor says:

> "Depending on the particular application washing may be the primary purpose of a wet screening installation or may be merely incidental."

Would you agree with that?---Yes.

I will take you over to para.15. You will see there it says:

> "In my opinion no beneficiation or other treatment except screening takes place in the shute or at the wet screens in the screen house."

I think it is plain your view is different?---Yes. I believe that other treatment does occur besides the process of particles being presented to apertures as a result of which they either pass through or they do not.

MR HULME: Paragraph 16 then says that no beneficiation takes place in the surge bins.

MR HULME (Continuing): You have said yesterday that in your view the process does continue?---In my view the scrubbing process, the process of detachment of clays and the like, does continue in the surge bins.

Can you perhaps bring together in a few sentences the contrast between mere screening on the one hand and scrubbing and screening on the other, as regards size distribution etc - grade - following those two processes?- --The contrast between screening on the one hand, scrubbing and screening on the other, as regards what?

Size distribution of particles and grade, if grade connects to size?---Let me look at it with regard to size distribution first. Where we only require the separation of particles based on what we term the physical size, the two products which leave the screen - the screen oversize plus the screen undersize - when added together will make up the feed. There is no change in the nature of the particles as they pass across a screen.

Where, however, scrubbing is also involved, there is a significant change in the nature of the particles and if we add together the screen oversize, the screen undersize, where scrubbing is also involved, they do not, when added together reconstitute the feed.

So in the process of scrubbing and screening there has been a process of degradation. If I do a mass balance around the circuit, what goes in does not equal what comes out. In a process of screening alone, what goes in equals what goes out.

In terms of assay, if I looked at the assays on a size by size basis, because of the preferential degradation of the clays from the hematite, I would expect that the clays would preferentially go into the very fine sizes and, once again, if I did a mass balance in terms of iron contents - - -

WITNESS (Continuing): - - - iron contents on the size fractions going in and on the size fractions going out, if there was only dry screening separation on a size basis I would expect the mass balance to add up: What came in equals what went out. In the case of scrubbing, I would not expect the mass balance to add up.

MR HULME: You may be saying something which will surprise laymen in the sense of non-engineers. When you said before that after scrubbing and screening the mass of the separated streams would be different from the mass of the feed we all know that you cannot destroy matter. When you use "mass" there, to what, precisely, are you referring?---The mass in each size fraction. Where we are only separating particles on the basis of size then I would expect that the mass in the coarsest size fraction going in equals the sum of the masses in that same size fraction going out. I would expect this to occur all the way down through the size fractions. In the case of scrubbing, however, as a consequence of particles being detached from a particular size, I do two things: I take those fine particles and put them in another size and I change the size of that original particle. If I look at mass balances therefore on every sized fraction, I would not expect to get complete equality with scrubbing and screening. I would expect to get a complete equality in terms of statistical significance with screening alone.

I have no more questions on that affidavit. Thank you. One matter I will now pick up from yesterday. In para. 12 of Mr Beukema's affidavit there is a reference to "Iron ore plants involving wet screening without further processes, including one in Brazil, Aguas Claras Mine. Does your knowledge extend to how to pronounce that?---No. It does not.

Would you look at exhibit 3, please? The pages are not - - -

MR HULME (Continuing): - - - are not numbered. You are looking about six pages in for a page which begins "This does not change"?--- Yes.

You will see there:

> "Typically, at Aguas Clarus in Brazil, run of mine ore is crushed to 200 mm ....(reads)....to meet pelletising feed requirements."

Does that information suffice to give you a broad picture of what is happening there?---Yes, it does.

Do you regard what is happening there as being wet screening without further processes?---I would believe that there is a further concentration process that occurs in the spiral classifiers.

Is that a wet process - spiral classifiers?-- -Yes. That is a hydraulic classification process in which the lighter and finer particles are removed in one stream and the heavier particles are removed in the other stream, and in this case the heavier particles, consisting of the valuable particles in the sand fraction, is sinter feed as stated here. The finer particles go into a further hydraulic classification process, the fine particles from that being rejected to a thickener and a slimes dam. It is my view that the fine particles which go into the slimes dam are the siliceous and clayey particles predominantly, so that is a concentration process.

Do you regard what is happening there as in any way showing that mine as being an exception to what you said, that you do not know of iron ore processing plants where the ore is wet screened without a further process being in view?---It seems to me that it is exactly in line with my comments.

The last matter is just a matter of usage. I wish you to assume that we have a beneficiator, and I do not really care what kind of beneficiator it is or even whose it is, or even who gets the royalties. I bring down 100 tonnes and I put it through the beneficiating process and I have finished with 90 tonnes of something which I regard as good and I have 10 tonnes of rubbish and I am going to put that aside. In industry usage, have I beneficiated the 100 tonnes or have I beneficiated the 90 tonnes?---It is my opinion that the 100 tonnes has been beneficiated; the 90 tonnes of valuable product has been produced as a result of beneficiation.

Thank you, doctor.

CROSS-EXAMINED BY MR SHER QC:

MR SHER: There are just a few matters, doctor, about which I want to ask you. Taggart you regard as authoritative? ---Taggart is - -

Could you just answer that yes or no. You either do or you do not?---Might I ask, your Honour, if I might qualify comments? I do not believe that there can be a no or yes answer given to a question such as that.

All right, I will ask you another question then. Do you rely upon Taggart's definition of scrubbing as appropriate in deciding what happens in the plant under discussion in these proceedings?---I believe I do.

Not only do you believe that you do; you have referred to it many times in the course of your evidence. Is that not so?---Yes.

And you have adopted it as your own?---I have referred to it. I have agreed with the definition which has been given, yes.

And you have adopted it as your own for the purpose of expressing your opinion?---I believe so, yes.

Before coming to it, can I just find out from you are there other texts which are regarded by you as authoritative? ---There are many texts of mineral processing which are used for reference purposes to which students and engineers are referred for reference purposes and which are commonly used.

Are they regarded as authoritative by the people who use them?

MR HULME: With respect, your Honour, I do not know quite what that means. Is a book on real property regarded as authoritative? It is a book of high repute. It is used in the industry. Perhaps my learned friend could make it a little bit clearer what one is saying in saying, "Yes, that is authoritative"?

OLNEY J: So far I have understood the question as perhaps being directed towards determining whether Taggart is the only authority or the only recognised authority in the field. I have been told by the witness that there are other books to which students and engineers are referred and which they use for reference purposes. I think Mr Sher is following a line which is legitimate in view of the use to which Taggart has been put, Mr Hulme.

MR HULME: It is apparent that the main difficulty is that the witness cannot be clear as to precisely what is meant in saying, "Is it authoritative?"

OLNEY J: Perhaps that is the next question.

MR SHER: There is only one language I know, your Honour, and I am apparently not using it too well. I will try something else.
TO WITNESS: Dr Lynch, do you refer, if you are looking for definitions, to works other than Taggart?---Yes. I do.

Could you name some of them?---Pryor, Handbook of - - it is entitled"Mineral Processing"; Goúden, Gadatt, which is a text book - - - 10

WITNESS (Continuing): - - - a text book of ore processing, Wills Mineral Processing Technology; I might even refer to many of the chemical engineering textbooks. Chemical engineering are published by Gaulson & Richardson, Elements of Chemical Engineering, Badger & McCade. I might refer to Perry's Handbook of Chemical Engineering.

MR SHER: Do you ever look at any American texts?---Gadatt is an American text.

The answer is either yes or no. Do you look at any American text?---Yes.

You do? Amongst those do you occasionally consult the Dictionary of Mining Mineral and Related Terms compiled and edited by Paul W. Thrush and the staff of the Bureau of Mines of the US Department of the Interior? Would you like to see it?---I would like to see it, certainly.

Here it is; just have a look. Do you ever refer to that or other editions of it?---No.

Have you ever heard of it?---Yes.

Have you seen it?---In our library, yes.

Can I have it back, please? Without getting an exhaustive list from you, is it a fact that you, from time to time, if you are looking for the meaning of words or the description of a process, go to an authority such as Taggart?---Yes.

Why do you do that?---Because frequently the description that is given in such a book agrees with the description which I might use myself and expresses it succinctly and defines it very well. I can then use such a definition myself.

It is really to get something more succinctly expressed than what you yourself would say. Is that the purpose?---To conveniently obtain, in a succinct form, a definition of a term and this might well be one reason for my reference to such a text.

Are you telling his Honour that you know what these terms all mean and you are really just looking for some expert way of expressing what they mean better than the words you would use yourself?---I know what several of the terms might mean - -

Or, perhaps as an alternative, do you look at them to see what the words mean?---In several instances I might look at them to see what the words mean, yes.

MR SHER: Because within the iron ore industry and mineral processing you are aware of the fact that words often do not have the same meaning to the same people. That would be the first thing, would it not? ---I am aware of that fact, yes.

And they may change their meaning according to the particular mineral you are talking about?---Yes, they may.

In relation to processes as opposed to words, do you go to authorities to find out what the authority says about a process - - - 10

MR SHER (Continuing): - - - a process, from time to time? ---I frequently refer to the library to read about particular processes.

Why do you do that?---To seek to improve my own knowledge.

Because your knowledge is not complete in relation to all processes in treatment of minerals. Is that it? ---Absolutely.

Indeed, in this very case, to enable you to qualify yourself to give evidence, you consulted Taggart as to what the word "scrubbing" meant?---In this case I consulted Taggart, as to Taggart's definition of scrubbing.

Why did you do that? Did you not have an idea yourself of what scrubbing was?---Yes. I had a very clear idea.

Why did you consult Taggart then?---Taggart has defined it in a succinct and clear manner, which is in accordance with my ideas.

Is that why you went to Taggart - because you wanted a succinct description of the process rather than your own words? ---It takes me a long time to prepare a succinct description of anything.

That may be the reason why you went to Taggart in this case. Is that why you went to it, to get a succinct description of scrubbing for the purposes of this case?-- -I read the description of - -

I am sorry, doctor. That really was not a very difficult question and it would, with respect, permit of a "Yes" or "No" answer. Did you go to Taggart in this case to enable you to get a succinct description of the process of scrubbing?---In terms of the question asked,no.

You did not?---No.

Why did you go to it then?---In order to read the description of "scrubbing" in Taggart and, having read it and having found it to be so succinct and to be specific, I have then, rather than adopt that definition and quote it as my own definition, referred to Taggart as being the origin of that definition.

Therefore, what you are saying is that one of the reasons you went to Taggart was to find out what he said scrubbing was; not merely to get his way of expressing it but to find out what he actually said it was?---I do not see the distinction.

Perhaps you do not but is that why you went to it - because you wanted to find out what Taggart said scrubbing was; that

is, what the process was as opposed to seeing how he actually described it; in other words, the succinct description? In other words, if I might put it to you more succinctly myself, did you go to find out the substance rather than the form? ---No.

MR SHER: You just went to find out the form, did you - the way to express the meaning of the word?---Having decided - -

Would you please answer that directly? Did you go to find out how to express this process in succinct language? ---No.

Did you go to it to find out what the process was?-- -No.

You did not go to it for either of those reasons?---No.

Tell me, apart from consulting Taggart, did you consult any other authority about the word scrubbing?---In terms of a text, no.

So, as far as you are aware, these other texts to which you refer from time to time may or may not have the same description of scrubbing as Taggart?---Yes, that is correct.

But you found Taggart satisfactory and therefore decided not to pursue that inquiry further?-- -Yes.

Have you told his Honour, do you think, fairly and fully what Taggart says about scrubbing?---I have not read the total definition of scrubbing in Taggart.

Do you believe that the way in which you have used the definition clearly conveys to his Honour what Taggart actually says about scrubbing?--- It was my impression that I did but I certainly may not have done so.

Why may you not have done so? Do you think perhaps you over-simplified or understated what Taggart says about scrubbing?-- -I may well have over- simplified it because I eliminated from it - - -

WITNESS (Continuing): - - - from it a couple of sentences in the middle of the definition which I regarded as not adding materially to the principles of the definition.

MR SHER: But they add materially to what the first sentence means, do they not?---I will refer once again to the definition.

Would you please answer the question. Do the sentences you have left out add materially - -

MR HULME: He has been asked to look at the words that he has left out.

MR SHER: I am not asking him to look at the words at this stage.

MR HULME: He has been asked whether the words which were left out affect the first sentence. He is entitled to see the passage and have a look at it.

OLNEY J: I think if the witness cannot answer the question without referring to the first sentence he ought to look at it. TO WITNESS: Are you able to answer that question without referring to the sentence?---No.

MR SHER: Before you look at it, let me just get clear why it is that you want to look at it, because I understood you to say why you wanted to look at it. You regard the part of Taggart about which you have told his Honour as being a fair representation of his definition?---As being a fair and brief description of the principles involved in scrubbing.

Yes; and of his definition of scrubbing?---Of the principles involved in his definition of scrubbing, yes.

The word "definition" appears in the very introduction to the sentence you have adopted as your own. It was Taggart's definition of scrubbing you looked at, was it not?---Yes.

He calls it a definition, does he not?---I cannot answer that without referring to the book.

You have to look at it to be able to tell whether or not what Taggart described was a definition or not. You cannot remember that?---No. I cannot remember it.

I will ask you to look at it in a moment. You will find it is there when you do. Just to repeat the question I asked you earlier, do you believe you have fairly

conveyed to his Honour Taggart's definition - assume that that is what he describes it as - of scrubbing by the use of the sentence you have actually quoted to the court?---As I recall reading it yesterday, I did.

MR SHER: Before looking at it, you told us a little while ago that there were some other sentences you had not conveyed to the court. Do you remember saying that just a few minutes ago?---Yes.

Is this your position - that you did not refer to the other sentences because they do not affect or change the meaning of the sentence you did read out?---As I recall it, the principles involved in the scrubbing process they do not change - as described in the sentences I did read.

Let us get clear what you are saying. Are you saying that these other sentences you did not read out make no difference to the part you did read out?---I must qualify my answer to that. I would believe that they make no substantial and significant difference in terms of principles.

Is that why you did not read them out?---Yes.

Would you look at the definition on scrubbing at p.10.01? Firstly, do you agree that the heading "Scrubbing" appears and the word "Definition" in bold print appears?---Yes.

The first sentence you read to his Honour; does that immediately follow the word "Definition"?---Yes.

Did you read to his Honour the whole of the first sentence or only part of it?---As I recall, I only read part of it.

Is it fair to say you only read the first line of it?---As I recall it, yes.

I think it will assist your Honour if you have a copy of this. It is in Mr Herkenhuff's affidavit, ECH 1.

OLNEY J: I see - Taggart, yes.

MR SHER: Your Honour will see, "Washing and scrubbing", section 10, and I am asking the witness about what appears in the centre of the page.
TO WITNESS: What you read to his Honour was the first line, "Scrubbing is disintegration effected by forces which are relatively light"?---Yes.

And that is all you read to his Honour, is it not?---As I recall it I did not read the following two and a half lines.

Yes, or any other part of that definition?---I do not recall reading the remainder of it either.

Doctor, could you just direct your attention away from the book for a moment? You are really saying, in substance, in your evidence that this particular plant is really a scrubber, are you not?---Might you define the particular plant?

You really do not know what I am asking you about. Is that what you are saying?---You said to me, as I recall it, that I am saying in my evidence that this particular plant is really a scrubber.

And are you suggesting that you do not understand what I mean by "this particular plant" or are you just being cautious? ---I am certainly being cautious.

Then let me tell you what I mean. I am talking about the plant about which you have been giving evidence for the last few hours, the wet screen and the chute that feeds the feed into the wet screen. That is what I am talking about?---Let me explain why I asked - -

Do not explain, please; just answer the questions. Are you calling that plant a scrubber?---I am saying - -

Are you calling that plant a scrubber? You either are or are not? ---I cannot answer yes or no to that question, your Honour. I must qualify it.

Are you calling any part of it a scrubber?---Again, I cannot answer yes or no to that question. I must qualify it.

Just to get it clear, you are saying that beneficiation begins in part of this plant because the water hitting the feed as it goes through the pulping box is the beginning of a scrubbing effect?---In part of that equipment, because the water hitting the feed is the start of the scrubbing effect, yes.

That is really the most substantial part of your evidence, as you see it, I take it?

MR HULME: In no sense do I feel the witness could answer the question- what is the most substantial part of his evidence?

MR SHER: I will withdraw the question, your Honour. TO WITNESS: Do you regard that part of your evidence as important to this case?

MR HULME: This is most objectionable; worse.

MR SHER: Your Honour, in my submission it is a perfectly proper question. It goes to the witness - - (I am making an objection; I would be grateful if your junior and your instructing solicitor would keep quiet while I am making it.)

Your Honour, in my submission it is a perfectly proper question. If it does nothing else it reflects on the credibility of the witness, how he perceives his evidence to be.

OLNEY J: What is your objection to it, Mr Hulme?

MR HULME: Except on the basis that all evidence he gives is important, it is not for him to be asked to determine which parts of his evidence he regards as being important. For a start, it is based on the fact that he presumably regards some parts of his evidence as unimportant and then he can be asked to identify which are unimportant. It is not a proper question for the witness to be asked. He can certainly be asked, does he regard it as important that he do his best to tell the truth in respect of all questions or something; that is perfectly proper, but to ask him to distinguish between the important parts of his evidence - - -

MR HULME (Continuing): - - - important parts of his evidence and the unimportant parts is to face him with an impossible task. He is not told on what basis he is to determine what is important - important to him or to the court? How does he know what is important?

OLNEY J: Yes. I must say I am not really interested in what witnesses think are important or unimportant, but I think I may have misunderstood the question, or the thrust of the line of questioning. My understanding was that the questioning was directed to establishing the fact, if it can be established, that fundamental to this witness's evidence is the opinion he has expressed as to the commencement of beneficiation at that particular point, which does seem to be what the case is about.

MR HULME: Expressed in that way it would be unobjectionable.

OLNEY J: Yes. Perhaps you could remind me of the question you asked, Mr Sher?

MR SHER: It was preceded by others. Having got the witness to recognise that I was talking about a particular part of the plant and having got him to acknowledge that he was saying beneficiation began in part of that plant because it was a scrubbing effect, I then asked him whether he regarded that evidence as important - that part of his evidence as important. However, the objection has served the effect and I intend not to pursue it now because the point of asking it has now been lost.
TO WITNESS: In telling the court what scrubbing was, did you have in your mind that that definition would then enable you to say that scrubbing took place, therefore, at a particular part of this plant - having defined it?-- -I did not hear the question?

You defined scrubbing by reference to Taggart?-- -Yes.

You then went on to say, using that definition, that there was therefore a scrubbing effect in this pulping box in this part of the plant?---Yes.

To enable you to say that you relied on the definition?--- Again, might I answer with more than "Yes" or "No" ? I said the scrubbing effect commenced where the water first contacted the ore.

In saying that you relied upon your understanding of what scrubbing was?---Yes.

And Taggart's definition of scrubbing?---Which support one another, yes.

OLNEY J: The two views coincided?---Yes.

MR SHER: Therefore, you would agree, would you not, that if you are wrong about your definition of scrubbing your opinion that this is a scrubbing effect could also be wrong?---No, I do not agree with that.

Even if your definition is wrong, you would still say this was still a scrubbing effect, would you? I will rephrase it. Even if your definition of scrubbing is wrong, you would still say that this was scrubbing - the beginning of scrubbing - in this pulping box where the water hits the feed?---I might say there is, in my opinion, no absolute, completely accepted definition of scrubbing. The definition of scrubbing, in my view, cannot be regarded as right or wrong.

MR SHER: Let us deal with the two aspects of that. If you are right in your definition of scrubbing, then scrubbing commenced, as you say, at this particular point?---Yes.

If you are wrong about your definition of scrubbing, then it did not commence at that particular point?---If I am wrong about my understanding and definition of scrubbing, it did not commence at that particular point.

And you concede that there are different definitions of scrubbing? ---No, I do not.

You do not?---No.

Then I do not understand your difficulty?---I can see that there are possibly different definitions of scrubbing.

I see.

OLNEY J: I find it difficult, with this type of evidence, when the expert says, "I define scrubbing as X and in the example of particular plant I find X taking place; therefore, on my definition of scrubbing what takes place is scrubbing." That is really what you have said, is it not?---Yes.

