

Transcript of Proceedings

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THE HONOURABLE JUSTICE C HOLMES, Commissioner

MR JAMES O'SULLIVAN AC, Deputy Commissioner

MR PHILLIP CUMMINS, Deputy Commissioner

MR P CALLAGHAN SC, Counsel Assisting

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IN THE MATTER OF THE COMMISSIONS OF INQUIRY ACT 1950

COMMISSIONS OF INQUIRY ORDER (No. 1) 2011

QUEENSLAND FLOODS COMMISSION OF INQUIRY

BRISBANE

..DATE 12/04/2011

..DAY 3

THE COMMISSION RESUMED AT 10.02 A.M.

ROBERT ARNOLD AYRE, CONTINUING:

COMMISSIONER: Yes, Mr O'Donnell.

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MR O'DONNELL: Can I tell the Commission the parties have agreed on the order of cross-examination of Mr Ayre. Can I hand up a list?

COMMISSIONER: Yes, certainly.

MR O'DONNELL: There are three copies.

COMMISSIONER: I am also a bit worried about Mr Telford having been bumped off the Bar table. I didn't mean that to happen yesterday, Mr Telford. Are you all right over there?

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MR TELFORD: I appreciate your concern, your Honour. We made inquiries to see whether a desk could be placed here and we were told it couldn't for fire safety reasons.

COMMISSIONER: I see. And there is just no way of squishing you on otherwise?

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MR TELFORD: Look, it appears not, but I am content to stay here for the moment.

COMMISSIONER: All right. If at any time that causes you real difficulty, would you let me know?

MR TELFORD: I will. Thank you, your Honour.

COMMISSIONER: Thank you for this, Mr O'Donnell. Yes, Mr Callaghan?

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MR CALLAGHAN: Mr Ayre, just to recap, yesterday, as you will recall, we were concentrating on the management of Wivenhoe Dam?-- Yes, I recall.

And we agreed that during the events of January this year, Wivenhoe was required to be operated in accordance with the manual of operational procedures which - I have lost the exhibit number - but in any case you have it in front of you?-- Yes, I do.

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And the manual contains a number of strategies?-- It does indeed, yes.

From W1 through W4?-- Yes.

And the strategy at any given time, the strategy adopted, is in essence dictated by the predicted level of the lake?--

Certainly for a number of the strategies and there are other considerations built into some of the lower level strategies as well.

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Yes, all right. But certainly once we get to W4, the trigger for that is a predicted level of the lake at 74 or higher?-- And in accordance with the maximum release rates that is exceeded in W3.

All right. But as we read the manual, you can't go to W4 before it gets to a predicted level of 74, is that right?-- Yes, that's correct.

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Okay. Can I ask, before we go on, we established yesterday, I think, the basis upon which the lake level is predicted and I took you through a number of the model runs-----?-- Yes, I recall, yeah.

-----which depict a projection as to the level of the lake?-- Yes.

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Is there an agreement or a statement anywhere as to how many such runs would be needed before it was agreed that the lake level was in fact predicted to exceed that figure of 74?-- No, there is no prescriptive number of runs per se. We conducted model runs to the - well, the number of model runs basically to convince ourselves that, indeed, we were potentially transitioning between strategies.

Well, if we can just look back to what actually happened - and I put before you the appendix A model results, and I will place those before you again - they are Exhibit 22 - we established quite clearly, I think, that for the purposes of using these documents, you were working on the red line?-- Yes, that's correct.

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And even on that approach, if we looked at run 34, the lake level was predicted to be at least at 74 on that model run?-- It was, and at a predicted time later on the 12th of January.

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Yes?-- Yes.

And certainly run 35, likewise-----?-- Yes, that's correct.

-----it was predicted to be in excess of 74?-- Yes.

There was no barrier - or was there any barrier to going to W4 at that time?-- No, not as such the way we interpret the transition between the movement from W3 to W4 is not necessarily as a step jump but it is more of a gradual transition. And that's reflected in the increases in release rates.

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All right. We might just have to explore that. W4 is the strategy to be adopted at which the primary consideration is protecting the structural safety of the dam?-- Yes.

And according to the manual, the conditions - or the

conditions expressed in the table, at least - excuse me one moment - Exhibit 21, if we could get that up. And you have a copy of the manual in front of you, do you?-- I do, yes.

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It is page 29?-- Yes.

It is said that the conditions are that the Wivenhoe storage level is predicted to exceed 74?-- It does, and there are a number of other dot points listed under there.

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Well, there are. But just as I read them at least-----

MR DEVLIN: Commissioner-----

COMMISSIONER: Yes, Mr Devlin?

MR DEVLIN: -----yesterday I was fairly patient. My friend, probably unintentionally, cuts the witness off when clearly he is going to make a fuller explanation. These are very technical issues, and I really asked learned Counsel Assisting to not cut my client off when he is trying to answer.

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COMMISSIONER: Thanks, Mr Devlin. Mr Callaghan, you will be careful of that?

MR CALLAGHAN: I do apologise. I have no intention of doing that and I wasn't conscious of doing it. The acoustics aren't perfect but I do want the witness to take as long as he needs and to give us as full an explanation as you feel the question requires, Mr Ayre. So, please, cut me off if I am doing anything that suggests I am cutting you off?-- Okay.

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But I will try not to let that arise. There are a number of dot points - and I wanted to explore those with you one by one because - perhaps we can consider the other three there because they don't seem to be preconditions, if you like, to the triggering of W4. They seem to be things that you have to do when you are at W4 but they are not something that actually has to occur before W4 is operative?-- No, that's correct, yes.

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Okay. As I read it - and, please, correct me if we're wrong - but the only trigger for W4 is the prediction that the lake level will exceed 74?-- Yes.

All right. And as I think you agree, certainly by run 35 - model run 35, and arguably at least by run 34, W4 could have been triggered?-- It could well have been. Our consideration at that time was the model estimates were only indicating that we were nudging 74 or just above and, as I mentioned before, the application of the transition between the strategies is really a progression and not necessarily a step jump.

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Okay. Is that - it may well be - is that something that's expressed in the manual or is that just simply the interpretation that the flood operation engineers have adopted?-- I believe that's an interpretation that flood operations engineers have adopted.

Okay. You have agreed - I mean, I think we worked out that it was the model run 37 at 8 a.m. which actually triggered W4?-- That's correct, yes.

So there were perhaps five hours there when, even adopting your method of lake level predictions, W4 could have been operative but was not?-- It could well have been. However, our considerations at that point were we don't like to unnecessarily cause property damage and if we can avoid it then we will, and as we were only just nudging above EL 74 we were hopeful that we could just maintain an increased rate of release below the upper release limit on W3, which is 4,000 CUMECS, and still effectively provide sufficient mitigation for that particular event.

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All right?-- I think what should be noted is the very intense rainfall that had commenced over the immediate environs of Lake Wivenhoe commenced around about 5 a.m. and that was at a point in time we were actually preparing our technical situation report, not necessarily doing any further modelling.

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All right. I suppose again, just to complete the recap, you would agree that on the model results that you had, there were five hours at which even using the without forecast rain method W4 could have been operative but had you been using the with forecast rain method, W4 could have been triggered perhaps at 8 p.m. on Sunday. That's the time of run 22?-- That's correct, but I think I explained yesterday the dis-benefit of the forecast rainfall is there is no guarantee that rainfall will actually occur. So there is a very high risk of making releases that will either inundate bridges prematurely or inundate properties needlessly.

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But there is the question of releases but under W4 you have still got - or you have got complete flexibility over the releases, don't you?-- Yes, we do, yes-----

So you can still make that - I am sorry, this is an example of where I actually didn't hear you?-- We do to a point. Obviously, we are required under W4 to have all of the spillway gates opened by the time the lake level reaches the EL 75.5.

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Yes. Subject to taking that into account, you have got complete flexibility over how you release water and when you release it?-- Yes.

All right. That could have been the case - and I understand what you say about why you have adopted the without forecast rain method, but, nevertheless, had you adopted the other method there would have been some 36 hours when you had that flexibility which you did not?-- Yes, that's correct.

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Yesterday I took you to paragraph 8.4 of the manual - this was just as we concluded yesterday - and I suggested to you that as it reads it requires that one of the things which must inform the choice of strategy is a prediction as to the level

of Wivenhoe Dam using the best forecast rainfall at the time?-- Yes, I recall.

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All right. And I made the suggestion to you - or I make it now - that your approach was a departure from that which is required by the manual?-- I don't believe necessarily so. The Wivenhoe flood strategy flowcharts on page 23 actually points to the Wivenhoe level likely to exceed EL 74. It doesn't necessarily specify what basis that's made on.

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Yes, that's true?-- And so an interpretation of the manual, I think, using that flowchart fits with the approach that the flood operations engineers use.

All right. And I am anxious to hear what you have to say about this: is there any other part of the manual which you say should inform the interpretation of paragraph 8.4?-- Not that I am aware of, no.

All right. Can I just ask about the method that you did adopt, that is to say the actual rainfall without forecast method-----

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MR DEVLIN: Well, I am not sure that's even a fair question, Commissioner.

MR CALLAGHAN: Sorry.

COMMISSIONER: I am not-----

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MR DEVLIN: Actual rainfall taking into account forecast. That was his evidence yesterday. The form of the question was actual rainfall without forecast. That is not his evidence. His evidence is he takes actual rainfall and he takes into account forecast rainfall.

MR CALLAGHAN: I withdraw that. I don't mean to misrepresent anything that you said. The predicted lake levels on the without forecast rain as depicted by the red line are made on the basis of rain which has already fallen and which is expected to enter the dam?-- That's correct.

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Is that correct?-- Yes.

When we're talking about rain that's already fallen and is expected to enter the dam, that - and correct me if I'm wrong - obviously won't be every drop of rain that's fallen?-- No, not necessarily, and as evidenced in certain events during the January 2011 flood, such as the rainfall that fell on the Toowoomba escarpments, and also the rainfall that fell on the environs of Lake Wivenhoe, rainfall was not necessarily captured in gauges, so we couldn't actually incorporate that into the modelling.

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That's certainly one issue. But the other is just, I suppose, the percentage of rain that falls which eventually finds its way into the dam?-- Yes. Not all rainfall necessarily becomes run-off.

There is an expression, I believe, known as the run-off fraction?-- Run-off coefficient or run-off fraction, yes.

Okay. And that is meant to describe the amount of rain which - or is meant to calculate, I suppose, the amount of rain - the percentage of the amount of rain that falls that actually does enter the dam?-- It provides an index of how efficient the run-off process is, yes.

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And the run-off process is something which, I would suggest, will be affected by the saturation of the catchment?-- It is influenced by that, yes.

Can I ask how that fraction is - perhaps more accurately, is that fraction recalibrated on a regular basis?-- During the course of events we do modify the calibration result - the loss rates to improve the fit of the model performance.

How frequently is that done?-- It - I guess it varies. It is certainly - during the early phase of the events, we spend a fair amount of effort in trying to replicate the rate of rise of the hydrograph, so that's predominantly adjusting the initial loss rate. And during the body of the flood - the hydrograph, we modify the continuing loss rate to ensure that there is a volume balance at the dam.

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I guess what I am getting at is - and I am not sure I followed all of that, to be honest - but I guess what I am getting at is we're all aware that the saturation of the catchments were an influence in a lot of flood events around Queensland over this period?-- Yes, certainly key characteristics of these events.

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And my question to you is simply whether you feel that the saturation of the catchment around Wivenhoe was adequately reflected in the run-off fraction which was applied to the predictions?-- Overall, because we don't necessarily just concentrate on one location, we do look at a number of gauging stations. I think the models produced fairly robust results across the whole range of the catchments. During the Tuesday it was noted that we were unable to actually replicate the rapid rate of rise that occurred resulting from that intense rainfall, and, as a consequence, operational decisions while we were in the strategy W4 were based on actual lake levels rather than any model predictions or model results.

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The situation being a fast breaking one by that stage?-- It was certainly accelerating quite rapidly.

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I think if we looked at your statement - your first statement at paragraph 408, you make the point that in respect of this question of whether we should be working on without forecast rain or with forecast rain models, the manual is unclear, which is why, I would suggest, you say it must be amended?-- Yes, that's correct.

And we can say this much at least, on the basis of what your

evidence has been so far: that if paragraph 8.4 does mandate regard being had to forecasts, it does not reflect what you actually do?-- That's correct, yeah.

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Which steers our attention now to the manual itself and how it comes into existence. Look, we will address this with some other witnesses, and you may not be the best qualified to say, but are you aware of the requirement to have a manual and where it comes from?-- I am aware of sections of the Water Supply Act of 2008 and the reference to the dam safety provisions regarding flood mitigation dams.

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So there is a requirement by legislation that the dam should have a manual?-- Yes.

But then how does the manual itself actually come into existence?-- There is a - well, in the latest revision, a panel was formed by Seqwater, to which I was one of the members, and included representatives from the Dam Safety Regulator.

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Can you just tell us - and, again, if you can't be exhaustive, that's okay - but can you just tell us who else was involved in the panel?-- I believe all four duty engineers participated, Peter Allen, who is the Director of Dam Safety of the dam, I think Ron Guppy, who is Peter's assistant, and I also believe there was another person from Seqwater. I can't recall whether it was Rob Drury or Barton Maher who was involved.

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All right. This was the 7th revision of the manual for Wivenhoe and Somerset?-- Yes.

You have been familiar with earlier editions?-- Yes, I have.

And specifically if you were involved in revision 7, you would have necessarily had regard to revision 6?-- Yes.

And on this issue that we're focussing on at the moment, that is to say the relevance of the predicted lake level - and by all means correct me if I'm wrong - but is it the case that in revision 6 the reference point for all decisions was simply the actual lake level?-- Yes, that's correct.

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This whole concept of predicted lake levels was only introduced in revision 7?-- Yes, it was.

Do you just want to tell us, if you can, why it was thought necessary to move the focus of the manual in that way?-- From my understanding of what was discussed during the revision process, the opportunity to provide a degree of flexibility in particularly the high level objectives, so strategies W2 and 3 and entering into strategy W4, would benefit from the use of a prediction which would give further - more lead time to actually respond to those changing strategies.

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It was thought desirable to have some flexibility-----?-- Yes.

-----especially once you get into the-----?-- Into the more - well, the objectives that would have far more serious consequences.

Okay. I may as well take you to 8.4 on page 22 and get your comment on the passage which appears to be - or which may be problematic; that is to say the passage which begins, "The strategy chosen at any point in time", and continues on with the three bullet points below, and that's where the phrase "best forecast rainfall appears"?-- Yes.

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Were you aware of how that phrase came to be included in the 7th revision or who the author of that phrase was, or what was intended by it? Anything you can tell us about it?-- Well, I believe the author was John Tibaldi, and I believe John was trying to put in his own interpretation of - as to how the duty engineers would interpret the manual.

As I think you have already acknowledged, Mr Tibaldi in fact shares the view of yourself and the other engineers that the without forecast model is in fact the one that ought to be used?-- Yes.

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The problem probably being, I would suggest to you, simply the use of the word "forecast", if that read - if that sentence was the same but the word "forecast" was deleted, that would pretty much reflect the way you would say the whole thing should operate, wouldn't it?-- That's correct, yes.

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You would say the best rainfall information was the stream flow?-- But no further forecast, yeah, yep.

The problem being, I would suggest to you, that forecast is a fairly well understood word that means just that, something which is predicted to happen in the future?-- I think it highlights the folly of engineers trying to write potentially legal documents.

I was going to ask you about that. It was actually my next question because, as you are aware, this document has potentially important legal consequences?-- Yes.

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I mean, I am not going to ask you to comment on what they are but you know that in the Act-----?-- I am aware it is gazetted under the Act, so it-----

Is what under the Act, sorry?-- Gazetted under the Act.

Yes. And you are aware there is immunity provided if the manual's complied with, immunity for certain-----?-- Yes. In cases where damage occurs, the operator and the owner is not necessarily liable for damage.

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So, can I ask, was a lawyer involved in the drafting of this document at any stage?-- I'm - I cannot comment. I am unaware if Seqwater had a - their legal team review the final revision of the document.

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Certainly not during your input into it, there was no legal assistance offered to you?-- No, there was no legal representative at any of the panel meetings I attended.

And no-one suggested that it might be a good idea?-- No, I don't believe so.

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To your knowledge?-- Yeah, I can't recall, but I don't believe so.

All right. You were also involved in the preparation of the Seqwater report on the operation of Somerset and Wivenhoe during the January flood event; is that correct?-- Yes, that's correct.

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I might tender that document. You can see-----

COMMISSIONER: Exhibit 24.

ADMITTED AND MARKED "EXHIBIT 24"

MR CALLAGHAN: Mr Ayre, the document itself is contained in the box that's just been handed to the Commissioner's Associate. Do you have a copy of it?-- Not with me.

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All right. Can we put one in front of you? This is a document which is required to be produced following every flood event; is that right?-- Yes, that's correct.

I think you have some comments to make about the difficulties that that can cause for you. We will come to those later on. But can you just tell us what your involvement in the preparation of this report was?-- With the four duty engineers, three of us are hydrologists and the other, who is John Tibaldi, is more of an assets management person, so it was decided because of the volume of hydrological information and analysis that we knew would be incorporated in the report that John Ruffini, Terry Malone and myself would focus on producing the chapters of the report that relate to the event data, the performance of the model, and we all contributed to the sections on the compliance of the operations to the manual.

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Is it possible to unravel now who did what or is it just a team effort?-- Well, it was a team effort. Terry Malone and John Ruffini looked at the event data, both rainfall and stream information. We all contributed to the assessment of the preliminary magnitude of the flood. I performed most of the work to produce the model performance and validity

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section, and, like I said, it was a combined effort to look at some of the other sections. John Tibaldi took the lead authorship in the - producing the report.

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Okay. I just wanted to ask about the degree of - what I'm getting at is this: was there any disagreement between you and any of the Flood Operation engineers in the course of the discussions and communication which would have been involved in the preparation of in report, any disagreement which is not reflected in the report itself?-- Oh, I don't believe so. There was certainly difference of opinion about how things should be presented or what was the best way of actually conveying what happened, but the end product was effectively the report you see.

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I do just have to ask you about this e-mail that was sent apparently by you on Friday, the 14th of January, which is still while things are fairly raw, I'd suggest. Can I just place this in front of you? It's an e-mail, 3.46 p.m.. I will just give you a chance to read it?-- Yes.

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And the concern being simply this is an e-mail sent to the other - to be seen by the other flood engineers; is that right?-- Yes, that's correct.

Just sent to duty engineer, but it's to be seen by Messrs Tibaldi, Ruffini and Malone?-- They would be able to access the e-mail through the Flood Operations Centre.

