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<p>1 Wednesday, 25 September 2019</p> <p>2 (2.49 pm)</p> <p>3 CHAIRMAN: Yes, Mr Pennicott.</p> <p>4 MR PENNICOTT: Sir, good afternoon.</p> <p>5 Before we get to the evidence of Dr Barrie Wells,</p> <p>6 who was sat in a seat in front of that fireplace on the</p> <p>7 screen, in London, a short while ago but has temporarily</p> <p>8 disappeared -- sir, before we get to his evidence, you</p> <p>9 will be aware that there are essentially two</p> <p>10 applications before the Commission, both of which relate</p> <p>11 to Dr Wells' evidence. The first application is</p> <p>12 an application by the government to invite the</p> <p>13 Commission to expunge a number of identified paragraphs</p> <p>14 in Dr Wells' COI 2 report.</p> <p>15 The second application is an application by Leighton</p> <p>16 to resist, at least at this stage, the admission of</p> <p>17 Prof Yin's second report which is a report which is</p> <p>18 responsive, essentially, in our submission, to Dr Wells'</p> <p>19 reports both in COI 1 and COI 2.</p> <p>20 Sir, I don't know precisely how you wish to deal</p> <p>21 with those applications. I know you've seen them,</p> <p>22 you've had a think about them, but logically I think</p> <p>23 probably in time Mr Khaw's application for the</p> <p>24 government was first, and that's the expunging</p> <p>25 application. I have my own views, which I will express,</p>	<p>1 directly in ... CS2 ds and many requirements are stated</p> <p>2 without derivation, reference or context. It is</p> <p>3 therefore necessary, if seeking either context or</p> <p>4 clarity on points of detail, to refer to the overarching</p> <p>5 principles set out in international standards, of which</p> <p>6 the foremost are the collection of standards published</p> <p>7 [in ISO]."</p> <p>8 Then he went on to cite certain paragraphs in CS2</p> <p>9 which refer to ISO.</p> <p>10 Pausing here, Mr Chairman and Mr Commissioner, it is</p> <p>11 quite clear from what Dr Wells is trying to say here</p> <p>12 that he was trying to say that, well, despite the</p> <p>13 express or explicit terms as set out in CS2, there are</p> <p>14 certain standards which would need to be incorporated or</p> <p>15 implied into CS2, and that is his understanding and his</p> <p>16 interpretation of CS2.</p> <p>17 But when we look at the two passages that he cited</p> <p>18 regarding CS2, it says, first of all, under 3.2:</p> <p>19 "A system of third party certification of the</p> <p>20 manufacturer to the quality standards of ISO 9002 is</p> <p>21 designed to ensure [compliance with British</p> <p>22 Standard ...] is being carried out."</p> <p>23 Then he went on to say:</p> <p>24 "Review of the CS2 comprises two stages. Stage 1 of</p> <p>25 the review is to update the technical specification and</p>
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<p>1 if necessary, to the Commission, but perhaps it would be</p> <p>2 appropriate, in the first instance, to hear briefly from</p> <p>3 Mr Khaw.</p> <p>4 CHAIRMAN: Yes.</p> <p>5 MR KHAW: Yes, Mr Chairman and Mr Commissioner.</p> <p>6 I fully understand that the Commission may not</p> <p>7 always welcome interlocutory applications in an Inquiry,</p> <p>8 but we believe this is an important one that we need to</p> <p>9 make.</p> <p>10 If I can first of all take the Commission to the</p> <p>11 relevant paragraphs of Dr Wells' report regarding the</p> <p>12 Extended Inquiry. That is in ER1, item 2.</p> <p>13 CHAIRMAN: Sorry, bear with me a second.</p> <p>14 MR KHAW: If we can take a look at internal page 3, starting</p> <p>15 from section 3, about rebar testing.</p> <p>16 CHAIRMAN: Mm-hmm.</p> <p>17 MR KHAW: The relevant paragraphs that we object to start</p> <p>18 from 3.1. Mr Chairman and Mr Commissioner can see that</p> <p>19 3.1 actually is about the quality assurance standards</p> <p>20 relevant to rebar testing are CS2.</p> <p>21 CHAIRMAN: Yes.</p> <p>22 MR KHAW: And the updated standard CS2, et cetera.</p> <p>23 Then 3.2 we say starts to contain Dr Wells'</p> <p>24 interpretation of CS2, because he says:</p> <p>25 "There are many points of detail not addressed</p>	<p>1 quality assurance system for steel reinforcing bars to</p> <p>2 align with the quality and performance levels as</p> <p>3 stipulated in the latest international standards ..."</p> <p>4 Again, pausing here, there is nothing in CS2 which</p> <p>5 states or even indicates that if certain international</p> <p>6 standards had been complied with, then you don't need to</p> <p>7 comply with the standards as set out in CS2. There have</p> <p>8 never been any provisions in CS2 to that effect.</p> <p>9 So what Dr Wells is trying to say is that despite</p> <p>10 the express provisions in CS2, the failure to carry out</p> <p>11 all the rebar testing as required under CS2, in fact</p> <p>12 does not amount to a breach. That's essentially what he</p> <p>13 is trying to say.</p> <p>14 Because if we look at 3.4, he is trying to set out</p> <p>15 the long-term goal of CS2:</p> <p>16 "... is to reach the situation extant in most other</p> <p>17 countries, where the national standards do not require</p> <p>18 purchasers' testing provided manufacturers' testing is</p> <p>19 deemed adequate. This is in line with the ISO</p> <p>20 overarching standard ISO 3951 ..., which states that</p> <p>21 standards should allow for a reduction in testing ..."</p> <p>22 Then he went on to say:</p> <p>23 "What this is saying is that the ISO committee, ie</p> <p>24 the community of experts, advocates a flexible approach</p> <p>25 for quality assurance when applying standards, rather</p>

Page 5	<p>1 than dogmatic adherence to rules." 2 Now, the question arises on what basis can Dr Wells 3 talk about what was the underlying thinking of the ISO 4 committee? It's clearly not stated here. 5 Then if we look at his conclusion at 3.14 on the 6 next page, page 5, and the conclusion in question 7 appears at page 6, (b). He then said, after his 8 interpretation of CS2 and also the reference to 9 international standards in trying to interpret the 10 requirements under CS2 -- he said: 11 "even though some batches of rebar were not 12 re-tested after delivery to the site, both the spirit 13 and the intention of the applicable standards were met 14 overall." 15 We can then look at the next page, 3.18, where he 16 has said, in that case: 17 "The adequacy of the testing should be assessed by 18 reference to the relevant quality assurance standards. 19 I have presented this assessment in my answer to 20 question 1." 21 Then he went on to say: 22 "... the relevant quality assurance standards 23 clearly means CS2:1995 and CS2-2012 but may also be 24 interpreted as including other national and 25 international standards. As stated previously, CS2 ...</p>	Page 7	<p>1 MR PENNICOTT: I'm inferring that he can hear, although you 2 might like to confirm it because he is making some 3 notes. But I don't know. 4 CHAIRMAN: Let me just see. 5 Dr Wells? Ah, yes. 6 DR WELLS: Good afternoon. 7 CHAIRMAN: First, thank you very much for your attendance to 8 give evidence in London. I think you've come from North 9 Wales; is that right? 10 DR WELLS: That's correct. 11 CHAIRMAN: A bit of a journey. We are -- as you know, 12 courts are inclined to this kind of, including 13 Commissions of Inquiry -- we are having a brief 14 inter-exchange concerning certain aspects of your 15 technical and expert evidence. We are quite happy for 16 you to listen to it, if you wish to do so. I don't know 17 if you've been able to hear what's being said. 18 DR WELLS: I have. Thank you. 19 CHAIRMAN: Good. So we will continue on, and thank you very 20 much indeed for your presence. 21 MR KHAW: Thank you, Mr Chairman. 22 CHAIRMAN: Yes, Mr Khaw. 23 MR KHAW: I was at 3.20, where Dr Wells said: 24 "It is therefore necessary to include, as being 25 relevant, the guidelines given by the ISO and</p>
Page 6	<p>1 states", et cetera. 2 Then he repeated the two paragraphs contained in 3 CS2:1995 and 2012. 4 MR SHIEH: Before my learned friend goes further, I can see 5 from the computer screen that Dr Wells is actually 6 seated. 7 CHAIRMAN: Yes. 8 MR SHIEH: I don't know whether he can hear the submissions 9 currently being made, because it actually impinges on 10 his report. I'm just raising it so that the Commission 11 can decide whether we need to mute it or whether the 12 Commission sees no problem about Dr Wells being able to 13 hear what's being said about his report by Mr Khaw. 14 MR PENNICOTT: I think he should be able to hear. 15 MR KHAW: I have no problem either way. 16 MR PENNICOTT: If he were in Hong Kong, he would be sat 17 here, listening to this, and I think he should be able 18 to hear. 19 CHAIRMAN: All right. I'm happy to go with that. 20 MR KHAW: Thank you. 21 Then I was at 3-point -- 22 CHAIRMAN: Yes. Because we are talking about an expert's 23 opinion. We are not talking about a factual witness who 24 suddenly is giving evidence on a wrong basis and should 25 be outside the courtroom.</p>	Page 8	<p>1 specifically ISO 3951 ... which states that it is 2 acceptable '... to reduce inspection costs (by means of 3 a switch to a smaller sample size) should consistently 4 good quality be achieved'. 5 So that in fact tallies with my earlier point, that 6 is when he said it was necessary to include standards, 7 international standards, for the purpose of 8 understanding the overarching requirement under CS2. He 9 was in essence saying that certain other requirements 10 should be implied or incorporated into CS2. That is his 11 position. 12 In fact, that is the main point of our objection, 13 because that really involves a statistical expert's 14 views on the interpretation and construction of 15 a document, and we believe that should not be allowed. 16 If I could take you to our written submissions in ER 17 item 7.1. 18 CHAIRMAN: I see the point you are making, and obviously, if 19 we were to agree to this remaining and being spoken to 20 by Dr Wells, it would be with a good deal of caution and 21 bearing in mind what you say. But subject to being 22 corrected -- and I don't often deal with 23 statisticians -- it seems to me that it's not pure 24 mathematics. It has to be discussed within a context. 25 If you are doing statistics about sheep, for example,</p>

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<p>1 and their health and wellbeing, et cetera, et cetera, 2 the weight they put on over periods of time, you have to 3 look at things like weather, grass patterns and things 4 like that. 5 So what we are saying here is, for example, "to 6 reduce inspection costs (by means of a switch to 7 a smaller sample size) should consistently good quality 8 be achieved" -- you are saying if you are getting -- if 9 you have a record of consistently good quality materials 10 coming before you, then you don't have to have the same 11 sample size. "I have therefore taken, for my 12 mathematical approach, a smaller sample size." Then 13 I can either say I don't accept that or Prof Hansford 14 can say he finds difficulties with that. 15 It's not so remote, is it? He's not suddenly 16 delving into the niceties of trying to understand Middle 17 French, you know, or something like that. 18 MR KHAW: No. Mr Chairman, we would like to point out this 19 fundamental difference, that is the difference between 20 asking a statistical expert to comment on the adequacy 21 of rebar testing by referring to international 22 standards. That I can perfectly understand and that is 23 what we need. 24 CHAIRMAN: Yes. 25 MR KHAW: But it is quite another question, an entirely</p>	<p>1 That is rather trite, I believe, and in fact if 2 Dr Wells -- is not saying CS2 should be interpreted in 3 a particular way. We have no objection to that. In 4 fact, we have actually considered proposing a middle of 5 the road by suggesting that all parties and also the 6 Commission should now consider Dr Wells' report on 7 a de bene esse basis. But the problem that we face is 8 that once we do so, and unless we have the assurance 9 that this rebar testing issue actually would not be 10 visited at the end of the day, then once this evidence 11 is put in, we are deprived of an opportunity of asking 12 an expert on, for example, quality assurance or 13 international standards, to give his or her own opinions 14 as to whether this is the correct way of interpreting 15 CS2. 16 CHAIRMAN: Okay. Yes. 17 MR KHAW: So this is the problem that we face if this part 18 of his evidence is not excluded at present. 19 I believe that Mr Chairman and Mr Commissioner have 20 seen our arguments by referring to Leighton's two 21 letters, because Leighton was trying to say, in the two 22 letters, "Given what we have said, you should be aware 23 that Dr Wells would be asked to give evidence on the 24 matter of interpretation." But if we look at those 25 letters carefully, what they said was simply question 1</p>
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<p>1 different question, when you are asking a statistical 2 expert to actually give his own opinions on, "Hey, CS2 3 should not be interpreted just on its own terms; it 4 should be interpreted by actually taking into account 5 this and that, and the overarching principle, what is 6 actually the underlying thinking of the ISO 7 committee" -- this is a matter of interpretation, which 8 is miles away from a question regarding the adequacy of 9 rebar testing simply by referring to certain 10 international standards. I think that's the main 11 objection we have. 12 CHAIRMAN: All right. Thank you. I have your point, yes. 13 MR KHAW: In fact, we have cited an authority, and I don't 14 wish to really spend time on that, but in essence what 15 that authority says is that if the court is asked to, 16 for example, consider expert opinion on company law in 17 respect of Cayman Island law, then obviously, if there 18 is an issue as to whether a director of a company had 19 the power to do certain things under articles of 20 association, the Cayman Island lawyers could give their 21 opinions on Cayman Islands company law. They could give 22 an opinion on how documents should be interpreted, the 23 rules of interpretation according to Cayman Island law. 24 But they cannot give their evidence on the actual 25 interpretation of that foreign document.</p>	<p>1 that I postulated earlier, that is the adequacy of rebar 2 testing by referring to international standards. They 3 never indicated that they would ask Dr Wells to give his 4 own opinions on the actual interpretation of this 5 document. That is wrong, as a matter of fact. 6 So we say they cannot rely on their letters to say 7 we should have been aware of this coming. 8 And also, they rely on the list of issues in saying 9 the list of issues actually refers to the words "based 10 on international quality assurance standards", 11 et cetera. Again, that was premised upon the issue that 12 they were asking the expert to comment on the adequacy 13 of rebar testing by referring to international 14 standards, not by asking a statistician to give his 15 opinions on what this requirement in the local industry 16 actually meant. It's two completely different matters. 17 CHAIRMAN: Yes. 18 MR KHAW: So I hope I have registered sufficiently my 19 objection. The last point that we wish to raise is that 20 in fact everyone knows and Leighton has actually 21 acknowledged that in fact no suitable measures would 22 need to be taken due to the lack of rebar testing. So 23 in fact what they are trying to ascertain here is 24 a rather theoretical point, regarding whether the 25 strength reduction test or factor is overly</p>