What you have also said is, "My definition coincides with Taggart" and it follows, therefore, that what you see taking place in the plant is scrubbing according to Taggart as well. If your view that your definition and Taggart's definition coincide is incorrect, then it may be that what takes place in the plant is not necessarily scrubbing according to Taggart although it is scrubbing according to Lynch?---That what takes place is not scrubbing according to Taggart but scrubbing according to me? I guess you would say that it would not be scrubbing according to me either, but I would have to be presented with alternate definitions.

Thank you.

MR SHER: Thank you. Your Honour has done in one or two questions what I could not do in 10 minutes so I will go on from there.
TO WITNESS: To just go back to this definition you fell back on,"Scrubbing is disintegration effected by forces which are relatively light", I put to you, Dr Lynch, that that is conveying the impression to the person listening to it that the forces that are needed to fit within that definition would be minimal forces?----Yes, I believe so.

And that is the impression you were seeking to convey by using that expression?---Yes.

MR SHER: Is that not right?---Yes.

But if we read on we will see that the author was referring to the relativity of those forces, to another process, was he not? What he said was, "judged by ordinary standards of comminution" so what the author was saying was that the lightness of the force was to be judged relative to the force needed in ordinary standards of comminution. Is that right?---That has been said, yes.

There is no doubt that that is said. It is there in black and white, is it not?---Yes.

So it is not, as it were, a concept of lightness undivorced from any other concept; it is relative to a particular process to which the author refers?---As is indicated.

Just answer that, please. Is that not right?---Yes.

And the process to be used as the yardstick is comminution?---Yes.

And you are an expert in comminution, are you not? Do not be modest?---I would not answer "yes" or "no" to that either, without qualifying it.

I thought you were and I was putting that to you because I thought you would agree with me. Let us see what comminution involves. Has Taggart a definition of comminution? If we look up the index will we find comminution referred to?---No, it is not in the index - - -

WITNESS (Continuing): - - - the index.

MR SHER: So strangely enough this authority does not refer to the process by which he assesses the relative nature of the forces needed to bring about scrubbing. That is a bit odd, is it not?

OLNEY J: Perhaps it is a term which is so well known that only you or I are the people who do not know what it means.

MR SHER: Perhaps that is right. Perhaps it is not. TO WITNESS: Is that a really well known, well understood, term? - comminution?---Again, I cannot answer yes or no. Well known relative to what, relative to who?

Is it well known in academic circles?---Again, I would have to say, in what academic circles?

The circles in which you move?---Yes. It is.

OLNEY J: It is not very well known in legal academic circles.

MR SHER: Let me suggest this particular definition to you (I am reading now, in the event that you need to have the authority, from The Dictionary of Mining, Mineral and Related Terms by Mr Thrush and his staff of the Bureau of Mines from the US Department of the Interior):

> "Comminution - the act or action of comminuting or the fact of being comminuted, pulverisation, or trituration - the breaking, crushing, or grinding of coal, ore or rock. In powder metallurgy the same as pulverisation."

Do you regard that as a fair definition of comminution? ---The answer is, again, it is very difficult to say "yes" or "no". I would have to qualify my answer.

In general terms, does that describe what comminution is? ---Again, I would have to qualify my answer. Shall I do so?

OLNEY J: Go ahead.

WITNESS: Comminution is generally regarded as the finer end of this breakage process. That is how it is generally regarded, in my opinion, thus you mentioned crushing. Crushing would not, generally, in particular coarse crushing, be regarded as a comminution process but they are all part of the general range of breakage processes. Once again, there is not in my opinion an exact and a precise definition of the term comminution.

MR SHER: Mr Arthur F. Taggart, the Vinton Professor Emeritus of Mining, School of Mines, Columbia University, and his contributors are Americans, are they not? ---Taggart was certainly an American.

The definition I have given you is from the US Department of the Interior's publication of a dictionary with an editor and a staff from the Bureau of Mines, an American Government Department. Do you think it is likely that when Mr Taggart (who did not define comminution in his text book) spoke of it he had in mind something as described in this American dictionary?---He certainly would have considered it as ordinary standards of breakage, yes.

What do you mean ordinary standards of breakage? Comminution is a special process, is it not? It is not ordinary standards of breakage. Comminution means something in the mining industry, does it not?---The definition which has just been read to me covers the total range of breakage processes.

In the mining industry, does it not?---Not necessarily in the mining industry.

It certainly includes the mining industry, would you not agree?---Comminution refers to solid particles and it is not only within the mining industry that we deal with solid particles.

Certainly, but comminution in a dictionary of mining, mineral and related terms you would think would be the sort of definition Mr Taggart would have in mind in a handbook of mineral dressing - - -

MR SHER (Continuing): - - - mineral dressing, would you not think? ---Again, I cannot answer "Yes" or "No" to that.

Of course you cannot answer "Yes" or "No" to what the fact is but I am asking your opinion. Do you think Mr Taggart and his editors in his textbook "Mineral dressing, Ores & Industrial Minerals" had in mind anything other than ores and minerals when he was talking of comminution in his definition of scrubbing?-- -Judged by ordinary standards of comminution he certainly was considering, in my opinion, breakage processes as applied to ores and minerals.

That definition which I read to you, if we can pick up some of the words which can convey in a word, a synonomous word, what it means - such words as pulverisation, crushing, grinding suggest a great deal of force, do they not?--- There are certainly considerable forces applied in these breakage processes, yes.

So when we go back to his definition of forces which are relatively light, judged by ordinary standards of comminution, the relativeness of the lightness has to be related to these substantial forces that would be used in comminution, does it not? ---Again, I cannot answer that "Yes" or "No" without qualifying it.

Why cannot you answer it "Yes" or "No"?---Because the forces that are applied are to break very fine particles and to achieve the breakage of very fine particles can be very small.

But what about the very heavy and difficult ores that are being comminuted - they would be extremely heavy, would they not, those forces, extremely large?-- - The very heavy and difficult ores: The forces that are applied to break coarse particles are large; the forces that are applied to break fine particles are quite small - to actually break the fine particles. Once again, this is a very broad-ranging definition judged by ordinary standards of comminution.

If that is so and you are trying to work out from the definition whether the relative lightness of the force comes within the definition, you are in big trouble, are you not, because you really do not know whether you are comparing it with comminution which does not take much force or comminution which takes an enormous amount of force? You have that difficulty, have you not?---In qualitative terms I would believe not.

Do you think you can determine what the relatively light force which is involved in scrubbing is by comparing it with comminution, when comminution may range from something which does not take much force at all to something which may take an enormous amount of force? You see

no problems there?---You have asked me several questions there. Would you repeat them, please?

MR SHER: Certainly. I will go through it again. You see no difficulty in defining scrubbing by reference to the force which is required to make up scrubbing - in comparing that force with the force required for comminution, when comminution may range from a very light force, to which you have referred, to a very heavy force?---In qualitative terms, no, I do not see any difficulties. 10

So, to put that into practice, the relatively light force to which the author is referring could mean anything from what - a gentle touch to a really heavy blow delivered by a mechanical device - - -

MR SHER (Continuing): - - - mechanical device running into tonnes?

MR HULME: Your Honour, I object to that. This whole cross-examination is proceeding on the basis that the only thing that Taggart says is relatively light judged by ordinary standards of comminution and the questions are asked on that basis. The fact is Taggart gives examples of how it can be done. He says, "You can do it with a spray of water" and it quite wrong to put it to the witness on the basis that the thing gives no - -

MR SHER: I disagree and, in my submission, the cross-examination should not be interrupted. If your Honour and my learned friend want any assurance I intend to take the witness through the whole of this definition.

MR HULME: Your cross-examination will be interrupted as often as I am allowed to object to an improper question and it is wrong to say that "relatively light" judged by ordinary standards of comminution is the only guidance given to the kind of forces being spoken of when examples are given of how it can be done. The question should not be asked on the basis - -

MR SHER: Your Honour, in my submission my learned friend's objection is not properly founded. What I have done is perfectly consistent with the use of language. The examples to which my learned friend refers are examples of scrubbing, not of comminution, and the reading of it makes it clear.

MR HULME: I agree with that but that gives you an indication of the kind of forces required for scrubbing; it is the examples which give guidance as to the size of the forces. I agree they are examples of scrubbing; that is the whole point of the objection.

OLNEY J: I am rather hoping that we get onto the next part of the definition soon because that seems to me to tell us what force is required.

MR SHER: I entirely agree, your Honour, and with respect, the time taken is not, I would submit, my fault. This witness is put forward as an expert; he has relied in his evidence upon this definition; it will be our submission hereafter that he has relied wrongly on it and he has not given the court the whole of the definition and had he done so a different conclusion might well have followed.

OLNEY J: Yes. I will allow you to proceed along that line, Mr Sher, and hope we will make some progress.

MR SHER: I am sorry to be taking so much time but I do not, your Honour, intend to have the witness avoid answering the questions and if I have to take as long as I do to get answers, I will persist. TO WITNESS: Dr Lynch, the examples that are then given are examples, would you not agree, of forces relating to scrubbing; that is, sufficient to break down soft, unconsolidated materials such as clay or to sever the bonding brought about between grains by precipitates of salts and the like? They are examples of scrubbing effects, are they not?---Yes.

You still have this difficulty, do you not, I suggest, in assessing the degree of force by reference to comminution as you do not know what force of comminution the author is actually referring to, because it could range from a light force to a very heavy force?---To actually achieve the breakage of a particle by comminution, it can require forces of varying degrees.

We have gone through all that. I merely want you to agree, if you would, that the relativity of the force in relation to comminution leaves you with the problem that comminution can range from anything from a very light force to a very heavy force. You still have that difficulty, have you not?---I have the problem that I do not know what that difficulty means.

You do not see any difficulty. Is that it?---So far I do not.

Before I take you to the rest of the definition - would you just look away from it for a moment, thank you - do you say that water sprayed onto a falling mass is what Taggart had in mind when he defined scrubbing?---Disintegration effected by forces that are relatively light. The start of the disintegration process, in my view, is - - -

WITNESS (Continuing): - - - in my view, is the point at which the water adheres to the falling mass.

MR SHER: That is not what I asked you. I will ask you again. Would you close that book for a moment, please? Taggart gives an example of water in relation to scrubbing, does he not, in this very definition? ---I would have to read it again.

Just a moment, Doctor. I will let you read it but I am just testing your memory now. You have just looked at it and you have just read it and you have read the lot, have you not? You have read the whole of that definition while you have been in the witness box, have you not?---I certainly cannot quote it back verbatim.

I am not asking you to quote it. Will you answer the question? Did you read it?---I have certainly read it to the point at which we went.

Have you read past that point in the last half hour?---While I have been in the witness box on this occasion I have scanned it. Whether I have absorbed all the words, even at that point of scanning, I do not know.

I just asked you a simple question which I would ask you to answer "Yes" or "No" to his Honour. While you have been in that witness box this morning since I started to cross-examine you have you read the whole of that definition?---I do not know.

Does the definition refer to spraying water or jetting water onto something as an example of scrubbing?---Once again, I do not know.

You do not know. Do you have any idea?---I just do not recall what that total paragraph describes.

I am not giving you a memory test; I am not asking you to describe it with any precision. I am just asking you to say whether or not you can tell his Honour that in that definition there is an example given of scrubbing concerned with the jetting of water onto something?---No. I cannot.

Let me suggest to you that there is. Would that surprise you? ---No.

Let me suggest to you that the example given is not the process which takes place in this pulping box. Does that surprise you?---It does not surprise me particularly.

It should surprise you, because according to you, the definition of Taggart, which you adopt, does describe what

happens in this pulping box, so if there is an example given here which is inconsistent with that it ought to surprise you?---That is on the assumption that there is an example given which is inconsistent.

MR SHER: I have asked you to make that assumption?---And I have repeated that that is on the assumption that there is an example given which is inconsistent.

Would you have a look at the second photograph, which is described in the legend accompanying them as "The pulping box 80 by no millimetre feed"? With the assistance of that photograph - - You have inspected this, have you not?---No. I have not.

You have not?---No.

Have you been told what happens in the pulping box?---I beg your pardon? "Have I inspected the pulping box?" I have not inspected these photographs.

The question was not a good question. You have been out to the plant?---Yes.

You have inspected the pulping box twice, have you not?---Yes.

You have seen what happens with the ore as it goes in?---Yes.

As it passes through the pulping box?---Yes.

And as it comes onto the screen?---Yes.

Is it a fact that the ore goes in at the top, free-falls until it hits ore at the bottom which is on a ledge which is situated within the pulping box - -? ---Yes.

- - and in the process of falling is it struck by sprays coming in from both sides?---Yes.

Does it fall through the sprays?---Yes.

It then hits the accumulated feed at the bottom and slides onto the wet screen?---Yes.

At any stage - - -

MR SHER (Continuing): - - - any stage would you say that the feed was sprayed with a water jet, when the feed was backed by a rigid surface?---No.

Would you now open Taggert and would you just follow me as I read the second sentence?

> "Scrubbing is usually effected by rubbing the larger and harder grains ....(reads)....backed by a rigid surface is sufficient."

Do you see that?---Yes.

That is not what happens in this pulping box, is it?--- In terms of this definition are you asking me?

I am asking you whether what happens in the pulping box is a water jet played against the mass of crude backed by a rigid surface?---May I refer to this - -

Would you answer the question, witness? Is what happens in this pulping box properly described as a water jet playing against a mass of crude backed by a rigid surface?---It is not properly described by those words which are part of this sentence.

In so far as the scrubbing is effected by rubbing the larger and harder grains together, water has nothing to do with that in the definition, does it? It is not even mentioned?---No, that is true enough.

Would you agree that if that example given by Taggart indicates that water alone is insufficient to create scrubbing - - I will withdraw the question and put it differently. Do you agree that the message conveyed by Taggart in that definition, in that part, indicates that water alone is not sufficient to cause scrubbing?---Would you repeat the question, please?

Do you agree that in that definition Taggart is saying that water alone is not sufficient to cause scrubbing?- -- No, I do not agree.

You do not agree that that is the message he is conveying?--- I do not believe that that is the total and complete message that is being given.

Then can you explain why, in your opinion, Taggart referred to water jets playing against a mass of crude and then talked about it being "backed by a rigid surface"? What is the significance of being backed by a rigid surface?---Because, the completion or the very considerable progress of the scrubbing process would require a considerable residence time and the way in which that residence time would be achieved would be by having the ore on a plate or on a rigid surface.

MR SHER: But this is not a definition of the completion of scrubbing. This is a definition of what scrubbing is, the beginning or any part of it, and what he is really conveying I suggest - -

MR HULME: If your Honour please, if my learned friend wishes the witness to leave the court while I take the objection I am happy to have him do so?

MR SHER: I do not have any objection.

MR HULME: Very well. I have made my offer.

MR SHER: Just a moment! I take it what my learned friend is going to do is say something which the witness may adopt and my learned friend would not want me then to comment that the witness had merely adopted counsel's suggestion. It is up to you, Mr Hulme.

OLNEY J: I am at a complete loss at this stage.

MR HULME: The whole of this cross-examination proceeds on the basis that all that Taggart says is in those five lines, and the witness is being cross-examined on that basis - - -

MR HULME (Continuing): - - - on that basis; that that and that alone, where Taggart has brought together his definition, constitutes scrubbing. That assumption is simply untrue and Taggart shows that in the preceding paragraph where soaking is brought into the process. Taggart says that water is the normal separating medium; that air is sometimes - -

OLNEY J: I think that what is occurring is that Mr Sher is cross-examining the witness on something which the author has described as "Definition" under the heading "Scrubbing" and I have taken the cross-examination to relate to whatever has appeared in those six or 10 lines. I would have thought that it was fair to say, having regard to what is said in that passage headed "Definition", that the questions thus far are legitimate. It may be, of course, that something else he has said qualifies the definition but we really have not got that far yet.

MR HULME: Yes, but the whole basis of it is that there has been a misrepresentation of what Taggart says about scrubbing.

OLNEY J: I have understood it to mean that we have been talking about what Taggart says about scrubbing in these seven lines and I would not understand the witness's answers, in any way, to have any relevance to what Taggart says in some other lines. If the definition in those seven lines is not the complete definition, then the answers are, of course, qualified to the extent that they are directed towards a particular passage.

MR HULME: If it is taken as limited to that form and that when my learned friend says Taggart, as he does from time to time, it is limited to those particular lines of Taggart and not to Taggart's whole message - -

OLNEY J: That is all I have heard evidence of and that is all I am thinking of at the moment.

MR SHER: I do not know whether I ought to say anything about this, your Honour.

OLNEY J: Perhaps you will proceed, Mr Sher.

MR SHER: Yes, I think it might be better if I proceeded and I can perhaps make it by way of final submission.
TO WITNESS: Doctor, when you were being asked, as you were, by Mr Hulme about some of the things said by other witnesses and in particular when you were being asked by Mr Hulme about Mr Booth's affidavit, you were taken to some of the discussion - or you went yourself to some of the discussion-under the heading "Principles of Scrubbing" on the lower part of that page?---Yes.

MR SHER: You were relying upon what was there said by way of answer to something Mr Booth said, were you not?---It illustrates the point in the type of language that is appropriate, yes.

One of the things you were trying to convey to his Honour - and I do not use that "trying to convey" pejoratively - the message you were getting across at Mr Hulme's invitation, was that you were disagreeing with Mr Booth and you were pointing out why you disagreed by reference to Taggart?---Yes.

The difference between you and Mr Booth in relation to Mount Newman is that he has a vast amount of practical experience at Mount Newman and you virtually have none - - -

MR SHER (Continuing): - - - none. Is that so?---Yes, that is correct.

You have never seen Mt Newman, have you?---Yes, on several occasions.

Have you inspected the plant there?-- -No. As I said, I have not inspected the plant.

You know that Mr Booth was one of the men who designed it? That is right, is it not? He swears that in his affidavit?---Okay, yes.

You have read his affidavit?---Yes.

So you are setting yourself up, as it were, as correcting the man who was actually involved in the design of the very plant which you say you have never seen?- -- I have said nothing about the Mt Newman plant except that I have not seen it, and that is the only comment I have made about it.

You were saying Mr Booth was wrong, were you not?---No, sir.

In any event, I will come back to that later. I just wish, while we have Taggart, to deal with this question: You were referring to this passage in Taggart at the bottom of the page, to make a point about what really was scrubbing and you referred to the metallurgical effect of it and the special way in which scrubbing went on. Do you remember that? ---I referred to the metallurgical effect of scrubbing.

Yes. In your affidavit, did you use the word scrubbing to mean the same thing at all times?---I believe that I did.

I suggest you did not and I suggest that what you did was this and I will just take you back to what you said in substance about Mr Booth: Mr Booth and other witnesses made some comments about your observation in para.9 of your affidavit that the pulping box would not have been designed the way it is if it were not for the purpose of maximising the scrubbing effect of the water. I am sorry. I will start at the beginning. In your affidavit you talked about the design of the pulping box as maximising the scrubbing effect of the water. Do you remember saying that?---Yes.

Mr Booth said something about that, in effect. He said "Well, if you wanted to maximise the scrubbing effect of the water you could have done it differently" and he gave some conceptual drawings?---Yes.

You were answering his criticism of you, were you not, when you referred to Taggart?---My reference to Taggart - and I would refer to my reference to Taggart this morning - was to demonstrate, if you like, that it was said

in Taggart that scrubbing under certain circumstances may be carried out in chutes and on screens.

MR SHER: Right. You were making two answers to Mr Booth's criticism. You were saying that to which you have just referred and you cited Taggart as your authority for it, if any authority was needed. Is that so?---Yes.

The other answer you gave, I suggest, was you said "When I talked about scrubbing in this paragraph, 'maximising scrubbing', I was talking about the metallurgical effect of scrubbing?---Yes.

What you pointed out then to his Honour was that scrubbing can have both good and bad effects?---In metallurgical terms, yes.

What you were saying was "What I meant in para.9 about maximising the effect of scrubbing was maximising the best side of the metallurgical effects of scrubbing"?---Achieving the best compromise from the several effects which occur with regard to scrubbing.

But looking at it from a metallurgical viewpoint?---Yes.

But that is not how you used the word scrubbing earlier in your affidavit at all, is it?---Might I refer to the earlier section?

Were you not just using the word scrubbing in the earlier part of your affidavit as meaning what Taggart defines scrubbing to mean, namely the disintegration effected by forces which are relatively light?---It is absolutely consistent with maximising the metallurgical effect of scrubbing.