And just looking at the sentence, "We need to ensure we have a consolidated view on things before information is distributed."?-- Yes.

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I am just wondering whether that is the attitude you have all adopted all along, that you have to all say the same thing or whether there has been any dissent?

MR DEVLIN: With respect, learned Senior Counsel Assisting, in fairness ought to ask the witness what he meant by it, rather than putting his own construction on it in the form of a sentence.

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COMMISSIONER: Well, you can put your own construction on it, Mr Callaghan. You can't assume it in the course of your sentence, so you really need to ask him was that the approach that they took, one of-----

MR CALLAGHAN: Madam Commissioner, I am happy to ask him. What did you mean by that?-- All I was aware was there was a number of articles in the media speculating about the operation of the dam and I just want to ensure that we didn't provide different interpretations of our actions during the course of the flood.

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All right. I will tender that.

COMMISSIONER: Exhibit 25.

ADMITTED AND MARKED "EXHIBIT 25"

MR CALLAGHAN: As I think I drew your attention yesterday, the - well, you can see that the document - the report itself perhaps - I haven't added it up but it might contain over a thousand pages of material?-- I believe there is 11,020 pages.

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Okay. Committed the figure to memory. And I will just revisit the proposition that I expressed some concern about yesterday, that the results of model runs 34 and 36 are not included in all those many pages. You may have said all you wish to say about that yesterday, but I suggest to you that's a matter of concern?-- I don't believe the noninclusion of those particular runs necessarily suggests anything. The - from my interpretation of those model results, they were all indicating that the predicted peak level would be around EL74 and if I could refer to my schedule in - Schedule 1 in my first statement, if you review the model results in terms of the peak releases from those particular runs, they're all relatively consistent in being of the order of, I think, about 3,300 CUMECS.

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The concern being expressed, though, is that each of those model runs, 34 and 36, do suggest that even on - even by adopting your preferred method for working out the prediction of the level of the lake, they both suggest a level of over 74 at a critical time?-- Yes.

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All right. Can I take you to the Seqwater report and paragraph 6.1, which is page 55? You have that now?-- Yes, I do.

And in the box on that page containing the bold type, it says, "It should be noted that the data contained in the section is operational data that was collected during the event and upon which operational decisions were made."?-- Yes.

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We are talking about here about for the most part data - this certainly includes data provided by the Bureau of Meteorology?-- It does indeed, yes.

Can I ask you what operational decisions were made on the basis of this data?-- The setting of actual release rates associated with a number of the lower level objectives did take into consideration some of the forecast rainfall.

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Anything else?-- There was - it was certainly used throughout the event to inform us in terms of the duration and the potential magnitude of the event.

Anything else?-- Not that I can think of at the moment.

The interest being to know what you do rely on or what

decisions you do make that are based on forecasts and its release rates at the lower level strategies?-- Yes. 1

And an estimate as to the duration of an event?-- Yes.

It's obviously management considerations involved in that?-- And it's resourcing and particularly of the dams ensuring we have enough people available.

All right. When you talk about informing release rates at the lower strategies, are we confined to W1 there?-- Not necessarily confined to W1. I think we also applied them in W3 as well. 10

Well, on the subject of release rates, they are - one of your concerns when you are setting release rates is the prediction of the flow rate at different places down the river?-- Yes. Strategies W2 and W3 inform us to take regard of the flows at Lowood and Moggill respectively. 20

Can I ask when you do that, you have already a prediction of the flow at Moggill, say, which will be introduced from other sources, such as the Lockyer-----?-- Yeah, there will be downstream tributary contributions and the residual catchment to Moggill.

And where do you get that figure from?-- They are estimates that also come out of the Real Time Flood Operations Model.

And then in terms of working out the flow at Moggill, is it simply a matter of adding - predicted flow - is it simply a matter of adding the proposed release from Wivenhoe to a figure which is supplied by the model as to what the flow will be from other sources?-- That's an approximate approach that can be used, or the alternative is to actually use the hydrological models to route the releases from Wivenhoe down to Moggill and incorporate the estimates from the other downstream tributary streams. 30

What do you actually do?-- For the most part, we use the approximate approach. 40

Adding the two together?-- Adding the two together.

Not using the routing method?-- Not necessarily, until it becomes a significant flood.

Well, what was the story in January? When did you adopt - can we work out now, having regard to the materials, and I appreciate it must have been a fast breaking situation, can we work out now when you adopted which approach?-- I don't believe it would be necessarily - and I can't speak for all the other duty engineers as to what approaches they took when they were on shift----- 50

No?-- -----so, it - it - you know, would be a difficult thing to unravel.

Okay. The routing method is a more sophisticated method; is that correct?-- It does take into account the attenuation that occurs naturally within the river channel.

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Do you have available appropriate tools to adopt the routing method?-- Yes, the real time model incorporates the releases from Wivenhoe and we can route those flows down to the lower extremities of the Brisbane catchment.

Would there be any reason not to use that all the time, the more sophisticated method?-- It is just expediency, generally.

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Does it take longer?-- It does take longer to rerun the runoff routing model, yes.

What sort of time are we talking about?-- Oh, it would be of the order of 15 minutes or so.

Okay. We talk about flow rates and water levels at various places downstream from the dam, such as Moggill and Lowood?-- Yes.

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Do you have a method of measuring flood levels at other points all the way down the level?-- There are a number of other gauging stations that we do refer to, particularly in the model calibration, which are located at different locations within the Bremer and Lockyer - the Bremer, Lockyer and lower Brisbane.

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The levels at those sorts of places are something that can be measured by various hydrodynamic tools; is that-----?-- Well, there are actually stream gauging stations, so the ALERT data we are capturing in real time, so-----

Don't sorry?-- So, we are capturing that data in real time, so we do have that information available directly to us when we have undertaken the modelling.

That's where it is?-- Yes.

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But what about a projection or where it's going to be?-- Well, the projection is based on the hydrologic models.

All right. Perhaps I can put it this way: are you aware of any hydrodynamic tools that you'd like to have that you don't have?-- The current system did have a hydrodynamic model but when the system was brought into the latest Linux platform, the hydraulic model wasn't fully ported over to that system, so we don't have an integrated hydraulic model available in the system at the moment, but we do have access to the Wivenhoe alliances Mike-11 model of the Brisbane River system.

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You say you have got access to it. Was that accessed during these events?-- It wasn't available during the peak of the event, but we made arrangements during the drawdown phase of the event to get access to it.

Why wasn't it available at the peak of the event?-- Well, it was not available in the Flood Operations Centre, but it was available within Seqwater's office.

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Is this something that might have helped you?-- It would help to an extent. There is a trade-off in terms of the effort required to actually run the hydrodynamic model because it would need to be calibrated to this particular event. So, there would have been a substantial effort required to actually ensure that the hydraulic model was, indeed, applicable to this particular flood.

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So, it's resources issue as well as an access issue?-- Yes.

Sorry, you have access to it, but-----?-- Yeah, we have access to it, but in terms of actually implementing it, it would certainly be a significant resource requirement.

Now, as you are aware, there's been a lot of media attention paid to the operation of Wivenhoe and, in particular, there's been currency given to some concerns expressed by Mr O'Brien?-- Certainly.

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And as a result, you have produced your fourth statement which really deals, as you understand it at least, with every concern that he's raised?-- I have tried to address the issues raised in the submission, yes.

All right. And, look, Mr O'Brien said what's he's said, you've responded, he can make further submissions to the Commission if he wishes to. I don't propose to take you through those. With respect, your document is very clear in your responses, but can I just ask you about this one, and I think we have your fourth statement. I think it might be paragraph 66. Just by way of background, I suppose, this is, I'd suggest to you, an issue of language and what's meant by "flood mitigation capacity"?-- Yes.

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The concern being expressed that the installation of the fuse plugs lowers the level at which - well, the concern that has been expressed is it lowers the level of flood mitigation capacity because if the fuse plug's triggered, then you are not mitigating the flood. That's the concern that's been expressed?-- That's the concern, yes.

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You have responded to that by saying, well, you are still mitigating the flood, it is just water's being released at an uncontrolled and-----?-- Uncontrolled rate, and I think the - what's not necessarily been interpreted is that only Strategies W1 to W3 deal with flood mitigation. Strategy W4 is actually for the protection of the Wivenhoe Dam, the security of the dam. So, strategies W1 to W4 only affect Wivenhoe up to EL74, and the-----

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I suggest you meant W3 there?-- Sorry.

W1 to W3?-- Yep, so W3 only applies up to EL74 and the auxiliary spillway fuses don't trigger until a much higher

level.

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Yes?-- And so, therefore, don't influence the flood mitigation capacity per se of those lower level strategies.

You can see the point that's being made in that case, that it's a bit misleading to a layperson, confusing at least, to talk of a flood mitigation capacity of a certain amount when, as you say, well, the strategy doesn't even contemplate that flood mitigation is an issue once you get to the top?-- Yes, I appreciate that concern. The amount of air space on - I think is where Mr O'Brien was trying to-----

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Yes?-- -----indicate in his submission, and in reality we have actually got more air space available to us since the augmentation, because the dam can now take water levels, peak water levels up to the top of the wave wall, which is now EL80. So, it wasn't just the augmentation in terms of the fuse plugs, there was the ancillary works which included the strengthening of the main spillway monoliths anchoring into the foundation, the baffle plates across the service bridge, which stopped the high level flows impinging on the fully opened gates, and the contiguous nature of the wave wall now. So, in reality, we can actually take higher levels than the original dam design.

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But to the average player, if water's careering uncontrolled through three fuse plugs, as it would be if the dam level was up to 80, wouldn't it-----?-- Yes.

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The layperson would find it hard to accept that the temporary air space available above the fuse plugs was really relevant to any concern. I understand you say it's-----?-- The dam would still be providing a mitigation in that sense, albeit it would be a fairly devastating result for downstream communities.

That's where you can understand the-----?-- Yes.

-----public concern?-- Yep. But I think the - what's missed in the interpretation here is that the auxiliary spillways actually make the dam safer and that's what their purpose was.

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You have made a good point, that once you are at W4, dam safety is the only issue?-- Yes.

Or the primary-----?-- Primary.

-----consideration?-- Yes.

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Yes. Can I take you now to a few issues which you have raised in the course of the various statements that you have given concerning suggestions that might be made for improvements-----?-- Yes.

-----to various things which have arisen out of the - which were revealed after these flood events? Firstly, I think, and all means look at your statements if you need to, I think it's

paragraph 140 of your first statement, draws our attention to the arrangements for staff accommodation and communication during future flood events?-- Yes.

1

I mean, you have probably said in your statements all you want to say, but I'd suggest to you that it doesn't make a lot of sense for people to be sleeping in meeting rooms on temporary bedding when there's a good hotel very close to the Flood Operations Centre. You might find it difficult to comment on some of these for various reasons?-- No, I think it does highlight there was certainly a lack of forethought in respect to floods of this magnitude with regard to the potential long-term stay required by the staff of the flood response team. So, I am aware that the Bureau of Meteorology, the Flood Warning Centre, has arrangements of that sort and it seems to me that that's a - certainly a sensible idea. The difficulty the Flood Operations Centre faces is the lack of frequency of these type of events, so putting in standing arrangements with a hotel on the basis that we may need them for three days every 35 years is more problematic.

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But this wasn't a need for anything more than a room to sleep in though, was it?-- That's correct.

There was also concern expressed about keeping family members informed and communicating - for Flood Operations staff to communicate with their own family?-- A number of the flood assistants, they lived in suburbs which were affected by the floods, so they lost power or indeed were isolated during the course of the flood. We were able to call upon most of our team to actually get into the flood centre. So, those guys who did have family who were without power or, indeed, were living in flooded suburbs, they obviously were concerned about their family conditions.

30

Concerned. I mean, did it contribute to a level of anxiety about-----?-- No, I believe they performed their tasks professionally. They-----

I am not suggesting they didn't?-- I - well, I think they were able to concentrate on the job at hand, but it was obviously a concern for them.

40

All right. You also talk at - you have spoken, I think, at maybe at 396, 397 about the staffing arrangements?-- Yes.

Would you like to elaborate on that or summarise your position on that?-- I think whilst we had an adequate number of personnel to handle this particular event, it did highlight that there was potentially a need to restructure the team so that we had a logical succession planned for certainly the duty engineers, and the number of duty engineers, I think optimally five in the rotation would be very useful, just to ensure that - the management of fatigue and the like.

50

And I think you suggest perhaps there be someone designated to do the modelling?-- Yes, we - it would be ideal if we had a number of the technical assistants who were actually able to

be dedicated to the modelling side of things so that that
freed up the duty engineers to look at the strategies and the
communications.

1

Did you want the people doing the modelling to be technicians
or I think at one stage you suggest a trainee Duty
Flood Operations Engineer?-- I think logically speaking if
they were people who would be eligible to become duty
engineers, that would be ideal.

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It would be a good training position?-- It would be a good training position for them to learn.

You have also spoken, I think, perhaps at 393, about a need to expand the network of rainfall gauges. I suggest this is something that at least one of your colleagues has also suggested. Would you like to elaborate on that?-- Well, as hydrologists we can never have enough data, but the event did highlight that there are still areas within the catchments where perhaps there is a scarcity of rainfall gauging stations and we would certainly welcome those areas being accommodated by additional sites, recognising there is a cost in installing and maintaining these gauges. So it would have to be a need - well, a review of the actual network to ensure that it is optimal.

10

There has specifically been a suggestion that additional rain gauges should be installed at the base of the Upper Brisbane catchments, that is close to Wivenhoe itself?-- Yes.

20

Because that's the area which has the shortest run-off time into the lake?-- Yes. The area just behind D'Aguilar Range which runs off into Lake Wivenhoe, certainly there is not a lot of coverage in that area.

Likewise, in the Upper Lockyer, is that something that's been drawn to your attention?-- Yes. The - and I had discussions with the Flood Warning Centre at the bureau. Obviously the inability to actually quantify exactly how much rainfall fell in those areas, if we had additional stations that would obviously be advantageous.

30

What about just the adequacy of the data collected by the Flood Operations Centre itself? I mean, is there other data out there to which you would like to have access which you didn't?-- There certainly is information that's collected by other agencies, primarily the local authorities, that would be useful to incorporate into the system, and, indeed, the new platform, the fuse system, has been designed to incorporate that information.

40

The flood event log itself is something which I have asked you a couple of questions about, and I think you agreed yesterday that it didn't actually record the moment at which W4 was declared which to the rest of us is a fairly significant moment. I understand that it was a fast breaking situation in the centre?-- Yes. I think the event log is certainly an area which can do with a lot of review and restructuring so that the information captured is actually truly reflective of the conversations that occurred.

50

All right?-- I believe as part of the new Flood Operations Centre that Seqwater are planning, they are looking at having telephone calls recorded.

And I suppose to revisit something I raised with you yesterday, I think, in effect, there has never been a specific

training exercise addressing the W4 considerations?-- No, that's correct. Simulation exercises that we have done in the past have been targeted at the more frequently occurring events, so the 1 in 20 AEP type of scenarios. It is certainly something that would be worth incorporating in the future.

1

And what about training generally, because - don't take this the wrong way, but you gentlemen are all of a certain age. We have to be looking to the future and developing, I would suggest, a training model for anyone who holds the important positions that you hold?-- Yes, it is certainly - well, I know all four of us recognise that the age within the Flood Operations Centre is probably representative of a high demographic, and bringing in junior engineers, especially for the modelling roles, would be very appropriate. And, as you suggest, actually trying to formalise a training program is indeed worthwhile investigating.

10

All right. Can I turn then to the topic of communications with people outside the Flood Operations Centre? Again, I think yesterday I drew your attention to a couple of examples in the flood event log of difficulty in contacting some agencies. I think paragraphs 240 to 242 of your statement deal with that, but, again, could you elaborate or summarise that for us?-- Yes, there certainly were operational issues in terms of loss of communications with certain agencies at particular periods. We did try multiple avenues of communication, so it was not only just phone calls but we had fax, email, indeed two-way and satellite phones if necessary. I don't believe the inability to contact some of the agencies necessarily inhibited our operational capacity in the Flood Operations Centre. It simply meant that we weren't sure that the parties that we were trying to communicate were necessarily getting the latest information.

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And I am not going to quibble with you as to whether it inhibited you but if we go back to paragraph 229, I think the best practice model is for the FOC to have a limited and focussed role on what you are actually doing?-- Yes.

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All right. There is a draft communication protocol you refer to in paragraph 400. In that part of your statement, I suppose I draw your attention also to paragraph 404?-- Yes.

Would you care to speak to the issues you raise there?-- Well, the draft protocol was the first time it had been implemented, and at the moment we haven't had any structured feedback from the recipients of the protocol communications. I think the main focus of our communications was through our situation reports. Rob Drury from Seqwater then utilised those situation reports to produce what we term technical situation reports for distribution to the Water Grid Manager and other agencies. I understand that Seqwater are currently doing a review of that communication process but I don't believe they have formally come to any conclusion on that.

50

All right?-- In terms of the communications with the Bureau of Meteorology, I certainly think our communications with the

Flood Warning Centre in particular worked very well. The information they were able to provide and the sharing of model results with the Flood Warning Centre certainly helped to inform us as to the responses in the Lockyer catchment in particular but also help confirm what information was going - was related to the Upper Brisbane, and, hence, assisted us greatly in sizing the event and coming up with appropriate strategies. The area that we probably lacked was in getting a better understanding of the actual meteorological systems and I guess the unpredictability and nature of that particular system that affected us. So I think a more structured approach in being able to access the meteorologists within the bureau would certainly benefit the duty engineers.

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There was, of course, a specific communication issue as between the Flood Operations Centre and the Brisbane City Council as to the upper threshold of the non-damaging flows at Moggill. I am not sure whether you were on duty at that time?-- I was on duty and in the Flood Operations Centre but I didn't take that particular call.

20

All right. That's the sort of misunderstanding with another agency that ideally would not occur, isn't it?-- Well, I don't know whether it was such a misunderstanding. I think it was a sharing of information between Brisbane City Council and the flood centre. I think we were seeking clarification of how we actually reported things in the technical situation report - sorry, in the situation report.

Am I wrong, though, because I thought that as a result of that for a few hours, at least, you were attempting to hold-----?-- No, sorry, I think I am confusing that with the quarter past mass 12 phone call.

30

Okay?-- No, but on the Monday morning, the teleconference between John Tibaldi and Terry Malone, no, I wasn't present at that.

That's - you are aware about what I am talking about, though?-- Yes, I am, yep.

40

And that is to say the council expressed a certain view as to what the appropriate release rate ought to be?-- To-----

Sorry?-- To - in terms of they were indicating their assessment about what they knew about damage that would occur in the City of Brisbane.