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<p>1 conservative. That's what they were trying to ascertain 2 by referring to international standards. 3 But we say, in fact, this whole exercise would serve 4 little practical purpose, given the fact that we have 5 now the conclusion that no special measures would be 6 needed due to the lack of rebar testing. 7 CHAIRMAN: Sorry is, what was it you said? I missed the 8 phrase, "that we have now reached the conclusion that 9 no" -- 10 MR KHAW: Suitable measures would be required because of the 11 lack of rebar testing. 12 CHAIRMAN: Thank you. 13 MR KHAW: So in fact this issue would serve little practical 14 purpose, but now they are asking us to jump one step 15 further, by actually not just ascertaining whether there 16 should be suitable measures or not because no suitable 17 measures would be necessary. They are asking us to 18 actually study the requirements at present to see 19 whether the requirements comply with international 20 standards, whether it should be interpreted. Why would 21 that be within the terms of reference of this Extended 22 Inquiry? We have serious doubt about it. 23 That is why we believe it is more important to have 24 those paragraphs excluded for the time being, to save 25 everyone's time.</p>	<p>1 a matter for the Commission. The Commission could very 2 well say Dr Wells has got it all wrong; the Commission 3 actually thinks the standards don't mean that. In which 4 case, fine, Dr Wells has expressed his opinion on 5 a wrong basis. Or the Commission could well say it is 6 assisted by Dr Wells' interpretation. 7 So the matter is always in the hands of the 8 Commission. 9 It's far better for disputes like that to be dealt 10 with de bene esse. We've had numerous incidents in 11 COI 1 when, for example, government witnesses went on 12 and on about their own view as to whether or not certain 13 rules had been complied with, whether certain 14 record-keepings were up to scratch or whatever, and 15 those matters had all been dealt with sensibly 16 de bene esse by counsel saying, "I'm not going to 17 cross-examine on that because those are really matters 18 of law, matters of submission for the Commission." The 19 fact that a witness had mentioned his own view as to 20 what certain rules meant wouldn't bind the Commission 21 and not cross-examining or not calling a witness to 22 contradict that wouldn't really prejudice that 23 particular party. 24 So I would simply commend to this Commission that 25 the matters which Dr Wells has mentioned in his report</p>
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<p>1 CHAIRMAN: Yes, I see what you mean. 2 MR KHAW: Thank you. 3 CHAIRMAN: Thank you. 4 MR SHIEH: Mr Chairman, it's ironic that the last sentence 5 of my learned friend should be to the effect that he 6 wants to save everybody's time, when we had in fact 7 encroached upon the time that could have been used for 8 Dr Wells' evidence. 9 Can I just make a few points first? It is slightly 10 unreal in a commission of inquiry to hear submissions 11 citing case law on rules of evidence when we all know 12 strict rules of evidence do not apply. 13 Secondly, Mr Chairman has it spot on when you 14 intervened to say that matters very much turn on 15 context. If Dr Wells is to give evidence in relation to 16 whether testing complied with applicable quality 17 assurance standards, then as part of the context 18 Dr Wells would have to explain what he understood the 19 relevant applicable standards to mean, before he could 20 express a view as to whether or not the testings that 21 have been done complied with the relevant standards. 22 Now, the ascertainment of the relevant standards 23 could well be simply looking at plain English on CS2. 24 It may be a matter of looking at matters extraneous to 25 CS2. That exercise of construction could well be simply</p>	<p>1 concerning his views on what the applicable standards 2 actually meant should be dealt with de bene esse. 3 There's also one practical matter because, if 4 Dr Wells is going to express his opinion, as he is 5 entitled to because leave has been given, opinion on 6 whether testing complied with applicable quality 7 assurance standards, he then says, "In my 8 understanding/opinion", or whatever word you call it, 9 "the applicable standards mean the following", then how 10 on earth is one going to redact that? If one redacts 11 that sentence where he sets out his 12 view/opinion/understanding of what the applicable 13 standards mean, then the Commission would be completely 14 at a loss, because the Commission will not know by 15 reference to what Dr Wells is expressing his opinion on. 16 So, for all these reasons and to save time, I would 17 simply invite the Commission to look at the letter of 18 O'Melveny & Myers in CO2 bundle AA1 at page 392, which 19 basically encapsulates what I have just said. 20 For all these reasons, I would respectfully submit 21 that there should be no expunging. The Commission can 22 perfectly well deal with the matter de bene esse. 23 Parties can take their own view, whether or not they 24 leave the matter to be argued or whether they need to 25 cross-examine a witness. If my learned friend says it's</p>

Page 17	<p>1 all a matter of law, submission, fine, have the courage 2 of your conviction, don't cross-examine; deal with it as 3 a matter of interpretation. 4 CHAIRMAN: Thank you. 5 MR KHAW: Mr Chairman, just one point of reply. In fact, 6 there is one point that I entirely agree with Mr Shieh, 7 that is the matter of interpretation should be a matter 8 decided by this Commission, and usually will deal with 9 it by way of legal arguments. That spells out the need 10 for this application, because if that is the case, as 11 Mr Shieh has acknowledged, Dr Wells' views on 12 interpretation do not bind this Commission, do not bind 13 anybody. Why should they be here? Why should they be 14 here to confuse everybody? 15 Also, he goes not just in terms of the literal 16 meaning of the words in CS2. He goes even further 17 because he goes on to discuss the thinking behind ISO 18 committee, and then he tries to extract this overarching 19 principle for the purpose of his own interpretation. 20 But if one is trying to ask somebody to say something 21 about trade practice or trade custom for the purpose of 22 interpretation, then you need someone from that 23 particular field to speak about those matters but not 24 a statistical expert. 25 That's all I wish to reply.</p>	Page 19	<p>1 this, some of this evidence -- 2 CHAIRMAN: You've made it -- 3 MR PENNICOTT: Can I say -- 4 CHAIRMAN: Yes. 5 MR PENNICOTT: -- clearly there's common ground that this is 6 ultimately a matter of interpretation. It is not, 7 strictly speaking, for the experts, but occasionally, 8 and this may be one of those occasions, it may not be, 9 that background and context is required to understand 10 where the expert is coming from. But again whether you 11 determine that is the case or is not the case is for 12 a later stage, in my respectful submission, and I agree 13 with Mr Shieh that the proper approach is for the 14 Commission to consider all of this de bene esse and take 15 a view at the end of the day. 16 Sir, there are other factors which may be peripheral 17 but I mention them anyway. Mr Rowsell's report for 18 COI 2 has about seven or eight paragraphs that deal with 19 this very issue as well. He comes at it from 20 a different perspective, but nonetheless is covering 21 very similar ground to that which is covered by 22 Dr Wells. So one of the points that has been 23 highlighted when Mr Khaw read out certain paragraphs 24 from Dr Wells' report was that it is hoped that there 25 will be a move away, as we go to the future, from</p>
Page 18	<p>1 CHAIRMAN: Mr Pennicott, do you have any observations? 2 MR PENNICOTT: A number, sir, but I'll try to be as short as 3 I can. 4 Sir, clearly Mr Shieh is correct, as, sir, you have 5 indicated, that this is a Commission of Inquiry. This 6 is not a piece of litigation, it's not an arbitration, 7 and we are not bound by the strict Rules of Evidence. 8 Secondly, as everybody has acknowledged, what this 9 issue goes to is the testing or the non-testing of 10 7 per cent of the rebar. It is common ground, as has 11 been indicated already, that no suitable measures are 12 recommended as a consequence of this omission. 13 CHAIRMAN: Sorry to interrupt. Please forgive me, but just 14 approaching this on a good, common-sense basis. 15 MR PENNICOTT: Yes. 16 CHAIRMAN: If you have 7 per cent not tested but 93 per cent 17 tested, and if you have all those testings done over 18 an extended period of time, and if they are all 19 obtaining the necessary pass mark, if I can use that 20 term, can't you reach certain conclusions from that? 21 MR PENNICOTT: Yes, and indeed the statistics evidence that 22 you will be hearing does indeed reach those sorts of 23 conclusions. 24 CHAIRMAN: Yes. 25 MR PENNICOTT: Indeed. And you don't actually need all of</p>	Page 20	<p>1 Hong Kong requiring two lots of tests, one by the 2 manufacturer and one by the purchaser, if I can put it 3 that way, and it is hoped over time that the second 4 testing, ie by the purchaser, in this instance 5 Leighton, will no longer be required, and that would 6 then start to accord with the practice that happens in 7 many other parts of the world. 8 I think it's that point that Mr Rowsell draws 9 attention to. After 24 years, we are still apparently 10 in the initial stage and still requiring manufacturers 11 to test and purchasers to test, and query when is that 12 initial stage going to come to an end? That's the 13 context in which Mr Rowsell looks at it. But 14 nonetheless it's all part of the same story, if you 15 like, or subject matter. 16 Also, one points out that one of the government's 17 witnesses, Mr Lok Pui Fai, also in four paragraphs in 18 his fifth witness statement, DD9/12281, also covers this 19 ground again, not -- and I don't suggest that he delves 20 into questions of contractual interpretation and so 21 forth, but again it's more evidence about the same 22 subject matter. 23 So, at the end of the day, we've got at least three 24 sources or will have three sources of evidence, factual 25 evidence from Mr Lok Pui Fai, Mr Rowsell's evidence,</p>

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<p>1 Dr Wells' evidence, that you will have to consider.</p> <p>2 Sir, in my respectful submission, the proper</p> <p>3 approach is to look at this on a de bene esse basis.</p> <p>4 I have to say I also rather agree with Mr Shieh that</p> <p>5 having looked at the various paragraphs that are</p> <p>6 objected to and try to do a rather detailed textual</p> <p>7 analysis of them, just striking those paragraphs out</p> <p>8 will be difficult or give rise to complications. One</p> <p>9 might find oneself striking out the odd sentence but</p> <p>10 leaving the rest of the paragraph, either because the</p> <p>11 rest of the paragraph is not objectionable, or if you do</p> <p>12 take it out, some of the other paragraphs are not going</p> <p>13 to make sense. So there is a practical issue there as</p> <p>14 well.</p> <p>15 Sir, as I say, without wishing to be, as it were,</p> <p>16 taking sides, I'm bound to say that it seems to us that</p> <p>17 the de bene esse approach is the right one.</p> <p>18 CHAIRMAN: Mr Khaw, I confess that, a bit like the man who</p> <p>19 has to have a rhinoceros described to him, I may have</p> <p>20 difficulty conceptually with what I am supposed to see,</p> <p>21 but on a day-to-day judging basis, when I see it, I can</p> <p>22 recognise it.</p> <p>23 What I think is the case here is if Dr Wells started</p> <p>24 to talk about a particular matter in a context which is</p> <p>25 not permitted for an expert, I like to think that I'm in</p>	<p>1 CHAIRMAN: If it's an issue at the end of the day, then that</p> <p>2 can be debated, and I think you can take it that from my</p> <p>3 perspective, I will do my utmost to ensure that</p> <p>4 impermissible evidence is not allowed, bearing in mind</p> <p>5 that this is a Commission of Inquiry, and what the</p> <p>6 public I think want at the end of the day, or in the</p> <p>7 initial instance, what the executive of this government</p> <p>8 wants, is some plain, clear understanding of the matters</p> <p>9 that counted and how we deal with them.</p> <p>10 MR KHAW: I'm grateful.</p> <p>11 CHAIRMAN: So, from that point of view, the approach is</p> <p>12 somewhat different from determining, for example,</p> <p>13 contractual liability.</p> <p>14 MR KHAW: I'm grateful.</p> <p>15 CHAIRMAN: But I'm aware of your concerns, and both</p> <p>16 Prof Hansford and myself will bear them in mind.</p> <p>17 MR KHAW: Thank you.</p> <p>18 CHAIRMAN: Prof Hansford I think also feels that</p> <p>19 a de bene esse approach would assist him the most.</p> <p>20 MR KHAW: Thank you.</p> <p>21 CHAIRMAN: Thank you.</p> <p>22 MR PENNICOTT: Sir, thank you for that.</p> <p>23 The other application is Leighton's application to,</p> <p>24 at least for now, invite you to say that Prof Yin's</p> <p>25 second statement, that was received last evening,</p>
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<p>1 a position to be able to say, "Sorry, Dr Wells, you are</p> <p>2 in no position to interpret that. That's not the extent</p> <p>3 of your expertise. Let's leave that and move on." And</p> <p>4 remember, in this particular case, I've got the</p> <p>5 assistance of a professor of engineering who is also in</p> <p>6 a position to say to me, "Look, we just don't need this;</p> <p>7 it doesn't have to go here."</p> <p>8 So I've got that difficulty of making sure that</p> <p>9 sufficient context is allowed, that we can talk about</p> <p>10 matters on a realistic basis, but at the same time not</p> <p>11 allowing people to stray into areas which are not areas</p> <p>12 of their true expertise.</p> <p>13 So I'm inclined, subject to what you say -- and I do</p> <p>14 wish to give you the last word, of course -- towards the</p> <p>15 de bene esse approach.</p> <p>16 MR KHAW: I have nothing further to add. I believe I have</p> <p>17 said what I could say.</p> <p>18 CHAIRMAN: Yes.</p> <p>19 MR KHAW: Save and except that I highlighted the issue that</p> <p>20 in fact we had considered this approach previously.</p> <p>21 CHAIRMAN: Of course.</p> <p>22 MR KHAW: But we are having a practical difficulty. That</p> <p>23 is: how are we going to address this issue of</p> <p>24 interpretation if it really becomes an issue at the end</p> <p>25 of the day?</p>	<p>1 possibly in the early hours of the morning -- I can't</p> <p>2 remember exactly now -- should not at this stage be</p> <p>3 admitted.</p> <p>4 MR SHIEH: I apologise for whispering -- because it was put</p> <p>5 by Mr Pennicott as if it's my application, but it's --</p> <p>6 MR PENNICOTT: Sorry, Mr Shieh is quite right. We'd better</p> <p>7 get things in the right order. It's the government's</p> <p>8 application to adduce Prof Yin's second statement, which</p> <p>9 is opposed by Leighton. That's the correct way of</p> <p>10 putting it and I apologise.</p> <p>11 CHAIRMAN: All right.</p> <p>12 MR KHAW: Sir, I'm afraid it's me again.</p> <p>13 CHAIRMAN: That's all right.</p> <p>14 MR KHAW: First of all, Prof Yin, despite his teaching and</p> <p>15 other commitments, managed to come up with his response</p> <p>16 which we believe is helpful about one week after we</p> <p>17 actually received Dr Wells's report. We appreciate his</p> <p>18 hard work and efficiency.</p> <p>19 We can all see from Prof Yin's response that he was</p> <p>20 simply trying to respond to various points raised in</p> <p>21 Dr Wells' report. In the present case, one has to bear</p> <p>22 in mind that given the time constraints on all parties</p> <p>23 as a result of the application for expert directions</p> <p>24 earlier, it was not possible for Dr Wells and Prof Yin</p> <p>25 to actually meet in order to map out their differences</p>