Just a moment! That cannot be right, surely? If you say scrubbing can have good effects metallurgically if done one way and bad effects metallurgically if done another - - -

MR SHER (Continuing): - - - done another, scrubbing as a generic term must include both, must it not? ---Again, I find it difficult to answer "Yes" or "No" to that. I must qualify my comments.

If I were to ask you about scrubbing as defined by Taggart, you would not know whether I meant scrubbing with a view to getting the best metallurgical effects or the worst metallurgical effects, or a compromise effect. You would not know that, would you?---Scrubbing, as defined by Taggart, refers to the disintegration of particles by forces which are relatively light.

Certainly - and he is there referring to scrubbing regardless of its metallurgical effects?---Exactly.

Right. When you, in the earlier part of your affidavit, were talking about Taggart's definition and scrubbing, as you did in para.7 in particular and para.8 - - I cannot recall where you referred to Taggart, actually.

OLNEY J: That was in 4.

MR SHER: Thank you.
TO WITNESS: You were talking about scrubbing in general terms, were you not?---You have omitted 6.

All right, 6 as well. You were just talking about scrubbing within Taggart's general definition of it?---The physical process of scrubbing, yes.

Yes; the general definition of scrubbing?---Yes.

Yet when you got to paragraph 9, which was criticised, you say that you were talking about scrubbing with a view to having a look at its metallurgical effects and getting the best compromise?---I do not follow the question which is being asked.

Do you not understand it?---No.

I will put it again. In para.9, where you referred to the design of the chute or the pulping box as maximising the scrubbing effect, the scrubbing effect you meant there was not a general scrubbing effect but a scrubbing effect to get the best metallurgical effect?---Yes, that is correct.

You would agree, would you not, that you have changed, therefore, the use of the word scrubbing in your own affidavit, in the earlier parts, to a different meaning in para.9?

OLNEY J: Could I just interrupt there, because I wrongly interrupted a moment ago? Paragraph 4 does not refer to scrubbing but to beneficiation and I cannot, just at the moment, see any reference in Mr Lynch's affidavit to Taggart but he does, in para.6, use the word "scrubbing". "Technically, they are both scrubbing effects"; then he goes on and makes some comment about scrubbing. I think that is the only other reference to scrubbing in the whole affidavit.

MR SHER: He refers to scrubbing in a number of places, your Honour. It first seems to appear in para.6 where he refers to "Technically, they are both scrubbing effects". He refers to it again at the bottom of the page in para.6. He refers to it in 7 - "The scrubbing is not properly to be regarded as an integral part. Scrubbing is a completely different physical process which begins in the pulping box." Then scrubbing, in para.8, "effected by the water is a step essential". So he has referred to it at least five times before we get to para.9.

OLNEY J: He has not, in the affidavit, purported to define scrubbing.

MR SHER: No. I am just wondering where Mr Taggart first was mentioned.

OLNEY J: In the witness box, I think.

MR HULME: It was yesterday, your Honour. The affidavit says nothing of Taggart. It was all done as Mr Lynch's own opinion. He used Taggart for the first time yesterday.

MR SHER: I am grateful for that correction but I, with respect, would submit that the question is still a proper question, your Honour.

OLNEY J: You are asking him what he meant in para.9 by scrubbing?

MR SHER: Yes.
TO WITNESS: What I am putting to you is that you have used the word "scrubbing" in para.9 to mean something different from the same word in those earlier paragraphs?---That is not correct.

That is not correct?---No.

Then were you saying that scrubbing as you refer to it in para.9 meant - - I will just get clear what you are saying in para.9. You are saying the scrubbing effect you refer to there is to get the best metallurgical effect, are - - -

MR SHER (Continuing): - - - you?---The best metallurgical result.

MR HULME: Wait a minute - that is not what is in para.9. Look at para.9 itself and read it. You have to distinguish between what is in 9 and what was said this morning. You are misunderstanding, in fact.

MR SHER: I do not think I am but I will just get it clear. TO WITNESS: In para.9 you referred to the design of the pulping box?---Yes.

You referred to it by reference to "maximising the scrubbing effect" and you agreed that the scrubbing effect you referred to there was a scrubbing effect which got the best metallurgical result?---Yes.

The best compromised metallurgical result?---Yes.

One of your answers to the criticism levelled at your comment by Mr Booth was, "He hasn't really picked up this point about the best metallurgical result". Is that not what you were saying, in effect?---As I recall it, with regard to Mr Booth's preconceptual designs, I think I said that as far as I was aware there was no evidence presented to indicate that any one of those three would be better in terms of metallurgical results.

You certainly said that but what you have just said, I suggest, emphasises the point I make; that the point you were making was that your comment related to the metallurgical results of scrubbing?---Yes.

And you were not criticising Mr Booth's criticism in relation to scrubbing generally but just in this particular way?---I was not criticising Mr Booth's criticisms in relation to scrubbing generally?

Yes, but just in this particular way?---Mr Booth's criticisms with relation to scrubbing generally - I would need to have to refer to the comments he made in order to see what his criticisms were in relation to scrubbing generally.

Let us take it a different way, doctor. Scrubbing can be directed to a number of different purposes; objectives?---Yes, that is fair enough.

It was a long time waiting but it was worth waiting for. If you wanted to scrub to get one type of metallurgical effect you might use one technique or one sort of system or plant, whereas if you did not worry about getting a certain metallurgical effect you might use a different system or plant. Is that right?---Yes, that is correct.

It depends what you are aiming for?---It depends what you are aiming for with regard to the ore you are treating; yes, that is correct.

MR SHER: I do not think there is any doubt that everyone would agree there is more than one way to scrub an ore - there are dozens, are there not?---Yes, there are.

There are specially designed scrubbers?---There are scrubbers that are sold as such, yes.

We had in evidence yesterday a handbook with some extracts which showed photographs of some of the different types of scrubbers that are commercially available?---Yes.

You are familiar with those, I take it?---In general terms, yes.

So there is more than one way to scrub?---Yes.

And there is more than one objective to be achieved by scrubbing?---Yes.

Are you saying in para.9 - so that I get clear what you are saying - that to maximise a particular metallurgical effect this scrubber has been designed the way it is?---Yes, that is correct.

In that sense it would be fair comment, would it not, that you are using the word "scrubbing" there in a particular way?---Again, may I qualify my answer?

Just as long as I get one, that is the main thing.

OLNEY J: Yes, go on?---Every metallurgical process that is used has the object of maximising some particular metallurgical objective which has an economic connotation.

MR SHER: That is every scrubbing operation?---Pretty much every metallurgical operation. In almost every metallurgical operation there are disadvantages which accrue; there are advantages. It is all a compromise - - -

WITNESS (Continuing): - - - a compromise.

MR SHER: You, I suppose, had some information from the Hamersley people about the quantities of the ore going through this beneficiation plant?-- - I have not discussed them in any detail whatsoever.

Are you telling us you did not have any information about the nature of the ore that went through this?--- I have general information. I certainly do not have specific information.

Did you have some sort of technical information?-- -A general, very broad geological description - mineralogical description if you like - of the types of ranges of ores that are subjected; nothing in more detail.

At what date?---Quite some months ago, when I was talking about the various types.

I am sorry. I think I misled you by the question. I did not mean when you got the information, although I do wish to know that. The date of the information is what I meant?---I did not ask for any specific sorts of information at all. I was concerned just, in general interest terms, with the general natures of the ores that were to be encountered during concentration.

Somebody told you, did they?---Yes.

I take it your inquiry was answered?---Yes.

Hamersley are co-operating with you, are they not?---In that the questions I ask are being answered in broad terms, yes.

You are Hamersley's witness, are you not?-- -Yes.

They are the ones who enlisted your aid?---Yes.

I take it when you have wanted information you have asked them for it?---Yes.

Have you not got it?--- In broad terms, yes, except may I say something? I regard myself as somebody to discuss the principles of the processes.

You have descended, I suggest to you, to offering some opinions rather than just discussing processes.- for example, what you say about the design of the pulping boxes? -- -That is an opinion, yes.

It is not only an opinion. It is a very particular form of opinion, is it not?---It is an opinion, yes.

What you are really saying - - you were not involved in the design

of the pulping box, were you?---No, I was not.

MR SHER: Have you spoken to anyone who was?---No.

So when you say that the box was designed in a certain way it is not based on any information you have received? ---It is not based on any inquiries that I have made, no.

When you say that the box would not have been designed the way it is "but for" that is your opinion and your opinion solely?---Yes.

Not based on any information received from Hamersley?---No.

And not as the result of any discussions with any of the people involved in the design?---No. It is based on my general information and metallurgical understanding and experience.

Right. Have you conducted any tests on any of the ores that are put through this plant?---Put through the Hamersley plant?

Yes?---No.

So you have not yourself tested the effect of water upon these ores?---No.

Have you been told that the ores differ from place to place within the mine?---Yes - - -

MR SHER (Continuing): - - - the mine?---Yes.

And differ markedly?---Yes.

Have you been provided with the results of any tests that Hamersley have conducted concerning those ores? ---No.

How then can you tell what the effect of water would be on the ores at Hamersley, if Hamersley have not given you any tests and you have not conducted any yourself?---If the objective of the screening process was purely to separate particles on the basis of size, then in my experience the feed box would have been appreciably, would have been appreciably simpler - if the objective had been to separate particles on the basis of size. If the objective is to carry out a scrubbing operation, in addition to separation of particles on the basis of the size - -

I am sorry to interrupt but I think you must have misunderstood my question. The question directed to you was really based upon the evidence you gave in evidence in-chief to Mr Hulme, which was that you really cannot decide what you are going to do to any ore unless you really know what the ore is and unless you have, in effect, worked out its qualities?---You certainly cannot decide exactly what you are going to do. That is true.

But you were talking about designing plant - having in fact to know your ore - were you not?---Designing the details of the plant, yes.

Right - and you did not have any such information?---In general terms, however, I would suggest that it is possible to lay out the nature of the plant.

But the point of your evidence to my learned friend, Mr Hulme, towards the end of your examination in- chief, was that the particular design depends upon the particular characteristics of the ore?---It does.

And you did not have any information about those particular characteristics, did you?---No. The design details do depend upon the characteristics of the ore.

And you did not have any of that information about the particular characteristics of this ore?- --No.

And you did not have any information about the characteristics of the ore that was tested when this plant was actually designed back in the mid-1970s?---No.

So what you have said in para.9 really is a guess?---I believe not.

MR SHER: Perhaps I will just finish off Mr Taggart while we are on him. You then referred to this passage in the bottom part of p.10.10 of Taggart, in further answer to Mr Booth's criticism of you, and made the point that according to Taggart, depending upon the material to be scrubbed, and the type of clay, you may or may not use a different technique or system? ---You may or may not use different equipment, yes.

Yes, because, as Taggart points out:

> "If the clay is tough, adhesive and water resistant....(reads)....particularly if subjected to vigorous sprays."

That was Taggart's point which you adopted in part answer to Mr Booth's criticism of you?- --Yes.

What I wish to ask you about that is this: Firstly, you could not describe the feed into this particular part of the beneficiation plant - that is, that it goes into the pulping box - as well-rounded, could you?---No.

It is very rough and irregular, is it not?---Yes.

Indeed, the photographs which we have seen, and the exhibits which I dare not ask anyone to open up - - if we look at them we will find they are all very rough and irregular and certainly - - -

MR SHER (Continuing): - - - certainly could not be described as well-rounded, smooth boulders, could they?---No.

So we are really dealing here, are we not, with what Mr Taggart referred to in the earlier part of his example as "the stone requiring to be tumbled until most of the surface concavities are eliminated"? That is more an apt description of the feed into the pulping box than "well-rounded, smooth boulders", is it not ?---That is a more apt description of the feed but also in that he has said if the clay is tough, adhesive and water resistant.

As to that, you really did not have any information, did you? ---I had certainly observed the clays, which disintegrate very rapidly in water.

But you have only been out to this plant on two occasions, have you not?---Yes.

You would not regard that as sufficient to equip you to design the pulping box?---I would not regard that as sufficient to equip me to design the pulping box. I would regard it as sufficient to permit me to comment on an existing design with regard to principles.

Be that as it may, the question of actual design really depends upon knowing how tough, adhesive, and water resistant the clay is - the details of the design, yes?---Yes.

You do not know anything about how tough, adhesive and water resistant the clay is at Tom Price, do you, other than what you saw on two occasions?---I do not have the details - the metallurgical details.

You were not given any?---No. That is correct.

Did you ask for any?---I did not ask for details of results; nor do I think that that is pertinent when principles are being considered.

Leaving aside principles, when you get down to commenting upon the design of a particular piece of plant you are no longer talking about principles; you are putting principles into practical effect, are you not?---That is true.

In relation to your opinion that the pulping box would not have been designed the way it is if it were not for the purpose of maximising the scrubbing effect, that opinion as to a practical matter is without any information at all as to the characteristics of either the ore or the clay or the shale accompanying it?---I said that the pulp - -

MR SHER: Is that not right? Would you please answer that? To express that opinion you did not have the information about the characteristics of either the ore or the shale or the clay and as to its adhesiveness, toughness, or water resistant capacity?---No. I did not have that information nor did I consider that I needed it.

You felt that without that information you were still able, because of your qualifications, to express the opinion that the chute (this is without regard for any of the designers at all) would not have been designed the way it was, or the pulping box as you call it, if it were not for the purpose of maximising the scrubbing effect?---Yes. I would feel competent to express that opinion.

The scrubbing effect you there refer to is the compromise with regard to metallurgical results?---Yes.

Did you have any material, information, tests, or surveys concerning the metallurgical qualities of this ore?---No.

OLNEY J: We will rise now and resume at 2 o'clock.

LUNCHEON ADJOURNMENT

K93. 2.00

UPON RESUMPTION:

OLNEY J: Yes, Mr Sher?

MR SHER: If your Honour pleases.
TO WITNESS: Doctor, can I just take you to two topics? I want to ask you about the meaning of the word "screening" and I want to ask you about whether sieve bends are included as screens. Perhaps I will deal with the latter first. You are the author of at least two-- would it be offensive to call them textbooks or are they more than textbooks? They are more than textbooks, are they not?---They are two books which describe technical subjects relating to mineral processing.

One of them is called Mineral Crushing and Grinding Circuits?---Yes.

Published in 1977?---Yes.

In that text you deal with a number of matters but you do refer to size separation by screening?---Yes.

There is a discussion of that topic, quite a deal of technical discussion, at pp.99-104?---I will accept your comment about the pages.

I would not, for a moment, expect you to remember the page numbers in your book even though you are the author of it.

MR HULME: We concede these are authority for it.

MR SHER: Yes; I thought you might.
TO WITNESS: I just want to read a passage to you. Do you have a copy of your book handy?---No.

I gather your solicitor has one there. Will you look at p.99 at the section 5.4, Size Separation by Screening? What you say there is:

> "Two types of screens are in common use in industrial plants; vibrating screens and wedge-wire screens....(reads).... The operating characteristics of each screen are discussed below."

I have accurately read what you say, have I not?---Yes.

To pass over vibrating screens to wedge-wire screens which is 5.4.2 at p.101, you commence the discussion by saying:

> "Wedge-wire screens, the most common forms of which are known as sieve bends....(reads)....corn starch factories and in sewerage treatment plants."

I have accurately read that passage from your book?---Yes.

MR SHER: It is clear, I suggest, that those two passages I have read to you are premised on the acceptance that sieve bends are regarded as screens?---Yes, they are.

And a common way of describing them are to use the initials DSM for Dutch State Mines as an indication of the type of sieve bend it is?---You might well get into copyright problems or whatever you call them but if somebody says about a DSM screen I would believe I knew what they meant.

In the industry a DSM screen refers to a sieve bend - - -

MR SHER (Continuing): - - - sieve bend?- --Generally speaking, yes.

I think you refer to Mr Wills in your affidavit at para. 3 and you have agreed with Mr Hulme that that is an authoritative text used, I think, in universities for teaching undergraduates?---I do not believe I ever agreed with anybody that any text was authoritative. I may have, but it is certainly a text which is commonly used.

I did not intend to provoke a discussion about the word "authoritative" so I will use some other terminology. "Wills: Mineral Processing Technology" is a book you yourself use in teaching students at the university, I take it?---It is certainly a book in our library to which students have access and to which they refer.

You would regard it I suppose as, if not authoritative, indicating at least one view of terminology within the mineral processing part of the mining industry?-- - Yes.

At p.195, I wish to read something into the transcript and ask you to agree that it is an accurate statement of what is in the text, so we do not have to bother his Honour with the whole book. Under the heading "Screen types" does this appear?

> "There are many different types of industrial screens which may be classified as either stationary or moving screens."

There is then a discussion of stationary screens and is the first stationary screen discussed the grizzly?---Yes.

Then is the next stationary screen discussed called a sieve bend, or sieve bends?---Yes.

Does it say:

> "Static screens such as the Dutch State Mines (DSM) sieve bends and its later version the door Rapifine have gained wide acceptance in the minerals industry for very fine, wet-screening purposes."

WITNESS: Yes, it says that.

MR SHER: Both you and Mr Wills then appear to be accepting that a sieve bend is regarded as a screen in the processing of minerals?---Yes.

I take it you are not alone in that view of the inclusion of sieve bends within the generic term screen?- --I would believe not.

MR SHER: It would be generally accepted that a sieve bend is included in the word "screen"?---Yes.

And that screening would include the process of putting material, I suppose initially across and as to part of it through a sieve bend?---Screening includes the operations that go on on sieve bends.

Do you have your affidavit before you there?---Yes.

Can I take you to para.3? What you say there is this:

> "I agree with Mr Grosvenor and Mr Booth that the expressions beneficiation, treatment, crushing and screening" - and you use those two words separately there, not together - "have been for very many years....(reads)....they are used universally or with a constant meaning."

I take it nothing has happened since you swore that affidavit to cause you to change that observation? ---No.

Can we take it then that you at least would agree, dealing with the word "screening" alone, that it has a number of generally accepted meanings within the industry but that not everyone uses the word in exactly the same way - - -

MR SHER (Continuing): - - - same way?---Yes, that is correct.

That is what you meant by saying that that does not mean that they are used universally or with a constant meaning?---Yes - that our terminology is imprecise.

I am reading now from the Dictionary of Mining, Mineral, and Related Terms from the US Department of the Interior, the 1968 edition, and the definition of screen which appears at p.972.

> "Screen: (a) a large sieve for grading or sizing....(reads)....screen and vibratory screen."

Would you accept that as a definition within the iron ore industry of "screen"?---I did not comprehend the lot of it. Might I refer to the book?

Certainly. You will find it at the bottom of the second column on p.972?---I would accept it as a partial definition. I certainly would not accept it as a complete definition.

What that means, if I may suggest it to you, is this: Your reaction to that definition is evidence of the fact that people may differ as to the use of terminology in this industry?---I agree completely.

You have heard of Allis-Chalmers, the screen manufacturers, have you?---Yes.

I take it you have heard of other firms such as Hewitt-Robins and Nordberg?---Yes.

The W.S. Tyler Company?---Yes.

There is, to your knowledge, in the United States, a Vibrating Screen Manufacturers Association known as VSMA - - -

MR SHER (Continuing): - - - VSMA?---I do not know of it.

You know of those firms to which I have referred?-- -Yes.

Have you ever seen the terms and definitions put out by a body called the Vibrating Screen Manufacturers Association of Lexington Avenue, New York State, which includes Allis-Chalmers, Hewitt-Robbins, Linkbelt, Nordberg Productive Equipment Company, Simplicity Engineering, Smith Engineering and the W.S. Tyler Company?-- -I am not aware of having seen the definition.

Would you agree in general terms that they ought to know what the meaning of the word "screen" or "screening" means in the industry for which they provide screens?- -- I would prefer to see the definition first.

Whatever they said, you would have to accept they ought to have an idea of what they are talking about, would you not?--- Yes.

I mean, these are the manufacturers and sellers of them?- -- I would require to qualify my comment.