Yes?-- And I believe - again, it was a good exchange of information between the parties. I think it is entirely appropriate, in terms of the application of strategy W3, that John and Terry tried to accommodate that requirement from Brisbane City Council. However, as circumstances overtook them, they had to revert to the higher release strategy that was determined earlier in the day.

50

Yes. I am sure you - I think I understand why you say it was entirely appropriate, but for a few - for a couple of hours

there at least it did mean that the manual was not being used as the basis - or the figures in the manual were not being used as the basis for operating the dam, though, didn't it?-- Oh, no, I don't believe so. I think in accordance with the manual, we were trying to maximise protection to urban areas in strategy W3 and that's, indeed, what John and Terry were undertaking. They weren't necessarily following the model results at that time. I understand they did a calculation which determined that they thought the predicted level would increase by .2 of a metre. As a consequence of delaying those releases, I don't therefore think that they believed it was not going to invoke strategy W4. So it was in keeping with the strategy objective.

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All right. I have taken you already to the manual and some of the more perhaps controversial parts of it. Are there other parts of the manual which to your mind might deserve some attention? Perhaps could I specifically take you to paragraphs 301 and 406 of your first statement? We're talking here about strategies W2 and W3?-- Yes, there is certainly attention develops in those particular strategies where we're trying to set target flows or releases to meet mitigation requirements, be that either trying to prevent the inundation of bridges or maximise protection to the urban areas, which is countered by the requirements to drain the flood storage within seven days. The manual doesn't necessarily indicate which of those two requirements takes precedence. So I think a clarification on that point would be good.

20

Finally, I think, for you on this topic can I take you to 155 of the statement where you speak about the need for reports to be prepared. Do you have a suggestion in that regard?-- Certainly during this period from October through to March, we have experienced over 19 flood events in North Pine Dam and five flood events - five separate flood events in Somerset and Wivenhoe. So the requirements within the manual for the duty engineers to prepare a report for the dam safety regulator within six weeks becomes fairly problematic because effectively for most of that period we have been operational. So we have been concentrating on actually doing the operations as opposed to being able to dedicate time to preparing reports. So I think the - some latitude in terms of that time-frame, particularly during wet seasons where there is a lot of activity perhaps could be given.

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Okay. I might just tidy up a few gaps in the record by tendering a few exhibits which are relevant to your evidence on the Wivenhoe topic in particular. You refer in your statement, I think, to a document entitled Flood Preparedness Report?-- Yes.

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I will just get a copy of that shown to you. I don't think I had any specific questions for you about this document, Mr Ayre, but it is, as I say, referred to in your statement. Can you just perhaps speak to it briefly?-- Yes. There is a requirement in the manual for Seqwater to now prepare a report at the commencement of each wet season indicating the level of preparedness of the Flood Operations Centre, the Flood

Response Team and the dams to accommodate floods in ensuing wet season. So the document outlines the training and the preparedness of the Flood Operations Centre for the ensuing wet season.

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I tender that.

COMMISSIONER: Exhibit 26.

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ADMITTED AND MARKED "EXHIBIT 26"

MR CALLAGHAN: I will show you this document. This is probably self-explanatory. It is appendix Q from the flood report itself?-- Yes, very familiar with that one.

Very familiar with that one, all right. It is simply a document which gives us an indication as to the manner in which Wivenhoe Dam - the level of Wivenhoe Dam raised during the flood event?-- Yes, it does.

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Yes, I tender that.

COMMISSIONER: Exhibit 27.

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ADMITTED AND MARKED "EXHIBIT 27"

MR CALLAGHAN: I suppose one thing that we haven't touched upon but did get some currency in, amongst other things, the material advanced by Mr O'Brien is the significance of the gauge readings which are perhaps reflected in that little irregularity at the peak of that graph, would that be right?-- That's correct. The area - well, the pink squiggle and the red crosses.

40

I might just get that up and give you the opportunity - can I just get that up on the screen and give you the opportunity to - exhibit 27 - we're concerned with the - as you describe the squiggly part - the pink squiggle and the blue squiggle at the top of the line?-- Yes.

Can you just explain that to us?-- Wivenhoe Dam has two automatic headwater gauges. They are shown in the pink line and the blue line. Those gauges are located in the approach to the main spillway adjacent to the intake. I do have a photograph of that in some evidence I think we provided.

50

All right. We can-----?-- I will just continue just describing that. So those headwater gauges are used to primarily monitor the lake level. However, they are situated about 35 metres upstream of the main gates. During elevated

water levels, as occurred during this particular flood, there is a phenomenon known as drawdown that occurs and we believe those automatic gauges were influenced by the effect of drawdown. So they effectively don't show the true water level within the lake. They are depressed, as such, and there is also circulation issues that occurred during that time which is evidenced by the erratic nature of the pink line. Again, associated with the hydraulics of the spillway approach. As a requirement when we do flood operations, in accordance with our Emergency Action Plan, the operator is required to actually take manual gauge board readings. The manual gauge board for Wivenhoe Dam is actually located on the opposite side of the wall of the approach wing wall. So it is not affected by drawdown as such, and that's the reason why the red crosses give a different description of the water level compared to the automatic gauges. We rely on the manually red values in preference to the automatic gauges primarily because we can instruct the operators to go out and reread a value if indeed we think it is inconsistent, whereas the automatic gauges are fairly basic. They just simply broadcast a number and they don't necessarily retain that number on board in a logger. So there is no way to actually interrogate the automatic gauges once you determine an erratic number.

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Thank you. Madam Commissioner, I am just about to move on to another topic altogether. Would that be a convenient time for a short break?

COMMISSIONER: You would like a break? All right. We will come back at 20 to.

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MR CALLAGHAN: Thank you.

THE COURT ADJOURNED AT 11.22 A.M.

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THE COMMISSION RESUMED AT 11.41 A.M.

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ROBERT ARNOLD AYRE, CONTINUING:

COMMISSIONER: Yes?

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MR CALLAGHAN: Mr Ayre, during the adjournment, I think you were shown a copy of an e-mail from a Mr Peter Hill to Mr Barton Maher?-- Yes, that's correct.

And we are showing you that because it will be introduced into evidence - well, we will introduce it now - but people will be asked about its contents which are to this effect, that other dam owners with large gated storages do consider the Bureau's forecast rainfall out to four days in their decision making, and the opinion is expressed that such forecasts provide a reasonably robust indication of whether significant rainfall is likely. You have had a chance to read that?-- Yes, I have, yes.

20

We are really, because this is going to be introduced, inviting your comment on it?-- I understand where Peter is coming from. However, I do also note the - he acknowledges the words of caution that Peter Baddiley from the Brisbane Flood Warning Centre provides regarding rainfall forecasts. I, indeed, hope there are improvements in forecast products which will provide us with the ability to contain greater reliance on them. However, at this point in time, I don't think those products have necessarily demonstrated their worth in that regard. That is just my experience.

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Yes, thank you. All right. I tender that document.

COMMISSIONER: Exhibit 28.

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ADMITTED AND MARKED "EXHIBIT 28"

MR CALLAGHAN: Can we move, then, to the topic of North Pine Dam?-- Yes.

And it too is subject during times of flood to operation in accordance with a manual?-- Yes.

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A Manual of Operational Procedures For Flood Mitigation at North Pine Dam?-- Yes, I am aware of that.

Provision 5 issued in August of 2010?-- Yes.

You have a copy of that in front of you?-- I do, yes.

And I tender a copy of the manual. A photo of the dam is helpfully displayed on the screens in front of us.

1

COMMISSIONER: I'm sorry, Mr Callaghan, did you actually just tender the manual?

MR CALLAGHAN: I did tender the manual. I meant to, if I didn't.

COMMISSIONER: Have you already tendered it - yes, you have.

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MR CALLAGHAN: Yes. There was an error on the original - on the exhibit list, which is circulated. Exhibit 21 might be recorded as being the North Pine Dam, but it should be Wivenhoe.

COMMISSIONER: Okay. So North Pine Dam isn't in?

MR CALLAGHAN: Just then as 29.

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COMMISSIONER: When I say-----

MR CALLAGHAN: When you say it's 29-----

COMMISSIONER: Exhibit 29, North Pine Manual.

MR CALLAGHAN: Mr Ayre, perhaps if we go to page 9 of the manual?-- Yes.

The flood mitigation objectives are set out. It records there that full supply level of the dam is 39.6 AHD?-- That's correct.

30

And the other figures recorded there show that the radial gate control gear is 41.66 and the embankment crest 43.28?-- Yes.

So, full supply level is very close to the top of the height of the dam; is that right?-- There isn't a lot of freeboard between full supply and the crest.

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All right. And at page 19, I think it specifies there that - perhaps to rewind, you are obliged to maintain the dam at full supply level or bring it back down to full supply level after a flood?-- It is primarily a water supply dam, so, yes, we are obliged to bring it back to at or near full supply level at the cessation of releases.

And you're not, according to page 19, permitted to release water until it, in fact, exceeds the full supply level by 50 millimetres?-- The gate trigger level is, yes, indeed 50 millimetres above full.

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All right. And the Flood Operations Strategy specifies that you have to ensure that peak outflow doesn't exceed peak inflow?-- Yes.

That is the flood mitigation strategy?-- The philosophy behind the operation of North Pine Dam, yes.

It just seems that there's very little scope to be able to achieve that?-- Indeed, you are actually chasing somewhat during the early phases of the event until such time as the peaking flow occurs.

The only way, I suggest, that the flood mitigation capacity could be improved or provided would be if the full supply level was set at a lower height?-- That or - well, potentially an auxiliary spillway, but, yes, indeed if you did lower the full supply level, that would improve the capacity, yes.

10

Can I draw your attention to page 16? Just excuse me a moment. Can I take you to page 19, and the second paragraph from the bottom of the page with the three bullet points there?-- Yes.

That, as it reads, seem to authorise prerelease of water from the dam to reduce the risk of the dam overtopping?-- Yes, I think that recognises the limited working storage above full supply.

20

Yes?-- And as a consequence, in use of the discretionary powers of the Senior Flood Operations Engineer would enable us to do free releases.

When would that happen?-- That potentially would occur if we had relatively good knowledge about the magnitude of the inflows that were likely to occur.

30

And where would you get that knowledge from?-- That would be based on our modelling, utilising both the no rain and forecast rainfall scenarios.

All right. So, you'd look at those model runs, both aspects of them-----?-- Yes.

-----to make an assessment? Okay. Is that the only basis on which that part of the manual would be implemented?-- Potentially if there is a gate malfunction and we would need to accommodate the loss of release capacity, we may be able to accommodate some prerelease through the operational gates.

40

There's a contrast between this manual and the Wivenhoe. They're very different documents?-- They are indeed, yes.

And whatever else we might say about the Wivenhoe document, in so far as dam safety is concerned, it's fairly well structured, we can understand you work through the strategies until things get serious and then W4 kicks in. I can take you through the whole thing if we have to, but can I just suggest to you as a global proposition that this document doesn't really follow any similar sort of structure?-- It's certainly different in nature and I think that's related to the - well, the actual configuration available to us at North Pine Dam.

50

Yes?-- So, we - North Pine Dam catchment is only

350 square kilometres, so it is a fairly quick responding catchment. The working storage that we have to have - as temporary storage above full supply is only a maximum of about 40,000 megalitres, of which we don't necessarily wish to use all of that, so the risk profile for North Pine is quite different in that context.

1

Yes. And I suppose on that topic, just if you can in summary form just explain how the whole concept of dam safety is served by the manual, by this manual?-- Well, the manual specifies minimum gate settings based on lake level, so we need to achieve those minimum gate settings corresponding to a range of levels within the lake. So, in that sense, that's what's used to make sure that outflows are as close as inflows or as close as practicable as inflows.

10

Once you get to full supply level, there can't be much of a range, though?-- Well, there's the operational range of - you know, just two and a half metres or so.

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Right. I think one well recognised risk at this dam is, apart from the one we have already discussed in other context of overtopping and dam failures, is a specific risk of inundation of the radial gate control equipment?-- Yes. The design's not ideal in that context. The radial gate switch gear is located under the service bridge, so it doesn't allow for a great deal of freeboard above full supply level.

And there's not a lot that can be done about that, other than to release-----?-- Well, I understood Segwater are actually investigating the relocation of the controls-----

30

All right?-- -----and hence the switchboard.

Okay. A report was prepared in relation to this event or in relation to North Pine for this event as it was for the others. Was it prepared on a similar basis?-- It was, yes.

And you had input into the preparation of that report?-- I did, yes.

40

Do you have a copy of that report with you?-- No, I don't.

All right. I will show you a copy. Just excuse me for a moment.

COMMISSIONER: What's to become of the North Pine report? Is it an exhibit?

MR CALLAGHAN: Yes. Sorry, I tender that.

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COMMISSIONER: That's 30.

ADMITTED AND MARKED "EXHIBIT 30"

MR CALLAGHAN: My query with this document, Mr Ayre, is this, that if we go to - I am not sure if there's a page number, but it's the Flood Event Summary which is chapter 2. Have you managed to locate that yet?-- Yes

The summary's prepared in block form, if you like. There's initially a summary as to that block of 16 hours and so on, the short point being this, that the dam level at the end of the period, that last column there, records the height of the dam AHD?-- Yes, it does, yes.

10

And the highest figure in those columns, I think, is 39.96; is that right?-- Yes, I believe that's the case.

We know that the dam, in fact, got higher than that, though, don't we?-- We do, yes, yes.

And I appreciate that's not something that necessarily ought to have been included in a summary in that form, but my query is whether a summary in that form that doesn't include the actual peak height of the dam is really an effective summary?-- Yeah, I agree, it's an oversight and should have been collected.

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Can I turn, then, to some - again - comments that you have made in respect of proposals for improvement or-----?-- Yes.

-----things that can be addressed? Perhaps, again, if you have got your statement there - you might have already covered this - at 317 you refer to the winches which might be submerged in high flows. That's what you have spoken about already, is it?-- That's correct, yes.

30

And that's receiving attention as we're speaking?-- I believe Seqwater are looking at alternatives in terms of the location of the controls and, indeed, the motors and winch gear.

I will take you to paragraph 368. Is that dealing with the same issue?-- Yes.

40

All right. Can I take you to 413? I think you canvassed the revision of the radial gate setting?-- Yes, that's correct.

Would you elaborate on that for us?-- Well, I believe there's opportunity, because of the height of the release from North Pine Dam, we had the centre gate at setting 20 and the four other gates at setting 19 out of a possible 23 available settings. We were aware that the operators were actually shin-deep in water accessing the controls in that situation. Advice from the operators indicated that water levels above EL40 started to make access to the piers and the controls somewhat difficult and so a recommendation that I think should be investigated is the potential to look at either larger gate increments, so that would mean that the gates are opened more earlier, or, indeed, more frequent gate operations which would achieve the same sort of outcome.

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When you talk about operators walking through shin-deep water, can you just describe that a little more for us?-- In the bottom of the service bridge there's a grated panel, so the water is actually coming up from the bottom of the bridge, and they were accessing the controls through that water.

1

Is this moving water or was it still or-----?-- It's moving water.

Moving water. And had this happened before?-- Not that I'm aware of.

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All right. Did the operators have available to them any equipment to assist in that regard?-- They did have harness lines and equipment, safety equipment of that sort. I'm not sure whether they were actually utilising them at that time.

Right. And even to the extent of waterproof footwear or anything like that, were you aware of whether they-----?-- They certainly had, you know, personal equipment in terms of their rain jackets and I believe they all wear waterproof footing, yes.

20

All right. And you have also raised if not in your statement at least in an interview that you had with Commission staff the question of reviewing whether the same Flood Operations Centre should deal with both the Wivenhoe/Somerset system and the North Pine system at the same time. Do you have something to say about that?-- Yes, certainly the requirements for both operations are somewhat different. As I mentioned, the North Pine catchment responds very quickly and the lake level does rise rapidly, so having a dedicated team to look at North Pine specifically, I think, is worth investigating.

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It does seem to be a very different sort of an operation?--
Yeah, it certainly is a very different context in terms of
time-frames.

Perhaps finally on the question of communications with the
Moreton Bay Regional Council as to things like closing bridges
and so on, do you have an observation to make in that
regard?-- Generally speaking, I think the communications with
the Moreton Bay call centre has been reasonably good. I am
aware of a number of occasions where both parties have not
necessarily received contact confirming or otherwise the
closure of Youngs Crossing, and that has required us to make
further inquiries. So I think just tightening up that
communication protocol would be certainly appropriate.

10

Thank you. That's all I have for the moment. Oh, I am sorry,
I think in the copy of the first statement that was tendered
there was an appendix which may not have accompanied the
document that was tendered. So I will - there was a schedule
1A?-- Yes.

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Should have gone in as well?-- That's correct.

Yes, all right. That should be-----

COMMISSIONER: I will make that Exhibit 17A so it stays with
the statement.

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ADMITTED AND MARKED "EXHIBIT 17A"

MR CALLAGHAN: That's all I have for the moment.

COMMISSIONER: Thank you. Yes, Mr-----

MR DEVLIN: Commissioner, during the break a number of counsel
spoke to me in terms that it might save the time of the
Inquiry if I were to examine at this point so that a broader
range of topics of interest separately to various counsel-----

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COMMISSIONER: Is everybody happy? Anybody got an issue with
that? Go right ahead, Mr Devlin.

MR DEVLIN: And, your Honour, if I might then at the end
examine only by leave on matters that I haven't canvassed that
might be canvassed by the counsel, but I would promise to be
brief.

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COMMISSIONER: All right. I will hold you to it. Thank you,
Mr Devlin.

MR DEVLIN: Thank you. Mr Ayre, you gave this answer about the use of forecast rainfall and the no forecast rainfall basis for making operational decisions. You told learned Senior Counsel Assisting that the no forecast rainfall basis has proven to be the most reliable although you take into account forecasts?-- Yes.

Now, in your first statement have you at various points endeavoured to explain in detail for the public and for the benefit of this Inquiry the basis upon which you make those statements and that you acted in that way?-- I believe I have. 10

Now, firstly, have you endeavoured to set out in some detail the experience upon which that judgment is based?-- I believe we have given accounts of some previous flood events that are not of the same magnitude but where it has been successfully applied. 20

Where you came to the conclusion, I take it, that the no forecast rainfall basis had proven to be the most reliable and the forecast basis proven to be less reliable?-- Yes, that's the case.

Can I first of all take you to your first statement, and at paragraphs 199 to 209? Have you got that?-- Yes, I have.

At paragraph 201, you have said that there were in this event significant differences between forecast rainfall and actual rainfall during the very event itself?-- That's correct. 30

Now, somewhere in your statement, I think a couple of pages on at page 43 paragraph 206, have you endeavoured to set out the statistics where there has been some underestimated forecasts and some overestimated forecasts?-- Yes, I have.