Page 25	<p>1 and agreements. It was rather unfortunate, but in view</p> <p>2 of that, Prof Yin found it necessary to actually produce</p> <p>3 this response, in the hope that he could kindly assist</p> <p>4 the Commission in trying to identify and also understand</p> <p>5 the differences in opinions and also the analysis</p> <p>6 between the two experts. This is the whole purpose of</p> <p>7 having his response.</p> <p>8 In fact, Prof Yin was originally hoping to canvass</p> <p>9 the points which might be raised in the further</p> <p>10 information that Dr Wells was directed to give by last</p> <p>11 night, but since the information only came this morning,</p> <p>12 he thought that it would be helpful to submit his report</p> <p>13 first, before he actually had a chance to comment on the</p> <p>14 further information supplied by Dr Wells.</p> <p>15 In fact, we have to say most of the points raised in</p> <p>16 Prof Yin's response would be referred to in our</p> <p>17 cross-examination of Dr Wells. In fact, we could have</p> <p>18 simply put the points to Dr Wells during our</p> <p>19 cross-examination, without actually providing any</p> <p>20 written materials in advance. But the reason why we do</p> <p>21 so is that in view of the rather technical nature of the</p> <p>22 analysis provided by the two experts, we believe that it</p> <p>23 would be helpful for everyone to have something in</p> <p>24 writing to refer to, before Dr Wells actually gives</p> <p>25 evidence.</p>	Page 27	<p>1 thought that we are being obstructive, because this is</p> <p>2 going to come out in any event, we perfectly accept that</p> <p>3 if there are matters in that document that Mr Khaw for</p> <p>4 the government wishes to put to Dr Wells, he is</p> <p>5 perfectly entitled to do so, after having tried to</p> <p>6 understand it himself obviously, and some of those</p> <p>7 matters, insofar as it tries to anticipate what might be</p> <p>8 asked of Prof Yin in cross-examination, then that would</p> <p>9 come out in any event. I'm not trying to gainsay any of</p> <p>10 these propositions.</p> <p>11 But the point I am taking is a more practical or,</p> <p>12 one may say, forensic one. If the document is</p> <p>13 admitted -- you can call it a statement, you can call it</p> <p>14 what you want, but it would be a document on the record.</p> <p>15 It would be in the nature of let's say a supplemental</p> <p>16 report. Conventionally, if a supplemental report is put</p> <p>17 in, the party against whom that report is put in would</p> <p>18 be expected to have a chance of studying it and</p> <p>19 formulating a response before putting a certain witness</p> <p>20 in the witness box. That is the difficulty we are</p> <p>21 facing.</p> <p>22 I mean, fine, if you want to put it to the witness</p> <p>23 when he's in the box, without it forming part of the</p> <p>24 record as I say, so be it. But we just are concerned,</p> <p>25 if it actually is already in as a government document,</p>
Page 26	<p>1 If Mr Shieh's point is that Dr Wells has not</p> <p>2 actually had a chance to see the report, so we should</p> <p>3 not be referring to that report -- but we believe that</p> <p>4 the artificiality of that argument is that, in any</p> <p>5 event, there's no reason why we are not entitled to put</p> <p>6 the points orally to Dr Wells during cross-examination.</p> <p>7 So what practical differences would that make if we</p> <p>8 provided everyone a copy of the written documents in</p> <p>9 advance so that we could actually understand what we</p> <p>10 were trying to discuss with Dr Wells during</p> <p>11 cross-examination?</p> <p>12 So that's in fact the basis of our application and</p> <p>13 we believe that there is no question of any procedural</p> <p>14 unfairness, because even without the written documents</p> <p>15 we would just start our cross-examination of Dr Wells.</p> <p>16 CHAIRMAN: Yes. Thank you. So the document at this stage,</p> <p>17 it may metamorphose into something else later, but at</p> <p>18 this stage would be a sort of aide-memoire?</p> <p>19 MR KHAW: Exactly. And also, in all fairness to Dr Wells,</p> <p>20 if say after today, after he had a chance to look at the</p> <p>21 response, if he has something to add, or he wants to</p> <p>22 make his further observations on Prof Yin's response,</p> <p>23 he's perfectly entitled to do so tomorrow.</p> <p>24 CHAIRMAN: Yes, Mr Shieh.</p> <p>25 MR SHIEH: Mr Chairman, can I start by saying, lest it be</p>	Page 28	<p>1 we can't preclude in future, for example, people saying,</p> <p>2 "The document has gone unanswered, it's</p> <p>3 an uncontradicted report"; or "You ought to have</p> <p>4 a chance of dealing with it but you don't."</p> <p>5 Of course, Mr Chairman may remember the context</p> <p>6 within which it was put in and be able to put in all</p> <p>7 kinds of safeguards to prevent that kind of point being</p> <p>8 made. But what Leighton is concerned about is the</p> <p>9 government being able to stack up the kind of</p> <p>10 documentation or reports on its side, so as in future to</p> <p>11 be able to say, "There's a report which you have not</p> <p>12 dealt with."</p> <p>13 More importantly, one may ask whether it actually</p> <p>14 assists, because everyone, upon seeing what the other</p> <p>15 side has said by way of an expert report, would</p> <p>16 obviously ask his own expert how to deal with it, and</p> <p>17 obviously we have also considered what to do to deal</p> <p>18 with what Dr Wells may wish to say concerning Prof Yin's</p> <p>19 report.</p> <p>20 The Commission has not had any application on our</p> <p>21 part to put in what Dr Wells wanted to say, and I can</p> <p>22 tell you part of which is here (indicating), forming</p> <p>23 part of what I had prepared by way of cross-examination</p> <p>24 of Prof Yin.</p> <p>25 And the pre-existing directions did not cater for</p>

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<p>1 meetings of experts; Mr Khaw said unfortunately, because 2 of the practicalities of the matter. It did not provide 3 for responsive reports. 4 So, rightly or wrongly, we have proceeded on the 5 basis that we would just do our best, take our judgment 6 call, be helpful to the Commission, rather than ask the 7 expert to say, "Can you actually do a supplemental? It 8 doesn't matter whether they understand it, just dump it 9 in". We have actually tried to understand the point and 10 tried to assist the Commission, in my cross-examination, 11 to put what we believe to be the really germane points 12 in as easily understandable as possible. 13 In a way, we are feeling we are penalised for trying 14 to be helpful, because in trying to assist this 15 Commission to try to distil the very obtuse points of 16 statistics into understandable propositions on our part, 17 we now see the government saying, "It doesn't matter, we 18 just put in this supplemental report", which has the 19 effect of stacking up the documents on the side of the 20 government, putting us at a disadvantage because we do 21 not have an equivalent document to speak to, and that, 22 we would respectfully submit, puts us at a disadvantage 23 in terms of presentation. 24 Put it this way: when it comes to closing 25 submissions, they would be able to say, "Look at Yin 1,</p>	<p>1 give evidence, I have little doubt that, all other 2 things being equal and in other circumstances, the 3 Commission would give leave to allow Prof Yin's second 4 report in. 5 However, I am bound to say that I see the strength 6 of what Mr Shieh says, and I think it's really a dual 7 point. One, perhaps Dr Wells himself has not had 8 an opportunity, or at least not a proper opportunity, to 9 look at this report. It's one thing to have a question 10 put to you by counsel orally, another thing to have 11 something in writing, in a document, "Please read this; 12 what do you say about it?" That's a rather different 13 proposition, it seems to me. 14 Again, although -- I'm not sure whether Mr Shieh did 15 say this -- it's not clear to me whether part of the 16 complaint that Leighton make is that they've not had 17 an opportunity of speaking to Dr Wells about this second 18 report, which seems to me would be perhaps another 19 legitimate complaint, if it were being made. 20 So, sir, I think it's difficult. As I say, in other 21 circumstances I would suspect the Commission would allow 22 this report in. But I'm bound to say the safest course 23 seems to me, at the moment at least, is for the report 24 not to go in formally but for the cross-examination 25 simply to continue, and to what extent the application</p>
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<p>1 look at Yin 2." It's treated as if it's already part of 2 their case. For us, we have Wells 1, we have my best 3 attempt to put questions, using my best judgment, to 4 Prof Yin, and his answer, without the equivalent of 5 Wells 2. That, we respectfully submit, puts us at 6 a disadvantage. 7 We respectfully submit that the proper way to deal 8 with it would be, if there are points which counsel or 9 the legal team regarded as really germane to distilling 10 the differences between the parties, let the legal 11 advisers do their work, crystallise them, put the 12 questions and let the witness answer, rather than to 13 allow the government the chance of putting in an extra 14 report and putting us at a disadvantage. 15 These are the points I wish to make. 16 CHAIRMAN: Thank you. 17 MR PENNICOTT: Sir, I -- probably like you -- find myself on 18 the horns of a dilemma, in this sense. Obviously, 19 I have received and, because we were not sitting this 20 morning, have read Prof Yin's second report. I am bound 21 to say, as I indicated earlier, my view is that it is 22 truly, it doesn't introduce many new matters; it is 23 responsive to Dr Wells, and to that extent it seems to 24 me to be helpful. But for the constraints of time, and 25 the practicalities of the fact that Dr Wells is about to</p>	<p>1 to introduce the report might be renewed, perhaps 2 tomorrow, if it is then indicated that Dr Wells has had 3 an opportunity of looking at the second report and 4 Leightons have had an opportunity of considering it in 5 more detail as well, with or without Dr Wells -- and 6 of course that raises this point: we would then have to 7 give Leightons permission to speak to Dr Wells about 8 that second report, even though he had started his 9 evidence, but it seems to me perhaps the government -- 10 it seems to me I don't know what the government's 11 position would be if that situation arose. 12 So it's not a straightforward application or the 13 answer to the application is not straightforward, in my 14 view. There are a lot of countervailing considerations. 15 Ultimately, however, it seems to me that it is what is 16 fair to Dr Wells that matters, and I do on balance 17 conclude that one has this fear of unfairness to 18 Dr Wells at this moment in time. 19 CHAIRMAN: Yes. Thank you. 20 Mr Khaw, is there anything you would like to add? 21 MR KHAW: Yes. Mr Chairman, in fact we do not intend to 22 actually put what is stated in Prof Yin's response 23 verbatim to Dr Wells and ask for his views. Obviously, 24 as Mr Shieh has pointed out, we would have to digest his 25 report before we can put relevant questions to Dr Wells</p>