Perhaps I will take this up with another witness but I will just give you this and see whether you agree with it? If I told you that a group of such manufacturers, under the title Vibrating Screen Manufacturers Association (I have the 1967 version), defined "screening" as:

> "A mechanical process which accomplished a division of particles on the basis of size and their acceptance or rejection by a screening surface."

would you regard that, firstly, as an accurate definition? ---I am thinking of the word "mechanical" and whilst I would regard it as a partially accurate definition, I would have to think hard before I regarded it as totally accurate and a totally comprehensive definition.

If I told you they defined both dry screening and wet screening as follows:

> "Dry screening: Separation of material without the addition of a liquid vehicle.
>
> "Wet screening: Separation of material with the addition of vehicles such as water"

would you regard those as acceptable definitions? You do not have to worry about "mechanical" there? ---No, but we are getting into things that have implications also.

Do not worry about that?---Your Honour, I am unable to answer questions in the precise manner that I require to be able to answer them, when I am told not to worry about these implications

MR SHER: The only implication is what a word means and all I am asking you is whether you accept, certainly in 1967, that dry screening meant separation of material without the addition of a liquid vehicle and wet screening meant separation of material with the addition of vehicles such as water. Can you not accept those definitions?---In that "wet" means the addition of a liquid - that is what achieves the wetting action - I can accept that definition. The wet-screening process, however, that is carried out on a sieve bend is different in kind from any screening process that is carried out on a vibrating screen.

Of course it is but I am not asking about the sieve bend now. I am just onto this question of what the word "screening" means? Forget about sieve bends for the moment?---Again, your Honour, I cannot forget about sieve bends if I have already agreed that they are part of a screening system.

OLNEY J: Do you have any reservations about the prefatory words "separation of - -"

MR SHER: " - - material with the addition of vehicles such as water."

OLNEY J. (TO WITNESS): Is it the use of the description "Separation of material" that causes you to have reservations as to the accuracy of those descriptions? ---No. It is ensuring that I am precise in what I say in view of whatever might occur in the future.

MR SHER: Can I just limit the question to this - - -

MR SHER (Continuing): - - - to this? Assuming I have read accurately from the document and it is what I say it is, it would appear at least in 1967, in America, that the manufacturers of vibrating screens regarded the word "screening" as encompassing both dry and wet screening?---Yes.

That, you would agree, was the way in which the word was commonly understood in the industry at that time? ---Again, might I explain and repeat my explanation? Implicit in the term wet screening is a series of sub-processes which do not only refer to the actual screening process.

I am not asking you about what is included in wet screening. I am merely asking you about whether the word screening includes wet and dry screening, at this stage?---In terms of the definition which you have read to me, that is okay.

In 1967, according to this document, screening meant wet or dry screening, and that is how it was understood in Australia, was it not?---We referred to wet screening and to dry screening.

If we just referred to screening we could mean either or both? ---Yes.

Can we go back to Mr Taggart? If we look at his descriptions in s.2-134 and following, we will find a discussion at some length about what are described by the author as "wet concentrating plants". Just turn over a few pages and you will see what I mean - 2-136, 2-137, 2-138. There is a discussion there about wet concentrating plants and some very detailed descriptions of some of the plants?---I do not see it on 2-136?

Do not worry about 2-136. I just wished to show you the commencement of the chapter. Part 28 is "Iron". It is 2-134. Do you see that?---Yes.

This is a sub-section of a larger discussion, but when we turn over the page to p.2137, for example, the heading of the page is "Wet concentrating plants?--- Yes.

Then we go down the page and it says:

> "Washing plants utilise tumbling in water....(reads)....by some 20-odd mills in the western Mesabi district."

Do you see that?---Yes.

You do not quarrel with that assertion of fact, do you?---At the time it was written, I am quite prepared to accept that.

MR SHER: You would accept Taggart as being accurate in making those statements of fact, would you not?---I am not arguing with that. I am saying at the time it was written I am prepared to accept it.

What do you mean by that - that you believe it to be true?- -- Yes, I am prepared to accept that it was accurate at the time it was written.

This part of the text or textbook, or whatever it is, discusses what are described by the author as "wet concentrating plants" and after referring to 20-odd mills in the western Mesabi district he goes on to discuss some of them in detail, by name. You see on that page he starts off with the Oliver Iron Mining Company, Canisteo washing plant. Do you see that?---Yes.

Then over the page he talks about - - he shows in figure 85 a typical Mesabi jig plant?---Yes.

He discusses the Charleson Iron Mining Company, Judd pit?-- -Yes.

And then goes on to discuss Butler Brothers, Harrison plant?---Yes.

And over the page we will find he goes at 2-141 to the Warren Foundry & Pipe Corporation?---Yes.

If we go back to 2-138 and 2-139 - - I do not think it is in part of that exhibit which is exhibit ECH1, your Honour - - -

A423. 2.25

MR SHER (Continuing): - - - is exhibit ECH 1, your Honour.

OLNEY J: No, it certainly is not there.

MR SHER: Perhaps I could take the witness through something and then hand a copy to your Honour so your Honour will follow what I have been asking about.

OLNEY J: Thank you.

MR SHER: Perhaps my learned friends might, as it were, like to look over my shoulder.
TO WITNESS: If we look at pp.138 and 139 we will find a series of drawings which set out in effect a flow chart, different parts of processes in some of these wet concentrative plants which are, apparently, from the Mesabi range?---Yes.

You will notice, at the head of each of those flow charts, that the author divides the operation up into different processes such as brushing, screening, concentration, washing and shows something going to product?---Yes.

So it would appear that the author is drawing a distinction between screening and washing amongst other things?---I cannot accept that.

Can you not?---No.

He is drawing a column with screening in one and washing in another, is he not?---Yes, but of course, what he is not saying is that what is contained within the screening system does not include washing.

I will accept that and go on, if I may. They are not easy to follow, these flow charts, and it is perhaps easier for you, doctor, than any of us but, if you take the care to follow the process through, it would be apparent that some of that screening includes wet screening and some of it includes dry screening?---Yes.

So it is clear that in Taggart his use of the word "screening" includes both wet and dry screening?---As a generic type if you like, yes. I would agree with that.

I think I should tender this thing, your Honour, because I do not think it is part - - We will have it photostated, I think that is easier.

OLNEY J: Perhaps you could indicate what pages?

MR SHER: Yes. I tender pp. 2-134 up to and including 2-140, your Honour. I will have them photostated. If your Honour wants to follow what I have just asked the witness - -

OLNEY J: Yes, I will have a look at them now.

MR SHER: We will provide our learned friends with a copy of that which we are tendering so it is clear what we are putting before the court.

OLNEY J: Yes. I will take in these pages.

EXHIBIT EXHIBIT 10 .... Handbook of Mineral Dressing by Taggart, pp. 2-134 to 2-140 inclusive.

OLNEY J: Are you moving away from that now, Mr Sher?

MR SHER: Yes. I will not be using Taggart any more for the time being.

OLNEY J: I will arrange for those copies to be made.

MR SHER (TO WITNESS): Finally on this question of the use of the word "screening", to bring it closer to home, there is an Australian standard issued - and the one I have is dated 1980 - which has a glossary of terms relating to solid mineral fuels and part 1 relates to coal preparation. Are you familiar with the Australian standard?---I am familiar with the existence of the Australian standards and I am familiar with the existence of those relating to coal preparation.

Is there one for minerals other than coal - - -

MR SHER (Continuing): - - - than coal?---I cannot answer that. I do not know.

You are not involved in the compiling of this particular document and the definitions given to terms, are you?---The answer is "No."

Have you ever been?---No.

Has your department ever been?---Have members of the department to which I belong ever been? As far as I am aware, yes.

Yes. Indeed, the document itself records that representation on the committee entrusted with the preparation of the standard includes, amongst others, universities? ---Yes.

The University of Queensland is one of them?---Yes.

I will make it clear that this relates to coal but so far as it defines terms if we look at the definition of screen and screening - -
TO HIS HONOUR: I will tender this shortly. I will just read it into the transcript.

OLNEY J: Yes?

MR SHER: It reads:

> "Screen' is defined as any type of perforated surface used to subdivide any material according to the particle size of the constituents. The various types of screens are as follows"

and it then lists about 20 different types of screens. Then defining screening it reads:

> "The separation of solid particles of different sizes (with or without the use of water) by causing one component to remain on the surface provided with apertures through which the other component passes."

You would accept those definitions as equally applicable to the iron ore industry, would you not? ---I would have to read them. I would have to ensure that I regarded them as being comprehensive.

Would you look at the two definitions? I have opened it at screen. If you turn over the page you will find screening?---Just on a first reading - it covers the

best part of half a page, the term screen alone - -

MR SHER: More than half a page - it goes over the page?---In total about half a page or a little bit more. Just on first reading, I do not see specific mention of a wedge-wire screen. It may well be that this is here but I do not see specific mention of it.

You think that a definition of screens ought to include a definition of wedge-wire screens such as a DSM bent sieve?---I have said that I regard that as a screen but - - I will not go any further.

Apart from that reservation, is the definition of screen in your view an appropriate one in Australia for the iron ore industry?---Again, I need to read every word of this and think about it. I would regard this as being a first approximation to a definition and, indeed, this is how these standards are developed. They are a continuing process of evolution. They are not fixed.

With all the reservations you have mentioned, does it appear to you to be reasonably comprehensive as a definition of the types of screens one may find in this country which may be found in the iron ore industry apart from the coal industry?---That is a pretty long one so it is pretty comprehensive, I guess.

Perhaps we need not spend any more time on screens. Let us just look at the word screening. Would you look at that, please? Do you see the definition of screening there and in particular the bit in brackets about with or without the use of water - - -

MR SHER (Continuing): - - - of water?---Yes.

It is clearly the definition in the coal industry. Would you agree that it is also terminology which you would find in the iron ore industry in this country?- -- I would agree that that is the definition of the physical process of screening.

The point I wish to make with most emphasis at this point of time is the reference to with or without water. You would accept that, would you not?---That water can be used or need not necessarily be used in the physical process of separation?

Yes?---I would agree with that.

And it is encompassed in the word screening? "Wet screening" is encompassed in the word screening?---I come back to the same old point, do I not - that wet screening is within the business of screening, the generic term "screening" but, of course, description of a process as a wet-screening process implies that there is more than one sub-process. It is not only screening that is implied.

I was not asking about the latter. It was just the former and your answer suffices. I tender that document, if I may.

EXHIBIT EXHIBIT 11 .... Australian standard 2418, part I (1980)

MR SHER: I will not take you through it but you exhibit to your affidavit some extracts from Gaudin. What is the date of that publication which you exhibited? It does not appear from the exhibit?- --As I recall this "Principles" was written in 1930.

With such limitations as that date may involve, if we look at p.7 where he talks of "The development of crushing and grinding technique has necessitated the development of a technique for the sizing of the crushed or ground material" - do you see that part?---Yes.

He goes on to discuss stationary screens and then vibrating screens and then classifies. I would suggest to you that that passage and other passages in your exhibit indicate that Gaudin was including, in 1930 when he wrote this text, within the concept of screening, wet screening?---I am sure he was. Might I add that I have at all times said that on particles less than about 4mm wet screening, which has only the purpose of assisting size separation, is most important and there are wet screens used in Australia at these smaller sizes. These are very commonly required in mineral treatment processes which require such wet screens.

MR SHER: In the course of equipping yourself to give evidence in this case in the last few days, there could not be any doubt that you have read affidavits filed on behalf of the defendants, such as those of Mr Grosvenor, Mr Beukema and Mr Booth?---I have read those three, yes.

Have you read Mr Baker's affidavit?---No.

L53. 2.37

MR SHER: I am quite happy for the transcript to record, your Honour, that the book itself which my learned friend has shown to me appears to have been published for the first time in 1939.
TO WITNESS: To get down to this question of wet screening - - Before I do perhaps I should ask you some questions about your qualifications. The affidavit indicates that you have obtained five post-graduate degrees of some eminence in 1965 and 1975. I take it that your initial qualification was a bachelor's degree, was it?---My first qualification was a diploma.

When did you obtain that?---I completed the course in 1953.

What was that a diploma of?---That was an associateship of the Sydney Technical College, having studied in the department of chemical engineering.

It was a diploma in chemical engineering?---It was an ASTC, that was the formal legal qualification, chemical engineering.

But what was the area of your study?---Chemical engineering.

Was it with that qualification that you then went in 1954 to work with the Zinc Corporation Limited of Broken Hill? ---Yes.

You there worked for four years, 1954-1958?---Yes.

After which you became a staff member at the University of Queensland?---Yes.

From 1954 to 1958 you were not engaged, in any way, in the iron ore industry, were you?---No.

So that by the time you became a full-time academic member of the staff at the university you had had no experience or qualifications in iron ore processing?---I do not believe there is such a thing, your Honour.

Whether there is or is not, you had not had it; is that not right? ---I believe that there is experience in the whole area of the treatment of mineral particles of which iron ore is one grouping.

You had not specialised in the study of iron ore, had you?---No.

You have remained a member of the staff at the University of Queensland ever since?---Yes.

Would it be fair to say that primarily your occupation is that of an academic member of the staff of the University of Queensland?---No.

MR SHER: It is not primarily your role?---No.

When did it change from being, in effect, an academic member of staff to something different?---From 1958 I was appointed to the research staff of the university. The staff at the university consists of parallel streams of research staff and academic staff. The research staff have no teaching duties - -

Can I just interrupt you? You were on the research staff then?---Yes.

For how long were you on it?---I have been ever since.

Have you never taught?---I have given many sets of lectures but not as a formal member of the academic staff - - 10

So you have been a member of the staff in a research capacity since 1958?---Yes. If I might explain one step further, in 1980 or thereabouts the senate made a specific invitation to me to accept appointment as a professor without, in any way, changing my duties.

Should we call you professor as well? Please do not take offence, Dr Lynch. I want to make it clear that I am in no way disparaging your qualifications but they have been in a rather narrow field, have they not?---My qualifications are BSc chemical engineering, MSc chemical engineering, PhD, DFC chemical engineering. They are my formal 20 qualifications. Do you wish to discuss my experience?

I will come to that in a moment. The fields of study that you pursued are in chemical engineering?---The fields of study - - -

WITNESS (Continuing): - - - of study in the past 22-23 years have been concerned with the treatment of solid particles. There is a grey area.

MR SHER: From the viewpoint of chemistry?---No. We are talking again about definitions within university systems and within disciplines. These also are grey areas.

Have you ever had a job working for a mining company?---Zinc Corporation was a mining company.

Apart from that?---I must again explain. This is a very difficult type of matter to say yes or no to.

Have you ever been employed by a mining company as a member of the staff or on the payroll?---Again,I will explain. This is a very difficult question to say "Yes" or "No" to.

OLNEY J: Perhaps you could explain it?---The research centre of which I am the director is virtually entirely supported by research funds from industry. I have always been in the position where my position has been supported by research funds from the industry. It has not been supported by conventional university funds.

MR SHER: In so far as you have been funded by industry you may regard yourself as having worked for the industry but you have never been on the staff of the payroll of any particular company, have you?---The answer to that is "No."

In so far as you have been employed or engaged by any company or any part of the industry it is in this general sense that the industry has contributed funds which have facilitated research?---I would once again have to discuss the nature of the research and the involvement I have had with companies.

You have had quite a bit of involvement with some particular companies, have you not?---I have had very considerable involvement with - "some" may be a reasonable definition - at least 20 companies; more like 25.

Included in those companies, have you had considerable involvement with CRA?---Yes.

Is that the parent company of Hamersley?---Yes.

Have you had considerable involvement with Hamersley?---Yes.

Have they funded your research work from time to time over the years, both those companies?---CRA has been one of the 20 companies - - I beg your pardon, not CRA directly but companies within the CRA group have been amongst the 20-odd companies, each of which,

right now for example, contribute through the Australian Mineral Industries Research Association, approximately $11,000 per annum to the support of our mineral processing research group. Hamersley at present is one of those companies. Hamersley also contributes by the same mechanism to the support of my mining engineering research group.

MR SHER: In so far as you have had any practical experience have you ever been involved in the design of any mineral processing plant?---Again, there are several aspects to the design. There is the design of a process itself; there is the mechanical design. I have been involved on several occasions with the process design.

But never on the mechanical side?---I have not been concerned with the mechanical designs.

So you have been concerned with the principles to determine a flow sheet but not the actual practical way in which those principles are carried into effect?--- I have been concerned very much with the specification of equipment sizes.

How recently?---As recently as weeks ago.

When did that sort of work start?---It first started, that I recall, back in 1965.

What was that?---That was at Mt Isa mines. That related to a grinding circuit with which I was concerned at the time.

A grinding circuit for what?---A grinding circuit for copper ores.

Have you ever been involved in any practical work involving the iron ore industry?---Yes.

For which companies have you worked?---Specifically I have been concerned with the Eyrie Mining Company in Minnesota - -

When was that?---During the years that I was in Minnesota - mid-1971 to mid-1972.

Was that the first time you ever did anything involved in having something to do with the design of plant for the iron ore industry - - -

MR SHER (Continuing): - - - ore industry?- --I was not concerned with the design of the plant. I was concerned with the analysis of plant operations for purposes of model building of the processes involved.

What sort of iron ore plant was that?---That is a taconyte operation.

That is quite different from hematite, is it not?---Yes.

Have you ever been involved in the design of plant in either the theoretical or practical sense involving hematite iron ore mining?---We have been concerned in detail and by "we" I mean the Julius Kruttschnitt Mineral Research Centre or the team there of which I am the director.

Have you, personally, been involved at any time in a practical way with the design of hematite iron ore processing plant?---With the theoretical design of the plant, have I, as a member of the team, been involved? The answer is yes.

When was that?---When we had a substantial programme running at Mt Newman.

What was the date of that?---I guess it started around about 1972, 1971-72, and it was probably completed around 1976, 1975-76.

Did you have much to do with it?---Not in terms of actual data collection; in terms of repeated discussions with regard to data analysis, yes.

So that was your role, discussion of data analysis?- -- Yes, that was my role.

When you say in your affidavit that you have lectured at mining schools in the United Kingdom, Germany, France and Yugoslavia, has that been for days,weeks, months or what? Have you been there for a day?---In the United Kingdom it was a month at the Cornwall School of Mines. Germany was a week of lectures at the Freiburg Mining Academy. France was a month of lectures at the Nancy School of Mines. In Yugoslavia it was a week of lectures at the Institute of Mines.

Were any of those lectures concerned with the processing of iron ore?---Those lectures were all concerned with the mathematical modelling and automatic control of mineral treatment processes in general, included amongst which are crushing and screening processes, which comprise the types of process which are involved with iron ore.

When you went to the United States, as you say in para.(c) of your affidavit, 1(c)--you visited and studied most of the major mineral processing plants in Australia,

as well as the iron ore processing operations of the Yeri Mining Company, United States Steel and National Steel and the others. They were all taconyte mines, were they not?-- -Yeri, United States Steel and National Steel are, yes.

MR SHER: Did you go to any hematite mines?---I visited one - either one or two. As I recall it, there are relatively few left compared with what there were.

For whatever reason, how many hematite iron ore mines have you actually visited apart from the two visits you have had to the Tom Price mine?---The two or one, whichever it may have been, in Minnesota, the hematite mine in China. There are the Republic and Empire mines in upper Michigan.

Did you go there for a day or a few hours or a week or two or what?---They were all day visits.

Just a day visit?---Yes.

In so far as you have studied, as you say, the plaintiff's high-grade ore facility in its concentrator at Tom Price in 1981 and again in May 1983, how many days did you spend there in 1981?---As I recall, it was - - -

WITNESS (Continuing): - - - recall it was two days in 1981.

MR SHER: And in May 1983?---The actual day in the plant was one day.

So you had a total of three days at the Tom Price mine?----Of that order, yes.

In 1981 when you visited there, were you aware that there was an ongoing dispute between the company and the people entitled to royalties?---I forget when I first became aware of this.

Can I perhaps put it to you differently? Why did you go there in 1981?---Because of Hamersley's involvement with the University of Queensland through the Mineral Industry Research Association. What I do in each case is to - -

That is the reason you went there?---Excuse me - -

It had to do with the research programme?---It had to do with the research programme, yes.

Was that the only reason you went there?---That was the only reason.

So when you swore this affidavit on 22nd May 1983, the only visit you had had to Tom Price for the purpose of acquainting yourself with information specifically for these proceedings was the one day in May this year?---That was the only occasion that I visited there specifically with regard to these proceedings.