And if we go through the real time-frame there, do we see on the left - on the two columns to the right, sorry, you have got "catchment average forecast rainfall", in the left hand of the two columns and "catchment average actual rainfall", is that right?-- Yes, that's correct. 40

And do we see, for instance, the second entry from Monday the 3rd of January at 4 p.m. to Tuesday the 4th of January at 3 p.m., do we see that the forecast rainfall exceeded the actual rainfall by an order of magnitude of almost 4?-- Yes.

The next one by an order of magnitude of 15?-- Yes. 50

The next one, an order of magnitude of 5?-- Yes.

COMMISSIONER: Mr Devlin, you are not going to read them all out, are you?

MR DEVLIN: No, I am not, your Honour.

Then as we go down the columns, do we see the differences set

out?-- Yes.

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Very well. You also speak in paragraph 201 of this being consistent with observations made in previous heavy rain and flood events since 1996?-- That's correct.

Now, a number of your fellow flood engineers have served with you over a number of these flood events?-- They have, yes.

So you have the same shared experience about what is reliable and what is not?-- We do, yes.

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And what is more reliable than something else?-- That's correct, yes.

Thank you. Now, at 204 you set out the various tools that the Bureau of Meteorology does supply you?-- Yes.

You set them out from A to F, and then you say the most reliable tool is the QPF?-- Yes, the short duration 24 hour estimate.

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But even with that being the most reliable there are significant variations-----?-- Yes.

-----in your experience?-- Yes.

And then over at 207, when you look at forecast three and five day rainfall, then the variations continue?-- Yes, the longer duration forecasts are more volatile.

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And you have set out some of those variations on the next page?-- Yes.

And the page after that. Now, if you go then to paragraph 216 - it is only a page or two on - you set out there details of a study which you actually - or a report that you actually prepared in September 2001?-- Yes, that's correct.

So that was an empirical study?-- It was an empirical study based on information related to the forecast rainfalls.

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And at 217 you say that that report concluded that the use of pre-releases was hard to justify on the basis that the current level of rainfall forecast accuracy in those catchments?-- That's correct.

Now, go to paragraph 221. You also drew attention to a Connell Wagner study, a copy of which you no longer have?-- Yes, that's right.

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But what did it conclude?-- It concluded similar findings to the 2001 report in that trying to base operational strategies on forecast rainfall was indeed very difficult.

And did that Connell Wagner study postdate your own study in 2001?-- Yes, it did.

Now, are you also aware - if I could ask Mr Ruffini's statement, exhibit JLR12, to be placed on the screen? As that's being put up I can commence my questioning. Are you aware that on about the 1st of December 2010 there was a re-statement by Mr Bradley of the Bureau of Meteorology, a re-statement to the effect that "the forecast of rainfall amounts over catchment time space scales is recognised as one of the most challenging, difficult tasks. Detailed rainfall forecasting is not deterministic. The uncertainties involved are often expressed in probabilistic forecasts, an example of which is at a website." You are aware of that communication?-- Yes, John did alert me to that, yes.

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And that communication came out of a further discussion at your level about the use of rainfall predictions - forecasts?-- That's correct, yes.

And attached to that email, which we see at JLR12, is a document headed "Rainfall forecasting for the Wivenhoe Dam catchment"?-- Yes.

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You are familiar with that document?-- I am.

And you are familiar with the fact that the document repeatedly discusses the levels of uncertainty in the use of rainfall forecasts?-- Yes.

I think in your evidence also you spoke about the difficulty of the catchment in terms of having reliable forecasting actually reflecting on run-off into Wivenhoe and Somerset dams?-- Yes, the issue isn't simply the depth of rainfall on the catchments of the dams; it is also the distribution of that rainfall within the overall catchment. So there is a risk that whilst the depth might be right, it might not necessarily fall in the location specified. So there is uncertainty associated from that perspective as well.

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We know that there are mountain systems there in the near vicinity of Wivenhoe and Somerset. Has that got a lot to do with it as to where the rainfall falls, on one side of the mountain or the other? Is it that simple?-- The typographic features do influence rainfall in the catchment to a significant degree, yes.

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Also, of course, there is the feature that a good slice of the catchment for the Brisbane River is below the dam itself?-- Yes. Wivenhoe Dam only commands just over 7,000 square kilometres out of the total 13 and a half thousand to Brisbane City.

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If I could turn to another topic then, and that was you were being asked about the upgrade of the software. Have you addressed this in your statement at paragraph 162? If you turn to that. Was the proposed replacement software, this Deltares FEWS - is that the way you pronounce it?-- Yes, that's correct.

Was that in any way used during this flood event?-- We have

used it in some of the post event analysis and some test runs were done on the system but it was not used in an operational context.

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It wasn't?-- Wasn't used in an operational context.

Right. What are the potential benefits of this replacement system?-- Well, the system itself is simply an operating platform. It will rely on the existing models, as such, and the calibration associated with those models. The benefits of the system - or the new system is really from an IT perspective, there is greater support available to it. It does have a few good features in terms of ensuring that model runs - all model runs are preserved, unlike the existing system. So it has a better cataloguing arrangement of scenarios that are needed to be kept.

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Now, the state of the software as it was, was there any particular point at which the current state of the software impinged upon what the Flood Operation Centre had to do during that crisis?-- I don't believe so. I think the models actually performed very well. At no stage did we have any failures with the system as such. I think the system is still robust despite its age and we would certainly - we're certainly comfortable with its use.

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I want to take you briefly to exhibit 25, the email that you sent. It is a requirement, is it not, for you and your fellow flood engineers to collaborate on the compilation of the flood report?-- Yes, I certainly think it is a team effort and all parties - as I made counsel aware before, I wasn't necessarily in the Flood Operations Centre for all periods of the event, so we do need each of the engineers to contribute to make a full and complete picture.

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And that is a process widely known and understood within the relevant government departments?-- I believe the dam safety regulator is fully aware of that, yes.

Very well. Now, by the 14th of January, clearly you were aware of assertions made in the media?-- Yes.

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By saying "The media has already made assertions about the appropriateness of our adopted operational strategy, and we need to manage our response/position", what did you mean by that when you communicated that to the other - it was directed to the other duty engineers, is that right?-- It was directed to the duty engineer email, so, yes, the other duty engineers in the Flood Operations Centre. My meaning was simply that we just needed to make sure that there wasn't any further misinformation being bandied around and we just needed to make sure that we focussed on our operations and, indeed, considered a consolidated approach when responding to anybody with any particular questions.

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Was that communication in any way inconsistent with the fact that you had a duty to collaborate on the production of the flood report?-- No, I don't believe so.

Was it in any way calculated to conceal any information from media sources or from the public?-- No, no intention.

Now, you were also asked - or it was put to you that it was a matter of concern that in the flood report you did not include model runs 34 and 36. Do you recall that being put to you-----?-- Yes.

-----by Counsel Assisting? You didn't agree with that suggestion, is that right?-- That's correct.

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You said this: "They all indicated that we were around EL 74 predicted lake level. The models were all consistent pointing to a 3,300 CUMECS release rate."?-- Yes, that's correct.

Well, now, is it the fact that in the flood report you did include runs 35 and 37?-- Yes.

Run 35 showed a predicted lake level of 74.1?-- Yes.

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So it already showed exceeding that 74 level?-- Yes.

And, of course, run 37, which you mention, had a predicted lake level of 74.5?-- Yes.

So was there any reason specifically now that you can think of that 34, which showed 74.0, and 36, which showed 74.3, from memory, was not included?-- No, the - we were simply trying to reduce the number of - or the amount of information in the report and distilling it back to those particular model runs we thought were pertinent.

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So can we conclude that at the time the collaborative thought of the flood engineers, including 35 and 37, was that they were broadly consistent with 34 and 36, the other two runs?-- Yes.

So 35 and 37 were included as being part of a consistent run?-- Yes, that's correct.

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There was no agenda in keeping something back from government or the public in not including runs 34 and 36?-- No, we were already aware that the report was quite voluminous, and, as I said, we were endeavouring to simplify things.

You were asked about the changes to version 6 - between version 6 and version 7 of the manual. I would ask you to go to paragraph 254 of your statement. Is this the paragraph in which you explain, or endeavour to explain in detail why the wording was changed?-- It is, yes.

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Would you like to just briefly expand on that reason?-- The word "predicted" was incorporated primarily to signify that rainfall that was already on the ground should be taken into account, and to do that the no rainfall scenario is adopted in order to reach that predicted level.

Very well. So you had - you had the mechanism to factor those things into your modelling, and so on?-- Yes.

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So best to change the way the manual reads to take that into account?-- It was done in light of the transition of responsibilities between, effectively, the current senior flood operations engineers into Seqwater's team. So it recognised the Terry Malone has been nominated as a new future senior flood operations engineer, and so for Terry and John Tibaldi to actually sculpt the elements within the manual to best assist them in their understanding of what's done.

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Thank you. Next I would like to take you to exhibit 20, your fourth statement. Did you locate on the website of one of the media outlets the report compiled by Mr O'Brien?-- I did, yes.

After compilation of your statements for the assistance of this Inquiry, and after, indeed, the conclusion of your duties with the production of the flood report, did you turn your mind in the last week or so to what Mr O'Brien claimed?-- I did, yes.

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And you have distilled that into Exhibit 4?-- Yes, that's correct.

I just want to take you to a couple of features of that. Go to paragraph 15, please. Mr O'Brien generally asserts that the flooding in Brisbane could have and should have been substantially avoided?-- Yes.

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What do you say to that?-- Well, I reject that assertion completely.

And have you become aware of hydrologic modelling done by Mr Malone since the flood event has concluded?-- Yes. As part of the flood event report production and subsequent addressing of various issues, Terry has done a number of additional hydrologic assessments.

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And have you had the benefit of reading, during this morning's break, a statement - a second statement of Mr Malone signed yesterday, the 11th of April?-- Yes, I have.

Were you, however, generally aware that the modelling had taken place and what its conclusions were?-- Yes.

Were you ever in a position to look at what was the results of that modelling in order to determine whether or not you agreed with it?-- Yes.

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Thank you. Now, by reference to Mr Malone's second statement, he deals with the suggestion that if Wivenhoe releases were increased to 3,000 CUMECS at midnight on Sunday the 9th of January 2011, the peak of the flood in the lower Brisbane River would have been significantly lower?-- Yes.

Now, generally what is your response to that particular

proposition?-- Certainly the peak may have been lower. However, I think the overall combination of the downstream tributaries with the releases from Wivenhoe Dam would still have resulted in flood levels at the Port Office gauge which were above major flood levels.

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Now, we know that Mr Malone in the modelling, for modelling purposes modelled releases increasing from 1,000 - I am reading from paragraph 3C of your second statement - releases from 1,450 CUMECS at 09:00 on Sunday the 9th of January to 3,000 CUMECS at midnight on Monday the 10th of January, continuing increases until 3 p.m. Tuesday the 11th of January?-- Yes.

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Are you aware that that was the nature of the modelling?-- Yes.

He noted that these releases would be contrary to the manual but they had been adopted for the purpose of the modelling. You would agree with that?-- Yes.

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That they would be contrary to the manual?-- Yes.

So that he reports that "Under that scenario at 3 p.m. on Tuesday 11 January the water level in the dam would have reached EL 74.0 and strategy W4 would have been invoked." You agree with that?-- Yes.

"Under the current manual then", he says, "releases would have been increased up to 5,000 CUMECS at which stage the modelling would have shown the water levels had stabilised." You agree with that?-- Yes.

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And then he says that the model - "The modelled impact of this modified release strategy upon the flow at Moggill is shown", in a particular figure, and he notes that "The reduction in peak flow at Moggill is only small but the onset of damaging flows under this model of 4,000 CUMECS as set out in the manual comes earlier and lasts for 12 hours longer."?-- Yes.

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Do you agree with that conclusion?-- I do, yes.

And further that "The modelled impact of the releasing earlier from Wivenhoe Dam, as has been suggested, would have had minimal impact on the peak height at the Brisbane Port Office gauge." Do you agree with that conclusion?-- I do, yes.

Thank you. He makes this qualification, however: "That is a hydrologic model. A hydrodynamic model would be more appropriate and that there are steps being made to produce such a model."?-- Yes, that's correct.

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Thank you. Next he examines the proposition or the suggestion that if the level in Wivenhoe Dam was at 75 per cent full supply level, that the peak of the flood at Moggill would have been significantly lower. You are aware of that suggestion?-- I am, yes.

And he says that, "Modelling of inflows to the dam shows that the deficit would have been filled and gate trigger level reached on early Sunday morning without any releases having occurred up to that time."?-- Yes.

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Is that your personal view, professional view?-- Yes, it is, yes, I concur with that.

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He says, "From the this point, releases would have been made in accordance with the manual. Releases would have increased up to 1,500 CUMecs late Sunday night and thereafter would have followed a similar pattern to the actual releases up to 1400", that's 2 p.m., "on Tuesday, 11th of January 2011."?-- Yes, I agree with that.

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Do you agree with that?

MR O'DONNELL: I don't know if members of the Commission have the second statement of Mr Malone that my learned friend is cross-examining on?

COMMISSIONER: No.

MR O'DONNELL: We have three copies of it.

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COMMISSIONER: Thank you, Mr O'Donnell. That's very considerate of you.

MR O'DONNELL: There are a number of diagrams which are helpful to look at.

COMMISSIONER: Thank you. Yes, Mr Devlin? We have got those.

MR O'DONNELL: Yes, thank you, your Honour. At page 4, I am reading from the bottom, I do apologise, 5C, so that the modelling allowed Mr Malone to conclude that even with a starting point of 75 per cent FSL, the point would have been reached on Sunday night, the same point as if the dam had started at - as it did, at 100 FSL?-- Yes, that's correct.

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Over at page 6, paragraph (g) Mr Malone, referring to the graph figure 5, which is up on the screen, concludes, "The modelled reduction in peak flow, that is starting off at 75 per cent FSL, at Moggill is very small. The reduction in starting level only impacts the low flows between 8 and 11 January. After that point, the hydrograph at Moggill is virtually the same."?-- Yes, it's very similar, yep.

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Do you agree with that conclusion? You agree with that conclusion?-- I do, I do, yes.

And then further by reference to figure 6 and by reference to the Brisbane Port Office gauge, Mr Malone concluded from the modelling that, "A lower starting level at Wivenhoe Dam would have had minimal impact on that height at the Port Office."?-- Yes, I believe Terry's indicated it's less than 200 millimetres.

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Less than 200 millimetres. That's starting off at 75 per cent FSL?-- Yes.

Do you subscribe to the view that this event rivalled 1893?-- Certainly in terms of the characteristics associated with

flood volume, it was of a similar magnitude. This particular event was some 2.65 million megalitres in volume to Wivenhoe Dam. The February 1893 was some - slightly larger at 2.7 million megalitres.

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So, the flood event at least approximated 1893?-- It was similar in the upper Brisbane and Stanley Rivers in that context, yes.

It's probably a matter of everlasting fascination to members of the South East Queensland public to know that there were such figures available in 1893. Are you aware of the providence of those statistics?-- Yes. Due to my earlier involvement in flood studies on the Brisbane River in the 1990s, we were able to recover a series of archival information regarding the 1893 flood, including the peak levels at the Port Office gauge, and estimates in the upper Brisbane.

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So, were there measurements taken even back then in the upper Brisbane - by what location do you mean?-- There's a station at Cabomba on the Brisbane River.

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And, of course, the Port Office gauge would have been a well-recognised flood gauge in those days?-- Yes.

Thank you. Can I take you to another observation? Then turning back to away from Mr Malone's second statement and back to Exhibit 20, your fourth statement, he makes this assertion, which you have set out at the bottom of the paragraph 22 on page 5, "Some 50 per cent to 60 per cent of the water passing the Brisbane City River gauge during the major, moderate and minor flooding was water released from Wivenhoe." What do you say to that proposition?-- I'd agree that there was a significant contribution from the releases from Wivenhoe to the flood peak in Brisbane.

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Is it possible to quantify to it that extent?-- Well, it depends on the techniques used. I have done an assessment based on the releases from Wivenhoe at that 2.6 million megalitres and there are estimate of the flow emanating from Lockyer Creek, which was just under 680,000 megalitres, and 430 thousand megalitres from the Bremer River.

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So, they're your basic figures?-- They're our numbers, yes.

Thank you. I ask you to go to page 11 where you set out this assertion at paragraph 49, just below 49, "In only 14 out of the 180 hours in the lead-up to the very high releases at 1900 hours on Tuesday 11th January, did the releases from Wivenhoe exceed the inflows. In this period Seqwater were collecting water in Wivenhoe that was subsequently released into the peak of the flood in Brisbane." You have got a response to make to that?-- Well, the very nature of a flood mitigation dam means you do store water at the earlier parts of the event to meet predefined release targets. The assertion here that we were storing water so that we can

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release later in the event, I think, is somewhat misleading. 1
 If we have a look at the numbers in terms of flood volumes
 that occurred over the period from Thursday through to
 midnight on the Sunday, the 9th, there was something like - I
 will just find it - 560,000 megalitres of inflow and we had
 released approximately 230,000 megalitres of water in that
 timeframe. So, effectively we had actually around about
 340,000 megalitres of water in storage during that period and
 that equates to a lake level of around EL68.6, which is just
 above the W1, W2 threshold level. So, effectively we'd only 10
 utilised some 22 per cent of the total flood storage capacity
 available to us.

So, the flood mitigation function of Wivenhoe Dam was alive
 and well and doing its job?-- It was, indeed, working in
 accordance with the strategies, otherwise you would have to
 ignore the strategies in W1 and not store that water.

Thank you. Next at paragraph 58, just below it in your fourth
 statement, it is asserted by Mr O'Brien that, "In the flood 20
 report, Seqwater has relied upon an undocumented rainfall
 event twice the size of any of the actual rainfall events to
 support the dam level readings that were used as a basis for
 the maximum releases late on Tuesday the 10th." Would you
 care to explain what occurred in relation to that period of
 time and the rises in the lake level?-- Well, the - I would
 certainly reject the assertion that we were trying to justify
 the manually read readings at the time. The analysis that we
 did was actually post-event and all we were simply trying to
 do was to ascertain what quantum of rainfall would have had to 30
 have fallen in that vicinity to actually cause the actual rate
 of rise. As we have mentioned previously, there were no
 actual rainfall gauges in that immediate vicinity to verify,
 but there were stations located at Mt Glorious, the dam - the
 headwater itself lowered in Savages Crossing which did
 actually record very intense rainfalls with average recurrence
 intervals in exceedance of one in 2,000.