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<p>1 for his views.</p> <p>2 So we are not actually relying on the written report</p> <p>3 for the purpose of putting all parts of the report to</p> <p>4 Dr Wells for his comments, but this is in fact to</p> <p>5 facilitate everyone's understanding of the lines of</p> <p>6 cross-examination that we intend to put to Dr Wells,</p> <p>7 when you have something in writing to refer to, given</p> <p>8 the rather technical analysis which has been produced by</p> <p>9 both experts. In fact, that is our intention.</p> <p>10 So, on that, we could not see any practical</p> <p>11 difference between putting the matters stated in the</p> <p>12 response by referring to a written document and putting</p> <p>13 the points without referring to written documents.</p> <p>14 The second point I wish to make is that, as I made</p> <p>15 earlier, if there are points that Dr Wells would want to</p> <p>16 address in relation to Prof Yin's response, he certainly</p> <p>17 would feel free to do it tomorrow, after today's</p> <p>18 cross-examination. There will still be time for him to</p> <p>19 consider this response. And I would have no objection</p> <p>20 if Leighton's legal advisers would seek leave so that</p> <p>21 they would be allowed to discuss with Dr Wells on</p> <p>22 matters arising from Prof Yin's report.</p> <p>23 CHAIRMAN: Yes. Thank you.</p> <p>24 It is a difficult one, but I do accept the strength</p> <p>25 of Mr Shieh's proposition that there is always</p>	<p>1 London?</p> <p>2 Dr Wells, good afternoon.</p> <p>3 DR WELLS: Good afternoon.</p> <p>4 COMMISSIONER HANSFORD: Can we turn the volume of Dr Wells</p> <p>5 up, is that possible? Is that at this end? If we</p> <p>6 can't, that's okay, but it would be better.</p> <p>7 MR SHIEH: Good morning, Dr Wells. Testing.</p> <p>8 DR WELLS: Okay. I can hear you. If I speak up a little,</p> <p>9 perhaps you can hear me better.</p> <p>10 COMMISSIONER HANSFORD: That's fine.</p> <p>11 CHAIRMAN: We can hear you fine now. Thank you. Excellent.</p> <p>12 DR WELLS: By way of testing the volume, I would normally</p> <p>13 stand for the witness affirmation. I fear that if</p> <p>14 I stand, you will only see me from the waist downwards.</p> <p>15 CHAIRMAN: You can take it seated, thank you, if you would.</p> <p>16 DR BARRIE TREVOR WELLS (affirmed)</p> <p>17 Examination-in-chief by MR SHIEH</p> <p>18 MR SHIEH: Dr Wells, thank you very much for being the</p> <p>19 expert witness on statistical matters for Leighton and</p> <p>20 for assisting us.</p> <p>21 You remember you have -- hello?</p> <p>22 A. Hello. We can see your shared content.</p> <p>23 Q. Dr Wells, you have given two expert reports for the</p> <p>24 purpose of the Commission, one in what is called COI 1,</p> <p>25 specifically on the holistic report, and one in COI 2,</p>
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<p>1 a difference between a written expert report and</p> <p>2 questions put in cross-examination by counsel. And</p> <p>3 while it may be, as Mr Pennicott has suggested, that by</p> <p>4 the end of today and into tomorrow we are in a position</p> <p>5 where we can say, "Right, we understand what's going on.</p> <p>6 Let Dr Wells have a look at this statement and we maybe</p> <p>7 have to agree it tomorrow; we may not."</p> <p>8 I think we have to work within the constraints of</p> <p>9 time. It's one of these situations where unfortunately</p> <p>10 we are not in a position to say, as we would be in</p> <p>11 ordinary civil litigation, "Fine. You now have ten days</p> <p>12 to consider that statement and give a response. You've</p> <p>13 got a further ten days", et cetera. It's all been</p> <p>14 rather pushed up against each other, and I think I'm</p> <p>15 looking generally at the ability to get both sides'</p> <p>16 point of view in the fairest way possible.</p> <p>17 On that basis, I'm inclined at the moment not to put</p> <p>18 in the statement but let us revisit that this afternoon,</p> <p>19 to see whether anyone has any changes of mind,</p> <p>20 particularly the tribunal.</p> <p>21 Thank you.</p> <p>22 MR SHIEH: Mr Chairman, with the applications dealt with,</p> <p>23 may I now call Dr Barrie Wells --</p> <p>24 CHAIRMAN: Yes.</p> <p>25 MR SHIEH: -- who has now been seated, as we can see, in</p>	<p>1 specifically in relation to the verification report.</p> <p>2 Can you confirm that?</p> <p>3 A. That is correct.</p> <p>4 Q. Just for identification purposes, can you look at the</p> <p>5 bundle of expert reports in COI 1.</p> <p>6 Can that be shown to Dr Wells. There's a bundle of</p> <p>7 expert reports in COI 1. Yes.</p> <p>8 That is entitled, "Expert report prepared by Barrie</p> <p>9 Wells", dated 13 September 2019. That is for the</p> <p>10 Original Inquiry, COI 1.</p> <p>11 Do you recognise that, Dr Wells?</p> <p>12 A. I confirm I recognise that.</p> <p>13 Q. Can we then turn to -- I don't think we need to identify</p> <p>14 signatures, because you are an expert and obviously this</p> <p>15 is your report.</p> <p>16 Can I ask you to look at the bundles in COI 2.</p> <p>17 There's a bundle called ER1, and in this bundle we have</p> <p>18 your report on the Extended Inquiry, also dated</p> <p>19 13 September.</p> <p>20 A. I confirm I recognise that.</p> <p>21 Q. In the same bundle, there is your oral synopsis which</p> <p>22 you will be dealing with in due course. It's just for</p> <p>23 identification purpose so don't start yet.</p> <p>24 Lastly, in response to certain requests for</p> <p>25 information from the Department of Justice -- it's</p>

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<p>1 actually in bundle AA, I think.</p> <p>2 MR PENNICOTT: COI 1, ER1, tab 13.</p> <p>3 MR SHIEH: COI 1, I'm sorry, because there was a response to</p> <p>4 the request for information by the Department of</p> <p>5 Justice. It's in the expert witness bundle in COI 1.</p> <p>6 A. I recognise that.</p> <p>7 Q. It's a document called "Dr Wells' response to government</p> <p>8 questions", and you can see a series of questions</p> <p>9 followed by your response.</p> <p>10 A. I recognise that.</p> <p>11 Q. And those responses are prepared by you?</p> <p>12 A. Those are the answers which I prepared, yes.</p> <p>13 Q. Before asking you to develop your synopsis, Dr Wells,</p> <p>14 there is one point which perhaps I should make clear to</p> <p>15 the Commission, which is this.</p> <p>16 Prof Yin gave us -- the Department of Justice gave</p> <p>17 us the document from Prof Yin last night. We had to</p> <p>18 prioritise what we were doing, because Dr Wells was</p> <p>19 actually preparing his responses to the requests for</p> <p>20 information from the Department of Justice, and so we</p> <p>21 did not want to bother him or trouble him with</p> <p>22 Prof Yin's document, until he had finalised his response</p> <p>23 to the government's request for information.</p> <p>24 So Dr Wells has had extremely limited time to look</p> <p>25 at that document from Prof Yin. Now, Prof Yin's</p>	<p>1 time pressure.</p> <p>2 MR SHIEH: So I just wish to sort of reserve the position of</p> <p>3 the expert or the experts so that it can't be put</p> <p>4 against them that they had somehow still put forward</p> <p>5 their reports, despite having seen some suggestion</p> <p>6 somewhere that they might have got one thing or two</p> <p>7 wrong. That's all I wish to say at this stage.</p> <p>8 So, Dr Wells, you've heard what we have said here.</p> <p>9 Without further ado, perhaps I will hand the stage over</p> <p>10 to you, for you to develop the synopsis that you had</p> <p>11 prepared.</p> <p>12 Oral synopsis by DR WELLS</p> <p>13 WITNESS: Thank you.</p> <p>14 My name is Barrie Wells. I am a statistician.</p> <p>15 I think I was approached to undertake this work by</p> <p>16 recommendation from the chairman of the Concrete</p> <p>17 Society, with whom I sit on various standards</p> <p>18 committees. My expertise is primarily in statistics --</p> <p>19 the FRIS stands for a Fellow of the Royal Statistics</p> <p>20 Society -- but actually my PhD is from the department of</p> <p>21 theoretical mechanics at Nottingham University, and so</p> <p>22 I do know a little about stress and strain, which is</p> <p>23 probably why I've been involved in the meetings with the</p> <p>24 chairman of the Concrete Society.</p> <p>25 The next slide, please. The holistic report first</p>
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<p>1 document made some suggestions that Dr Wells might have</p> <p>2 got some facts wrong or might have misunderstood</p> <p>3 something, this or that. We have not had a chance to go</p> <p>4 through those matters in detail with Dr Wells. He may</p> <p>5 or may not accept certain points put by Prof Yin that</p> <p>6 maybe he might have misunderstood something or got</p> <p>7 something wrong. So I am going to ask him to put</p> <p>8 forward his expert reports, but what I don't want to do</p> <p>9 it, as part of the hurly-burly of a hearing, for it</p> <p>10 later to be put to him, "Oh, you have been told about</p> <p>11 Prof Yin's criticism of this work; why didn't you</p> <p>12 correct it immediately?" I wish it to be known that</p> <p>13 Dr Wells has had extremely limited time. So while I ask</p> <p>14 him to confirm his reports, I hope that it will not be</p> <p>15 said against him if, for example, eventually it's put to</p> <p>16 him, "You might have got it wrong" and he accepts, then</p> <p>17 the point is taken against him, "Why did you then affirm</p> <p>18 your expert report to begin with?" just because he has</p> <p>19 had limited time. We could have actually asked him,</p> <p>20 "Within the time available, can you point out the</p> <p>21 limited responses by you could", but that would not be</p> <p>22 productive; that would be a half-baked attempt.</p> <p>23 CHAIRMAN: I understand the point. I think the point works</p> <p>24 for both sides in the sense that it also works for the</p> <p>25 professor. Both parties have been under considerable</p>	<p>1 and then the verification report later. So the holistic</p> <p>2 report addresses sampling strategies to obtain the data,</p> <p>3 and then the use of the data. I want to address those</p> <p>4 two points. That is what I understand I was asked to</p> <p>5 look at.</p> <p>6 The key points -- next slide -- are these six main</p> <p>7 points that I address in my report: sampling prior to</p> <p>8 testing couplers, in other words the desk exercise; what</p> <p>9 shall we do?</p> <p>10 Then points 2 to 6 subsequent to that -- "Having</p> <p>11 obtained the data, what shall we do with it? How shall</p> <p>12 we analyse it?" So we have acceptance and rejection.</p> <p>13 A specimen that has been identified and examined, is it</p> <p>14 defective or not defective? There are various tests</p> <p>15 involved, including the PAUT test, the direct</p> <p>16 measurements and the number of threads. So there are</p> <p>17 various reasons for rejection, and the rejection</p> <p>18 criteria, therefore, I feel need to be examined.</p> <p>19 Having done that, there was a large amount of</p> <p>20 discussion of defective rate and therefore necessary</p> <p>21 strength reduction resulting from the defective rate.</p> <p>22 Since that was also within the statistical remit, I have</p> <p>23 tried to address that question.</p> <p>24 Then, finally, I have made some points on the</p> <p>25 consideration of the appropriate confidence level.</p>

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<p>1 If I go through those in detail, one at a time.</p> <p>2 Next slide. That's point 1: sampling prior to testing</p> <p>3 the couplers. My point here is that the outcome shows</p> <p>4 a significant discrepancy between the expected</p> <p>5 proportions. Actually I've said the word "significant"</p> <p>6 there, and significance will come up a lot in</p> <p>7 statistical discussions because it is a technical term</p> <p>8 in statistics, but it's also a general English language</p> <p>9 term, and I feel I've used it there in both its</p> <p>10 technical and non-technical senses. But you can see</p> <p>11 quite clearly that there is a discrepancy, hence it is</p> <p>12 "significant" in the non-technical sense, but then</p> <p>13 I also want to show that statistically it is</p> <p>14 significant, that we can say with a certain level of</p> <p>15 confidence that we have in making that non-technical</p> <p>16 statement about significance.</p> <p>17 So the specific numbers involved which I believe</p> <p>18 have been already discussed earlier in the week -- we</p> <p>19 have a ratio of 26 per cent, which we were expecting,</p> <p>20 that is to say before anything has actually been looked</p> <p>21 at. All we know is the design documents, and the design</p> <p>22 documents tell us that there ought to be 26 per cent.</p> <p>23 When we actually go and look, we actually find that</p> <p>24 there's 8 per cent, 7.78 per cent, the actual ratio.</p> <p>25 My first thoughts when I saw that was they look</p>	<p>1 Next slide, moving on to point 2. We are moving</p> <p>2 into the acceptance and rejection. So we have now done</p> <p>3 the sampling, we've looked at it to ask, "Is it really</p> <p>4 adequate? But we have to make do with the data we've</p> <p>5 got, so what can we do with the data?" Here, I was</p> <p>6 trying to address the point that the acceptance and</p> <p>7 rejection -- "Is it defective? Is it not defective?" --</p> <p>8 was not strictly a binary measure, and therefore the</p> <p>9 whole assumption of the binomial approach is incorrect,</p> <p>10 because there are two measurements that have to be</p> <p>11 passed. There's the number of threads exposed and the</p> <p>12 engagement length. And actually there's a third part to</p> <p>13 this which is the visual assessment of whether or not</p> <p>14 the coupler is actually connected and hence whether or</p> <p>15 not it's even worthwhile taking a measurement and</p> <p>16 counting the threads.</p> <p>17 So it's a multi-part process. It is clearly not</p> <p>18 just a binary distinction.</p> <p>19 But my point here is more that the results are</p> <p>20 simply incompatible. You could argue that this isn't</p> <p>21 statistics, this is just numbers, but I would like to</p> <p>22 propose that statistics really is the simple things as</p> <p>23 well as the more complex ones such as hypothesis tests,</p> <p>24 and so on and so forth. As we approach the anniversary</p> <p>25 of Florence Nightingale's birth, it should be remembered</p>
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<p>1 rather different and I would have expected any</p> <p>2 statistician to have done the same thing, to have looked</p> <p>3 at them and said, "These look different". It is normal</p> <p>4 practice in fact, after having undertaken a sampling</p> <p>5 exercise, to back-check, just very quickly look and see</p> <p>6 whether or not you think the assumptions you made at the</p> <p>7 beginning were justified. And here I think it doesn't</p> <p>8 really take a statistician to look at those two numbers</p> <p>9 and say, "Mmm, perhaps not; we do need to have a closer</p> <p>10 look."</p> <p>11 In my opinion -- so far I think what I've said is</p> <p>12 simple arithmetic but we now get on to my opinion -- so</p> <p>13 if we look at the next slide, I'm beginning to develop</p> <p>14 opinions rather than just crunch the numbers. The fact</p> <p>15 that the bias was towards the smaller number, the</p> <p>16 smaller part of the sample, so that type A was 175,</p> <p>17 type B was 62, and it's the 62 that's under-sampled,</p> <p>18 that is likely to lead to bias towards a higher number</p> <p>19 of defectives. So it's not just that we suspect that</p> <p>20 the sampling regime was not truly random and it's not</p> <p>21 just that a proper mathematical statistical test</p> <p>22 confirms our suspicions and says that we have a high</p> <p>23 probability that this is not random. We can also say</p> <p>24 that any results that come from analysing this data will</p> <p>25 necessarily lead to a more conservative result.</p>	<p>1 that Florence Nightingale made dramatic improvements to</p> <p>2 nursing care simply by drawing pie charts. The simple</p> <p>3 statistics should not be overlooked in search of the</p> <p>4 more complicated.</p> <p>5 All I've done here is said if we add up all of the</p> <p>6 ones where the two measurements, the number of threads</p> <p>7 exposed and the engagement length, don't match, having</p> <p>8 of course already ruled out ones with cut rebar because</p> <p>9 obviously you can't accurately count the number of</p> <p>10 threads exposed, so having made all necessary</p> <p>11 adjustments to the data set we find that 36 per cent of</p> <p>12 the direct measurements and 20 per cent of PAUT</p> <p>13 measurements simply weren't compatible with the count of</p> <p>14 threads exposed.</p> <p>15 So the actually criterion used for deciding</p> <p>16 defective is logically incorrect. It's incompatible.</p> <p>17 It's internally inconsistent.</p> <p>18 The next slide goes on to further analyse this idea</p> <p>19 of binomial, that actually there were at least three</p> <p>20 outcomes: defective, not defective, and discarded. This</p> <p>21 is something that I have addressed in detail in one of</p> <p>22 my notes, where I've given an example which I was hoping</p> <p>23 would be illustrative. The point being that something</p> <p>24 is only discarded in this sense: if it has already</p> <p>25 passed the first part of the test, it has already been</p>