And the issue in these proceedings?---But, very clearly, the information that was obtained in the previous visit was most relevant.

Whatever the relevance of the material, the first time on a visit to Tom Price that you specifically directed your attention to the issues in this case was on one day in May this year? That is right, is it not, doctor?---I find that a very difficult matter to comprehend. The only occasion that I have visited Tom Price with the only objective in view, specific objective in view being the visit with regard to these proceedings, was in May 1983.

When you went there in 1981, were you not told that there was some question about where beneficiation begins in the concentration plant?---Was I not told on that visit - is that what I am being asked?

Either before it or at the time of it?---As I said, I am not too sure of when I first became aware of this disagreement and it may well have been before May 1981.

MR SHER: May 1981 - do you mean that or do you mean May 1983? ---Whenever I visited there in 1981. It may well have been before then that I became aware of it.

Did you go up there in 1981 to have a look at the concentrator plant, the beneficiation plant?---As I was explaining, I went there in 1981 as a part of the programme of visits which I pay to every company with which we work in order to discuss the technical problems and in order to discuss the objectives of that company with regard to the type of research that we do in the Julius Kruttschnitt Centre and in order to discuss the setting up of an experimental programme.

Then you were not going there to have a look at the beneficiation process with a view to the issues in this case?---Not with a view to the issues of this case. I was going there in order to investigate in detail the beneficiation plant.

Was that with a view to making a recommendation as to some changes or something, was it?---It was recognising that every process we are concerned with in mineral beneficiation, mineral treatment--we do not understand those processes as sufficiently as we should for plant optimisation purposes; it was with regard to discussing setting up an experimental programme which would give us the data to elucidate some of the problems that were involved.

What were the problems?---Problems with regard to dense medium separation - - -

WITNESS (Continuing): - - - medium separation.We do not understand the effects of all the variables on dense medium separation, for example, and that specifically was the type of area in which discussion centred.

MR SHER:

Did you have any research programme in mind,or set up as a result of this visit, which related to the wetting of the ore which goes through the beneficiation plant?---Which relates to the wetting of the ore?

Yes - which goes through the beneficiation plant?---No, there is no research programme which relates to there that I have been concerned with setting up.

You have had some practical experience of late in the design of plant for the Argyle Diamond Mine, have you not? ---My research group, of which I am the director, has been concerned with the experimental and simulation work involved in that.

You have taken part in that work, have you not?---I have been concerned with the general supervision of the work, yes.

Yes - and is part of the work which has been done by your department directed towards the need to crush the material for the purpose of processing?---It is in the general area of plant simulation we have been concerned with, of which crushing is one part.

And scrubbing is another part?---Scrubbing is another part.

Has not your department recommended or suggested or designed a specific scrubbing operation for the Argyle Diamond Mine?---I am finding this a very uncomfortable line of questioning, the reason being that the work we are doing with Argyle I must regard as confidential.

I do not want to be party to you breaching the confidence but let me put it to you in general terms: Your department has recommended a specific scrubbing device for this mine, has it not? That is not confidential, I suggest to you, because tenders have been put out for it. That is right, is it?---Okay, I am pleased to hear you say that.

You knew that, did you not?---I did not know that tenders had been put out. Scrubbing is very certainly a part of the Argyle operation.

And you have designed a specific scrubber, have you not?---We have been concerned with the simulation of the scrubbing system and the role of the scrubbing system

and variables in the scrubbing system, and variables in the scrubbing characteristics of the different ore types on the total plant operation.

MR SHER: And your department recommended the construction of a specific scrubber approximately 3 metres in diameter and about 8 metres in length, which is going to cost in excess of $1 million. Is that not right?---We have made certain recommendations to Argyle. I do not wish to discuss what we have recommended.

I will put it to you this way: Your recommendations do not include a scrubber which is remotely like the pulping box in the plant at Tom Price in the beneficiation plant. That is right, is it not?---That may well be.

It is not only may well be, it is the fact, is it not?

MR HULME: I am instructed, for fairly obvious reasons, that the matters of flow sheet and equipment at Argyle are regarded, certainly by those concerned, as reflected by Dr Lynch, as highly sensitive for various reasons. We have let this go as long as we can. It is true that that our course at CRA is related to Hamersley. It is also true that other institutions are involved there, including the Western Australian Government. It is perfectly true that there are installations in the world which have scrubbers which are very much more sophisticated than Hamersley's. My learned friend can of course cross-examine on that basis. It is difficult to see why he should pursue this on the basis of What particular one is there going to be at Argyle? They do exist. They are in use elsewhere. The contrast is available to be made. However, it is submitted that this witness ought not to be put in a position of having to reveal confidential arrangements about other people - - -

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MR HULME (Continuing): - - - other people.

MR SHER: I do not wish to cause him to reveal confidential information. If I thought I was asking him about confidential information I would not have pursued it. I am having my instructions verified. I understood that this particular matter had been put out to tender, your Honour, and it could hardly therefore to be said to be confidential but I will just check that. I will not pursue it for the time being while I verify my instructions.

OLNEY J: I do not wish to place this witness in the position where he feels he has conflict of interest. I think, through your cross-examination, you have made a point.

MR SHER: Yes. My learned friend appreciates the reason for making it and I now pursue the reason for making it.
TO WITNESS: Doctor, you are familiar, are you not, with a wide variety of scrubbing devices?---Yes.

In the industry a scrubber usually refers to one of those particular scrubbing devices, does it not?---In usual terms a scrubber does, yes.

There is a difference between somebody using a word in the industry to mean one thing and perhaps what you, as a person with a great deal of technical knowledge, may see as an effect of a process. You would agree there is a difference, would you not?---The difference - -

I am just asking you whether you see there is a difference?---At the extremes there may be a difference.

Would you not regard yourself as having to defer to somebody with, say, 30 or 40 years' experience in the iron ore industry alone and, in effect, nothing else, as to the use of terminology in that industry?---As to use of terminology in the iron ore industry?

Yes?---In other words, local terminology with regard to a particular mineral. In the particular area that that person has been involved, yes.

Why confine it to a particular area? What expertise do you have outside what I may say is a very refined area?---Thank you. Because terminology changes from district to district. It changes on a regional basis as well as on a mineral basis.

You have noticed in the books to which you refer a change in terminology amongst authors, have you not?---Yes.

MR SHER: Do you agree that there is a difference between the use of a word generally in an industry and the effect perhaps of a process? Let me illustrate it by example. A scrubber as opposed to a scrubbing effect - do you agree there is a difference between the two?---Between what is described in general parlance as a scrubber and the principle of scrubbing? Yes, I do.

Have you noticed that in none of its literature, none of its literature, Hamersley do not refer to this pulping box as a scrubber? I have used a double negative; I will put it again. I will put it in a positive way. Have you seen any Hamersley literature at all which refers to the pulping box as a scrubber apart from your affidavit and any other affidavit in these proceedings? ---No, I have not.

Have you seen material in which it is referred to, amongst other things, as a pulping box?---One of my difficulties is an extraordinary bad memory for detail - - -

WITNESS (Continuing): - - - for detail and I do not recall having seen it.

MR SHER: In other jurisdictions "I can't remember" is a pretty stock answer. There is no reason why you cannot use it here. What about the word "feeder" - have you seen it described frequently as a feeder or a feeding box? You cannot remember?---Details such as this I take little notice of, so I just do not remember.

Have you had a look at the plans of this particular device, this pulping box? Have you had a look at the design plans from Mitchell Cotts?---Yes.

They certainly do not call it a scrubber, do they?---Again, I do not know.

They call it a chute?---I will agree to that.

OLNEY J: Do I take it you are not much interested in what people call things but rather what the things do?---That is right. I am interested in the principles of operation. The names are frequently colloquial. On many occasions they may well be confusing. I am much more concerned with the principles of the operation.

MR SHER: Then let us talk about the operation. If I use the term wet screening and there is any doubt in your mind about what I am referring to, would you please let me know?---Yes.

Wet screening inevitably includes getting the screen material wet?---Yes.

I mean, you cannot have wet screening without wetting it, can you? ---No.

Wet screening inevitably involves some degree of cleaning?--- Yes.

Because you cannot wet screen without having some cleaning effect taking place?---Yes, that is correct.

Wet screening inevitably involves some degree of scrubbing?- --Yes.

Because you cannot wet screen without some degree of scrubbing?-- Yes.

To wet screen efficiently, you really need to have the feed very wet, do you not?---Yes.

Indeed, you need to have it in slurry form?---Yes.

The only way you can get it into slurry form --and you need to do that before it hits the screen, do you not?--- Yes.

It must hit the screen as a slurry?---Yes.

MR SHER: The only way you can get feed sufficiently wet to form it into a slurry, so that it hits the screen in that form, is to wet it before it hits the screen? ---Yes.

That involves using some device to get it very, very wet indeed? ---Yes.

That is what happens in the pulping box?---A lot of water is added in the pulping box. That is correct.

It gets it very, very wet indeed?---It does indeed.

Let me put to you a hypothetical situation. If that pulping box was several hundred metres down the track,as it were, away from the screen, you would have to wet it again before it went onto the screen, would you not, for the purpose of the screening purpose?---It that pulping box was several hundred metres down the track away from the screen - -

Further back?--- - - you would have to wet it again before it went onto the screen? I do not see why.

Are you suggesting that if you wet the ore several hundred metres away and carried it then in some form to the screen, that would be sufficient?---If it went down a chute, a continuous chute, if there was no loss of water, if there was adequate water present, I can see no reason why you would have to add more water.

But it is not the sort of thing you would recommend anyone to do? ---It depends totally on the circumstances. You have put to me a hypothetical question. I have given an answer - - -

WITNESS (Continuing): - - - given an answer.

MR SHER: Your answer, I suggest - tell me if I am wrong - suggests that you can do what I put to you as long as you get it to the screen in this wet slurry form?---If you add a substantial amount of water to the ore and if you transport it through a pipeline or a chute for a long distance and put it across a screen then I do not see that there requires to be more water added necessarily.

As long as it is in the appropriate slurry form when it gets to the screen?---Yes.

You would have to make sure that that happened, would you not?---Yes.

Just from a practical viewpoint, it would be pretty difficult to convey this material in slurry form on a conveyor belt, would it not?---It would be a rather unusual conveyor belt to convey it. It might well be not at all unusual to convey it in a pipeline.

But if you were designing a plant which involved wet screening, unless there was some special reason you would wet it just before it went onto the screen, would you not?---I would have to ask what "unless there was some special reason" means.

Lawyers use a phrase "all things being equal". I am not sure what it means but I will try it out on you. All things being equal, you have to wet it just before it goes on the screen, do you not?--- I gather that lawyers are as imprecise in their terminology as engineers are.

Have you read the Allis-Chalmers material relating to the screens which are, in fact, installed at Tom Price their brochures and - -?---I may well have read it several years ago. I have not read it since then - not recently.

You would expect the manufacturers of the screen to have some expertise at least in what is needed for effective screening?---I certainly would, yes.

I want to take you to something I have said and see whether you agree with it.(It is an exhibit to Mr Grosvenor's affidavit.) Would you look at that? This is a document about vibrating screens and it is about their theory and selection. We do not know the name of the author but Mr Pritchard can perhaps help us. He gives evidence. Do you see on the page headed "Introduction" a general description of the theory and selection?---I see the page marked "Introduction".

MR SHER: I will just interrupt what I am asking you to go back to this matter about Argyle. Do you know whether this is the case? - have flow sheet details of the Argyle plant been released to the technical press, including Engineers Australia, and have they been published in that press?---I do not know whether that is the case or not. If I am presented with the copy of the publication - -

There would not be any need, would there? If we have the publication it would be clear to everyone. Is it not the fact that tenders were called for the scrubber at Argyle over a month ago?---I have been out of the country for most of the past two months. I cannot say.

Or you just do not know?---No.

If we can go back to Allis-Chalmers, see the heading"Screen Uses"?---Yes.

It there sets out a whole series of uses - - -

MR SHER (Continuing): - - - of uses for which screens can be used?---Yes.

Including size separation, de-sliming, trash removal (which is described as separating foreign material from product), washing and concentration?---Yes.

Do you agree they are normal functions of wet screening?---I agree that screens are used for these purposes, as defined by Allis- Chalmers.

Anyone talking about screening, if they understood the word to mean wet screening in the industry, would regard the screen as being likely to be used for one or other of those functions?---I do not know that that is a comprehensive list of functions.

Comprehensive or not, it certainly comprehends these functions, does it not?---Yes, but - -

So if I said to you"Those wet screens at Tom Price" - and said something about them - if you knew nothing you would think those screens might be used for size separation, they may be used for washing, they may be used for concentration, they may be used for de-sliming, they may be used for media recovery, they may be used for them all or just one of those. Thoase thoughts would naturally occur to you, would they not?- --Well, broadly speaking, yes.

That is how you would understand people in the industry to regard screening, as a process that could encompass one or more of a substantial number of different results?---The terminology, the use of the word "screening, particularly in the wet context, would certainly be understood to involve more than one process, or possibly involve more than one process.

Not only do you say it would include some of those but you would assume it would include a number of those purposes?---Yes. I generally would assume that there would be more than one of these sub-processes occurring.

Can I take you to p.17? Do you see the paragraph commencing Surface moisture", para.5?---Yes.

It says: "Surface moisture carried by the material if screening is to be done....(reads)....with the feed if screening is to be done wet."

It goes on:

"Wet screening with sprays."

That is what they have at Tom Price, wet screening with sprays - right?---There are certainly sprays above the screens, yes.

WITNESS (Continuing): - - - on a screen which is wet?

MR SHER: Yes?---Yes.

He says:

> "The first step in determining the number of sprays required is to establish the total water necessary for good screening."

He then goes on to discuss different types of material. Then he says:

> "When the total water requirement is determined the next step is to distribute it over the screen surface so that the screen is covered by a curtain of water from side to side."

Do you agree that logically the first step is to decide how much water you need?---As a first approximation, yes

Then you work out how to distribute it over the screen?---Yes.

Do you agree with that?---Yes.

Then reading the next paragraph it starts:

> "The final step is to locate the row of sprays along the length of the screen."

Do not worry about that for the moment.

> "For ordinary sizing the sprays can be located at or near the centre but if the watering is required they should be grouped near the feed end."

I will not bother to ask you about that but the next sentence says:

> "If the feed contains a large quantity of clay, the sizing may be improved by pre-soaking or adding water to the feed in a flume ahead of the screen."

Do you agree with that sentence?---The sizing? It is a shorthand way of describing a desirable condition. It is certainly understood but there are a

lot of implications in that sentence which, if to be absolutely specifically discussed, could not be expressed just in two lines.

MR SHER: One can well understand why you would want to elaborate on that but as a general statement subject to some elaboration for a particular case is it not an accurate statement?---Yes, within this range of a better definition of what the sizing means.

Is the author of the document saying anything more than this; if the feed contains a large quantity of clay it is better to soak the feed before it gets to the screen or to add water to the feed before it gets to the screen?---The implication as I would see it is that the scrubbing process which results in disintegrating the clay away from the rock that you might be concerned with, would be enhanced by pre-soaking or adding water in a flume ahead of the screen.

But the author of this document is not talking about scrubbing. He is talking about sizing?---That is where I say this is a shorthand way of expressing something.

To a man in the trade, an iron ore man picking up this document, the manufacturers of the screen are telling him, are they not, "If what you want to screen has a lot of clay in it, you are either going to have to soak that material before it gets on the screen or wet it before it gets on the screen." Is that not all that is being said?---The implication to me, rather clearly, is that the reason for doing that is in order to enhance the scrubbing process.

It is in order to enhance the sizing process, is it not? That is what it says?---The sizing process, I would believe - -

That is what it says. It says, "If the feed contains a large quantity of clay the sizing may be improved." That is what it actually says?---And this is the difficulty of writing an engineering document, a technical document, aimed at engineers where a considerable amount of existing knowledge is implied and is assumed and then having that interpreted under these circumstances - and if I may say one sentence more, I fell very much into that trap in the writing of those textbooks, the monographs.

Just a moment, what was the trap you fell into?---Making assumptions about the knowledge - -

Making assumptions which led to special use of language?---Yes; assuming in terminology knowledge.

You are, in other words, conceding - - -

MR SHER (Continuing):- - - conceding that within discussion groups of people who have some knowledge of the industry, they tend to use words in shorthand fashion?---They tend to assume certain knowledge which relates to local conditions and they tend to have technical descriptions in terms of some specific context.

A couple of iron ore men back in 1962 talking about screening could easily have said "Well, if we want to size this thing properly, we had better pre-wet the feed", could they not?---Yes. They certainly could easily have said it.

They would both have understood what they meant by that?---I would expect that they would have understood that in the pre-wetting it would have contributed considerably to the clay being detached from the valuable rock, as a consequence of which a separation could be made.

In other words, to facilitate the sizing?---First of all to get the rock in such a condition that the fine particles were physically detached from the valuable particles, as a consequence of which a separation based on sizing could be made.

Have you ever negotiated the terms of a contract in relation to processing of iron ore?---No.

Do you have the faintest idea of what people who do mean by words they use?---No, in so far as I have never negotiated a contract.

Do you think that somebody talking about a screening process that is designed to size the ore would regard as part of the screening process what is described here in this document, pre-soaking or adding water to the feed ahead of the screen - - do you think that is likely?---Will you repeat the question, please?

Do you think it is likely that somebody talking about screening iron ore would include in those words what is said here by the author of this document, "Sizing may be improved by pre-soaking or adding water to the feed as part of the screening process"?---I cannot speculate on that.

You would not, would you? You would say "No, we are talking about scrubbing"?---I think I would say that I am talking about a process which contains a series of sub-processes, of which scrubbing is one, of which screening is another.

In any event, do you agree with the author of this document that sizing would be improved by adding water to the feed in the flume ahead of the screen, if there was a large quantity of clay in the feed?---We are

back to this discussion "What does sizing mean?"

MR SHER: What does sizing mean to you?---It is very difficult.

Does it not mean separating a feed into different sizes?---Yes.

Does it mean anything more than that?---I am thinking of ranges of sizes and the like, but I would agree with you that it means that. Yes.

If we were going to actually say to ourselves "Let us look at this Tom Price plant and decide whether they have taken a different step from that recommended by the manufacturer or what the manufacturer recommended" - - It would be nice to know whether they have followed the manufacturer's recommendations, would it not?--- If we were to look at the Tom Price plant and decide whether they had taken a different step from what the manufacturer recommended, it would be nice to know, yes - I would agreed with that.

What the manufacturer of this wet screen is recommending is that you put plenty of water on?---That is the recommendation in here, yes.

If we go down to the actual - - what this manufacturer has done to help his clients is to actually set out a chart of what sort of water you need for the material and application you are involved in - table 11. It is there, is it not - - -

MR SHER (Continuing): - - - is it not?---It is there.

So if we want to know what Allis-Chalmers say you should do with iron ore if you want to size it, we can see what they recommend for the gallons per minute per tonne of feed, the spacing of the sprays on the top and the bottom deck and the pounds per square inch water pressure?---In my experience with these types of documents these tables would be regarded as general indications only - that is my experience.

General or not, if we want to see what the manufacturer suggests we do we only have to look at table 11, do we not? ---What the manufacturer might recommend to an individual company, I do not know. I cannot comment on that.

Doctor, speaking generally, that is a good starting point, is it not - table 11?---Again, in my experience, this type of document is an indication.

Would you assume that if the ore to be wet screened is very sticky or has a lot of clay or a lot of waste in it, a lot of shale, then you are likely to want more water than less or less water rather than more, to get rid of it? ---Broadly speaking, I would expect you would want more water.

At Tom Price do you know whether or not they have more or less water than is recommended in this chart on the particular wet screen about which we have been talking?---No, I do not know.

If you found they had less water than is recommended, it would tend to suggest that the ore was not very sticky, it did not have a lot of clay and a lot of shale. Would you not agree?---At any particular instant in time I would expect that the amount of water is one of the operating variables.

But, doctor, if this recommendation is just general and needs to be tailored to the particular case, the more you need to degrade this ore with water, the stickier the clay is, the more difficult it is to remove, you would expect the more water you would need?---In general terms.

And the sooner you got it on the better?---You have made the hypothesis, yes.

If I could convince you that rather than having the amount of water that is recommended here they had substantially less going onto this ore, you would be driven to a number of conclusions, would you not? One would be that they

had just made a mistake - that is one conclusion. Do you agree with that?---I would have to ask a lot of questions to you in order to establish the facts of the case.