How large is the lake surface?-- The lake surface is some 40
 80 kilometres long and I just can't recall the actual surface
 area itself, but it's very substantial.

Did you have reason to conclude that there was significant
 rainfall on the surface of the lake itself?-- Yes, we did
 but-----

During this particular period Mr O'Brien's talking about?--
 Yes, based on the rate of rise from around about 5 a.m. on the
 Tuesday morning through to about 2 p.m. in the afternoon. 50

Right. So if you haven't got gauges on the lake, what do you
 do in order to work out whether there's been rainfall on the
 lake itself?-- Well, in this instance, we actually utilised
 reverse routing calculations to determine what the inflow
 would have to be and it basically had abandoned the use of our
 hydrologic models which are rainfall based. So, the
 operational decisions were actually taken based on actual lake
 levels during that period.

Yes. This is what you referred to earlier in answer to Counsel Assisting?-- Yes.

So, you have got a rising lake level, number 1?-- Yes.

You know your lake level. You have got surrounding gauges, but they - but the run-off and so on calculations don't explain the rising lake level?-- That's correct, yes, the modelling just didn't replicate the actual rate of rise.

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So, when you did your - what did you call it, reverse routing?-- Yes.

When you did that form of calculation or modelling, what happened?-- Well, we were able to determine what the estimated inflow was during that timeframe and in accordance with Strategy W4, we were trying to equalise the releases out of the dam to arrest the rate of rise in the storage.

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Yes. So, did you conclude as a result of those calculations that there must have been significant rainfall on the dam itself?-- That was our conclusion, there was significant rainfall that didn't actually fall in any of our gauges.

See, the implication in the press and so on was that you in some way, with your three flood engineers, invented some kind of phenomenon in order to self-justify your management of the dam at that point. What do you say to that suggestion?-- Yeah, I certainly reject the suggestion that was the intent of the modelling. All we were trying to do was demonstrate the magnitude of the intensity of the rainfall that must have occurred to cause the rapid rate of rise.

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Thank you. If I can go to the next one, which is above paragraph 62, again in your fourth statement, Mr O'Brien makes this assertion, "For reasons that are not apparent, Seqwater did not use the available capacity of the flood storage system. This could be because the declared capacity is truly unavailable due to operational concerns, due to changes to the assets, or Seqwater deliberately or unconsciously chose not to use the available capacity." What do you say to that assertion?-- Well, I refer earlier to the discussion had with Mr Callaghan before, that - regarding the inclusion of the auxiliary spillway. Certainly the flood mitigation capacity of the dam, in my view, has not been altered for the application of strategies W1 to W3, because the auxiliary spillways do not impact on lake levels below EL74.

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Yes?-- Additionally, the operational concerns with respect to the conjunctive use of the dams - I will try to explain what we do is actually use what's called the operating target line to actually equalise the level of - the risk within both dams, so that we maximise the flood mitigation capacity out of the entire system and not just one dam.

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Thank you?-- So, we utilised that approach in this event.

Go to just above paragraph 92. Madam Commissioner, before we move away from that topic of rainfall on the lake, we have a video of the radar situation at that time. I understand it is ready to play, and I'd ask that it be played.

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COMMISSIONER: All right. While that's being set up, do you want to tender the disc?

MR DEVLIN: Yes, I am happy to tender the disc.

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COMMISSIONER: Thank you. That will be Exhibit 31.

ADMITTED AND MARKED "EXHIBIT 31"

MR DEVLIN: Madam Commissioner, I don't know whether we have a laser pointer available, but it would be appropriate or helpful once the video starts for Mr Ayre to show the position of Lake Wivenhoe.

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COMMISSIONER: I wouldn't count on a laser pointer. You have one?

MR DEVLIN: You have heard what I have asked you to do once the video plays, Mr Ayre?-- Yes, I have.

Just point it in the right direction.

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COMMISSIONER: We might just rearrange ourselves a bit so that we can see properly, Mr Devlin.

MR DEVLIN: Thank you. Would you keep the laser point steady on that point, because it will get - it allows us to understand the movement?-- I will endeavour to do so.

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EXHIBIT 31 PLAYED

DURING THE PLAYING -

WITNESS: So, just before we actually start the playing, so this animation had been developed out of the Deltares FEWS system and what Terry has done is he's taken the three hourly rainfall that was captured in all of the gauges around the catchment and put it into an animation which commences on the 31st of December and it extends through to the 14th of January, I believe. The colour coding as shown in the legend here indicates varying rainfall intensities. So, the pink colours are the most intense and white indicates no rainfall. Somerset Dam is located there, Wivenhoe Dam is located here,

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and North Pine Dam is located in the catchment adjacent to the coast, and I will endeavour now to keep the-----

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MR DEVLIN: If I could ask the Associate to pause it on your say-so, Mr Ayre, at the 11th of January?-- So what this video will show is the movement of the rainfall, both in - spatially and temporally. So, the rainfall that's occurring now is relatively small in nature, it's only scattered showers.

Can you give us a time at regular intervals, please, if you are able to do that?-- So, this is the 2nd of January. We have just commenced - we have just finished operations at that stage. We are now approaching the Monday/Tuesday, the 4th of January. Wednesday is when the rainfall commences that actually commenced the event. So, this is the rainfall that starts the actual event off. So, we're into Thursday the 6th, Friday the 7th coming up. So, the rainfall did vary quite significantly throughout the event. On Saturday the 8th, the rainfall effectively cleared for some period before returning on Sunday the 9th. So, that's the rainfall that actually occurred that's caused me to call for the duty engineer meeting on the Sunday afternoon. The Grantham rainfall - can we just pause there, please? The Grantham rainfall occurred in this area here. Unfortunately, because of the lack of gauges, it doesn't necessarily show up particularly significantly. If we can restart, please? It doesn't look like it's actually responding. If you just hit the "pause" button? I think it's just paused there. Yes.

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Have we started again?-- Yeah, we have actually started again.

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That's all right?-- Having to keep running through.

We will pick it up where we left on, please?-- Yes.

Perhaps we should just keep it running and you should just speak over the top of what's happening?-- Yeah, I think it's probably-----

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You left off on the Sunday, did we, Sunday the 9th?-- Monday the 10th.

Just tell us when we're back to Monday the 10th, please?-- Certainly. So, this is Tuesday the 4th at the moment. So, the commencement of the rainfall on the Wednesday is about to enter.

What date are we up to now, please?-- That's Thursday the 6th. Friday the 7th. The rain effectively clears on Saturday the 8th for some period, before returning on the Sunday the 9th.

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What day are we on here?-- That's Sunday the 9th. So, that's when we saw the escalation of the upper Brisbane. The 10th is the Toowoomba and Grantham rainfalls, and you can see them there. Going into Monday night where the upper Brisbane, 125 mils in Monsildale and then the intense rainfall that

occurred on Tuesday morning and set across the catchment, and then the rain unlawfully effectively cleared from Wednesday the 12th.

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Thank you. I will ask you now to go to just above paragraph 92 of your first statement, Exhibit 20? This assertion is made, "Changes in the assets and to operational procedures appear to have substantially reduced the capacity of the dams to provide flood mitigation for Brisbane." You may have already dealt with this, but what do you say as to that proposition?-- Well, I disagree.

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The next assertion is - sorry, did you want to finish?-- I was just going to say there is a change associated with the operational strategy with respect to W4 as a consequence of the auxiliary spillway. So, the requirement is for now the gates to be fully opened by the time we reach EL75.5, whereas previously the - our evaluation design level was EL77. So, we had to release more water earlier in strategy W4.

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Does that, in effect, reduce the capacity of the dam to mitigate floods, however?-- No.

And why is that?-- Well, that gives it the opportunity to actually improve the security of the dam by increasing the release capacity.

Very well. Down the bottom of that page, this assertion, "Even with this apparent reduction in the capacity of the dams for flood mitigation, the flooding in Brisbane could still have been avoided or substantially mitigated." I think you have dealt with that one?-- Well, just to point out that the release rates were at least 40 per cent less than what the estimated peak inflows were for the event, so I do believe Wivenhoe did provide a substantial amount of mitigation even during the peak of the event.

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Very well. Go to paragraph 110. This deals with the necessity for earlier releases, so Mr O'Brien asserts, in order to avoid an avoidable flood. Is the post-event modelling of Mr Malone the answer to that, or is there more to it?-- No, the assessment done by Terry certainly highlights that point.

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Thank you. Paragraph 126. Perhaps we might take these in turn. Mr O'Brien asserts that there were four basic fundamental contributions to the event. So, we have dealt with not releasing sufficient water. Mr Malone's modelling deals with that, I presume?-- Yes.

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The second one, reducing flexibility?-- Indeed, there is a reduction in options as water is stored at high elevations in Wivenhoe Dam. However, as I have indicated before, we certainly do not want to cause needless inundation of bridges or, indeed, property damage unnecessarily. So, I think it's in keeping with the objectives of the strategies that water is, indeed, stored during strategies W1, 2 and 3.

That's actually the mitigation process in action?-- It is, yes.

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What about the third one, "Undertaking peak discharges of this stored water at a time what had maximum impact on downstream flooding."?-- Well, under strategy W4, we have no other alternative. We have to increase release rates to ensure that we maximise - sorry, equalise the inflow and outflow of the dam to arrest the rate of rise in Wivenhoe, so we had no - no other option at that stage.

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And, once again, the modelling after the event shows that you'd got to the same point around about Sunday or Monday?-- Yes, that's correct.

If you had started at 75 FSL, for example?-- If we had a drawdown, yep.

Thank you. Now, number 4, "Not using the full capacity of the flood storage system at the peak of the flood."?-- This is really the opposite of one of the earlier assertions. If, indeed, we did try to store all the water in Wivenhoe and Somerset, we run the risk of if the event is actually larger than what occurred, we would end up overtopping or certainly initiating the fuse plugs and causing an even worse downstream consequence.

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Go to now paragraph 158. This is an assertion that there were differences in readings between the automatic headwater gauge and the manual gauge board readings. Earlier you talked about the drawdown effect for the automatic gauges; is that the answer to that?-- It is, yes, and - but I do know that Mr O'Brien doesn't actually acknowledge the notes that are attached to the Bureau website, which indicate that, "The river height data in the - is the latest available operational data provided for flood warning purposes, and has not been quality controlled." So, I just think he has not acknowledged that, indeed, this is operational data and it will contain errors.

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Thank you. Commissioner, I think I have finished and I promise I won't get a second wind, but would it be appropriate if I just look to see I have covered all the topics over lunch?

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COMMISSIONER: All right. We will take the lunch break, but there is an application to be heard during it which doesn't really concern any of the parties. So, if you wouldn't mind moving off quickly, that would be helpful.

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We will otherwise resume the hearing at 2.30. Adjourn the Court.

THE COURT ADJOURNED AT 12.58 P.M.

THE COMMISSION RESUMED AT 1.03 P.M.

COMMISSIONER: Yes?

MR JOHNSTON: Madam Commissioner, my name is Johnston, initials M F. I seek leave to appear on behalf of the Australian Broadcasting Corporation, Seven Network, Queensland Television, which is Channel Nine, Network 10 and Queensland Newspapers, which is The Courier-Mail.

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I seek leave to appear on behalf of those media outlets and I am instructed by Thynne McCartney Lawyers. I have prepared a written application for leave to appear. That was sent through this morning. I don't know if you have had an opportunity-----

COMMISSIONER: Well, I have seen multiple copies of it, and it is really the least of my concerns.

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MR JOHNSTON: Yes.

COMMISSIONER: I don't have any difficulty about giving you leave to appear to make the application. I am more interested in the substance of the application, I must say.

MR JOHNSTON: I have also prepared written submissions which have just been settled, given the urgency of this application, and I have provided those to your associate. I am not sure if you have been given a copy-----

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COMMISSIONER: I have just been given them, so if you wouldn't mind taking a seat I will read them.

MR JOHNSTON: Yes, thank you, Madam Commissioner.

COMMISSIONER: I have read those, thanks, Mr Johnston.

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MR JOHNSTON: Yes.

COMMISSIONER: Your first point is about power.

MR JOHNSTON: Yes, Madam Commissioner. The point is quite simple but, in short, it is this. That when one has regard to section 16 of the Act, the Commission is given the power not to make a prohibition against publication and the words used are: "contents of any book, document, writing or record produced at the inquiry". My submission is that that gives the Commission the discretion at first instance to make a prohibition against publication for, in this case, recordings taken within these hearings. But once the Commission exercises discretion not to rely on that power, that is the Commission allows that to be broadcast and distributed to the world at large by the Internet, the Commission has no further power. That is, it will be beyond what is contemplated in section 16 to prevent or restrict or prohibit the republication or the further publication of that material.

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COMMISSIONER: Well, you have to argue, don't you, that republication is not publication because if there's a power to prevent publication, then one would ordinarily read that as extending to any publication whether it happens to be a republication or not.

MR JOHNSTON: My submission is that the power is not that wide and because there's an inherent inconsistency in allowing that material to go to the world at large via the Internet, it is publicly available to everybody. It's available for anybody to download. But then to somehow try to crimp or restrict that further republication of that material will be beyond what is contemplated in section 16 and beyond the powers of this Commission.

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COMMISSIONER: It is simply a matter of statutory interpretation.

MR JOHNSTON: Yes, it is.

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COMMISSIONER: Do you say that the Commission can only prohibit publication of something absolutely? It can't prohibit-----

MR JOHNSTON: No, I'm not. No, I'm not, Madam Commissioner. What I'm saying is there could be other examples where there's evidence - I notice you just saw a video, for example, and you may exercise your discretion and say, "Well, I am not going to allow publication of part of that video but I'll allow publication of the rest." But, Madam Commissioner, once you allow the publication of part of that video that we just saw, let's say on the Internet, then it's out there to the world at large. You, in effect, have lost control of it. You have no further power once it's distributed to the world at large to then somehow crimp or further restrict that publication of that material. Another example may be-----

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COMMISSIONER: Well, you say that but why do you say it? 1

MR JOHNSTON: Because there's an inherent inconsistency on the one hand to allow material to go out to the world at large, to allow it to be published to everybody.

COMMISSIONER: Well, it's material going out in a particular form.

MR JOHNSTON: Yes. 10

COMMISSIONER: And it is a matter of saying, "But it is not to be published in a different form." Can you give me some examples.

MR JOHNSTON: Well, Madam Commissioner, I have given some examples of the problem with that and some of the examples in my written submission talk about where people may e-mail, so you may have interested people there who may e-mail to their friends or there may be a chat group or a blog or so forth. People out there may want to cut out part of the Internet stream of this hearing and rebroadcast that, that is further distribute that material to others. Now----- 20

COMMISSIONER: Well, they might want to. It doesn't mean that they can.

MR JOHNSTON: My submission is that is beyond the power of the Commission to, once it has been released to the world at large, further somehow restrict the republication or further publication of that material. My submission is that comes out of the words "shall not be published." 30

COMMISSIONER: Once somebody sits in that box and says something, it's published to this up audience here.

MR JOHNSTON: Yes.

COMMISSIONER: Surely the powers extend to controlling the further publication of what's said here. 40

MR JOHNSTON: You certainly have that power to do that. But my submission is once you exercise your discretion to allow it to go outside this room-----

COMMISSIONER: So it is once through that door you're talking about?

MR JOHNSTON: Once you allow it to go to the world at large, my submission is you do not have the power to somehow restrict how it goes to the world at large. Once you have exercised your discretion to allow it to go to the world at large, you can't restrict or narrow how that material is further dealt with. 50

COMMISSIONER: All right. I'm not sure you're convincing me.

MR JOHNSTON: There is obviously no case law on it. But the

submission is a simple one because, Madam Commissioner, when you think about it, it is a strange situation to have material that's out there publicly available, anybody can look at this website, but it is an odd situation to have that there's then, in my submission, an uncertain order about how that material can be dealt with by members of the public, including my clients, the media organisations.

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COMMISSIONER: Maybe it is a rather short-sighted submission too because it is thought undesirable it be published in the way your clients propose so the obvious answer is not to publish it at all. So that the effect of your application might in fact be counterproductive, that there was no feed.

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MR JOHNSTON: And I have made that point that it would - it is not subject to my application at the moment but it is arguable that it would be within your discretion to say, "Well, I am not going to allow the publication of any Internet feed. I am not going to allow the publication of any video recordings taken within this hearing", and if you do that, of course my clients, anybody else would not be able to publish that material. But once, Madam Commissioner, you decide to allow that material to go to the world at large, it's beyond your power, in my respectful submission, to crimp or restrict that further.

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COMMISSIONER: Yes, you have told me a few times that.

MR JOHNSTON: My second submission comes to the principle of open justice and the discretion and considerations.

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COMMISSIONER: When you get to open justice, aren't you rather in a position of saying the Courts aren't affording open justice because they're not allowing the live feed to be played on the evening news?

MR JOHNSTON: It is a different situation, with respect, Madam Commissioner, because in the Courts, once again, I think once they've decided to allow that material to go out then it's out there. But in this situation you have decided to allow that material to go to-----

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COMMISSIONER: No, refer to your first submission. We're talking about open justice now.

MR JOHNSTON: Yes.

COMMISSIONER: You can hardly say that a forum isn't affording open justice simply because there isn't an Internet feed being played on the evening news, otherwise you would have to say every other forum isn't affording open justice.

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MR JOHNSTON: Well, I have given some good explanations as to why that would not be the correct position to take on a discretionary ground and I have given some examples of, and some pretty clear and simple examples, that not everybody has access to the Internet, not everybody has access to a computer. That there are those that may even have access to a

computer, say, through a local library; are computer illiterate. There are people who were displaced by these floods who have lost their belongings, lost their computers, lost their access to Internet who are clearly directly interested in these proceedings but they-----

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COMMISSIONER: But you're not really answering my question, which is if the Supreme Court in a murder trial, for example-----

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MR JOHNSTON: Yes.

COMMISSIONER: -----doesn't give access in the way you propose, is it not affording open justice?

MR JOHNSTON: Once it decides to allow it to go-----

COMMISSIONER: Why does it matter if it has decided to allow that feed or not? Either it is open justice or it isn't.

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MR JOHNSTON: Because the effect of allowing it only to go to the Internet in part or not allowing it to be rebroadcast is that only certain categories of people are allowed to see these broadcasts and those categories of people-----

COMMISSIONER: No, no, it is - that is not a question of being allowed to or not. And if you look at the example of a Supreme Court murder trial, then those categories would be excluded from seeing - or those categories who have access to a computer would be excluded. So getting back to my question, is that open justice?

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MR JOHNSTON: Well, my submission is, no, it wouldn't be in that particular case because-----

COMMISSIONER: That's going to be a surprise to the Supreme Court, I think, Mr Johnston.