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<p>1 classified as "not defective" on the first part of the</p> <p>2 test, which is the visual test. So the discards only</p> <p>3 come from that "not defective" pile. They don't come</p> <p>4 from the "defective" pile. So we are discarding some of</p> <p>5 the "not defectives" or, rather, discarding what, under</p> <p>6 the testing regime has at this stage decided is not</p> <p>7 defective, because it is a multi-stage process; it's not</p> <p>8 simply binary.</p> <p>9 So obviously if you are only discarding from one</p> <p>10 pile and not from the other pile, I think it should be</p> <p>11 fairly obvious that that will lead to a bias in results,</p> <p>12 a bias towards a higher number of defectives.</p> <p>13 Going on to the next slide, which is trying to</p> <p>14 emphasise this point, because I think it is an important</p> <p>15 point, that the binomial analysis rests on the</p> <p>16 assumption that only two outcomes are possible. I hope</p> <p>17 I have shown that actually there are more outcomes than</p> <p>18 that, if you look at it in detail. By example, for</p> <p>19 instance, if you were doing a drug trial, you might say,</p> <p>20 "It's binomial, the patient either dies or survives."</p> <p>21 Yes, but what about if the drug were to, for instance,</p> <p>22 significantly increase the lifespan with a high quality</p> <p>23 of life? Yes, the patient still died of the disease,</p> <p>24 but it's an effective drug because it had a positive</p> <p>25 effect on extension of lifespan; similarly, remission,</p>	<p>1 to look at the statistics and try to make suggestions as</p> <p>2 to how the data could and perhaps should have been</p> <p>3 analysed more efficiently to give a more scientifically</p> <p>4 reliable and justifiable answer and outcome.</p> <p>5 So where, for instance, I have adopted</p> <p>6 a 28 millimetre engagement length, I'm not straying into</p> <p>7 engineering here. I'm not saying, "I believe this."</p> <p>8 It's a number I took from previous testimony, but I do</p> <p>9 not feel competent to say, "Yes, you must use these</p> <p>10 numbers." The numbers are not intended to be correct in</p> <p>11 the sense of, "Please use these numbers to go away and</p> <p>12 design a structure or to design remedial measures, or</p> <p>13 decide whether certain measures are required." I'm</p> <p>14 trying to indicate what might happen if the data were</p> <p>15 properly re-analysed.</p> <p>16 The next slide, please. We then move on to the</p> <p>17 capping beam.</p> <p>18 COMMISSIONER HANSFORD: Sorry, Dr Wells, can I interrupt you</p> <p>19 for a moment. Can you take us back to point 4 and the</p> <p>20 table. For the benefit of those in this room, could you</p> <p>21 just explain or take us through what your findings are</p> <p>22 in these various columns and what they mean?</p> <p>23 A. Certainly. I do apologise. I had written notes to go</p> <p>24 with all these slides and then I was told I'm not</p> <p>25 allowed to bring notes into the room so I'm trying to do</p>
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<p>1 and so on.</p> <p>2 So whenever you lump things into two classes when</p> <p>3 actually there's more classes really there, you are</p> <p>4 necessarily going to bias the data.</p> <p>5 The next slide, please. Then we have the internal</p> <p>6 inconsistencies; that direct measurement, for instance,</p> <p>7 of engagement length wasn't given an allowance for error</p> <p>8 whereas the PAUT measurement was. Number of threads</p> <p>9 exposed doesn't agree with either of those in a large</p> <p>10 number of cases, and so on and so forth.</p> <p>11 So rather than being binomial, it's at least</p> <p>12 multinomial, and in my opinion it should actually have</p> <p>13 used a continuous assessment model because these are</p> <p>14 continuous variables. We are looking at how much of the</p> <p>15 thread was engaged, how much is this component of the</p> <p>16 structure contributing to the overall strength of the</p> <p>17 structure. It doesn't suddenly become zero because the</p> <p>18 direct measurement was 39.999 millimetres instead of</p> <p>19 40 millimetres.</p> <p>20 I've tried to illustrate what effect this has in the</p> <p>21 next table, where we have acceptance and rejection</p> <p>22 criteria, and I've tried to illustrate -- I should</p> <p>23 emphasise at this point that I am not trying to design</p> <p>24 a structure here. I'm not saying these numbers should</p> <p>25 be used as the actual answers. I took my remit as being</p>	<p>1 it from memory. And you are right: I meant to say here</p> <p>2 that -- for instance, assuming missing values have mean</p> <p>3 of the remainder of the sample -- now, this simply means</p> <p>4 that on a previous slide, I said that the samples which</p> <p>5 were discarded had already been passed on the first part</p> <p>6 of the multi-part test for defective or not defective.</p> <p>7 So somebody has looked at these and said, "Yes, they are</p> <p>8 definitely connected", so they had already passed that</p> <p>9 first threshold, and then they were discarded because</p> <p>10 somebody couldn't get the measurement.</p> <p>11 Now, I've no idea why. Could it be that the PAUT</p> <p>12 equipment couldn't be lowered into that part of the</p> <p>13 structure? Who knows? We have insufficient</p> <p>14 information.</p> <p>15 What I know from the statistical point of view is</p> <p>16 that those are missing values. If you were to discard</p> <p>17 them, then you deliberately bias the sample towards</p> <p>18 a higher number of defectives. So trying to compensate</p> <p>19 for this in the best way available statistically, the</p> <p>20 correct way, I believe, is to say that those values</p> <p>21 which you cannot obtain a measurement should be given</p> <p>22 the average of the measurements that you could take.</p> <p>23 So that is the best information we have. It's</p> <p>24 standard practice. You assume that the missing</p> <p>25 values -- so what the report refers to as "discarded"</p>

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<p>1 I have here referred to as a missing value, and where we 2 have a missing value I have simply given it the mean of 3 the remainder of the sample of its type. 4 So if it was discarded because you couldn't take 5 a PAUT measurement, then it takes the average or mean of 6 all the PAUT measurements, not of everything, only of 7 ones of its type. We don't want to start assigning 8 values which aren't appropriate. 9 So what I've done here is try to progressively 10 improve the analysis -- or maybe not improve, I can't 11 say that 28 millimetres is actually better or worse than 12 37 millimetres. That is outside my expertise. What 13 I've tried to do here is part-improve or part-change and 14 say there are other ways of doing this; it's up to 15 somebody else to decide whether this is the correct way, 16 or which one of those is the correct way, or maybe none 17 of those are the correct way, but I felt it was 18 incumbent on me to illustrate what those assumptions 19 would entail or what would happen if you make those 20 assumptions. 21 So we start off with the left-hand column -- 366, 22 332, 350 -- that's what was in the holistic report. 23 Then, if we replace it with the mean of the remainder of 24 the sample, we get the next column. Then, if you adopt 25 an engagement length cut-off but still discard the</p>	<p>1 these next three columns, how that 35 per cent changes 2 ultimately to 9.4 per cent, if you adopt the points you 3 have previously made about correction of the data. Is 4 that correct? 5 A. That is correct, yes. 6 COMMISSIONER HANSFORD: Thank you. That's very helpful. 7 A. Moving on now -- this is a different part of the report, 8 and this is a part of the report that I had some 9 difficulty with, because it seems to me to be introduced 10 without background. 11 I have since understood a fair bit more about it, 12 having read some of the documents that I have received 13 in the last week or so, but initially it did seem to 14 come a little bit from nowhere. 15 But the main point that I could say, given the 16 information that I have received, is the data set here 17 was very small. The actual data set which was used in 18 the report was seven points or couplers on one side and 19 11, from memory, on the other side. And the assumptions 20 behind the analysis method used to calculate the 21 strength reduction factors are flawed; that's my middle 22 point there. 23 One of the reasons for this -- I don't want to get 24 into details of statistical methods here, but 25 I understand from reading the background materials that</p>
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<p>1 samples, then you get the next column. Then, if you do 2 both, you get the final column. So the final column is 3 doing both the correction for discarding -- introducing 4 bias but discarding previously passed samples, and also 5 changing the cut-off to 28 millimetres. 6 COMMISSIONER HANSFORD: So, Dr Wells, forgive me again for 7 interrupting -- so just to understand that by way of 8 example, if you take the bottom line of your table, just 9 the bottom line at the moment, the holistic report tells 10 us there should be a 35 per cent strength reduction 11 factor. Is that correct? 12 A. Yes. This is calculated as being a 95 per cent upper 13 bound. 14 COMMISSIONER HANSFORD: Yes. 15 A. So all I've done is adopted exactly the same convention 16 as in the holistic report. So I'm not trying to pass 17 judgment here on whether that method is correct. 18 COMMISSIONER HANSFORD: Okay. 19 A. But yes, that's correct, the 0.35 means that the 20 holistic report then went on to say this means there is 21 the 35 per cent strength reduction due to the number of 22 defectives. 23 COMMISSIONER HANSFORD: And sticking with the logic of the 24 holistic report -- I know you are going to come on to 25 other points later -- you are then showing, through</p>	<p>1 the method that was used employed the Delta method. 2 It's actually a very complicated piece of statistics 3 that has been undertaken to come up with this, and 4 somewhere in the middle of it there was the recourse to 5 the Delta method. 6 The Delta method is basically a large-sample 7 approximation and it works well when the samples are 8 above 30, and here the sample sizes were 7 and 11. So 9 I think it's fair to say that 7 and 11 are not above 30, 10 and therefore the use of the method is not valid. 11 I'm just saying that to give you some indication of 12 my reasons for saying that the method was flawed. 13 I say it's a really complicated piece of 14 mathematical statistics. I think it's actually very 15 difficult to get right. So I would tend to sidestep the 16 whole thing and suggest the Monte Carlo approach, which 17 I did just to see how it worked. I'm not saying that my 18 results should be used to construct a structure, to make 19 decisions. I'm simply trying to indicate a more 20 scientifically accurate, better way of analysing the 21 data. 22 Next slide, please. Then finally, there's this 23 whole consideration of appropriate confidence level. So 24 the Standing Committee states -- and here I'm simply 25 quoting CS2:1995 and CS2:2012 -- that a threshold value</p>