MR SHER: But another conclusion that you might draw is that the ore really did not need much water on it to get the desired result?---I repeat that I would have to ask you a lot of questions concerning the facts of the case in order to be able to draw any useful conclusions at all.

You have offered the opinion to the court in your affidavit and from the witness box that this particular ore in this particular plant needs to be wet in the pulping box because of the nature of the ore. Is that not what you have said?---Yes.

But you really do not know the nature of this ore, do you?---In so far as I have been informed - shall we say that I have not gone and done the sampling and analysis myself.

But no-one has, have they? You have not been provided with any sampling or analysis by Hamersley?---All that I have seen is a general description of the ore types.

I suggest you have not been provided with any sampling or analysis by Hamersley?---No, that is quite true.

So your assertion that this particular ore requires to be wet at a particularly early point is, in your case, guesswork? ---I am certainly prepared to accept that the ore contains clay - - -

WITNESS (Continuing): - - - contains clay.

MR SHER: But if I could demonstrate to you that rather than using the amount of water recommended in this chart they were using less, that would cause you to wonder whether you had not been in some way - and I am not suggesting it is sinister - misled about the nature of this ore?---Not at all.

But it would make you wonder whether your assumptions were correct, would it not?---Not at all; not at all.

Not at all - it would not make any difference?---It would not make any difference.

So whether or not they are using more, less or the amount of water recommended you regard as irrelevant?---Oh yes; yes, because I know that the ore changes substantially in its characteristics and in its composition.

Do you mean from day to day or during the course of the process? ---From day to day; from point to point within the ore body.

Yes, and that means that you may have to vary the amount of water, does it not?---Yes.

But for you to say as a general rule as a basis for your opinion that this ore requires a certain type of watering at a given point of time, I suggest to you, is not based upon any knowledge at all of the nature of this ore? ---There is sufficient knowledge of the general nature of the ore for me to be able to make that general comment with some reasonable confidence.

Very well. Let me take you to something else. In para.5 you refer to "crushing and screening" which you say is generally regarded as a composite process?---This is in my affidavit?

Yes, para.5?---Yes.

You go on to discuss crushing and screening in the rest of your affidavit; is that right?---Yes.

You have discussed it on the basis of a composite process throughout your affidavit, have you not?---"Generally regarded as a composite process", yes.

Yes, and indeed in describing what happens in this particular plant you have regarded the crushing and screening as part of a composite process?---The crushing and screening area of the plant, yes.

But in fact here the process is separate, is it not?---Which process?

MR SHER: Well, the plant about which we have spent so much time talking, the washing and screening plant, the pulping box, the screen and the like - that is a separate screening process entirely, separate from any crushing, is it not?---That is a separate process which involves a series of sub-processes.

But it is as a screening process, whatever else it is, and certainly not a crushing process?---It is not a crushing process.

Yes, and indeed once the feed enters the pulping box there is no further crushing until it emerges from the washing and screening plant?---What I hold goes on in that system is not only the act of screening but there are other sub-processes involved, and in those terms I distinguish from the general term "crushing and screening".

But there is no more crushing, is there, after it goes into the pulping box and when it comes out on a conveyor belt to go to some other part of the plant?---That group of processes covered within the terminology of "wet screening" does not have crushing associated with it.

You have gone into opinion as to saying when the first step in the process commences?---Yes.

Because you say it is necessary for the completion of the process to wet the ore in this pulping box?---Yes.

So you regard the beginning as occurring because of what happens at the end?---"Regard the beginning as occurring because of what happens at the end" - well, let me put it in a way that I understand - - -

WITNESS (Continuing): - - - I understand. I regard a process as having a beginning.

MR SHER: Because of what happens at the completion end?---I do not particularly understand that but I certainly regard any process as having a beginning and an end.

But, doctor, you regard the wetting and the degrading of this ore as necessary to enable this ore to go into the drums, the cyclones and the whims?---I see what you mean, yes.

This is your purposive connotation. You say that because the purpose is to put it through the drums, cyclones and whims, the wetting of it in the first instance is the beginning of that process?----Yes.

So you define the beginning by reference to what happens at the end?---Yes.

To use your own words in para.8:

> "In my opinion the initial addition of water must be viewed as the first step in a process which those units complete and those units are the drums, cyclones and whims."

The last sentence - okay?---Yes, okay.

Would your opinion be different if the ore that went into this pulping box and was wet, did not go through the drums, cyclones and whims but bypassed them?---If the ore that went into the pulping box and was wetted came out and across the screens and there was no further beneficiation process?

Other than perhaps more wet screening of that kind but it did not go through the drums, the cyclones or the whims?---And there was no further concentration process?

That is right?---It must still be regarded as a type of process that I have discussed with you. It must still be regarded as a scrubbing process but a scrubbing process, I would think - - No. I would still have to regard it as a scrubbing process.

What then did you mean by saying that the word beneficiation and treatment usually have a purposive connotation? What did you mean by that?---They usually have a purpose in view.

Right, and the purpose in view here is heavier media separation. That is the purpose of this process, is it not?---The purpose of the scrubbing process?

MR SHER: The purpose of putting ore through this particular plant is to put it through the heavier media separation - the drums, the cyclones and the whims. Is that not right?---Yes, and also to reject the very fine particles in the cyclone overflow.

You spent some time explaining to his Honour why you needed to clean this ore because if it was dirty when it went into the drums and the like it would make trouble for the specific gravity problem?---Yes.

So you see the scrubbing, as you call it, in the pulping box as being the first step in the process completed by putting it through the drums, whims and cyclones? ---It is the first step in the total processing operation.

Which these units complete, to use your words - these units meaning the drums, cyclones and whims?---Yes.

If it does not go through the drums, cyclones and whims you have to restate your position, have you not?---The total beneficiation process, as I understand it, as I believe it to be, consists of the scrubbing which occurs, the washing which occurs, the sizing separation which occurs and then the beneficiation which occurs. It is unclear to me - - -

D89B. 3.45

WITNESS (Continuing): - - - to me, in those terms, what is being asked.

MR SHER: You have to find the beginning by reference to what happens at the end; namely putting the material through the drums, cyclones and whims?---Yes.

You said it needs to be clean to enable it to do that successfully?---Yes.

Therefore, when you start to clean it by scrubbing, that is the beginning of what you ultimately do?---The beginning of that total process which consists of a number of individual, sequential processes.

Certainly. What I ask you to consider is that you are not going to put it through the drums, the cyclones and the whims. You would have to reconsider your position, would you not?---In respect of what?

In respect of where it begins?---We are not talking about the same beneficiation process.

Of course we are not. You see, if you do not put it through the drums, cyclones and whims, you do not have the same need to clean it. That is so, is it not?---If you do not put it through the drums, cyclones and whims, you do not achieve the same degree of concentration. I cannot comment on the fact that you do not have the same need to clean it.

Why cannot you comment on whether you have the same need to clean it?---Because you are saying to me that if I delete the drums, cyclones and whims, then automatically I do not have the same need to clean the ore. That seems to me not to follow.

You do not need to clean it by reference to the needs of a drum, a cyclone and a whim, if you are not putting it through a drum, a cyclone and a whim. You would have to use some other criteria, would you not?---Some other criterion for what?

For cleaning? You see, the need to clean depends upon what you are going to do. You say, because you are going to put it through the drums, cyclones and whims, it has to be cleaned in a certain way or to a certain extent. What I am askingyou to contemplate is you are not going to put it through those three things. The need to clean would then have to be assessed by reference to some other criteria?---The view I would take is if the ore requires beneficiation it is put through the drums, cyclones and whims. If the ore requires beneficiation and it goes through the scrubbing-screening system and is not put through the drums, cyclones and whims, then it would appear to me that it is not beneficiated.

MR SHER: Did Hamersley tell you that some of this ore that went into this plant did not go through the drums, cyclones and whims?---No.

Does it come as a surprise to you to learn that some of it does not?---I cannot really comment on the operation and the method of operation of any particular plant.

Whether you can comment or not, until I put that proposition to you, you had not turned your mind to where beneficiation or anything begins in relation to this ore, if it does not go through the drums, cyclones and whims. You had not thought about it until a few minutes ago, had you? ---If it does not go through the drums, cyclones and whims, and the hydro-cyclone, there is no upgrading that occurs. I cannot understand what we are talking about.

I will come back to that. Let me just finish what I am asking you about now. Until I put this to you, you had no idea that this was happening, or might happen at this plant?---You are putting to me hypotheses, speculations, upon which I cannot really comment.

Would you please answer the question? I have asked it now about two or three times. It is not a difficult question, I would respectfully suggest. Until I put it to you, you had no idea that some of this feed - - -

MR SHER (Continuing): - - - of this feed was not put through the drums, the cyclones and the whims. The first you heard of it was when I told you a few minutes ago. That is either right or wrong. Is that right? Is that the first you have heard of it? ---I certainly heard the discussion that went on yesterday.

Was that the first you heard of it?---I do not recall hearing about it before.

When you heard it yesterday, and the evidence about the diversion, because of maintenance or perhaps other reasons, did you think about it then in relation to your theory about where beneficiation begins - overnight?---No. It would cause me no consideration, no reason to consider the matter whatsoever.

But surely it must? If you have decided that something starts at a given point, because of what happens at another point, and you are told that what happens at that other point may not happen, or does not happen, you have to re-think your proposition, do you not?--- Not in the least.

In any event, you have not re-thought your proposition?---As part of the sequence of processes involved in beneficiation, the first step in my view continues to be the point at which the water impinges on the ore and that is the first step in scrubbing. Scrubbing and screening will continue as processes within the general ambit of beneficiation, irrespective of what goes on downline.

The point you are trying to make is that this addition of water in the pulping box is something more than merely making a slurry for the wet screen. That is the point you have been seeking to make, is it not?---The point that appeals to me is - -

Is that not the point you have been trying to make? Let me put it to you specifically - that it is not screening, the preparation for screening in the pulping box, but something different? That is the point you are trying to make, is it not?---There is more than one process involved in what we describe by wet screening.

That process is scrubbing - is that right?---Yes.

And it is more than wet preparation for wet screening?---The two processes - - there is more than one process involved, yes.

Yes, and it is more than just the making of a slurry for wet screening. That is the point you have been seeking to make?---Yes, but only one of the processes involved on what we describe as a wet screen is the actual screening process.

MR SHER: The point you have been making is it is more than preparation for wet screening because you need to have this ore clean to go through the drums, the whims and the cyclones. Is that the point you have been seeking to make?---Yes.

If I told you that I want you to turn your mind to the situation where it does not go through the drums, the cyclones and the whims, you would have to re-think your opinion, would you not?---Not in the least.

It would make no difference to you?---It makes no difference to that particular process - what goes on beyond there.

If that is right, why did you say in your affidavit at p.8 "In my opinion the initial addition of water must be viewed as the first step in a process which these units complete, if what they do is irrelevant"? ---The initial addition of water must be viewed as the first step in a total beneficiation process which these units complete.

You are now telling the court that what happens at the drums, the whims and the cyclones is really irrelevant to the question of where beneficiation begins. That is what you are now saying. Is that not right? You are saying it does not matter what happens?---The total beneficiation process involves scrubbing and screening. It involves a series of sub-processes.

Doctor, you have said that something begins because of what happens at the end; namely that it goes through the drums, the cyclones and the whims?---Yes.

You have also said recently that it does not matter that it does not go through the drums, the cyclones and the whims; it is still the beginning of beneficiation. Is that right?---It is the first step in that process.

In what process?---In the process which occurs on the wet screen which, within our general terms of beneficiation, is one of theprocesses - - -

WITNESS (Continuing): - - - the processes which occur within the general range of beneficiation processes.

MR SHER: I will put it to you again: Are you now saying that what happens at the drums, the whims and the cyclones is really irrelevant to the quetion of where beneficiation begins in this plant?---As to where the processes involved in what we would call the total beneficiation begins, yes. I would think so, in those terms.

It is irrelevant?---The sequence of processes was scrubbing and screening, followed by storage, followed by preparatory screens, followed by the drums, the cyclones and the whims, and that is the total beneficiation process. The sub-processes which are covered within our general terminology of "beneficiation" include all of those, and the start of those sub-processes is back at that point, in my view.

You have said all that in different words before, in your affidavit. What I am asking you now is whether you are also saying, when the whole of that process is not gone through, that it really is irrelevant that it goes through the drums, the cyclones and the whims. Now, why do you not say it? It is irrelevant, is it not?---We are talking about a different total process if we remove the drums, cyclones and whims.

We have been told, as you heard yesterday, that some of this ore does not go through the drums, the cyclones and the whims, for whatever reason?---Yes.

In respect of that ore where does beneficiation begin, in your opinion?---If we remove the drums, cyclones and whims - -

Yes, we have done that?--- - - but we still put ore through the wet screening process, which involves scrubbing, in so far as the scrubbing or wet screening process is part of beneficiation - and I would have to think of the water and the beneficiation which might have occurred in the hydrocyclone at the end there; I would have to think about that also - I would imagine in (and I would have to discuss the flow diagram) if this speculation, this hypothesis, that the ore does not go through those three units - - I would have to look at the hydrocyclone also and look at the flow sheet which was involved.

Doctor, why do you keep calling it an "hypothesis"? You know from a witness called by Hamersley yesterday that it is not an hypothesis; it is a fact. Why do you call it an hypothesis? Do you not believe it?---"The information that you give me", then.

MR SHER: But Mr Langridge gave the information yesterday. Did you not believe it?---Well, when that sort of thing goes on, yes.

You have to re-think your theory now, have you not, in respect of that ore?---No, not at all.

You do not?---No, not at all.

You see, your point that it is not preparation for screening (and we would argue part of screening therefore) but scrubbing is based upon the need to scrub it for the purpose of the drums, the cyclones and the whims - - -

L174. 4.00

MR SHER (Continuing): - - - and the whims and we have gone through all that?---Yes.

If the drums, the cyclones and the whims are not going to be used, it is not being scrubbed for that purpose, is it?---That is true, yes.

You have to justify the scrubbing by reference to some other purpose?---I would have to look at the disposal of the water and investigate what concentration process occurred there.

What that last answer really means is that you would have to look into it again, find out some more facts and rethink your opinion?---Yes - - I beg your pardon. I would have to look into it again - -

Find out more facts?---Yes.

And rethink your opinion?---Yes.

And your opinion may end up being the same because of these new facts?---Yes.

Or it might be different?---It might be, yes.

The real area of dispute between you and other expert witnesses whose evidence you are familiar with because you have read their affidavits is that you are aware that other people are saying, this wetting in the pulping box is really just part of screening?---Yes.

Can we perhaps put it to you this way? Do you think this is something about which experts could honestly differ?---I guess, if we are termed as experts and presumably we differ and presumably our opinions are honest, yes.

I am not meaning to be offensive in any way but assuming that you accept my statement now that we do not suggest for a moment you do not honestly adhere to this opinion, could you not accept that of Mr Booth and Mr Beukema and Mr Grosvenor, that they honestly differ from you?---Yes, absolutely.

Would you agree then that the possibility exists that whether this is part of screening or not really may vary from person to person?---The interpretation, certainly, may vary from person to person.

I will take you to the sort of people who are different. Would you agree that on the one hand Mr Booth, Mr Beukema and Mr Grosvenor are all men of very considerable experience, practical experience, in the iron ore industry itself?---Yes.

MR SHER: And they are, to that extent I suggest, more experienced than you in that they have had years of practical experience in the very industry about which we are talking?---They are very experienced men indeed.

Mr Beukema was one of the top men at US Steel and that is one of the biggest iron ore mining and processing companies in the world, is it not?---It is.

And Mr Booth was the gentleman who, unlike Mr Langridge who fed information to the Mitchell Cotts people, actually worked with the Mitchell Cotts people on the design of the Mount Newman beneficiation plant? ---Yes.

Mr Grosvenor is a man of vast experience in America of a practical sense in the iron ore industry?---Yes.

And it is clear that they all disagree with you about what is going on in this pulping box.

MR HULME: With respect, this is not true of any of their evidence; that they disagree as to what is happening in the pulping box. They disagree as to what it is called.

MR SHER: Yes; I think my terminology was loose.
TO WITNESS: They all disagree with you as to what you should call what is going on in the pulping box. They are saying it is part of screening and you are saying it is not?---I am saying that the sub-process of scrubbing, which is a distinctly different process from screening, commences in the pulping box.

But they are disagreeing with you, are they not?---Yes.

You know that?---Yes.

You find yourself in conflict with the opinions of men of experience and practical knowledge of the iron ore industry, both in Australia and the United States?---It is not unusual for me to find myself in conflict with people in talking about the process principles.

It is because, I suggest, you have what may be described - and I do not use the word in any pejorative sense - as an academic approach to these questions. Do you agree with that?---I would wish you to define academic.

More a theoretical approach than a practical everyday approach? ---I would strongly dispute that.

You would disagree?---Absolutely.

Perhaps that is more a matter of comment - - -

149. 4.05

MR SHER (Continuing): - - - matter of comment.

OLNEY J: Dr Lynch, I do not want to open up a can of worms which may just have been closed, but in the process of wet screening is it your opinion that the process of scrubbing must inevitably take place to a greater or lesser extent?---Yes.

MR SHER: Do you have Wills' there, Dr Lynch?---Yes.

May we have that back for a moment, please? The purpose of wet screening, however you rate it - as to whether it is the primary, secondary or just one of a number of purposes - is sizing, is it not? One of the purposes of wet screening is sizing?---Yes.

Indeed, it would be fair to say, would it not, that as often as not it is the major or the primary purpose of wet screening?---Yes.

In this particular beneficiation plant sizing is critical to the operation of the drums, the whims and the cyclones? ---Yes.

Because not only do you need to size to get the contaminants into the lower sizes which do not go through the ferro-silicon, but if you do not size properly you are going to get small bits of ore going through the drums, are you not?---Yes.

And you will lose those small bits of ore because they will go into the waste rather than into the product?---Yes.

So sizing is not merely important from the point of view of getting rid of contaminants out of the product, but to ensure that you do not lose part of your product? ---Oh yes.

Would you not agree that, wherever we rank it, sizing on the wet screens (and I am talking about the primary wet screens) is a very important part of the process which those screens perform?---Yes.

Would you also agree that sizing on wet screening is made more efficient by very substantially wetting the feed?---Oh yes; yes.

To take a ridiculous example, if you fed onto a wet screen damp material, not only would it not size efficiently but it would be worse than dry material, would it not? ---It would indeed.

So once you decide to wet screen you really have to wet it well and truly?---Yes.

And the wetter it is the better, in a way, your sizing result achieved?---Well, it needs to be thoroughly wet.

MR SHER: Yes. If we talk about the wetting of this particular feed in this particular part of the plant, what actually happens is that the feed comes in virtually dry and falls through a pulping box, as you call it, onto a ledge or other ore, and it slides from there as a slurry onto the screen having been wet by sprays in the course of its fall?---Yes.

I have been told, and I am only repeating what I have been told and would ask for your view on it, if we apply the appropriate formula to the fall (and the distance is 1½ metres, I think, so Mr Langridge said) the time taken for the fall, which I understand is the whole fall from where it feeds in to where it sort of comes out at the bottom, would be about half a second?---I heard that yesterday and I guess it is right enough.

You are not in a position to quarrel with that?---No.

I take it you have great expertise in mathematics and the like? ---No, not at all.

It would seem to me, looking at your book, that there are a lot of formulae in it; are they not mathematical formulae? ---That does not mean I have great expertise in mathematics.

In any event, you know the formula to be applied in this particular exercise?---Well, I could guess it, yes.

Yes. That half a second or so is the whole fall so that, assuming the spray is about half-way down - - -

MR SHER (Continuing): - - - down it means that the feed is wet for something like a quarter of a second before it gets onto the screen?---Yes.

As it gets onto the screen it is flooded with water from the sprays at the head of the screen?---Yes.

So the wetting which actually takes place, which you say begins the degrading process and the like, is a wetting which takes place for about a quarter of a second?---Mm.

And is immediately followed by another substantial wetting?---Mm.

It would be fair to say, would it not, that if we are to look at the effect of the first wetting alone, we have to look at the effect of that first wetting and the time it takes to pass from the sprays in the pulping box to the sprays on the wet screen?---Yes.