MR JOHNSTON: Once it has been decided to allow that material go out, there should be some reasonable basis not to allow the further publication of that material. Now-----

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COMMISSIONER: But does that have anything to do with open justice as you put it in your submission?

MR JOHNSTON: It's a different point, I accept that.

COMMISSIONER: Okay. Good.

MR JOHNSTON: But I have given some of those basic examples in my written submissions and I think they're good points. That there are people out there that won't have access to these live broadcasts, they won't - the elderly, the people displaced by the floods will not be able to log on and download these broadcasts. Moreover, there's also people who won't have the time because of work, family commitments-----

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COMMISSIONER: Look, this would all be well and good if what

you were proposing was that each of these stations actually play the entirety of everything that happened in the day's proceedings. I assume you're not undertaking to do that.

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MR JOHNSTON: No, I'm not, Madam Commissioner.

COMMISSIONER: The idea is to take bits for the evening news effectively.

MR JOHNSTON: And that is the role of the media. The role of the media is to be the eyes and ears of the public. They are there to publish objectively and independently and critically while this Inquiry is going on. We have journalists, professional journalists, who review the material, work out what's relevant, what's not relevant and, in effect, provide a summary to those who don't have time to download the whole hearing.

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COMMISSIONER: Is there anything preventing them providing a summary without showing the video snippets?

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MR JOHNSTON: They can obviously rely on the transcript. But if one says, of course, they can rely on the transcript, the rhetorical question is why can't they also rely on the video footage.

COMMISSIONER: Well, they can. They can look at it to make sure that what they say is accurate, but it is just a matter of replaying it. It doesn't mean they can't give a summary.

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MR JOHNSTON: But, Madam Commissioner, if you allow extracts of the transcript to go out on the nightly news, then there is no difference between allowing the transcript to go out and allowing footage to go out as well, which provides that visual impression for members of the public that are interested in this Commission.

COMMISSIONER: It's just a visual impression. Well, that's what you're looking for. You want a visual impression?

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MR JOHNSTON: No, it allows the full openness of this Inquiry. And, Madam Commissioner, you've decided, I think for good reason, to allow it to go out onto the Internet and I assume the basis for that is to allow people to watch the proceedings. That same logic applies to the nightly news. That on the nightly news, a professional journalist can summarise, can look at the issues and also provide, for the same reasons that you've allowed it to be streamed to the Internet, its viewers with a summary of.

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Now, it may be the case, for example, that people who watch the downloads aren't going to sit there and watch the entire day. They may watch certain parts, if there's a Minister or a key witness. They may only watch part of it. It is no different to the media extracting parts of the video and broadcasting that on the nightly news.

They're my submissions.

COMMISSIONER: Thank you. I'm not sure if counsel assisting want to be heard on this. Is there something?

MS WILSON: The only other matter that should be raised in relation to this and to the open justice issue is this matter to be considered. That witnesses will be called who will be recounting their experiences and for some this will be a very emotional experience for them and it may be very overwhelming and intimidating. It may even affect their evidence to know that their evidence will be repeatedly replayed on various media outlets. That's the only other matter that we wish to bring before the Commission, Madam Commission.

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COMMISSIONER: Mr Johnston, anything in response?

MR JOHNSTON: Two points. First of all, there is no evidence that I understand that there is going to be people in a particular category that are going to be embarrassed or upset. But, secondly, when one looks at the cases dealing with open justice, issues of embarrassment, issues of reputation are not relevant considerations in deciding whether to release material or not. Those principle principles should apply equally here.

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My third point is if they're going to be embarrassed, they're going to be embarrassed by the transcript; they're going to be embarrassed by the video footage. There is no legitimate difference in terms of - as a discretionary consideration, in terms of whether to allow that material to be disclosed or rebroadcast in the order's terms.

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COMMISSIONER: Thanks, Mr Johnston. I'll adjourn briefly for, say, 10 minutes to consider the matter.

THE COMMISSION ADJOURNED AT 1.21 P.M.

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THE COMMISSION RESUMED AT 1.29 P.M.

COMMISSIONER: Yesterday I made an order that the evidence and exhibits in the Inquiry not be published by way of rebroadcast of the Internet feed, which the Inquiry provides to its website by way of a live stream for the benefit of the public. That order is now the subject of an application to me to set it aside.

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The first point which is made is as to the power to make the order under section 16 of the Commissions of Inquiry Act 1950. It simply states that:

"A commission may order that any evidence given before it, or the contents of any book, document, writing or record produced

at the inquiry, shall not be published."

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There is no argument that the video recording in this instance qualifies as a document or record. The argument is about what the power entails when it comes to ordering it shall not be published.

Mr Johnston, for the applicants, argues that once the live stream is permitted, material goes to the Inquiry's website, that is the end effectively of the power. I do not agree with that construction of section 16. I do not think that there is a basis to construe it so narrowly as to conclude that it allows only absolute prohibition of publication of particular evidence. I read it, particularly in the light of the Court powers granted to the Commission under the Act, as extending to the prohibition of publication of evidence in a particular form - in this case, the publication by way of incorporation of snippets of live stream footage into the nightly news.

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I conclude that I do have the power and had the power to make the order.

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Then one turns to discretionary considerations. It is a balancing exercise between the public interest and having the footage aired in the way described and the public interest in the effective functioning of the Inquiry. I am unconvinced that open justice can't be achieved or is somehow impaired if this footage is not available to the news services. There is no inhibition on the news services providing a summary of the events of the day at the Inquiry. It seems that the desire to have the feed available for reproduction of segments is simply a matter of adding visual and, I suppose, auditory effect.

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The public interest in having segmented portions of the feed displayed on the evening news seems to me relatively limited. I am unconvinced that it is a very effective way of conveying information to the public, but it is particularly so given the very high levels of access which have been provided to the public to the Inquiry's information, in far more complete forms by the feed on the website itself, the placing of submissions, statements and exhibits on the website and the making available of the transcript on the website.

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Against that are the objectives of the Inquiry to make full inquiry into the subject matter of the terms of reference. It seems to me that they are better achieved by not having witnesses distracted in giving their evidence or counsel in asking their questions by the prospect of having chopped up portions appearing on the evening news.

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Balancing those matters, my conclusion is that the order should stand and I don't propose to vacate it.

Thanks, Mr Johnston.

MR JOHNSTON: Thank you, Commissioner.

COMMISSIONER: Now, I am thinking you might want your submissions made an exhibit.

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MR JOHNSTON: That would be helpful, Madam Commissioner, if I can tender those.

COMMISSIONER: All right. Exhibit 32 will be the submissions in relation to this application.

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ADMITTED AND MARKED "EXHIBIT 32"

COMMISSIONER: Nothing further?

MR JOHNSTON: No, Commissioner?

MS WILSON: No.

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THE COMMISSION ADJOURNED AT 1.35 P.M. TILL 2.30 P.M.

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THE COMMISSION RESUMED AT 2.31 P.M.

ROBERT ARNOLD AYRE, CONTINUING:

COMMISSIONER: Just before we start, I have had some concerns expressed about the barrier to safe passage constituted by the gentlemen sitting in the wheel chairs up against the barrier. It doesn't seem to me that there is much to be done about it. You all, presumably, need to be there to instruct your counsel as the case may be, but could you just make sure you don't leave any obstacles to progress in front of you and you don't stick your legs out unnecessarily, and I hope we will be able to get away with that.

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Mr Devlin, did you have more questions?

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MR DEVLIN: Yes, only a couple though. First of all, Commissioner, may I tender the statement of Mr Malone which I spoke about, the second statement dated yesterday?

COMMISSIONER: That will be Exhibit 33.

ADMITTED AND MARKED "EXHIBIT 33"

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MR DEVLIN: I have had a query from a member of the public and I simply told him that the expectation would be that it would be published in due course on the net. Thank you.

Mr Ayre, if I can just take you back to - this is the second last matter I want to take you to - if I can just take you back to part 5.1 of the Manual of Operational Procedures, which is Exhibit 21, which is to be found at page 13 of the manual. You would be familiar with this part of the manual where it recites that a Real Time - under the heading "5.1 General", "A real-time flood monitoring and forecasting system has been established in the dam catchments." Then in the next paragraph, "The rainfall and river height data is transmitted to Seqwater's Flood Operations Centre in real time. Once received in the Flood Operations Centre, the data is processed using Real Time Flood Model (RTFM) to estimate likely dam inflows and evaluate a range of possible inflows scenarios based on forecast and potential rainfall in the dam catchments. The RTFM is a suite of hydrologic and hydraulic computer programs that utilise the real-time data to assist in the operation of the dams during flood events." Do you see that?-- Yes.

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And then at 5.2, "The senior flood operations and flood operations engineers use the RTFM for flood monitoring and

forecasting during flood events to operate the dams in accordance with this manual." See that?-- Yes.

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So the manual at 5.1 requires you to use the RTFM, is that correct?-- It does indeed, yes.

Right. Now, when you use the RTFM itself, what forecasts does it provide?-- It provides forecasts of inflows into the dams and flows in downstream tributaries to enable the projected lake levels to be determined.

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And then if we go to 8.4, at page 22, the paragraph that you were asked about this morning?-- Yes.

"The strategy chosen at any point in time will depend on the actual levels in the dams and the following predictions which are to be made using the best forecast rainfall and stream flow information available at the time." When it uses the phrase "using the best forecast rainfall", is that limited to QPF?-- No, it is - I believe it is referring to the Real Time Flood Operations Model predictions.

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Thank you. Now, my last question concerns the dam operators. Can you explain, just very briefly - it might be obvious to you, but can you just explain the difference between the engineers in the Flood Operations Centre and the dam operators?-- The engineers in the Flood Operations Centre, such as myself, we determine the operational strategies required and issue directives regarding gate movements. The operators of the dams actually manipulate the machinery that opens and closes the gates at the dams. So those operators are actually stationed at the dams during periods of flood.

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Now, it has been acknowledged that the Flood Operations Centre itself operated under maximum pressure for an extended period of time. What was your observation of the operating pressure under which the dam operators themselves lived during that same period?-- The operators were actually exposed to the elements, so they experienced the worst of the rainfall and, indeed, were working equally as long hours as the Flood Response Team in the Flood Operations Centre.

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And were their responses to you strictly in accordance with your requirements?-- I would have to say that the operators performed their duties with the utmost professionalism, dedication and commitment during those trying circumstances.

So far from there being any glitches in that relationship, the performance was over and above the call of duty, as you would see it?-- I believe the flood operations engineers owe the operators a debt of gratitude for the way in which they carried out our instructions.

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Thank you. Thank you, Commissioner.

COMMISSIONER: Thank you. Mr Rangiah?

MR RANGIAH: Mr Ayre, I represent a number of residents Fernvale. Could I ask you to take up your supplementary statement - that is your first supplementary statement - and could you turn to paragraph 31 on page 11? I think this is exhibit 18, Commissioner.

MR DEVLIN: Commissioner, I am having a little trouble hearing Mr Rangiah, and I am sure the members of the public are. Could Mr Rangiah speak up?

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COMMISSIONER: Well, there you go, Mr Rangiah.

MR RANGIAH: Yes, I will.

Now, paragraph 31, you refer to commencing another shift in the Flood Operations Centre at 7 a.m.-- Yes.

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And that was on Saturday the 8th of January 2011?-- Yes, that's correct.

Now, to put that date in context, is it the case that the flood event had been declared on Thursday the 6th of January?-- Yes, that's correct.

And the maximum dam height for Wivenhoe peaked the following Wednesday, the 12th of January?-- It peaked at 7.30 on the Tuesday evening.

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I see, thank you. Now, in paragraph 34, you say that by about 8 a.m. Wivenhoe Dam had reached 68.52 metres AHD. Then you say, "Because this level was above the predicted lake level of 68.5 metres AHD and relevant to strategy W1, I was conscious of the fact that we were transitioning the strategies from W1 to W2 or W3."?-- Yes.

When was W3 engaged?-- It was engaged with the directive that John Ruffini had issued, essentially, which required the releases to be taken to 1,250 CUMECS by 2 p.m. on that Saturday afternoon.

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Well, when was that directive given?-- I will just have to refer to my schedule 1 in my first statement.

Could I perhaps trigger your memory by suggesting that it was at 8 a.m.?-- Yes, it would have been just - during the handover that was occurring between John and I.

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And is that recorded anywhere?-- The directives?

The transition from W2 to W3?-- The change in strategies are outlined in our situation reports which were issued approximately every 12 hours.

And it is not recorded in the flood log event, is that right?-- That's correct, yeah.

So is it the case that you weren't transitioning from W1 to W2 or W3; you were in fact at W3 at 8 a.m.?-- As I explained this morning, it is not a step jump process. We do - we do transition gradually from each of the strategies, and as we had just entered the lower level of the range between 68.5 and 74, we were, indeed, in that transition process.

Well, at what point in time can you say that you had transitioned to W3?-- When the lake level exceeds EL 68.5.

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And, in fact, you say in paragraph 34 that the level was above 68.5 by 8 a.m.?-- Yes.

So by 8 a.m. you had transitioned into W3?-- That's correct.

So it is not correct to say that "we were transitioning the strategies from W1 to W2 or W3"?-- As I said, it is not a step jump type arrangement; it is really a gradual transition from each of the strategies.

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Now, you say then, "I knew that Burtons Bridge had been inundated on Friday evening, as had Kholo Bridge, so I was now concentrating on ensuring that Mt Crosby Weir Bridge was not inundated by making sure the releases plus the combined flows from Lockyer Creek were less than 1,900 cubic metres per second."?-- That's correct.

You accept that at that stage you were in W3?-- Yes.

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And the primary consideration under W3 is protecting urban areas from inundation, is that correct?-- That's the primary objective, yes.

And there are other objectives, such as minimising disruption to the rural life, or retaining full supply level, which remain relevant?-- Yes, correct, yes.

But they have a lower priority?-- They do, yes.

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But the primary consideration under W3 is to protect urban areas such as Brisbane from inundation?-- Yes.

So is it the case that your primary obligation then was to concentrate on ensuring that Brisbane is not affected by moderate or major flood?-- It is an objective to ensure appropriate flood mitigation but being cognisant of the lower level objectives.

Do you have a copy of revision 7 of the manual of Operation Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam in front of you?-- Yes, I do.

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Could you go to page 28 of that manual, please? Do you see just under the box that contains some conditions, it reads: "The intent of strategy W3 is to limit the flow of the Brisbane River at Moggill to less than 4,000 cubic metres per second."?-- Yes.

And that flow of 4,000 cubic metres per second represents a combination of the natural flows below Wivenhoe Dam as well as releases from Wivenhoe Dam-----?-- Yes.

-----is that correct?-- That's correct.

It is then indicated in the manual that 4,000 CUMECS at Moggill is the upper limit of non-damaging floods downstream?-- Yes, that's right.

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So at 4,000, would you expect minor flooding as described at page 12 of the manual?-- I am aware through the damage curves that were provided by Brisbane City Council that, indeed, some residential properties and other infrastructure would be inundated at flows less than 4,000.

This is on the basis that the Brisbane City Council says the appropriate figure is 3,500?-- Yes.

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But the manual gave that figure of 4,000?-- That's correct.

And that was the only figure that you were aware of that was relevant on this Saturday?-- I - well, it is - I know it is the target release for the combined flows at Moggill for strategy W3, yes.

You were really required to assume that the manual is correct?-- We worked in accordance with the values in the manual, yes.

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Now, according to the manual, is it likely then that release of 4,000 CUMECS would produce minor flooding of the type described at page 12?-- I believe so, yes.

That is causes inconvenience, low lying areas next to watercourses are inundated which may require the removal of stock and equipment, minor roads may be closed and low level bridges submerged?-- Yes.

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Now, the purpose of releases of water from Wivenhoe at rates of up to 4,000 CUMECS is to avoid moderate or major flooding in urban areas?-- It is to - well, the purpose of W3 is to actually maximise the protection to urban areas regardless of the size of the flood.

So are you agreeing with me?-- In a way, yes.

So in other words, these releases at that level may cause minor flooding but the objective is to avoid moderate or major flooding?-- The objective is to maximise the protection to urban areas.

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And what we ended up with in Brisbane was major flooding, wasn't it?-- On the Tuesday, yes, that's correct.

Now, one of the ways that you protect urban areas from flooding is by preserving the storage capacity of the flood

compartment of Wivenhoe Dam, is that correct?-- It is a strategy that can be applied, yes.

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And by 8 a.m. on that Saturday, you had indicated that the level had reached 68.52 metres at Wivenhoe?-- Yes.

And that was 1.52 metres above the full supply level?-- That's correct, yes.

And then if you could go to paragraph 44 of your statement, you say that at about 2 p.m. a further model was run, and by that time the model indicated that Wivenhoe would peak at 68.7 metres-----?-- Yes.

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-----at 1 a.m. on Tuesday the 10th of January?-- I am sorry, I am just-----

It is paragraph 44?-- Yep. Almost there. Yes, I believe that's the outcome of the modelling I undertook at that time.

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And did you have - or are you required to have in the back of your mind, as a flood engineer, that if the dam level reached 75.5 metres, then the first fuse plug would be triggered?-- I am aware of that, yes.

And that would then produce an uncontrolled release of about 4,000 CUMECS?-- The first central bay at 75.7 metres releases about 1,900 CUMECS.

But the aim is to avoid getting to that stage by controlled releases to preserve water storage capacity in the dam?-- When strategy W4 is invoked, yes.

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Now, in paragraph 45 you quote from the situation report that was prepared at 2.22 p.m. At page 15 where it refers to Wivenhoe, in the first paragraph you said that "It was intended to increase the release from Wivenhoe to 1,250 CUMECS by 1,400 on Saturday "?-- Yes.

And, in fact, by the time the situation report had been completed that must have already been done?-- I believe the last gate movement was undertaken at 2 p.m., yes.

40

And you said, "This will maintain flows of up to 1,600 CUMECS in the mid-Brisbane River throughout the afternoon."?-- Yes.

Now, under strategy W3, it was open to you to release up to 4,000 CUMECS?-- It is. However, that would have made releases in excess of inflows, and therefore not in keeping with an overall flood mitigation strategy.

50

Well, on that basis, it was certainly open to release more than 1,250 CUMECS at that stage?-- On the basis the modelling that was undertaken, and keeping with our operational strategies that we implement, the unnecessary or needless inundation of bridges or property is to be avoided, and that's in keeping with the way we operated on that Saturday afternoon.

But, nevertheless, it was open to you to increase the rate of release at that stage because you were engaging strategy W3?-- I don't believe there is any justification for doing so.

Now, at that stage the Bureau of Meteorology was predicting high rainfall over the catchment?-- Yes.