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<p>1 should be an upper limit of the statistical tolerance 2 interval at which there is a 90 per cent probability 3 that 95 or 90 per cent of the values are at or below the 4 upper limit, at which point one would naturally pause 5 for breath and ask, "What does it mean?" 6 It does touch on some quite arcane points of 7 statistics, but the main point I would say here is that 8 the only consistency in that is 90 per cent. So we have 9 90 per cent probability, there's no 95 per cent 10 probability, it only says 90 per cent probability, and 11 that either 95 per cent or 90 per cent of the values are 12 at or below. Why do we give the choice? For context. 13 How do you choose the context? Well, it doesn't 14 actually help reading the CS2s, but if you read the ISO 15 standards then there are tables which help you decide. 16 Hence my point elsewhere that I feel the ISO standards 17 are useful in helping to interpret the CS2s. 18 But regardless, where there is no choice, it's 90; 19 where there is a choice, it's 95 or 90. So I think that 20 it behooves us to at least look at how the figures would 21 have panned out had we used 90 per cent, and so I did 22 actually include that in my slide after next. 23 But the next slide I simply included because 24 I thought this might come up and I wanted to be able to 25 say, "Can I please refer to this?" This is my rather</p>	<p>1 you have in that upper limit, once you've set the upper 2 limit, based on how much of the data you want to be 3 within a certain interval. 4 COMMISSIONER HANSFORD: That's helpful. Thank you. 5 A. So all of that was simply by way of justifying the fact 6 that I've reworked the numbers with 90 per cent and 7 found that the value in the holistic report, which 8 previously was 0.366, comes out to 0.304 on 9 a 90 per cent limit, and then so on and so forth for my 10 successive changes, so that if we more correctly use the 11 missing values however many the sample, we 0.308. 12 I actually have a feeling that I've made an arithmetical 13 slip there and I will hopefully get an opportunity to 14 explain that later. Because I would have expected it to 15 have been less than 0.304. I think I may have 16 transcribed a number incorrectly in my haste. Sorry 17 about that. 18 But then when we get down to the 28 millimetres, and 19 28 millimetres plus assigning the mean, we actually get 20 substantially lower strength reduction factors. 21 Now, I'm not actually advocating that we use those 22 strength reduction factors. I was asked for 23 a statistical opinion, and my statistical opinion is 24 that the references tend to favour a 90 per cent limit, 25 and therefore you might consider it surprising that the</p>
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<p>1 crude attempt at trying to separate out that 90, and 95 2 or 90. The whole point is there are two separate 3 statistical concepts being bundled into one there: that 4 you get a confidence interval, which is how much of the 5 data do you expect to lie within a certain interval. So 6 that's the red line on this graph. Then, having set 7 that confidence level, there is this upper bound, there 8 is then actually a statistical confidence in the data 9 that is available to predict that upper bound. And what 10 we find, in the data set we've got at the moment, is 11 that that data upper bound is not symmetric, and therein 12 lies a lot of the problems with the methodology that was 13 used to derive the capping beam statistics. 14 Moving on to the next slide -- 15 COMMISSIONER HANSFORD: Sorry, Dr Wells, before you do, 16 what's the reference to "Wilson" on that slide? 17 A. Sorry, it's just because I didn't redraw it. I stole it 18 from a reference which I think I originally put in. 19 Wilson is another technique for doing what the 20 holistic report did to come up with the confidence in 21 the binomial. It's variously referred to in supporting 22 documentation as the Clopper-Pearson method or the 23 "exact" method. 24 COMMISSIONER HANSFORD: Right. 25 A. It's just a way of trying to calculate the confidence</p>	<p>1 90 per cent limit was never actually addressed in any of 2 the reports. So I was simply trying to redress the 3 balance. 4 Then the next slide, again, is still 90 per cent, 5 but this time looking at the capping beam data and 6 trying to introduce a more scientifically justifiable 7 usage of the data so that instead of discarding values 8 which have already passed a part of the test, instead 9 replace them with the mean, and hence my row there, 10 "Missing values"; that simply means I have assigned the 11 mean value where previously it was ignored, and 12 re-incorporated it into the analysis, to have a mean, 13 variance, type A, type B, and combined. 14 So again this is not intended to be a table on which 15 I would like anybody to go away and construct 16 a building. I am trying to illustrate alternatives 17 because I felt that was my brief. That is pretty much 18 all, I think, I have to say on the holistic report. 19 So we then have the Extended Inquiry verification 20 report, which is all to do with the quality of rebar, 21 which has been touched on already in this session. 22 So we have: the level of confidence in the quality 23 of rebar that was not re-tested on site; and 24 a calculated strength reduction factor. 25 If I could quickly go through those. The next slide</p>

Page 57	<p>1 is simply an extract from CS2:1995:</p> <p>2 "The long-term objective is to rely on the third</p> <p>3 party certification ..."</p> <p>4 I shouldn't need to read this because it was already</p> <p>5 read out to the tribunal earlier this session, and</p> <p>6 somebody pointed out that this was 25 years ago -- or</p> <p>7 24 years ago, according to 1995, but of course that's</p> <p>8 when it was published; it was actually written at least</p> <p>9 a year before that -- so hence at least 25 years ago we</p> <p>10 were supposedly moving towards a single testing regime</p> <p>11 and we are still moving towards.</p> <p>12 So the next paragraph: "Level of confidence in the</p> <p>13 quality of rebar that was not re-tested on site" -- this</p> <p>14 is I think the key point. I put it in quotes because it</p> <p>15 is a quotation directly from CS2:1995. How much</p> <p>16 confidence do we have in the quality of the rebar that</p> <p>17 was not re-tested on site? I think this is key, this is</p> <p>18 critical, and the word "confidence" I am interpreting in</p> <p>19 a statistical sense, so we should be able to put</p> <p>20 a number on this, a figure: are we 90 per cent,</p> <p>21 95 per cent, 99 per cent or whatever confident?</p> <p>22 The way I approached this was by saying we have the</p> <p>23 mill test certificates, we know what the manufacturer</p> <p>24 has measured for these samples, and there are three sets</p> <p>25 of measurements for each sample, for each batch.</p>	Page 59	<p>1 likely situation. So the correct way of approaching</p> <p>2 this is to ask the question: could those actually be</p> <p>3 different? What's the chances that a mean of 507 and</p> <p>4 a mean of 517 were obtained from completely different</p> <p>5 batches or by a completely different method or whatever,</p> <p>6 given that amount of variance?</p> <p>7 Now, 507 and 517, you could say they are fairly</p> <p>8 similar, or you could say, actually, they are quite</p> <p>9 different, they are 10 megapascals' difference. The key</p> <p>10 point is to look at the variance. If we have a variance</p> <p>11 of 121 on 507, that means that number, 507, could vary</p> <p>12 quite a lot on either side. Similarly, a variance of 91</p> <p>13 on 517, it could vary quite a lot on either side.</p> <p>14 So what are we to do? Well, we -- the next slide,</p> <p>15 I think -- what we do, or should do, as statisticians,</p> <p>16 is apply a hypothesis test. This removes the need for</p> <p>17 any assumptions. We don't need to ask are all the rebar</p> <p>18 homogeneous? Well, we know we are not, but we know how</p> <p>19 much they are not, we have calculated the variance. So</p> <p>20 we know this, we have a number, we can account for it.</p> <p>21 Differences among manufacturers? Easy. We simply</p> <p>22 do the statistics for each manufacturer separately. It</p> <p>23 automatically accounts for natural variation in rebar.</p> <p>24 This is the basis of most statistical analysis, the</p> <p>25 hypothesis test. Is it likely that two slightly</p>
Page 58	<p>1 There's the yield stress, the ultimate tensile stress</p> <p>2 and the ratio of the two, and all three measures have to</p> <p>3 pass in order for the sample to pass.</p> <p>4 Then there are various subclauses which say that if</p> <p>5 one fails, one specimen fails, then you are allowed to</p> <p>6 take two more and re-test those. It doesn't actually</p> <p>7 specifically state whether, if one of those fails, you</p> <p>8 can also replace that with another two. The implication</p> <p>9 is you can, but it's not actually clear on that point,</p> <p>10 and certainly there's nothing that says that you can't.</p> <p>11 But anyway, back to the numbers. So we have the</p> <p>12 manufacturers' numbers and we have the purchasers'</p> <p>13 numbers, where by "purchasers' numbers" I mean the</p> <p>14 numbers as supplied by MTRCL's HOKLAS-accredited</p> <p>15 laboratory, in accordance with CS2:1995.</p> <p>16 So in megapascals, we have the first three numbers,</p> <p>17 507, 496 and 518, which give you a mean of 507 and a</p> <p>18 variance of 121. Test results supplied by the</p> <p>19 manufacturer: 516, 508, 527, a mean of 517 and</p> <p>20 a variance of 91.</p> <p>21 The question is do they confirm each other or do</p> <p>22 they not confirm each other?</p> <p>23 This brings us to another interesting point of</p> <p>24 statistics. Statistics never actually proves anything.</p> <p>25 It can simply give us an idea as to what is the most</p>	Page 60	<p>1 different numbers are disagreeing with each other, or</p> <p>2 could most likely come from the same parent population?</p> <p>3 It's a basic tool, the hypothesis test. It's used every</p> <p>4 day, for everything from building bridges to planning</p> <p>5 economies. It was actually described by one eminent</p> <p>6 scientist as the most dramatic scientific advance of the</p> <p>7 20th century.</p> <p>8 And if we use it on this data, it shows that within</p> <p>9 the tolerances specified by Hong Kong's Standing</p> <p>10 Committee on Concrete Technology, we can state that the</p> <p>11 untested rebar would have passed, had it been tested.</p> <p>12 Okay, we can state that. It doesn't mean that it would</p> <p>13 have done; it means that the statistics say that. So we</p> <p>14 have confidence, in other words. It's not a statement</p> <p>15 of fact in the same way as two plus two equals four. It</p> <p>16 simply says there is no evidence, no credible evidence,</p> <p>17 that the untested rebar would have failed, and I believe</p> <p>18 that that is the correct way of undertaking the</p> <p>19 analysis.</p> <p>20 The next slide. The way the analysis was actually</p> <p>21 undertaken, as I understand it, as is written in the</p> <p>22 holistic report, is that it was based on the assumption</p> <p>23 of a worst-case scenario. In other words, if 55 out of</p> <p>24 110,000 samples had failed in the last ten years, then</p> <p>25 if we assume that all of the rebar that wasn't tested</p>

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<p>1 also failed, then the probability of that situation, 2 that worst-case scenario, can be calculated by -- so the 3 first one failing, that would be 55 over 110,000, so the 4 second one failing, that would be times 55 over 110,000, 5 and if there were about 130, from memory, untested 6 samples, then we multiply this 55 over 110,000 by itself 7 137 times, and that's where I come up with the figure 8 of: this is so unlikely that it's actually more likely 9 that two of us would accidentally, purely by chance, 10 pick the same atom from all the atoms in the known 11 universe. 12 In other words, I feel that it is an incredibly 13 unlikely worst-case scenario and therefore not really 14 usable. 15 By way of comparison, whenever the HOKLAS-accredited 16 laboratory tests a batch of rebar, it takes three 17 specimens as a sample and tests them. Now, it's just 18 possible that those three specimens were the only ones 19 in the entire batch which were going to pass the test. 20 Highly unlikely but it's possible. And if you take that 21 worst-case scenario, you actually find -- do the maths, 22 crunch the numbers -- that that situation is more 23 credible than this worst-case scenario that was used to 24 come up with strength reduction factors of 4 per cent 25 and 13 per cent.</p>	<p>1 First of all, Dr Wells, I don't pretend to know much 2 about statistics, and for this reason, in my 3 questioning, I may have to pause from time to time so as 4 to allow myself to digest your answer, gather my 5 thoughts and prepare for my next question. So please 6 forgive me and bear with me. 7 The other point I would like to make before I start 8 is that we have received your supplemental information 9 this morning. I myself haven't had the time to go 10 through all the details or to seek advice from Prof Yin, 11 so it is quite possible that some of the answers of my 12 questions may have been provided by you in your 13 supplemental information. So, if this happens, please 14 just let me know; okay? 15 A. Okay. 16 Q. Now, the first topic that I would like to discuss with 17 you is about the issue of randomness. On this 18 particular issue, you deal with it in paragraphs 4.3 to 19 4.5 of your reports. 20 Just to make sure I understand your reasoning, your 21 way to develop this point, isn't it, that first of all 22 you consider the total number of diaphragm wall panels, 23 which in this particular case is 237, and you take the 24 number of panels without capping beams of 175 panels, 25 and 62 of the other panels are with capping beams, and</p>
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<p>1 So I believe that those factors are simply not 2 credible and that a correct analysis is based on the 3 hypothesis test that the manufacturers' and purchasers' 4 tests for the available rebar are compatible and likely 5 to come from the same population. 6 So that is a quick run-through of what I think I was 7 asked to do, and I presume now I am to take questions on 8 it. 9 MR SHIEH: Thank you very much, Dr Wells, for your 10 exposition. 11 What follows next would be counsel for other parties 12 to ask you questions. I believe the government would 13 ask you questions first, followed by the MTR, and then 14 counsel for the Commission, Mr Ian Pennicott, would go 15 last in asking you questions, a sweeper, so to speak. 16 Mr Chairman and Mr Commissioner may ask you 17 questions any time they wish to, and after that I will 18 have a chance, if I wish, to ask you questions in 19 re-examination. 20 I hope that is all clear and please remain seated 21 while other counsel ask you questions. 22 WITNESS: Thank you. 23 Cross-examination by MR CHOW 24 MR CHOW: Good afternoon, Dr Wells. I act on behalf of the 25 government and I have a few questions for you, Dr Wells.</p>	<p>1 on that basis you work out that the number of panels 2 with capping beams represents about 26 per cent of the 3 total number of panels; is that right? 4 A. I believe so. 5 Q. Then you look at the number of specimens. Now, there 6 are altogether 90 specimens, and after the sampling 7 exercise 83 specimens were from panels without capping 8 beams, which you describe as type A samples; correct? 9 A. Yes. Sorry, just a point: I don't think I describe them 10 as type A samples. I think I'm quoting there from 11 a document which was supplied to me. So that isn't 12 actually my description. I'm simply copying it from 13 somebody else's. That's why it's in quotes and in 14 italics. 15 Q. That's fine. Now, we know that 83 per cent specimens 16 were taken from panels without capping beams, and seven 17 specimens were from panels with capping beams, which you 18 work out the ratio and you arrived at 7.7 per cent of 19 samples of specimens from panels with capping beams; 20 right? 21 A. I believe so. 22 Q. Then you compare the 26.1 per cent of the diaphragm wall 23 with capping beams, with the 7.7 per cent of specimens 24 that come from panels with capping beams; right? 25 A. I believe so.</p>