Because at that point of time the wetting that carries forward is at least the wet screen wetting?---Yes.

The effect of water on free-falling feed which passes a spray and continues on and then is wet for about a quarter of a second would, in any use of language, be described as minimal, would it not?---I would have to have the term "minimal" defined to me?

Let me tackle it another way. If wetting this ore to cause some degradation was an objective desired by the people designing this plant, they could have gone about it in other ways, could they not?---There are certainly other possibilities, yes.

They could have done it much more. They could have wet it much more by putting it through, in effect, a soaking apparatus?---I repeat the discussion we have previously had. What is done must be dependent on achieving the optimum metallurgical result.

Of course it must, but you cannot comment on that because you have no tests or statistics or figures. That is right, is it not?---That is quite correct.

The people who would really know why they used this particular means of wetting the ore are the people who designed it?---Yes.

Mitchell Cotts and the people who instructed Mitchell Cotts?---Yes.

They would really know what they were intending to achieve in this particular process, would they not?---Yes.

Assume for the moment that they really had wanted to get a degrading process going. There were commercially available washers and scrubbers which would have done a much better job of washing and scrubbing than a .25 of a second exposure to water?---A much better job with relation to what?

MR SHER: In relation to cleaning or scrubbing or washing? ---A much better job, certainly, with relation to one portion of the degradation process, but in terms of a total metallurgical objective I - -

You do not know, do you?---No, I certainly do not know. I do not know that it would have done a better job and I do not know that it would not have done a better job.

I would make one further point concerning the one quarter second. Every process, as we understand, has a start and the start, I continue to assert, is at the point at which the water comes in contact with the ore, irrespective of the length of time.

That, in the end, really amounts to resolving the question of whether that is wetting it for the purpose of screening - whether that is included in wetting it to facilitate the screening. That is what that comes down to, is it not?---I can only repeat my comment; that the start of the process is at the start of wetting, which is at that point.

HEARING ADJOURNED UNTIL 10.30 AM

THURSDAY, 10TH NOVEMBER, 1983

CC79. 10.30

ALBAN JUDE LYNCH:

OLNEY J: Yes, Mr Hulme?

MR HULME: If it please your Honour, can we just record that the book referred to at pp.250 and 251 is the book later identified as Gaudin. It is spelt inaccurately earlier and sufficiently inaccurately as perhaps not to be identifiable but it is the book referred to at 250 and 251.

OLNEY J: Thank you very much.

CROSS-EXAMINED BY MR SHER QC (Continuing):

MR SHER: Doctor, in February of this year counsel acting for Hamersley provided counsel acting for the defendants with a draft of your affidavit which, when you swore it, was virtually identical with that draft. I take it before you swore the affidavit you were shown a draft of it and made such corrections as you thought fit?---Yes.

Would it be fair to say that the draft of your affidavit was almost identical with the affidavit in its final form?---I would have to look at the draft and at the final affidavit. I cannot answer yes or no.

We can do that if you like but I suggest to you that the draft and the final affidavit were virtually identical, that there was hardly a change in them. Does that not accord with your recollection, that suggestion?---I do not recall, your Honour. I deal with many papers. I am prepared to accept the assertion.

There is a way of dealing with this and perhaps I will deal with it this way: I hand to you now what I am instructed is the draft of your affidavit which was provided for us in February. I just ask you to accept that that is, in fact, what it purports to be and we will prove it if necessary?---Yes, I accept that.

Will you just have a glance through it, doctor, because I would want your concurrence that the draft was almost identical with the final document?---As I see it, it is very similar indeed; it is very, very similar indeed.

Doctor, will you accept my assurance that I am not trying to trick you in any way? I am not going to then suddenly spring on you and say, "But look, here's this change" - -

MR HULME: You did ask him to check it.

MR SHER: Yes, certainly, and I think Dr Lynch is a bit more suspicious of me than he needs to be.

TO WITNESS: Doctor, the only point I want to make is, you swore an affidavit in May after your visit to the Tom Price mine but the draft which was prepared which is almost identical with your ultimate affidavit was prepared before that visit to the Tom Price mine - --

C24. 10.35

MR SHER (Continuing): - - - Tom Price mine? That is so, is it not?---Yes.

So that you were able to have an affidavit prepared almost in identical terms with your final affidavit even before you went to the mine specifically for the purpose of inspecting this particular plant; that is, the wet screening plant?---Yes.

Therefore the views you express are, in effect, views based on principle rather than actually viewing the plant and making a specific inspection of it?---Yes.

You have stated in your affidavit, in para.5, that:

> "Crushing almost always refers to the coarse end of comminution and in iron ore plants is always carried out in dry form."

Do you recall saying that? Perhaps you should have your affidavit before you, because I could be confident I have put it to you accurately. Would you look at p.4? At about the fifth line you will see "Crushing"?---Yes.

And I have accurately read out what is there, have I not?---Yes, you have.

Well, that statement is actually wrong, is it not - that it is always carried out in dry form?---I would have to have that proved to me.

Is their crushing not carried out wet in the sense that the feed is wet, at this plant itself?---In so far as the feed contains moisture, the feed can be described as being wet.

Does it not go from this plant, some of it at least, to further crushing?---Yes.

What did you mean, then, by your statement "dry form"? Did you mean bone dry, or did you mean something else?---That it was not carried out in the presence of flowing water.

Right - so you concede that there can be crushing when the feed is damp?---When the feed contains water, but in the terminology which in my opinion is currently in use and referring to dry crushing, that is the meaning contained in my statement here.

You did not mean "bone dry", did you, when you said "in dry form"?---I would have to ask for a definition of "bone dry".

Well, completely dry - no moisture at all?---Yes.

MR SHER: You did not mean that?---No. I can conceive of nothing in the business of ore treatment that is completely dry with no moisture at all.

But I am putting to you that there is crushing at this very plant where the feed is damp?---Where the feed contains moisture to a particular level?

Yes?---I would agree with that.

How would you describe the level of the moisture in the feed at this plant which gets crushed?---When the ore will flow reasonably with a particular level of moisture - when it will flow reasonably through a crusher and across a screen without considerable quantities of water being added, which virtually assists in fluidising the ore, if you like.

Would you agree that your use of language may not be the same as - - -

MR SHER (Continuing): - - - the same as language of other people concerned with iron ore processing?---Yes. Certainly, my discussion of terminology is in the context within which that discussion is being carried out.

Yes, but would you not agree that the ore which you now concede at this very plant is crushed with some level of moisture in it, may be described by other people as wet feed and opposed to dry?---I concede that it may be described as feed containing moisture.

But people do not talk like that, surely? Do they not say it is dry,or it is wet, or it is damp? They do not talk about feed containing moisture, surely?---They do indeed say it is dry or it is wet or it is damp. Might I give an example?

No. Might I just suggest to you that within the iron ore industry (I ask you to concede) other people would refer to the ore which you described as having a level of moisture as ore which is either wet or damp?---Where the process, where the crushing and screening process, is carried out with the ore in such a condition that the ore alone, without substantial quantities of water, flows through the crusher, flows across the screen and - -

You call that dry, do you not?---That would be my terminology, yes.

You agree that other people would call it wet or at least damp?---I would have to have the definition of other people.

I am just talking about the ordinary use of the English language?---If the reference is to other metallurgists within operating plants I would not agree that they would call it wet crushing.

Let us not confine the people to metallurgists. Let us just talk about people generally - men operating the plant, supervisors, executives, people visiting the plant with some interest in the iron ore industry?---Again, I would not agree that such people would define these processes as being wet crushing.

But would they define the ore as being either wet or damp?---Depending on the particular condition of the ore at the time - -

I am just talking about what sort of language people use, not definitions - just the ordinary English language? Mr Smith talks to Mr Jones and they are looking at it and Mr Smith says "That ore is wet" or "That ore is damp". You would say "That ore is dry" but do you agree that people would sometimes describe it as wet or damp - the very same ore that you describe as dry?---Mr - all right.

Do you agree with that?---It is a very grey area indeed, but in strict terms I am prepared to accept that if I have a rock here which might well weigh 1000 tonnes and if I have a mono-molecular layer of water over it, or

water of any degree over any part of it, in strict technical terms it can be described as wet. I am prepared to accept that.

MR SHER: That is the sort of ore about which you have been talking as dry ore?---Yes.

You gave evidence yesterday at pp.243 to 246 in particular about the difference between dry and wet scrubbing in relation to its effect upon the mass of the ore. Do you recall that evidence?---Between dry and wet scrubbing and its effect on the mass of the ore?

I do not wish you to guess at it and I do not wish to get into a semantic argument with you. Can I bring you directly to the question that provoked your answer? At p.243/244 Mr Hulme asked you this question:

> "Can you perhaps bring together in a few sentences....(reads).... particles and grade, if grade connects to size."

Then you gave a fairly lengthy answer and - - -

J200. 10.45

MR SHER (Continuing): - - - lengthy answer and talked about the mass, balance and the like. Then Mr Hulme put to you at p.245/6:

> "You may be saying something which will surprise laymen in the sense of non-engineers.....(reads)..... to what precisely are you referring?"

You then went on to answer that question. It is that part of your evidence about which I want to ask you some questions. You now appreciate to what I am referring - to that evidence?---Yes.

Correct me if I am wrong, but I would put, if I may, in simple terms what I suggest you were saying: Were you saying firstly that between dry screening and wet screening there was a different effect upon the mass of the feed comparing what went in with what came out?---No, I was not.

You were not saying that?---No.

Were you saying that in dry screening the feed which went in was separated into size and therefore the mass of each particular part of the feed remained the same and the total of the mass which came out was exactly the same as the total of the mass which went in? Is that what you were saying?---Well, the total of the mass of solids which comes out will always equal the total of the mass which goes in.

That is either wet or dry screening, is it not?---In the mass of solids, yes.

Were you not making this distinction - - if I may say this without, I hope, creating offence; it was not very easy to follow what you were actually saying at that point of time and I am trying to see if I can put it in more simple language so that I can see whether I have understood it. Were you saying anything more than this: In wet screening the effect of the water was to change the size of a lot of the particles which went in in the feed, but in dry screening that did not happen?---In essence, yes.

That amounts to this, does it not: To say that, you are assuming that in dry screening the particles do not get changed in size by the dry screening?---Statistically, under all except the most unusual circumstances, the dry particles do not get changed in size.

Therefore, when you are talking about the change in the mass, you are saying in dry screening the particles remain the same mass but get separated into different streams, but in wet screening the particles do not stay the same

mass; they get separated into sizes which are - - they are pulled apart, as it were, or degraded, and whilst the total which comes out is the same as that which went in you have a lot of different changes in size? ---Yes.

MR SHER: I suggest to you that you are wrong, and that in dry screening exactly the same thing happens in that respect as happens in wet screening?—-You would have to present to me the evidence.

Let me just put it to you as a simple proposition: In dry screening when the ore comes down onto the screen, and as it gets bounced along it, do not particles break up?---Yes.

Well, is that not exactly what happens in wet screening, although not to the same degree?---I refer once again to the statistics involved. There is certainly degradation which will occur in dry screening.

But is it not only a matter of degree?---Everything is a matter of degree.

The difference between wet and dry screening in essence is, I suggest to you, leaving aside - - -

MR SHER (Continuing): - - - leaving aside what name you call it, that wet screening sizes more efficiently than dry screening because it helps to break up these particles and get fines which are being carried along on larger parts, as it were removed from that larger part. Is that not the only difference, in essence?---No, it is not the only difference in essence.

But that is a difference, is it not - one is more efficient than the other?---The difference is that there are several sub-processes occurring,in my opinion, in the wet screening process and,in my opinion, the additional sub-processes which might also be occurring in the dry screening process would statistically,under almost all circumstances, be exceedingly difficult to detect.

Doctor, the effect of water really makes the sizing of the material that goes in in the feed more efficient, does it not? ---It makes the group of sub-processes which contribute, of which one is the actual size separation, more efficient - I would agree.

Doctor, in this plant at the primary wet screens, what goes in comes out at the other end, does it not?---Yes.

Exactly the same that goes in comes out, in terms of total feed? ---In terms of total mass? I will agree that in terms of total mass exactly what goes in comes out.

But it comes out in four streams rather than one?---Yes.

That is what happens?---Yes.

You have agreed then, in the course of those last few questions, that in dry screening particles become detached from larger particles?---I would agree that they become detached.

You describe that as scrubbing?---Yes.

So scrubbing takes place in dry screening?---Yes; it takes place in dry screening - -

But not to the same extent?---Experimentally and statistically the extent to which it is possible to detect is very questionable and the scrubbing, the degradation process, we have never had to recognise in our studies of dry screening.

In any event, the simple answer to the question is that scrubbing takes place in dry screening as well as wet screening? ---In those terms, yes.

Finally, to have feed go onto a wet screen you need some feeding device, do you not?---You do.

MR SHER: Is it part of your expertise to design such feeding devices?---The mechanical of design of such devices, no.

The theory is within your field of expertise but not actually the practice?---I would not even claim to have the theory of mechanical design by any means.

But you agree that to get feed, ore feed, onto a wet screen you have to have some feeding device?---Yes.

In general terms that is usually called a chute, is it not?---Yes.

If you were having the feed come in - - - 10

MR SHER (Continuing): - - - come in, it usually comes in at the top?---Yes.

Falls some distance through what is generally described as a chute?---Yes.

Either falls directly onto the screen or, alternatively, onto some sort of ledge to break its fall?---Yes.

If you want to wet it before it gets onto the screen, you could put sprays into that chute?---Yes.

RE-EXAMINED BY MR HULME QC:

MR HULME: Could you explain to his Honour what you would refer to as "wet crushing"?---Where there is a stream of water which is added to the crusher, in addition to the ore, so that emerging from the bottom of the crusher there is a stream of broken ore and a stream of water, which is a significant and large proportion of the total mass.

OLNEY J: This stream of water is added as the feed comes into the crusher?---Yes.

MR HULME: Confining "crushing" as you do in para.5 to the coarser end of comminution, are you aware of a wet crushing process being used in the iron ore processing?---No, I am not.

Will all ore that comes in contain some moisture?---Yes.

Outside a laboratory - perhaps not even inside but outside a laboratory - will you find ore which is bone dry? ---I cannot conceive of ore which has absolutely no moisture at all. It is almost invariable for ore, for one reason or another, to contain half to one per cent and upwards of moisture.

Just so as to put it to one side, are you acquainted with mines where dust is a problem?---Yes.

Where dust in the air is a very, very real problem?---Yes.

Are you acquainted with mines where some water is sprayed at the time of the crushing process for the purpose of dust control?---With very many, yes.

The crushing process, where all that happens is that you have the feed itself coming to the crusher and sprays for the purpose of dust suppression - - do you regard that as dry or wet crushing?---I would still regard that as dry crushing.

If one takes, in the case of this plant, what we have called stream A, the 30 to 80 stream, will that normally be crushed before it goes onto the stockpile?---Yes.

Crushed down to 30. May one assume that that ore, having been

through the beneficiating process and coming out in lumps 30 to 80 will still contain surface moisture that was not on it when it came down to the concentrator? ---Yes.

MR HULME: Would you describe the crushing of that ore as dry crushing?---Yes.

Do you know anyone in the industry who calls it wet crushing? ---No, I do not.

As far as you are aware, in calling that dry crushing is your usage conforming with that which operates throughout the industry?---In my view it does - - -

WITNESS (Continuing): - - - it does.

MR HULME: You were asked yesterday, at p.257, whether you were saying that "This particular plant is really a scrubber". It then emerged that what this particular plant was, about which we were talking, was the wet screen and the chute. You were then asked to give a "Yes" or "No" answer: "Are you calling that plant a scrubber?" You said you could not simply say "Yes" or "No" to that: "Are you calling any part of it a scrubber?" I would ask you to expand a little on that matter, firstly as to what is one of the processes you say is happening there, and the question "Would you call it a scrubber?"?---I do not recall the context in which the words "this particular plant" were used, and I wonder if there could be some clarification.

It was brought down to the wet screen and the chute which feeds the feed into the wet screen?---In my view, the processes which occur are the sub-processes of scrubbing, of washing and of size separation in that total system which we call the wet screen, to which is attached as an ancillary device, the chute. The question, as I recall it, as it was referred to was whether I would call the chute a scrubber. In conventional terminology I would not define it as a scrubber as such. I would suggest - I would assert - that the operation of scrubbing commences in the chute, but the noun to describe the unit in which the operation of scrubbing commences would conventionally be "a scrubber", and I might draw analogies which would clarify that. So that in absolute strict technical parlance I would describe that as a scrubber, perhaps qualified by additional words - - -

WITNESS (Continuing): - - - additional words, but in conventional terminology, although the process of scrubbing commences there, I would not describe it as a scrubber.

MR HULME: Scrubbing effects can operate in a number of places we have been told?---Yes.

In your view, is the question whether that process is taking place affected by the label that one ties onto that particular place?---No. It is my view that the label is wholly irrelevant to the process that might be occurring.

Does it make any difference, in your view, to the process that is taking place what name the item is given on the chart stuck onto the wall?---No. I believe that it makes no difference.

In your view does it make any difference what it is called in the Hamersley annual report?---In my view it makes no difference.

Mr Booth says:

> "Where feed material contains ores or contaminants prone to breakdown in size, the high pressure jets are used to accelerate the breakdown process."

Do you agree that one of the purposes of the high pressure jets of water used in the process as described here is to accelerate the breakdown process?---Yes.

MR SHER: Your Honour, I realise this is an expert witness and I have not objected on many occasions when perhaps I might have but that is a leading question. I would ask my learned friend not to ask leading questions in re-examination.

OLNEY J: Yes. I think it is a leading question and perhaps, Mr Hulme, you would just keep that in mind.

MR HULME (TO WITNESS): What name would you attach to the use of high pressure jets to accelerate the breakdown process?---Could I have the question clarified? What name would I attach to the use of high pressure jets to accelerate the breakdown process? Let me say that I would consider that the breakdown process consists of a scrubbing process, the scrubbing sub-process, and the related washing sub-process. I would consider that the significant purpose of the high pressure jets is to enhance these processes.

MR HULME: Mr Booth says as to what happens on the screen:

> "The wetting process is usually so arranged as to liberate and separate the bulk of the material into the two or more size ranges required."

What name do you attach to the use of water on the screen surface to liberate the material?---In conventional mineral processing terminology, liberation is detachment - - -

WITNESS (Continuing): - - - is detachment, and in these terms I would regard the process of liberation as being the process of detachment and degradation which is described by the unit operation of scrubbing.

MR HULME: I would take you to a section in Taggart, s.10.

OLNEY J: Which exhibit is that?

MR HULME: It is ECH1, your Honour.
TO WITNESS: From about line 4 onward:

> "Particle size alone is ordinarily but not necessarily the property upon which.....(reads).....but air is sometimes used."

Do you accept that statement? Do you agree with that statement of Taggart?---Yes.

It continues:

> "The names carry over from parallel familiar household activities and imply.....(reads).....carrying the smaller solid in suspension."

Is that consistent with your understanding of the word? ---Yes.

Then Taggart says in sub-s.(1):

> "The material to be scrubbed, the form and character of the material to be removed by the scrubbing and the results deranded determine the method and apparatus to be employed."

Do you agree with that proposition?---Yes.

If one goes over to the next page, just before s.2, we come to the methods of scrubbing:

> "1. Jet impact.
> 2. Tumbling.
> 3. Stirring.
> Each may sometimes advantageously be preceded by soaking."

Do you have any comment on that?---I would agree with that statement.

Then one finds - - -

MR HULME (Continuing): - - - finds this proposition:

> "If the material is moving towards the jet....(reads)....towards the jet over a rigid surface."

Do you have any comment on what is said there?---Again, I would agree with the comments that are made.

If one goes over to 10-05 there is a description of the log washer.

> "The log washer has two functions, (a) to disintegrate clay....(reads) ....to separate disintegrated fines from lump material."

(a) is disintegration and (b) is separation of disintegrated fines. Would you describe either of those as scrubbing?---I would describe the disintegration of the clay and the clay-bound sand matrices as essentially the scrubbing sub-process.

In normal parlance what would you call a log washer?---In normal terminology I would call it a log washer. In discussing the operation of operating mechanisms in a log washer with my technical colleagues, I would refer to the two sub-processes which are occurring of scrubbing and washing and the process of separation.