So, in fact, in the situation report on page 14, you had recorded that "advice from BOM indicates that south east Queensland can expect further high rainfall totals over the next four days"?-- Yes, that's correct.

10

And then further down you said: "Given the saturated condition of the catchment, significant inflows to Seqwater dams will be generated especially following the forecast rainfall on Sunday/Monday"?-- Yes.

And those significant inflows would be a product of the high rainfall that was expected plus the saturated conditions?-- That's correct, yes.

20

If we could go to paragraph 47, you said in the first sentence, "A release of 1,250 CUMECS from Wivenhoe Dam is a significant release. It will result in the closure of several downstream bridges."?-- That's correct, yes.

And you had already authorised that release, hadn't you?-- I had, yes.

30

And then you go on to say, "The release rates during the October and December flood events were about 1,600 CUMECS and the combined flow had led to minor flood damage in Brisbane." What was that damage?-- As I understand, it was damage to lower level infrastructure, including bikeways and walkways adjacent to the main Brisbane River area and, as council has identified, the usual trouble spots in places like Windsor, Rocklea, Oxley.

Is flood damage at the level of 1,600 CUMECS consistent with the indication at page 28 of the manual that 4,000 CUMECS flowing past Moggill is the upper limit of non-damaging floods downstream?-- No, I believe the phrase "non-damage" - the limit of non-damaging floods is potentially incorrect.

40

I see. So you're suggesting that the entry in the manual is incorrect?-- Yes.

And that was the view you took at the time on that Saturday, was it?-- No, it is - we recognise that damage does occur below the 4,000 CUMECS limit.

50

I am sorry, could you repeat that?-- We recognise that damage does accrue below the 4,000 CUMECS limit.

But that's not what the manual says, is it?-- The manual indicates that, no, 4,000 CUMECS is the limit of non-damaging floods, yes.

The upper limit of non-damaging floods?-- Yes.

So that entry on page 28 of the manual is inconsistent with your own view that you could get minor damage at 1,600 CUMECS?-- Yes, I believe it needs to be revised.

On that Saturday then, did you prefer your own view to that - to the requirement in the manual?-- I preferred my own view because there was nothing to justify making releases up to 4,000 CUMECS at that time.

10

Well, you say at paragraph 47 of your statement, "I was conscious, therefore, of trying to minimise release rates from Wivenhoe Dam in order to minimise the risk of urban damage occurring."?-- Yes.

But you have agreed with me, haven't you, that one way that you can minimise the risk of urban damage occurring is by releasing water at rates that might cause minor flooding but prevent - but thereby preventing moderate or major flooding?-- I don't necessarily believe that's in keeping with the strategies contained in - well, the objectives contained in the strategy W3.

20

Now, you have suggested that this entry on page 28 of the manual, that 4,000 CUMECS at Moggill is the upper limit of non-damaging floods downstream is incorrect?-- I believe the phrase needs to actually be revisited in a review of the manual.

30

And you believed it was incorrect on that Saturday that we are discussing?-- No, I recognise the value in the manual and that's the target release that we operated to, 4,000 CUMECS.

But one of the factors that you took into account was your view that releases at 1,600 CUMECS would cause minor flood damage in Brisbane?-- It is, yes.

You're operating on a premise which was different to that contained in the manual?-- I don't believe so. I think they are entirely consistent.

40

If we could go back to paragraph 44? You referred to the model indicating that the Wivenhoe Dam would peak at 68.7 metres?-- Yes.

And that was a model run on a without rainfall basis?-- That's correct.

50

That is, it did not take into account predicted rainfall?-- That's correct.

It only took into account rainfall that had actually occurred?-- Yes.

Just over the page - sorry, just excuse me for one moment. Now, I want to suggest to you that W3 - I am sorry, I will

start that again. I am suggesting to you that under the manual you were permitted to temporarily reduce the dam level to below FSL. Would you agree with that?-- I believe that option is available under certain circumstances, particularly in the draindown phase of an event where we need to comply with the other objective in the manual which states we need to be - return the storage back to full supply level at the end of the event. So sometimes we create a temporary deficit to account for further base flows that may flow in after we cease gate operations.

1

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And the other way in which you are permitted to reduce the level below full supply level is by exercising the discretion under paragraph 2.8-----?-- That's correct-----

-----of the manual?-- -----yes, but I would have to have justification for doing so.

Yes. Now, at page 15 of your statement then, in the second paragraph from the bottom, you say that, "Further assessments will be undertaken to determine increases above this level given the high likelihood of significant inflows in the next few days." Now, that is a statement that refers to both actual rainfall and predicted rainfall-----?-- That's correct-----

20

-----isn't it?-- -----yes.

Would you agree that generally revision 7 of the manual works on the basis of predicted dam levels?-- Yes.

30

And it uses, for example, on page 23, expressions such as "is Wivenhoe level likely to exceed EL 68.5 CUMECS"?-- That's correct.

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I'm sorry, metres, I should say. And on page 24, a condition for the engagement of Strategy W1, "Is Wivenhoe storage level is predicted to be less than 68.5 metres?"-- That's correct, yes.

1

So, it looks to what the future situation is likely to be, not just the present?-- Yes.

And you have interpreted - you interpreted the manual as indicating that the prediction must be based only on rainfall which has actually occurred and not predicted rainfall?-- We found that to be the most reliable projection, yes.

10

Was it your interpretation that you were permitted to take into account predicted rainfall?-- It was the interpretation of the panel who reviewed the manual.

Sorry, what was the interpretation of the panel? Were you permitted-----?-- That we were allowed to take into account predicted water levels on the basis of implementing strategies.

20

So, when you decided what strategy to engage and the way you engaged that strategy, are you saying that you do take into account predicted rainfall as well as actual rainfall?-- We take into account no further rainfall as the usual basis, but we do run forecast rainfall scenarios to advise us as to the likelihood of where the event could develop to so that we can come up with our final release strategy to accommodate circumstances.

30

COMMISSIONER: I am completely confused now, Mr Ayre, I am afraid. When you decide what strategy you are going to be in, do take into account rainfall forecast or not?-- Mostly the strategies are based on the actual rainfall on the ground to that point in time.

Which ones aren't?-- Well, all of the scenarios we do includes the rainfall to date. We do, however, do the sensitivity of including the forecast rainfalls just to see what range of operation is likely, so-----

40

But do you factor that into your decision making about the strategy or not?-- Yes, we do, when we're getting close to the transition between strategies.

So, you look at the fact that four days' heavy rain is predicted and say, "Well, we better move up a strategy on the basis of that."?-- Generally speaking, we won't move from the lower level strategies until such time as we're certain that we have to.

50

I am not sure what that answer is then. Those models that you have, that you say you act on the basis of which show with and without rainfall, I had understood you earlier to say that it was the without rainfall line of the graph that you would be interested in?-- Yes, most of the time that's the case, but it's when we're operating in the range that we do - we are

aware of what the forecast rainfall scenarios provide.

1

But it's one thing to be aware of it. Are you actually taking it into account and adding it in as a variable in your decision making?-- If all the models are showing consistently that we are likely to move to a different strategy, then it's taken into account, but if there's a degree of variability, then we would probably discount it, and just operate on the rainfall to date.

10

Thank you.

MR RANGIAH: Are you suggesting then that if the predicted level using predicted rainfall indicates consistently that the water storage level is predicted to be above 74, then you would move to a W3 - I'm sorry, a W4 strategy?-- Not necessarily. As the - the consistency of the numbers really is what I was talking about. So, if the - the estimates between model runs vary by significant amount, then we would be less inclined to put weighting on that sort of information.

20

So, it's not the case that when implementing strategy, you don't take into account predicted rainfall; is that what you're saying?-- It is a variable that we considered, but it's not the primary variable.

If you could go to your first statement, paragraph 305, you talk about models on a without - on a with forecast rainfall. Do you have that?-- Yes.

30

You say that, "They are not the best basis upon which to assess predicted late lake levels. It would be inappropriate to base predicted lake levels on models run solely on a with rainfall basis.", and then you give a number of reasons for that conclusion. Now, in making decisions on the strategies to use and how to use them, did you have those reasons in mind when you came consider forecasts with predicted rainfall?-- On that Saturday afternoon I ran a number of models containing forecast rainfall, including the 24 hour QPF and also the 72 hour access information. Both of those models suggested that the rates that - release rates that we were currently considering would be consistent, but we'd simply extend the duration of the release and, therefore, I saw no - no reason to actually increase releases as a consequence.

40

But were these reasons that you give in paragraph 305 the sort of reasons that you took into account in your assessment of whether to take account of with forecast rainfall models or without forecast rainfall models?-- Yes, the forecast models are really a sensitivity on what a release strategy will be and it's just giving us an idea of an upper bound, if you like, of where the situation could develop to.

50

Did you have these reasons in mind when you considered the two different models, not only on the Saturday but in the days that followed?-- Yes.

Now, on the Saturday, you have indicated that you were at

W3?-- Yes.

1

And the primary consideration is protecting urban areas from inundation?-- That's correct.

One of the reasons you give for not using a with forecast rainfall basis - or not giving it the same weight, is the need to protect urban water supply; is that right?-- That's a consideration of the overall objectives, yes.

10

And by the Saturday, that was a lower priority than protecting urban areas from inundation, wasn't it?-- Yes, it is, yes.

And that was particularly the case where you were aware that the Bureau of Meteorology had forecast a strong La Nina event to at least March 2011?-- The seasonal outlooks are only useful for creating awareness, they don't provide any quantitative assessments of likely rainfalls either specifically for catchments such as Wivenhoe or Somerset, or, indeed, a duration of the rainfall.

20

The factor, though, of protecting the urban water supply was lower down the list of priorities by that stage?-- It is, it's primarily considered in retaining the full supply level at end of the event.

And then you - another reason that you give there, over on the next page, is, "Needless inundation of bridges."?-- Yes.

But by the time that you had implemented W3, released 1,250 CUMECS, there were already a number of bridges and crossings closed, weren't there?-- Yes, five out of the seven lower level crossings were inundated at that time.

30

So, that was not a significant factor in not applying or discounting predicted rainfall models?-- No, not necessarily.

Now, on page 66 then you refer to the - you refer to the uncertainty of weather forecasts as a reason not to base predicted lake levels on models run solely on a with forecast rainfall basis?-- There's no guarantee that the forecast rainfall will actually fall in the catchments. Indeed, the rainfall depth and spacial distribution can vary quite considerably as demonstrated in some of the earlier figures that we discussed this morning.

40

Generally speaking, the further out the forecast is, further away the forecast is, the less accurate-----?-- The longer horizon from the forecast certainly creates larger levels of uncertainty, yes.

50

And the most accurate forecast is the 24 hour QPF?-- In the Flood Operations Centre we have considered the 24 hour QPF as being the most reliable of the forecast products, yes.

And the 24 hour QPF is the best information that the Bureau of Meteorology is able to provide, based on - and it's based on a level of probabilities?-- It's a - well, as I

understand it, it is a model - a model based estimates, which has meteorological interpretation and which is why we hold it in regard in that context.

1

But the forecasts are based on a level of probability of rainfall occurring at these levels, within the next 24 hours?-- Not a level of probability, they're based on climatic models, which basically give a quantification of the rainfall depth.

10

Now, if you don't take into account the predicted level of rainfalls - levels of rainfall in decision making, then do you proceed on the assumption that the predicted rainfall won't happen?-- The no rainfall scenario is indeed that, yes.

So, in other words, the no rainfall models ignore the probability or even any possibility of there being the predicted rainfall?-- Yes, they're based on what we actually know, which is the rainfall that's already occurred on the ground.

20

So, the no rainfall models use what is the best case scenario, that is there won't be any further rain?-- That's correct, yes, it's a lower level - lower limiting model scenario, if you like.

And it ignores the possible scenario or probable scenario that rain will fall as forecast by the Bureau of Meteorology?-- Well, those particular model runs do, but the model runs incorporating the forecast indeed have the estimates included.

30

And the worst case scenario is rain significantly exceeding the Bureau of Meteorology predictions?-- Quite likely, yes.

Are any models run on that basis?-- Occasionally we will do sensitivities on model runs, but during this particular event, I don't believe we did so.

And what, in fact, happened was that the rainfall significantly exceeded the predicted rainfall?-- On the Sunday and Monday and Tuesday, yes.

40

And you say that there had been no modelling on that basis?-- We didn't do - where we did models incorporating the forecast rainfall, but no models including additional forecast rainfall.

And the primary model that you had regard to was to the best possible outcome, that there would be no further rain?-- The model that we rely upon is the model which is based on information that we know about, which is, indeed, the data recorded till time now.

50

In some areas of public administration, decision makers apply what's called a precautionary principle or precautionary approach, and under that approach actions are taken to avoid serious or irreparable potential harm, despite a lack of scientific certainty as to the likelihood or magnitude of the

harm. Was that type of approach - did that have any place here?-- I believe we actually followed that type of approach in limiting the releases to the basis of no further rain modelling. So, we were making sure that we weren't needlessly inundating bridges or, indeed, property by factoring in forecast rainfall which has no guarantee of actually occurring.

1

But inundating bridges wasn't a case of causing serious or irreparable harm, was it?-- Well, I believe the - the bridges we're talking about includes the Brisbane Valley Highway, so that would mean that the residents of the Brisbane Valley would be isolated from Brisbane City and Ipswich and major centres.

10

So, that inconvenience to downstream communities was a major factor in your decision making?-- It's a consideration, but not - but it's taken in consideration with a number of other objectives.

20

But the serious or irreversible potential harm that was possible at this stage during these floods was major urban flooding?-- Well, at what point would we have known that?

Well, on Saturday-----?-- Yes. On Saturday our - on Saturday, if I can refer to my statement 1 schedule, the modelling based on forecast rainfalls did not suggest we were going to exceed EL74. Therefore, no justification for, in fact, invoking strategy W4 at any point earlier than we did.

30

And you say that at the same time, there was no modelling based on rainfall exceeding predicted levels?-- Well, we don't do hypothetical modelling, we just wouldn't have the resources to do every conceivable simulation during the flood event.

And later on, and I will come to this later, the predicted rainfall model did suggest rising lake levels to 74 metres?-- It did, yes.

40

And that wasn't acted upon?-- It was taken into consideration and the releases were, indeed, increased throughout Sunday, Monday and into Tuesday.

Now, Mr Callaghan took you to page 22 of the manual. Could you turn to that again, please? He took you, in particular, to the passage that reads, "The strategy chosen at any point in time will depend upon actual levels in the dams and the following predictions which are to be made using the best forecast rainfall and stream flow information available at the time.", and it was suggested to you that the natural meaning of those words is that you use predicted rainfall?-- As explained just previously after lunch when Mr Devlin was questioning me, the interpretation I have is in accordance with the use of the real time model in producing - in undertaking the projections and it's meant to be read in that context.

50

When Mr Callaghan was cross-examining you, did you suggest to him that you don't take into account the predicted rainfall models at all?-- As I mentioned before, we do take them into account in terms of awareness or a sensitivity of where the gate release strategy will be.

1

Does that mean that you don't take them into account in actually making decisions as to what strategy to implement at a particular time?-- Well, I think they are factored into our decision-making process as such, yes.

10

Is that only the case when you are considering transitioning from one strategy to another?-- Generally speaking, that's when it becomes most important, yes.

Wouldn't predicted rainfall also have a relevance in the rate of release that you adopt within a particular strategy?-- The predicted rainfall is highly variable and so depending on how consistent those forecasts have been, it may be incorporated, but, generally speaking, no, we don't, we do not take it into account.

20

In other words, you base your rate of release solely upon the rainfall that has actually fallen and not on the rainfall that is predicted to fall?-- In most cases, yes.

And the exception is when you are considering transitioning from one strategy to another?-- Yes.

Now, if you go further down page 22, I suggest that there are some other parts of the passages that are contained there that also indicate that you should take into account predicted rainfall. So, you will see that it says, "Strategies are likely to change during a flood event as forecasts change and rain is received in the catchments."?-- Yes.

30

And those "forecasts" must refer to forecasts of rain?-- They could be forecasts of rain or flow rates in some of the catchments.

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But they would certainly include rain forecasts?-- Yes.

And then further down, "Strategies are changed in response to changing rainfall forecasts."?-- Yes.

So, there's an express requirement that strategies are changed in response to changing or predicted - changing forecasts or predicted rainfall?-- As I've reiterated a number of times, the release strategies are predominantly based on the no rainfall forecast scenario, which indeed is a rainfall forecast.

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But you have indicated that when you're operating in a particular strategy, within a particular strategy and not at the margins of it, you don't take into account rainfall forecasts at all?-- Not necessarily, no.

Well, I thought you indicated that you don't take them into

account at all?-- We certainly do the modelling and depending on the sensitivity of the model results, they may or may not be taken into account at any particular time.

1

Well, I suggest that not taking them into account is a breach of the requirements of the manual?-- I disagree with that interpretation.

Now, we're looking here at revision 7; is that right?-- Yes.

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And this was promulgated in about November 2009?-- Yes.

And it was the current revision at the time of these flood events in January 2011?-- That's correct, yes.

And you were asked some questions earlier about revision 6?-- Yes.

And I think it may have been put to you, but, in any event, you indicated that floods - that release strategies were determined there only by actual levels, lake levels, not by predicted lake levels?-- The procedures contained in revision 6 of the manual do specify actual lake levels as the threshold points, yes.

20

See, I want to suggest to you that that's not quite correct. Can I hand to you a copy of the Manual of Operational Procedures For Flood Mitigation For Wivenhoe Dam and Somerset Dam, revision 6? I have two spare copies. Could you go to page 32? Sorry, perhaps before we get to that point, I might just start at page 29, and there's a paragraph that explains how this is intended to work, I think. Just under 8.5, "Flood Control Procedures.", the third paragraph says, "The flood control procedures to be adopted commence with procedure 1 and extend through procedure 4 as the magnitude of the flood predicted by the Real Time Flood Model increases."?-- Yes.

30

Just to get this clear, the Real Time Flood Model is one that takes into account both with rainfall predictions and without rainfall predictions?-- Yes, the model can be run with either configuration, yes.

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And then at page 32, just down towards the bottom of the page, is a subheading, "Procedure 4A.", and it says, "The procedure 4A applies while all indications of the peak flood level in Wivenhoe Dam are that it will be insufficient to trigger operation of the first bay of the fuse plug.", et cetera. Now, the reference to "all indications" suggest using both models, doesn't it?-- It suggests that both could be taken into consideration, yes.

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And it's an indication also that even under revision 6 predictions had to be made, it wasn't just based on an actual level of the lake?-- Well, I'd refer to page 31 where it says, "If the lake level reaches EL68.5 in Wivenhoe Dam, operation switch to procedure 2 or 3 as appropriate." I take that to be indicating actual lake levels.