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<p>1 Q. And because of the apparent disparity between these two</p> <p>2 percentages, 26 per cent and 7.7 per cent, you then try</p> <p>3 to determine the probability of these happening, and you</p> <p>4 arrive at a probability of about 1 in 1,000; right?</p> <p>5 A. Yes.</p> <p>6 Q. Now, you then say because the probability of this</p> <p>7 happening is small, then in turn it suggests that</p> <p>8 perhaps the sampling exercise was not random. Is that</p> <p>9 your point?</p> <p>10 A. Yes.</p> <p>11 Q. So, as I understand it, you are using the end result of</p> <p>12 the sampling exercise to assess the randomness of the</p> <p>13 sampling process; is that right?</p> <p>14 A. Yes.</p> <p>15 Q. Please help me to appreciate this reasoning, and I would</p> <p>16 like to apply it to a real-life situation. In</p> <p>17 Hong Kong, we have a lottery. As I understand it, in</p> <p>18 the UK there is a similar lottery. In the UK it's</p> <p>19 called the National Lottery. You know that?</p> <p>20 A. That is correct.</p> <p>21 Q. The way it works is that a certain set of numbers will</p> <p>22 be drawn, under the lottery systems. In Hong Kong, each</p> <p>23 time we draw six out of 49 different numbers -- so each</p> <p>24 ball will bear a certain number, and I understand the UK</p> <p>25 is of a similar system. I was told that in the UK you</p>	<p>1 doubt about the randomness in the process; do you agree?</p> <p>2 A. Yes, I would agree.</p> <p>3 Q. So, now, if we then go back to Prof Yin's sampling</p> <p>4 exercise. According to the evidence, he only carried</p> <p>5 out the sampling exercise once, and he arrived at</p> <p>6 a ratio of 7.7 per cent. Now, you say that because the</p> <p>7 chance of this happening is so small, then it suggests</p> <p>8 it is not random.</p> <p>9 Applying the same analogy that we have just</p> <p>10 discussed, if Prof Yin carried out another sampling</p> <p>11 exercise the following week, and if the result of the</p> <p>12 second sampling exercise gives the same percentage, 7.7,</p> <p>13 then perhaps, in such circumstances, we may have</p> <p>14 a reason to doubt whether the sampling exercise was not</p> <p>15 random. But the fact that Prof Yin has only carried out</p> <p>16 the sampling exercise once, if you agree with me in</p> <p>17 relation to the lottery, then I would suggest to you</p> <p>18 that that is no reason for us to doubt the randomness in</p> <p>19 the sampling exercise carried out by Prof Yin. Would</p> <p>20 you agree with me?</p> <p>21 A. No.</p> <p>22 Q. On the basis of one set of results, you said --</p> <p>23 A. I think the point you are missing is "one set of</p> <p>24 results". You are referring to one specific result from</p> <p>25 the lottery and then trying to draw a conclusion about</p>
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<p>1 have 59 numbers, so 59 different balls.</p> <p>2 MR SHIEH: My junior says you draw seven numbers in</p> <p>3 Hong Kong.</p> <p>4 MR CHOW: The last time I participated in the Mark 6 was</p> <p>5 some years ago, because, as I never won any Mark 6, so</p> <p>6 I gave up.</p> <p>7 Now, every time a set of numbers is drawn, if you</p> <p>8 look at that particular set of numbers and try to</p> <p>9 calculate the probability of that particular set of</p> <p>10 numbers being drawn, we always arrive at a very small</p> <p>11 probability.</p> <p>12 Now, I was advised that if, as in Hong Kong, if we</p> <p>13 have to draw six numbers out of 49, the probability of</p> <p>14 getting it right is one in 12 million, around one in</p> <p>15 12 million; this is the chance. Right?</p> <p>16 But as a layman, I would not -- although the chance</p> <p>17 of getting that particular set of numbers is so small,</p> <p>18 I would not consider the lottery process is in any way</p> <p>19 not random. Would you agree?</p> <p>20 CHAIRMAN: I don't understand.</p> <p>21 A. The lottery process has been designed to be completely</p> <p>22 random.</p> <p>23 MR CHOW: Right. If I go a step further, if the same set of</p> <p>24 numbers repeatedly comes up in a subsequent lottery,</p> <p>25 then perhaps, in such circumstances, we may start to</p>	<p>1 a set of 90 results by looking at rebar.</p> <p>2 If you were to look at 90 lottery results and you</p> <p>3 were to find that, of those 90 lottery results, 83 of</p> <p>4 them had come up with exactly the same numbers, you</p> <p>5 would probably be demanding your money back if you had</p> <p>6 bought a ticket because you would think it had been</p> <p>7 fixed.</p> <p>8 Q. Dr Wells, but your complaint is in relation to the</p> <p>9 percentage, 7.7 per cent rather than 26.1 per cent that</p> <p>10 you expect. So we don't have 90 lottery. We only have</p> <p>11 one lottery.</p> <p>12 A. Exactly --</p> <p>13 Q. Prof Yin carried out the sampling exercise once and he</p> <p>14 arrived at 7.7 per cent.</p> <p>15 A. No. I think you're missing the point. The random</p> <p>16 sample is of size 90. If you took a random sample of</p> <p>17 90 lotteries -- they do the lottery every week in the</p> <p>18 UK, I don't know how often it is in Hong Kong, but</p> <p>19 let's -- you introduced the UK one so I will concentrate</p> <p>20 on that. If you look back on the last 90 weeks of</p> <p>21 lottery and you find that, of those 90, a large number</p> <p>22 of them have got very similar numbers, then you might</p> <p>23 begin to doubt the process. You might begin to think</p> <p>24 that perhaps the mechanism had gone wrong or got stuck.</p> <p>25 I'm not saying we prove anything by doing this analysis.</p>

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<p>1 If you read 4.5, for instance, which is on the screen in 2 front of us, it says: 3 "The probability that this sample was random can be 4 estimated using a hypothesis test ..." 5 At no point do I say this is not random. I cannot 6 say it is not random. There is no concept of saying 7 something is or is not random. All we can say is that, 8 having undertaken a sampling exercise, it is normal 9 procedure to back-check. 10 The lottery example isn't appropriate. What you 11 might like to consider, for instance, is polling in 12 front of an election. If you were to poll a number of 13 people and after polling them you found that 90 per cent 14 of the people you had asked were male and 10 per cent 15 were female, you might begin to think that the results 16 you had got would possibly not accurately predict the 17 results of the election because, in the election, you 18 would expect 50 per cent of the electorate to be male 19 and 50 per cent to be female. So you might think that 20 something's gone wrong, and what you would do, probably, 21 is go back and look at the way you chose your sample, 22 and you might say, "I wonder if we only canvassed people 23 who were coming out of" -- and I'm trying to think of 24 a venue where you would get more males coming out than 25 females and I'm afraid I'm failing, but hopefully you</p>	<p>1 Now, the 26.1 per cent is the ratio of the two types of 2 diaphragm walls, one with capping beams and the other 3 diaphragm walls without capping beams; whereas the 4 7.7 per cent is the ratio of couplers. Am I right in 5 thinking that what you ought to compare the 7.7 per cent 6 with is the corresponding number of couplers in 7 diaphragm wall with capping beams, and corresponding 8 number of couplers in other set of diaphragm wall 9 without capping beams? 10 A. I'm sorry, I simply read the documents and, using your 11 simplification and referring to these as apples and 12 oranges, I read it as 175 apples and 62 oranges, and 13 83 apples and seven oranges, and I simply, without 14 knowledge of how many or whatever or the structure, 15 I simply said that if you went to the grocers and 16 randomly picked from 175 apples and 62 oranges and you 17 actually came out with 83 apples and seven oranges, then 18 I would say that you were disproportionately sampling the 19 apples. 20 Does that answer your question? 21 Q. I have to confess that I'm totally confused. I need to 22 take some time to digest this part. 23 COMMISSIONER HANSFORD: I think that was quite clear. 24 MR CHOW: Right. 25 175 -- if I read the transcript, what, Dr Wells, you</p>
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<p>1 get my gist. 2 COMMISSIONER HANSFORD: Perhaps a rugby match. 3 A. Sorry, you don't prove something is or is not random. 4 What you do is you start off by saying, "I'm hoping to 5 conduct a random test, I'm hoping to get a random 6 sample." Afterwards, it is normal procedure to at least 7 back-check. Maybe there's nothing you can do about it 8 but it is extra information which you get for free so 9 you should do it. 10 What I'm saying is that (a) that wasn't done in this 11 case, so I try to draw attention to the fact that in my 12 view this was a major omission, and (b), had it been 13 done, it would have cast doubt on the actual randomness 14 of the data. I've never said and never would say that 15 the data is not random. I couldn't say that, nobody 16 could. All I can say is that the numbers statistically 17 cast doubt on it, and that is not my view. That is 18 simply first year undergraduate statistics. 19 MR CHOW: Thank you, Dr Wells. 20 My next question is the diaphragm wall panels that 21 we have been talking about, do you know the number of 22 couplers in each diaphragm wall panels? 23 A. No, I don't think so. 24 Q. So am I right in thinking that when you compare the two 25 percentages, you should be comparing apples with apples?</p>	<p>1 have just said is 175 apples and 62 oranges, but if 2 I try to correlate with these two figures, the 175 are 3 the panels without capping beams, whereas 62 is the 4 panel with capping beams; right? 5 So the ratio of 26 per cent is the ratio between 6 apples and oranges; is that right, according to your 7 definition? 8 A. Yes. It might be helpful to introduce a little bit of 9 statistical jargon here. 10 Q. No, please do not! 11 A. Simply because it will make it easier, I think, to 12 understand. 13 The 175 numbers of them are without capping beam 14 details and 62 numbers of them are with capping beam 15 details would, in statistical terms, be referred to as 16 "the population". So that is everything, everything 17 that we know about. So, from the construction record, 18 the population is 175 and 62. And then, after my 19 ellipses, it says by the total number of samples, the 20 random sample size is 90 and the number of type A 21 samples is 83 and the number of type B samples is seven. 22 Technically, that's rather sloppy use of terminology 23 because they don't mean samples, they really meant 24 specimens. The sample is actually whole thing, the 90. 25 So the population is 175 and 62. Whether they are</p>

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<p>1 apples, oranges, capping beam details or whatever 2 I don't think is important for the statistics. The 3 sample is size 90, made up of 83 of one and seven of the 4 other. All I'm saying is that if you follow a very 5 basic statistical technique which is universally 6 recognised for judging whether or not a sample is 7 a likely example of its population, then you find that 8 because 83 to seven is so different to 175 to 62, the 9 probability that you've got it right is low, in exactly 10 the same way as if you were polling for an election and 11 you had asked 90 males and ten females, you might 12 reasonably think that you'd made a mistake and that your 13 results are unlikely to be useful in predicting the 14 results of the next election. That's all I'm saying. 15 Q. Dr Wells, just now you said you don't have the number of 16 couplers in the diaphragm wall panels. Now, when you 17 talk about one population, 175 panels without capping 18 beams and 62 panels with capping beams, the ratio you 19 determined -- if you simply compare 175 with 62, you 20 have 26 per cent, but if you compare the total number of 21 couplers within this group of 175 panels, with the total 22 number of couplers within another group of 62 panels 23 with capping beams, you may not have the same 24 percentage, 26.1 per cent, because the number of 25 couplers in each panel are different. Do you agree?</p>	<p>1 saying here is that based on the numbers, there is very 2 strong evidence that the sampling procedure was biased; 3 furthermore, that it was specifically biased towards 4 being used to generate a higher number of defectives. 5 That much is simple arithmetic. 6 The question as to how the sampling process was 7 arrived at is something that I did not address in any of 8 my reports, but if you are asking me specifically now 9 then I would say that the sampling process is actually 10 incompatible with the analysis which was done to 11 calculate a sample size for a given confidence level. 12 So we have these figures of 50 having been 13 originally suggested and then it increased to 84 as 14 being a minimum number in order to obtain a result valid 15 at a 95 per cent level. 16 Now, that analysis assumes that the process was 17 a single-part sampling process. So, for instance, to 18 take the polling analogy, you simply stop people in the 19 street and you ask them. What was actually undertaken, 20 as I understand it, was a two-part process whereby there 21 were 28 random locations and, at each random location, 22 three random specimens were chosen. That's a two-part 23 process, and the analysis which was used to arrive at 24 the number 84 does not apply. 25 MR CHOW: Thank you, Dr Wells. I understand we have some</p>
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<p>1 A. I can neither agree nor disagree. All I can do is tell 2 you that if what you say is correct, then it completely 3 pulls the rug out from underneath all of the 4 mathematical analysis that followed on from this, 5 because everything that followed on from this then 6 assumes that you could multiply these numbers up by 7 assuming a ratio of 175 to 62. 8 So, if you can't assume the ratio of 175 to 62 is 9 actually the ratio in population, then yes, you are 10 right that my subsequent analysis in 4.4/4.5 might need 11 to be revisited, but unfortunately everything in the 12 holistic report then gets thrown out as well. 13 So I'm really not competent to say whether 175 to 62 14 is the correct ratio to use for applying elsewhere, but 15 I would suggest that for the benefit of the holistic 16 report you should hope so. 17 Q. All right. I think that's enough for the present 18 purposes. 19 Can I just ask you a few more quick questions and 20 then I think it's time for us to adjourn. Earlier, in 21 answering my question, you mentioned about the sampling 22 process. Do you agree with me that a more accurate to 23 consider whether the sampling exercise is random is to 24 look at the actual sampling exercise performed? 25 A. I had tried to just look at the numbers here. What I'm</p>	<p>1 actual constraints here, we need to stop at 5.00. 2 Mr Chairman, I see that we are -- 3 CHAIRMAN: Just after 5.00. All right. Okay. 4 MR CHOW: Perhaps we need to continue tomorrow then. 5 CHAIRMAN: Yes. 6 Dr Wells, unfortunately, even though it's bright and 7 early in the morning for you, or reasonably early, we 8 are moving into the evening here, and because of time 9 constraints -- we have other matters, a couple of the 10 counsel have other matters on -- so we are going to have 11 to leave it now until tomorrow. I'm very sorry about 12 that. I hope you were anticipating the prospect of 13 having to come back tomorrow. 14 WITNESS: I was indeed. Thank you. 15 I know that I am subject to the good offices of the 16 people sitting around the table with me, but I am 17 perfectly happy to start earlier tomorrow, if the 18 building here was open earlier, and I can see somebody 19 nodding their head. So if you want me to be available 20 earlier tomorrow, that's fine by me. 21 CHAIRMAN: What time? You tell us and get some more nods 22 from those around you and then we can agree that, I'm 23 sure. 24 WITNESS: 6.30? Would that help the Commission if we were 25 to start at 6.30 local, UK time?</p>