But if you wished to say to somebody "Go and stand by" such-and-such - that kind of usage, you would normally call it what?---A log washer.

In the industry what would you expect people to refer to it as?---Refer to it as a log washer.

Would your view as to what was happening inside be affected by the fact that it was called a log washer?---No.

OLNEY J: It obviously does not wash logs?

MR HULME: Part of it was a log originally, was it not?---As Taggart explained, the origin of the name came from the presence of logs.

Would you go over to 10-08 where Taggart turns to washing, which he defines as:

> "Separation on a size basis between particles differing so widely in size ....(reads)....Washing usually involves more or less scrubbing."

Do you see that in the next paragraph?---Yes.

Would you agree with that?---Yes.

Then if you go to 10-09, about one-third of the way up from the bottom of the page - - -

MR HULME (Continuing): - - - of the page:

> "Vibrating machines are used for most modern sizing and washing of rock, gravel and the like down to....(reads)....the flatter the screen chosen."

Would you explain to his Honour the difference between and the significance of the difference between a screen on a low slope and one on a higher slope?---It is a very clear, to me, brief description.

Would you explain to his Honour the significance of the difference between using a steep slope and using a low almost flat slope?---The steeper the slope of a vibrating screen the more rapidly, in general terms, the particles pass across it; the flatter the slope the greater, in general terms, would be the residence time.

Why, in your view, is it that if there must be scrubbing it is preferable to have a low slope?---In order to allow the type of residence time on the screen in order to permit the process to reach an appropriate metallurgical completion.

You were asked yesterday some questions relating to the Allis-Chalmers paper, Vibrating Screen, Theory and Selection, exhibit NEG 4 to Mr Grosvenor's affidavit?---Yes.

Page 17 in particular; the last sentence in the third paragraph:

> "If the feed contains a large quantity of clay, the sizing may be improved by pre-soaking or adding water to the feed in a flume ahead of the screen."

It is the right-hand column, the third paragraph, the last sentence?---Yes.

You were asked some questions as to that and you replied in terms of scrubbing and it was pointed out to you that what was being said there was sizing?---Yes.

I want to ask you a few questions in relation to that. First of all, in these questions can we assume that lumps will behave according to their nominal size? I am going to ask you some questions,and I am aware that funny things can happen on screens, on the basis that something - - -

LA44. 11.25

MR HULME (Continuing): - - - on the basis that something less than 6mm will go through a 6mm hole and something more than 6mm will not?---Would you repeat the question you asked, please?

I want to ask you some questions on the basis that all the lumps behave in accordance with their nominal size - that something less than 6mm will go through a 6mm aperture and something more than 6mm will not go through a 6mm aperture?---In broad terms I would agree with that.

Yes; I am asking you to make that assumption. If you have a separate 4mm piece of ore and it goes across a 6mm screen, then if one makes my assumption, it would have every chance of going through the screen?---It would have a very high probability of going through, yes.

If it has adhering to it clay which makes it an 8mm lump, then again on the basis on which I am asking the question I am coming to, it will not go through?---I agree.

Assuming that it stays with the 6 to 30s and subsequently the clay degrades, leaving it as a 4mm lump in the 6 to 30mm stream, would you regard that as good sizing?---Looking at the lump as a coherent lump of ore plus clay, the sizing which was carried out, the size separation mechanism which was carried out on the first screen, clearly meant that it went where I would expect it to go. If I look at the term "sizing" and if I read it in the context in which I believe it is used in this document, which involves the degradation, the "liberation" as the term was used, of the clay from the hematite or from the ore, I would not. However, the question as such is difficult to answer without a lot of qualifications.

From the point of view of separating ores into fines and lump ore for sales, would you say the purpose of the screening had been achieved?---Again I must qualify the answer: Would I say that the purpose of the process has been carried out within that entire screening equipment, or has been achieved, if indeed the clay was not removed from the ore? I would say it had not been achieved.

If the scrubbing effect is such that by the time that [illegible] ore gets to the end of the screen it goes through the hole into the minus 6 - separates and falls through - would you regard the operation of the plant as better or worse than the operation where it continues to hold its clay - - -

MR HULME (Continuing): - - - its clay and stays in the 6 by 30? ---If the disintegration has occurred by the time the particles reach the end of the screen and the original 4mm particle of rock has passed through the aperture without adhering clay, I would regard the process as having been successful.

OLNEY J: What you are saying, really, is that one of the purposes, if not the only purpose, of this procedure is to remove clay from, in this example, the ore particle?---In this example about which we are talking, we are specifically discussing, as I understand it, the removal of clay from the ore particle.

If that is the purpose of the exercise, if the clay is removed then you have a good result and if the clay is not removed you have a bad result?---In this example. That is not the total purpose of that total screening equipment.

I appreciate that. The original question put to you, as whether it was good sizing if the 4mm lump with clay did not fall through the hole, really needs you to know what the overall object of the exercise is?---It is certainly, as it is expressed here, a very shorthand method of expression.

MR HULME: In the example I was giving you, there seemed to be three possibilities when something comes onto the screen with a piece of clay attached to it. It either comes off on the screen, or it comes off after the screen and on the way to the drums or it goes into the drums still adhering to the clay?---Yes.

If the purpose of the ultimate exercise is to have lump ore in one stockpile and fines in another, which is the best place for the lump of clay to separate from the piece of ore?---I would consider that the best place is at the preliminary screen. That would be my first reaction.

You were asked a number of questions as to what was thought to have been a change in your definition of scrubbing in your affidavit. Do you have your affidavit there?---Yes.

You were asked some questions on the basis that up to para.8 you had been using what one may call a Taggart-type definition but when you got to para.9 you were talking about metallurgical effects and a different use of the word scrubbing. In your view, is the word scrubbing used in the same sense in para.9 as earlier in your affidavit - - -

MR HULME (Continuing): - - - your affidavit?---In essence, yes, but I must qualify it by saying that I have certainly been guilty of a slight shorthand in this, not being completely explanatory.

OLNEY J: When you use the term "maximising", that is really equivalent to using the term "maximising the scrubbing effect"?---Yes. Every engineering process is carried out with regard to some economic objective - economic or, in our mineral processing case, metallurgical objective - and implicit in any consideration of maximisation is that it should be maximised with regard to a particular objective or a particular constraint. I have not clarified this in this paragraph.

MR HULME: Accepting that, doctor, is the word "scrubbing" being used in the same sense as earlier or in a different sense?---It is being used in the same sense.

You have said earlier, in explaining the word "optimising", that you can get good and bad results following from scrubbing?---Yes.

And you seek to optimise?---Yes.

At p.235 you discussed Mr Booth's suggested variation. Do you remember seeing his conceptual design to fit into the space at Hamersley, the drawings being PFB1?---Yes.

What you said of that was:

> "There is no evidence presented that an alternative design to the one .....(reads).....They are the comments that I would have to make on attachment PFB1."

WITNESS: I do recall saying that.

MR HULME: Would you, in order to know whether it would need evidence?---In order to assess the merits of different designs, the metallurgical merits to be achieved in differently-designed units it is my opinion that the evidence would require to be presented for a quantitative assessment.

OLNEY J: Again you would have to know what your objective was to start with?---Yes.

I follow that.

LA71. 11.40

MR HULME: I will take you to a matter raised at 290. At 290 you were asked whether you regarded the operation of a sieve bend as being screening. Do you remember being asked about that?---Yes.

Could you indicate briefly to his Honour what happens in a sieve bend?---A sieve bend consists of a series of horizontal wedge-shaped wires. These are built around the bend, the wider section of the wedge being to the fore and the pulp, as it flows down and across the sieve bend-flows at right angles to the horizontal wedges. The leading edge of the wedge cuts a slice of the pulp which then passes in the apertures between the wedges. The particles which are greater than a particular size are prevented from passing through the wedges and it is only the particles that are less than a particular size that are permitted to pass through. The repeated presentation as the pulp passes from wedge to wedge - that is the manner in which the particles are repeatedly presented to the apertures.

What size material does one use sieve bends for?---Generally very fine materials.

Can you put approximate figures on what one means by saying very fine - under what?---Around one half millimetre down; perhaps a little larger than that in particular cases, even a millimetre down, where these type of screens would be used, but that is a very general statement in that size.

The one we know of here is in a beneficiation plant or a concentrator - - -

315A. 11.45

MR HULME (Continuing): - - - a concentrator. In what other places might other sieve bends be found?---Excuse me but I would like to correct that last statement - at what point, what is about the size of a sieve bend? It would start at a little coarser than that. It might well be a couple of millimetres. It might be the starting point of a sieve bend.

OLNEY J: Are you saying a particular sieve bend would have a graduated effect? It would start with the coarser and get finer?---No.

Are you talking about individual sieve bends might be a millimetre or a half millimetre depending what is required?---Vibrating screens become relatively inefficient below a certain size and that size might be around about 3mm or thereabouts. Around about that point, sieve bends, these wedge-type screens, start to become significant. Then they proceed from there much finer in size. That is a qualification and correction to my previous answer. I ask for you to repeat the question, please?

MR HULME: Down at that size, somewhere from 2mm down let us say, I think you have said to his Honour that dry screening becomes very difficult?

OLNEY J: "Vibrating" screens?---Yes.

MR HULME: With very fine particles, 2mm down or 1mm down, can one reach a point where one almost has to wet screen? ---Yes. I would be talking very generally indeed, but even with the finer vibrating screens dry screening is a relatively - - can become relatively inefficient and it is not uncommon to wet screen with the finer vibrating screens, those that might well be down around 4mm or thereabouts. Certainly, by the time we get into the sieve bend area, wet screening - the use of sieve bends by slurries - is obligatory.

In what kinds of installations would one expect to find sieve bends? ---In a variety of installations - in tin mining, in scheelite mining.

I mean in iron ore?---Where size separation is required but where we are considering separation at sizes less than that area in which vibrating screens are efficient, which is down around the 2mm, 1mm and the like area.

That is the physical kind. In what kinds of plant would one expect to find sieve bends?---In wet processing plants.

Can you tell his Honour what process or what processes take place in sieve bends? I do not mean how they work. I mean in your terminology what processes are taking place - - -

MR HULME (Continuing): - - - taking place?---It is in terms of size separation, of screening, it is presentation of the particles to the aperture, but in terms of the fact that this continues to be done in water the process of scrubbing, the process of washing, would also continue to occur.

I would just say, your Honour, that the photograph of the sieve bend is No.17 in the list of photographs. It might be helpful to have that before you. I will not take your Honour to it, I do not think.
TO WITNESS: There is a passage at p.293, Dr Lynch, where you are informed of the existence in the United States of America of the Vibrating Screen Manufacturers Association, Lexington Avenue, New York State (although that perhaps is New York City), and were told that dry screening is defined by that association as being "separation of material without the addition of a liquid vehicle"?---Yes.

If one employs someone in an orchard to pick out the bad apples as they come past, would you call that dry screening? ---No.

It says:

> "Wet screening is the separation of material with the addition of vehicles such as water."

Do you follow that?---Yes.

If you had a mixed-up pile of sand and sawdust, one way of achieving a rough separation would be to put them into a bucket-full of water, would it not, hoping that the sand would sink and the sawdust would float?

MR SHER: Your Honour, I hate to interrupt this fascinating line of re-examination, which appears remarkably like cross-examination, but in any event the definition was in the context of the use of screens, which seems - -

MR HULME: Of course, and that was the precise point that my learned friend instructed the witness to ignore.

MR SHER: Did I? Where did I do that?

MR HULME: My learned friend said to him - - he read the definition: "Dry screening, separation of material without the addition of a liquid vehicle", and said: "Would you regard those as acceptable definitions? You do not have to worry about 'mechanical' there", "Mechanical" appearing in the head definition of "Process" - -

MR SHER: Of screening.

MR HULME: That is the very point I am making - that the definition is put to him on the basis of "ignore the overriding definition of screening", the witness having already said he had trouble with the word "hydraulic". My learned friend said: "Well, this time we haven't got hydraulic because it is not down the bottom", and implicit in that is: "Read it without looking back at the top". I mentioned it, your Honour, for the purpose of illustrating - and my learned friend has helped me to do it better than one could have hoped - the difficulty in which the witness is placed there. He is just being told: "Forget what has gone before and I'll put this kind of definition to you and tell me, as you sit in the witness box, whether or not you accept that as a definition".

MR SHER: Your Honour, all this indicates is that this is a matter of comment, not a matter of cross-examining a witness in re-examination about it.

OLNEY J: I think I follow what was put yesterday, and it appears in the transcript, and the point you are making, Mr Hulme.

MR HULME: I am happy to leave the point at that, sir.
TO WITNESS: You were asked whether you had ever had any - - -

MR HULME (Continuing): - - - had any practical involvement with industry, matters of that sort, or were merely involved in research. Have you been with the Kruttschnitt Centre since it was founded?---Yes. I was the foundation director of the Julius Kruttschnitt Centre.

And that was 1970?---Yes.

Are you able to tell his Honour who funded the cost of the original construction of the centre?---The centre was given to the university by MIM Holdings Ltd in 1970. This was the physical building plus a certain amount of financial support. It was extended, I believe in 1981, again donated to the university by MIM Holdings Ltd.

MIM Holdings being the Mount Isa Mines holding company?---Yes.

Is the kind of research done principally pure research or research on what one may call the applied side?---In conventional terminology it is highly applied research which is very oriented towards operating plants and operating mines and, indeed, the supporting funding of the centre, the entire cost of the operation of the centre, 95 per cent of that, I believe, comes from research grants, the great proportion from those companies concerned with minerals engineering. To complete the picture the funding this year amounts to about $1½ million.

Are specific programmes charged for? Is the centre asked by companies to do research into particular problems?---Very frequently. The manner in which the research is planned is that my colleagues and I - within a limited area and in mineral processing this is in developing mathematical models for use for plant design, plant optimisation, plant control - will define what we consider to be an area of weakness in understanding of the process. This will be submitted to the Australian Mineral Industry Research Association for consideration for funding. This association will then give this proposal to its member companies as a result of which companies will individually choose to fund a programme or choose not to and that is by far the major method of support funding. There have been, however, particularly in the last couple of years, individual companies who have funded individual programmes but within this general area of work.

You say in your affidavit that you have visited and studied most of the major mineral processing plants in Australia? ---Yes.

On the occasion when people want research done or when you visit their plants etc. do you find yourself speaking to people in the industries - - -

MR HULME (Continuing): - - - the industries?---Yes. That is the purpose of the visit.

How would you describe the amount of contact you have with people in the mining industry?---I am away from Brisbane of the order of three to four months a year - and this varies, but for a considerable portion of my time - and have been for several years, the purpose being to discuss our research programmes with the 20 or more companies which might support it, in the context of their particular operations, and to plan experimental programmes in those particular operations by members of the staff and graduate students in my centre.

Do those sponsor companies include such companies as Bougainville, Comenco, Electrolytic Zinc, Esso, Hamersley, ICI, Kembla Coal, Mt Isa, Mt Newman, North Broken Hill, Peko-Wallsend, Renison Goldfields, BHP, Shell Company, Swedish Mining Association, Zinc Corporation, Utah, Western Mining and Woodlawn Mines? ---Yes.

Do you think that over the years you have acquired certain knowledge of the terminology used in the industry? ---I believe so, yes.

You were referred yesterday to the last sentence in para.8 of your affidavit.

> "In my opinion, the initial addition of water must be viewed as the first step in a process which those units complete."

"Those units" are the drums, cyclones and whims. You were asked questions as to what the position would be if, at any particular time, one or other stream is not going through its normally relevant unit. Do you remember that?---I remember the discussion. My impression is that the question did not relate to if one or another stream. My remembrance, and it may be quite wrong, was that the discussion said if the drums, the heavy media cyclones and the whims were deleted. That may be a wrong recollection.

It is not one I can confirm either way, I think. It is on the part of the transcript we did not get overnight.

OLNEY J: I have before me 331. He answered a question on that - - -

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OLNEY J. (Continuing): - - - on that page which perhaps you do now have, Mr Hulme, you said:

> "The view I would take is if the ore requires beneficiation it is put through the drums, cyclones and whims. If the ore requires beneficiation and it goes through the scrubbing,screening system and is not put through the drums cyclones and whims, then it would appear to me that it is not beneficiated."

WITNESS: That is my recollection of the discussion.

MR HULME: Doctor, can I ask you to assume that in relation to a particular stream and let us say stream B, the 6 to 30, which normally finishes in a heavy media drum, for reasons of maintenance the stream bypasses the drum and goes out onto the stockpile?---Yes.

If that was happening, firstly would that have any effect on what you said in para.8 as to the streams which were continuing to go to their normal place?---No. I believe it is still quite consistent with my comment in para.8.

In relation to that stream, while it is bypassing the drum, it seems clear that the process is not completed in the drum if it does not go there?---No, I agree.

Would you describe that ore which has gone through the pulping box and the screen and has come out as 6 to 30, stream B, as having - -

MR SHER: Before my learned friend goes any further the question is obviously going to be a leading one because my learned friend is now going to give a description. What he should ask the witness, with respect, is, "How would you describe that ore?"

MR HULME: Wet? Dry? Hot? I can think of lots of ways. It is difficult - -

MR SHER: The witness should give the evidence; not my learned friend.

MR HULME: Neither can any sensible question that does not indicate the question in issue -- How would you describe the screen? You can say it is wet ore.

OLNEY J: I think perhaps it may need a process of elimination of alternatives, Mr Hulme.

MR HULME (TO WITNESS): How would you describe that ore? ---Let me clarify in my own mind - if the 36mm ore passed across the total process involved in wet screening, but instead of going from there onto the subsequent processes in drums and the like it was then diverted and did not pass through those subsequent processes?

Yes?---I would consider that beneficiation had occurred in those total processes involved within the wet screening system.

When would you regard that process - - -

MR HULME (Continuing): - - - that process as being complete in that case?---That individual beneficiation process, consisting of those sub-processes, I would regard at that particular point, at the time at which those particles fell off the screen oversize and were removed to wherever they happened to go - -

Where would you regard that process of beneficiation as having begun?---At the point at which the water first collided with the ore in the box ahead of the screen.

I am just looking at that passage, your Honour. We could not do this overnight. I knew there was something at which we wished to look but we just did not have the transcript.

OLNEY J: The part I read was at the bottom of p.331.

MR HULME: I only received it a few minutes ago.

OLNEY J. (TO WITNESS): Could you just help me with a couple of points? Drawing on your knowledge of the terminology used in the iron ore industry, is the term "refined" or "unrefined" a term which is used as applying to iron ore or iron ore processing?--- In my experience it would not be used in this general area of physical separation. Refining comes further down the line. Once the physical process is complete, the concentrate is produced, and then we go into chemical processing.

So you would attribute the term "refining" to a chemical process?---Yes.

What about the "manufacturing" or iron ore?---Manufacturing would be more concerned, in my opinion, with once the iron has been produced in a useable form; it then enters the manufacturing area.

What about the term "upgrade"?---Upgrade is concerned with the area in which we are talking about now.

Is "beneficiation" synonomous with upgrading?---In my opinion --- -

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WITNESS (Continuing): - - - opinion (and this is a grey area) "concentration" would be synonymous with "upgrading"; "beneficiation" in that it relates to the improvement of the properties of particles with respect to some particular objective would include concentration and upgrading.

OLNEY J: Would you regard a process involving only crushing and screening as an upgrading process?---In the case of aggregate production for roadworks, for cement production and so on, the gravel, the blue metal, would be upgraded in that case.

What about iron ore - iron ore taken out of the ground with a shovel, put on a Haulpak, tipped into a crusher and screened? Is the iron ore upgraded?---When we speak about the grade of an ore, the grade of a deposit, we very frequently refer to the chemical composition of the deposit, so "upgrading" very frequently relates to the increasing, by one means or another, the chemical concentration within a particular fraction. Now, in terms of crushing and screening of iron ore, as a result of the screening process where it is divided into two size of fractions, one size fraction will contain a higher concentration of ironthan the other size fraction therefore, in the terminology about which I have spoken, that size fraction could be defined as being upgraded.

Thank you, Dr Lynch.

WITNESS WITHDREW

DOCUMENT 2* - Plaintiff's Evidence
Evidence of Alban Jude Lynch
Re-examination