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<p>1 CHAIRMAN: 6.30? Wow. That's very good. For us, it's 2 easy, but for you -- will you be reasonably nearby? 3 WITNESS: I'm staying in a hotel just around the corner. 4 They don't serve breakfast until 7, so I will have to 5 make arrangements to get sandwiches stocked in tonight, 6 but I'm at your disposal. 7 CHAIRMAN: If he is prepared to start at 6.30, we can start 8 at 1.30. That sounds excellent. 9 WITNESS: Okay. If that's all right? Yes. 10 CHAIRMAN: Thank you very much indeed, Dr Wells. Thank you. 11 That would be of great assistance to us. 12 We will start 6.30 tomorrow morning, make the 13 linkup, UK time. Okay? 14 WITNESS: Okay. Thank you. 15 CHAIRMAN: Thank you very much indeed. 16 I would just mention to you, as a witness, whatever 17 kind of witness you are, including in this instance 18 an expert witness, you are obviously not entitled to 19 discuss your evidence with anybody, without the 20 permission of myself, between now and tomorrow. 21 WITNESS: Okay. Understood. 22 CHAIRMAN: Yes, of course. Thank you very much indeed. 23 WITNESS: Thank you. 24 Colin, we just wanted to start at 6.30 tomorrow; is 25 that okay?</p>	<p>1 give a response to that, he is deemed to -- 2 CHAIRMAN: I'm with you there. I didn't mention this fact 3 in the brief ruling I gave, because in my view, 4 statements can go in for all sorts of purposes and in 5 all sorts of contexts. 6 MR KHAW: Yes. 7 CHAIRMAN: And one can tidy that up to make sure that those 8 statements are not misused at some later stage. 9 MR KHAW: So it would be rather inappropriate for us to 10 really put things into Dr Wells' mouth, if the point has 11 not been tested or has not been actually put to him 12 during cross-examination. 13 So Mr Shieh's concern is not really a genuine one 14 because our analysis, at the end of the day, in our 15 closing submissions, will be confined to the points that 16 we have put to Dr Wells. 17 So his concern that some points will actually be 18 deemed to have been accepted will not exist. 19 But what I'm trying to say here is that I don't want 20 to have a situation where Leighton will come back and 21 say, "Well, since the response of Prof Yin has not been 22 admitted in evidence, then we are under no obligation to 23 ask Dr Wells to comment on those points while this issue 24 of admissibility is still not decided", because time is 25 really pressing. On that basis, I would venture to</p>
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<p>1 (Discussion off the record) 2 CHAIRMAN: I think what's actually being said off stage is, 3 "Are you mad?" But they are committed now, so there we 4 are. 5 MR PENNICOTT: Let's go! 6 CHAIRMAN: Let's go. All right. 7 MR KHAW: Perhaps, Mr Chairman, I just want to make one 8 point. While we may need to continue to revisit the 9 status of Prof Yin's response, I shall be very brief, 10 since I anticipate the probability that I will be able 11 to score one point today here may be very low, whether 12 you adopt Prof Yin's analysis or Dr Wells' analysis. 13 The point is this. I fully appreciate Mr Shieh's 14 concern that if we put in Prof Yin's report as evidence 15 now, it runs the risk that, at the end of the day, in 16 our closing submissions, we may run a point that since 17 Dr Wells has not been able to comment on a particular 18 point raised in Prof Yin's report, he will be deemed to 19 have accepted that point. But upon reflection there's 20 really an air of unreality in this argument because, as 21 counsel, we have to be responsible for what we say in 22 our closing submissions. If the point is not put to 23 Dr Wells during cross-examination, we can't really rely 24 on that point to say that since the point exists in 25 Prof Yin's report, but Dr Wells has not been able to</p>	<p>1 suggest that in fact Prof Yin's response could equally 2 be treated on a de bene esse basis. I believe there is 3 no reason why that could not be done. 4 So that's my suggestion which I just raise for the 5 Commission's consideration, given the fact that we may 6 need to continue to revisit this point tomorrow. But 7 I don't want this issue of admissibility of Prof Yin's 8 report to be hanging in the air, because it is a useful 9 report and I do wish Dr Wells to have the opportunity to 10 actually comment on the report, and in fact that is why 11 we have chosen to put forward his response now, rather 12 than wait until Prof Yin comes to give his synopsis. 13 The main reason is to give Dr Wells a chance to reply. 14 CHAIRMAN: Mr Shieh, if we were to say, "Okay, but you can 15 have an opportunity to discuss this report" -- or 16 response, rather -- "as much as you like with Dr Wells 17 overnight"? 18 MR SHIEH: Two points. One is, looking at what my learned 19 friend has said -- he said he did not want us to go back 20 and say, "Well, since the response of Prof Yin has not 21 been admitted in evidence, then we [as in Leighton] are 22 under no obligation to ask Dr Wells to comment on those 23 points while this issue of admissibility is still not 24 decided." 25 The answer is they could very well put whatever</p>

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<p>1 points they regard to be germane to Dr Wells in 2 cross-examination rather than for us to ask Dr Wells to 3 comment on that as part of our own evidence. 4 Secondly, I take on board Mr Chairman's suggestion 5 that what if we are allowed to speak to or to deal with 6 Dr Wells overnight and ask him to come up with 7 a responsive document. But, Mr Chairman, it would be 8 unsatisfactory because, if I can put it bluntly, in 9 terms of producing a document, the government has had 10 about a week and we would be working under extreme time 11 constraints -- 12 CHAIRMAN: I'm not thinking of you producing a document so 13 much. I'm thinking more of that if you had 14 an opportunity to look at that and discuss it with him, 15 then Dr Wells may be in a position to make some oral 16 response tomorrow of a more cogent and focused kind. 17 That's all. 18 MR SHIEH: Well, he can look at it so as to be prepared for 19 what may be put to him, but what puzzles us is what 20 is -- in this day and age, when one talks about distrust 21 of the government or whatever, one tends to think why is 22 it so important for the document to be in as a document? 23 If they want Dr Wells to be able to give a coherent 24 response because of his ability to read it overnight, 25 fine, he's got it actually. So if Mr Khaw's bona fide</p>	<p>1 consideration, I may still not be able to consider it", 2 but that would be a matter for Dr Wells. 3 CHAIRMAN: We appreciate that. 4 MR SHIEH: So it's really a matter of whether my learned 5 friend is somehow insisting on filing the document as 6 a document, and if so why is he so insistent? 7 CHAIRMAN: All right. 8 MR KHAW: Mr Chairman, my suggestion is in fact simply to 9 address Mr Shieh's concern because his concern is that 10 Dr Wells has not been given a chance to study the 11 document. 12 We say that if Dr Wells has any further observation 13 or comments, after he has had the benefit of looking at 14 that document, then of course he will feel free to say 15 so. This will be helpful to us, and this would also 16 address the point of any kind of unfairness that 17 Mr Shieh has been complaining about. 18 And also the purpose of having this document is that 19 when Prof Yin comes forward to give his presentation, no 20 doubt he will focus on his report, and he will also 21 comment on certain salient points raised in Dr Wells' 22 report. In fact, the earlier Dr Wells makes comments on 23 Prof Yin's response, the better, so that we could all 24 know the positions taken by all the parties regarding 25 the differences in the opinion between them.</p>
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<p>1 wish is for Dr Wells to be able to give a more 2 considered response when he is asked a question, I would 3 say thank you very much; I would ask Dr Wells to read 4 the document and wait for the questions to come his way. 5 CHAIRMAN: That's what seems to me to be what Mr Khaw is 6 asking. 7 MR SHIEH: Without actually having to attach a special 8 status to admitting a document, because one might ask 9 why admit the document to put it on file? 10 CHAIRMAN: All right. Fine. Whether one wants to admit the 11 document on that basis, that this is just 12 an aide-memoire so that we can move on tomorrow with 13 coherent questions, of which Dr Wells will have some 14 notice, because he will have read the document, and it's 15 not to be taken as part of an expert report countering 16 anything or expanding upon other matters. 17 MR SHIEH: Mr Chairman, you have heard our concern as to why 18 the government may wish to rely on it as a file 19 document, but if that point is put to one side, if the 20 invitation is for Dr Wells to consider the points made 21 in the document so that he can perhaps respond more 22 coherently tomorrow, having had one extra night to 23 consider it, then that is something that we obviously 24 would find difficult to resist. Obviously, subject to 25 Dr Wells saying, "Even with that one extra night's</p>	<p>1 CHAIRMAN: All right. 2 Dr Wells, can you ... 3 COMMISSIONER HANSFORD: I think he's been muted. 4 CHAIRMAN: Is there any way we can unmute Dr Wells? Oh, you 5 are unmuted. Dr Wells -- 6 DR WELLS: Hello. I can hear you. 7 CHAIRMAN: Dr Wells, there is what may best be termed 8 a responsive document that has been prepared by the 9 professor, and there has been some argument -- you 10 probably heard it earlier -- about the value of that 11 document at this moment in time in respect of your 12 evidence. It's a responsive document and, to a very 13 large extent, it is my understanding that counsel for 14 the government feel that if you were able to have a look 15 at it, it may assist you by giving you some earlier 16 notice of various issues, to answer their questions 17 tomorrow more comprehensively and with greater 18 confidence. 19 That seems to me to be a sensible way forward. 20 There are, of course, concerns expressed by the counsel 21 who represent Leightons and therefore who are your 22 counsel for purposes of the evidence given here. 23 I think their concerns are proper but can be answered. 24 Firstly, this document is going in at this moment in 25 time as an aide-memoire, simply to let matters move with</p>

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<p>1 greater efficiency tomorrow; okay?</p> <p>2 WITNESS: (Nodded head).</p> <p>3 CHAIRMAN: It's not going in as an expert report as such.</p> <p>4 If at a later stage the professor wishes that to go in</p> <p>5 as an expert report, separate submissions can be made</p> <p>6 and we can consider it separately, ensuring that you are</p> <p>7 not in some technical or legal way undercut. Do you see</p> <p>8 what I mean?</p> <p>9 WITNESS: Okay.</p> <p>10 CHAIRMAN: So if you get the opportunity today we will make</p> <p>11 sure the documentation is available. It will be no more</p> <p>12 than an aide-memoire for you to have a look at, so you</p> <p>13 can say, "Okay, I can see what is being said by the</p> <p>14 professor, the other expert in this matter. Yes, to</p> <p>15 some extent I agree or I don't agree, or at least I know</p> <p>16 how I can answer this more efficiently."</p> <p>17 Anything I have said to you now is not to be taken</p> <p>18 in any way whatsoever as suggesting that you haven't</p> <p>19 already dealt with matters efficiently and</p> <p>20 comprehensively. It's just that obviously if you've</p> <p>21 already got some written document explaining positions</p> <p>22 and you've got some foresight of that, you are in</p> <p>23 a better position. Okay?</p> <p>24 WITNESS: Thank you.</p> <p>25 CHAIRMAN: Nobody is going to suggest to you -- and if they</p>	<p>1 Just before we go, gentlemen, I'm sure all of this</p> <p>2 is very fascinating and I will do my best to stay up so</p> <p>3 that I am at least somewhere in the back pack of the</p> <p>4 race, but with the greatest of respect, what we have to</p> <p>5 be careful of I think is getting into great</p> <p>6 technicalities. There may be such a thing as a quantum</p> <p>7 computer, I think Google just announced it, but I don't</p> <p>8 pretend to have any ability to understand the interplay</p> <p>9 of quarks. What I'm more concerned with is what can</p> <p>10 a quantum computer do, so what I'm interested in here is</p> <p>11 more of the fundamentals of why you say some particular</p> <p>12 statistics don't assist us and others do, and one of the</p> <p>13 areas, for example, is what I tried to bring out in my</p> <p>14 long rambling way with the engineer, Mr Ng I think it</p> <p>15 was, yesterday when I was talking about the fact that</p> <p>16 taking this, how could it be that essentially</p> <p>17 86 per cent of these could have been put in wrong, when</p> <p>18 you've got a workman who's been briefed and you've got</p> <p>19 two engineers who both inspect in different teams.</p> <p>20 Either it means that their work is entirely negligent,</p> <p>21 which is perhaps questionable, or it means maybe the</p> <p>22 statistics that it's 86 per cent, that needs to be</p> <p>23 looked at.</p> <p>24 So those kind of issues will really assist. Okay?</p> <p>25 I appreciate you have to go through the more complex</p>
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<p>1 do, they will be shot down by me -- at any later stage</p> <p>2 that you haven't answered all the matters contained in</p> <p>3 that document, because you are receiving it as nothing</p> <p>4 more than an aide-memoire to assist you with tomorrow's</p> <p>5 oral examination. Okay?</p> <p>6 WITNESS: Thank you.</p> <p>7 CHAIRMAN: Any objections to having a look at the document</p> <p>8 on that basis?</p> <p>9 WITNESS: None at all. Thank you.</p> <p>10 CHAIRMAN: Good.</p> <p>11 Any problems there, Mr Shieh?</p> <p>12 MR SHIEH: No, Mr Chairman. Indeed, it is actually what was</p> <p>13 going to happen because, as I acknowledge frankly, we</p> <p>14 have actually given the document to him.</p> <p>15 CHAIRMAN: Okay.</p> <p>16 MR SHIEH: And obviously, if he has time, he will be</p> <p>17 considering it.</p> <p>18 CHAIRMAN: Good.</p> <p>19 MR SHIEH: As long as, as Mr Chairman very fairly pointed</p> <p>20 out, no one can later on say, "You have been given</p> <p>21 a chance to comment and therefore the ball is in your</p> <p>22 court. If you don't single out a particular paragraph</p> <p>23 by saying 'I can't comment on it', therefore you are</p> <p>24 stuck." Nothing of that sort is going to happen.</p> <p>25 CHAIRMAN: All right. Dr Wells, thank you very much.</p>	<p>1 stuff, and I have Prof Hansford to assist me there, but</p> <p>2 I'm just saying that I would be greatly assisted by that</p> <p>3 sort of direction more.</p> <p>4 Good. Anything further? Thank you very much</p> <p>5 indeed.</p> <p>6 Tomorrow afternoon, 1.30. Thank you.</p> <p>7 (5.22 pm)</p> <p>8 (The hearing adjourned until 1.30 pm the following day)</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

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