Yes, but that is in relation only to switching to procedure 2 or 3, isn't it?-- It is, yes.

And the passage that I took you to refers to procedure 4A?-- And I believe there's a degree of flexibility there to use either actual levels or predicted levels as the case may be.

All right. So, so you're agreeing then that even under revision 6, you didn't just depend upon actual levels, at least once it got to procedure 4?-- Yes, I can consider that, yes. 10

And that's consistent also with page 33 and the first paragraph under the subheading, "Procedure 4B."?-- Yes.

And, again, the reference is to procedure 4B applying once indications are that the flood peak level will exceed EL75.5?-- And I would contend that could be interpreted when the lake level actually reaches that point. 20

Well, doesn't it refer to when the indications are that it will exceed that level? Isn't that a forecast of what's to happen?-- It could well - very well be, but it's also - could be based on actual levels.

And I suggest to you that the intention is that the indications will be based upon not just no rainfall models, but also on with rainfall models?-- Considering the consequences of the initiation of the fuse plugs, there would have to be a high degree of certainty associated with the - invoking procedures 4A or 4B. I don't know whether we would be willing to use the long range forecasts to actually invoke strategies 4A earlier than would otherwise be necessary. 30

What about 24 hour forecasts?-- Same deal. I think they're too variable and I wouldn't necessarily invoke those procedures on that basis.

See, I want to suggest to you that revision 6 contemplated that you would predict lake levels, taking into account both no rainfall and rainfall models?-- It does allow that flexibility, yes. 40

And I suggest to you that there was no change with revision 7 in that sense, that it continued to require predictions to be made based on both no rainfall and with rainfall models?-- I think the manual does allow that degree of flexibility, yes.

I will tender revision 6 of the manual. 50

COMMISSIONER: Exhibit 34.

ADMITTED AND MARKED "EXHIBIT 34"

1

MR RANGIAH: Can I take you back, Mr Ayre, to paragraph 49 of your statement?-- Is this the first statement?

No, it's the second statement, I'm sorry. Do you have that?-- Yes, I do.

Paragraph 49 refers to a situation report issued at about 5.53 p.m. on Saturday, the 8th of January 2011, and what was indicated in the second paragraph was that, "Advice from Bureau of Meteorology indicates that South East Queensland can expect further high rainfall totals over the next four days."?-- Yes.

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That was in your report? And then further down you said, "Given the standard conditions of the catchment, significant inflow to Seqwater dams will be generated, especially following forecast rainfall on Sunday/Monday."?-- Yes.

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And at page 18 under the heading "Wivenhoe" you indicated that "the current gate operation strategy will maintain flows of up to 1,600 CUMECS in mid-Brisbane River throughout the evening."?-- Yes.

And then at page 19, you seem to recognise that higher releases may be required because - just at the bottom of the second last paragraph you said, "However, if falls are greater than those forecast releases from Wivenhoe Dam, may need to adversely impact Mt Crosby Weir Bridge and possibly Fernvale Bridge but will be maintained below 3,500 CUMECS."?-- Yes, that's adopting the precautionary principle we discussed before. We're trying to give the affected councils some prior warning should the situation deteriorate. We weren't necessarily suggesting it would.

10

But you recognised that possibility that it would?-- Yes, and that's an example of the use of the forecast modelling.

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Now, you knew that the forecasts were uncertain?-- Yes.

And you recognised there that there could be more rainfall than predicted?-- Yes.

And what this passage indicates as well was that you would react in terms of your strategy if it transpired that there was greater rainfall than predicted?-- It suggests that if the forecast rainfall indeed fell and run-off was generated, that we would transition the releases accordingly.

30

In other words, you would react to an event after it occurred?-- Yes.

You would not, on the other hand, take into account the possibility that it might occur and react accordingly?-- We don't do pre-emptive releases, no.

And what this passage suggests also, I suggest, is that you were particularly concerned with that objective of minimising impact to downstream rural life?-- It was one of the considerations being made, yes.

40

But under W3 it is a much lower priority than the primary consideration, isn't it?-- It is a lower priority. I don't know whether it is much lower, necessarily.

Would you accept the proposition that a higher release, or rate of release at that stage might have meant there was - that there were lower releases in the future if rainfall continued or worsened?-- As the modelling that was undertaken by Terry Malone and presented earlier indicated, yes, indeed, the peak release may have been reduced but the overall net effect would have been similar in the City of Brisbane.

50

Well, that's yet to be tested, but what I am asking you about is in that situation on that Saturday, if there were higher releases at that time it might have avoided even greater

releases later on if, as you anticipated might happen, the rainfall was worse than expected?-- Well, I don't believe the modelling we had available to us at that point in time necessarily would justify that.

1

Now, on page 19, just under the heading "forecast scenario", the second sentence reads: "The interaction with run-off from the Bremer River and Warra Creek catchment is an important consideration as the event magnitude will require the application of Wivenhoe flood operations strategy W2, which is the transition strategy, between minimising downstream impacts and maximising protection to urban areas." You were well and truly into strategy W3 by this stage, weren't you?-- Yes, that's correct. That was an error on my behalf.

10

In fact, strategy W3 had been engaged at 8 o'clock that morning?-- That morning, yes.

And this was a situation report at 5.53 p.m.?-- Correct, yes.

20

And according to this, you thought you were still in W2?-- I was certainly contemplating, at the time I wrote that, that we were in transition between strategy W1 and W3.

Well, you had gone through that transition, hadn't you?-- As I said before, it is not really a step jump transition, it is simply a progressive transition.

So what I want to suggest to you then is that your concern about downstream impacts that you express later on in that situation report were based upon a mistaken assumption that you were still in the W2 strategy?-- I think the overall objectives of the strategies are reasonably consistent. I do acknowledge that I had inadvertently recorded strategy W2 at that point in time but recognise that that wasn't correct, we had transitioned into W3 earlier in the day.

30

Well, this situation report is a record of what you were actually thinking at the time that you wrote it?-- That's correct, yes.

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And what you thought at the time you wrote it was that you were still applying the W2 strategy?-- The strategies, I think, are consistent between strategy W3 and W2 in that context, yes.

But did you think that you were applying strategy W2?-- At the time I would have, otherwise I wouldn't have put it in the situation report.

50

And I suggest to you that that confusion about whether you were operating within a W2 or the W3 strategy must have also caused some confusion about what was the priority?-- No, I believe the two strategies W2 and 3 are consistent in terms of limiting the flows below damaging levels and also keeping in mind the lower level objectives.

But they have quite different - they have quite different

primary considerations involved, don't they?-- Both strategies have predicted lake levels at Wivenhoe between 68.5 and 74. The maximum release rate in strategy W2 is three and a half thousand, whereas the maximum release rate in W3 is 4,000. In W2, the primary consideration changes from minimising disruption to downstream rural life to protecting urban areas, whereas W3 simply has the primary consideration of maximising protection to urban areas.

1

Yes. W2 is a transition strategy?-- Yes.

10

Where the objective of minimising impact to downstream rural life may be just as important as protecting urban areas from inundation?-- Not necessarily just as important but it is one of the considerations.

Yeah. It could be the balance can change during the transition?-- Yes.

But when you were in W3, the primary consideration is unequivocal, isn't it?-- It is, yes.

20

And that is protecting urban areas from inundation?-- That's correct, yes.

Could you go to paragraph 51? In paragraph C you say, "The model predictions were the downstream flow would still be maintained below 3,500 CUMECS." Now, that figure of 3,500 metres is a reference to the maximum release rate required under strategy W2, isn't it?-- It is the maximum release rate out of Wivenhoe Dam, yes.

30

But under strategy W2, a condition is that the maximum release is predicted to be less than 3,500 CUMECS?-- Yes.

And paragraph 51C is consistent with you still believing that you were operating under strategy W2?-- I believe it recognises we were in transition from strategy W1 to W3, yes.

If you recognise that you were in W3, then the figure that would have been relevant would have been 4,000?-- It would have indeed, but the modelling doesn't justify 4,000 because it was still well below three and a half thousand.

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But the point of you referring to the model predictions that downstream flow would still be maintained by 3,500 CUMECS was to indicate that you were in strategy W2, wasn't it?-- It was at that time, yes.

In paragraph 52 you say that at 7 p.m. you had finished your shift and that "at that time Wivenhoe Dam was 68.65 metres and releasing 1,242 CUMECS." Do you see that?-- Yes.

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Then at paragraph 55, you say, "I am aware that some commentators have suggested that after the January 2011 flood event more water should have been released from Wivenhoe over the course of Saturday the 8th of January 2011." And you reject that suggestion. And you - among the reasons you give

for rejecting that suggestion are that there was still a significant amount of flood storage that would have been available in the dam if rainfall increased significantly?-- Yes, the levels that were recurring over the course of Saturday and Sunday morning only varied from 68.32 to 68.65 metres.

1

But was any modelling done on the basis of a significant increase in rainfall?-- On the Saturday afternoon, I ran the three day forecast which was incorporated into appendix K of the Flood Event Report, which formed the basis of the situation reports, further assessments.

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Does your situation report at that stage refer to that modelling on the basis of rainfall increasing significantly?-- It is made on the basis of a three day access outlook.

Was that referred to, though, in your situation report?-- Yes, I believe on page 19 where it is indicated "forecast scenario", "based upon mid-range rainfall forecasts", and the mid-range there means the three day outlook.

20

Now, paragraph 56, the last sentence towards the bottom you say, "It was only if and when further rainfall eventuated that increased releases from Wivenhoe Dam would be necessary and justified." And, again, is that what I am suggesting is a reactive strategy rather than a predictive one?-- I would suggest it is a precautionary strategy where we don't need to necessarily increase releases to meet the criteria of the seven day drain down due to flood storage already - or floodwater already in storage.

30

Now, at paragraph 57 you say, "For these reasons it was appropriate that releases from Wivenhoe Dam maximise protection to urban areas while still minimising the impact to rural life downstream." Now, that's the language of W2, I suggest?-- Well, I believe it fits both. It does actually meet the high level objective of W3 and attends to the lower level objectives reference there as well.

40

Well, let's move to Sunday the 9th of January. And if you could go to paragraph 69? So you say there that you arrived back at the Flood Operations Centre at about 7.30 p.m.?-- Yes.

And then in paragraph 70 you refer to a handover and a discussion with Terry Malone and John Ruffini. And in paragraph A you say that you discussed that the catchment rainfall average for the past 12 hours for Somerset Dam was 150 millimetres and for Wivenhoe Dam was 80 millimetres?-- Yes.

50

Then in - if I could take you to subparagraph G, you were told that Wivenhoe Dam had started to rise again and would reach 72.15 during Wednesday morning?-- Yes.

You discussed that the strategy would be to maintain flows of about 1,600 CUMECS for 24 hours?-- Yes.

But you recognised that releases may have to be increased significantly during Monday morning, depending on rain?-- Yes.

Now, in paragraph H then you were told that John Ruffini had called Peter Allen, the Dam Safety Regulator, and John mentioned that he had advised Peter Allen that much larger flows were expected and you would have to increase releases to around 3,000 CUMECS based on the latest model run?-- Yes.

10

So you were told that?-- Yes, I was.

And John mentioned that he told Peter Allen that this was likely to have flooding impacts on low lying Brisbane?-- Yes.

Then in paragraph 72 you said, "Following the handover and discussions in relation to the need to increase releases to 3,000 CUMECS, I ran a new model at about 8 p.m." So does that indicate that you agreed with John Ruffini's assessment?-- Yes, I did.

20

In other words, you accepted that it would be necessary to increase releases to about 3,000 CUMECS?-- At least 2,600, yes.

Later in paragraph 72 you say that you started on a plan to increase releases to at least 2,600 CUMECS on Tuesday. But at that stage you were still at about 1,600, is that correct?-- At that stage - I will just have to check schedule 1.

30

I am basing that upon what you refer to as the current gate operational strategy, paragraph G?-- Yes, at 20:00 hours on the 9th of January we had a discharge from Wivenhoe of about 1,420 CUMECS.

So that the statement then in paragraph G of maintaining flows around 1,600 was not quite right?-- I believe - no, that's not quite right, yep. We were still at 1,400 CUMECS at that stage.

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MR DEVLIN: Commissioner, there seems to be - the witness and the questioner seem to be at cross-purposes. The words used are "to maintain flows of around 1,600 CUMECS in the mid-Brisbane River for the next 24 hours", and the other discussion seems to be about releases, so I don't know whether there is-----

MR RANGIAH: Yes, I accept that I may have caused some confusion through that question.

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MR DEVLIN: Perhaps that ought to be reapproached because there have been quite a number of questions based upon the misunderstanding.

MR RANGIAH: All right. So in paragraph 70G, you said that you had maintained flows of around 1,600 and that was based upon releases of 1,400?-- At the current releases, 1,400,

yes.

1

Now, if you could go to paragraph 76? You refer there to a situation report that you participated in preparing at 9.04 p.m., and you recorded that very heavy rainfall had been recorded in the upper reaches of the Brisbane River and Stanley?-- Yes.

And a bit further down you said that "severe weather warning remains current, heavy rainfall in the dam catchment areas"?-- Yes.

10

Over on the next page, the second paragraph, it is predicted that the dam would reach at least 73 metres during Tuesday morning. I should say "at least 73 metres during Tuesday morning?-- Yes, that's correct.

And - excuse me for one moment - then you had indicated by now that the objective for dam operations would be to minimise the impact of urban flooding in areas downstream of the dam?-- Yes.

20

You decided at that stage that releases would be kept below 3,500 and the combined flows would be limited to 4,000?-- Yes.

And that indicates firmly that you were now in strategy W3?-- Yes, that's correct.

You noted that the current release rate was 1,400 and that gate opening would start to be increased from noon on the next day and expected release to be increased to at least 2,600 on Tuesday morning?-- Yes.

30

And this report is prepared at 9.04 p.m., approximately?-- 9 o'clock on the evening the Sunday the 9th, yes.

If you could go to paragraph 78, you say there that a release rate of 2,600 meant that Fernvale Bridge and Mt Crosby Weir Bridge would need to be closed before the releases could start to occur?-- Yes.

40

Do you see that?-- That's correct.

In fact, Mt Crosby Weir had to be closed when the release rate reached 1,900?-- It has capacity to handle up to 1,900 CUMECS, yes.

And Fernvale Bridge at 2,100?-- Well, the approaches at Fernvale go out to around about 2,000 CUMECS.

50

But at this stage the release rate was still 1,400?-- That's correct, yes.

And you could certainly have increased it to 1,800, approximately, without closing either Mt Crosby Weir or Fernvale Bridge?-- Well, we had to take into account the flows coming down the Lockyer Creek and residual catchment

areas, so, again, as a precautionary note until we get notification those particular bridges are closed and, therefore, no public is at risk, we wouldn't increase the releases until we have notification those bridges are indeed closed.

1

Then in paragraph 78 you said, "Once the situation report had been issued, I started trying to coordinate the relevant bridge closures through the SRC and ICC." Can you just tell me what the SRC and ICC are?-- SRC is the Somerset Regional Council. They have responsibilities for a number of the bridges that are located downstream of Wivenhoe and in particular Fernvale Bridge. ICC is Ipswich City Council and they have responsibility for Mt Crosby Weir Bridge.

10

And paragraph 79 - I won't go through the whole of it, but about halfway through you refer to a discussion with Rob Drury in which you told Mr Drury that Terry Malone told you that he'd spoken with Tony Jacobs at the Somerset Regional Council and Tony had said that the department of Main Roads was responsible for closing the Fernvale Bridge?-- Yes.

20

And that Tony Jacobs didn't have the after-hours contact number but would contact him on Monday morning?-- Yes.

Now, at 3.30 p.m. that day, you had asked Terry Malone, hadn't you, to contact local councils to warn them of the potential for the closure of Mt Crosby Weir and Fernvale Bridge?-- I think - I can recall that, yes.

30

You refer to that paragraph 66. But did you ask him to contact the Department of Main Roads?-- Not at that time because in the Emergency Action Plan, and, indeed, the manual, the reference authority for Fernvale Bridge is identified as Somerset Regional Council.

All right. And did you - were you aware that it was the Department of Main Roads that was responsible for closing the bridge?-- Not until that point, no.

40

So your understanding was that it was the Somerset Regional Council that was responsible for closing?-- Yes.

And at paragraph 83, you refer to advice that guard rails needed to be taken off the Mt Crosby Weir Bridge before it became inundated?-- Yes.

And that advice was received at about 10.30 p.m.?-- Yes, Brett Myers, the water treatment plant manager at Mt Crosby Water Treatment Plant.

50

And why was it not realised before this that it would be necessary to remove the guard rails?-- Well, it was at this point in time that the situation report that we advised that we were now contemplating releases that would actually inundate the bridge. You wouldn't remove the rails off the bridge and allow public traffic in if you weren't in a position that the bridge was going to be inundated. So at

that point in time - or up until 9 p.m. we hadn't necessarily contemplated inundating the bridge.

1

I see. But it certainly was a possibility from at least 3.30 that afternoon?-- It was a possibility, yes.

So is it the case that, according to paragraph 66, that finally the Fernvale Bridge was closed at about 11.35 p.m. when the police were present?-- I believe police were on site around about that time, yes.

10

And so at that stage it was possible to start increasing the releases?-- Once we were assured that releases could, indeed, be made with both bridges closed, then we could proceed with opening, yes.

So it was something like a two and a half hour delay between when the decision was made to increase the rates and the rates actually being increased?-- We were aware that some of the standby operators were actually being billeted in Fernvale. So we just wanted to make sure that those standby operators were actually available at the dam before we proceeded in making any releases.

20

And I suggest to you that, in fact, the release rates were not increased to about - I will start that again. I suggest to you that the release rates were not increased over 1,500 CUMECS until 2 o'clock on Monday the 10th of January?-- At 2 a.m. we issued a directive to commence opening the gates, yes.

30

And that was following the decision that had been made some five hours before that the rates would be increased?-- On the basis that we were now fully aware that the Fernvale Bridge and Mt Crosby Weir Bridge had effectively been closed and, therefore, we weren't endangering the public.

And the rate of release didn't reach 2,000 CUMECS until about 9 a.m. on Monday the 10th of January, does that sound right?-- That's correct. It was a gradual increase in accordance with the modelling.

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So at about 8.30 a.m. on the 10th, direction number 10, I think, was issued by Terry Malone and flows - I am sorry, I will just - so Terry Malone issued direction number 10 at 8.30 a.m.?-- I believe so. I wasn't actually present in the Flood Operations Centre at that time.

50

And flows then were maintained at 2,000?-- Yes, that's correct.

1

In fact, they weren't increased to 2,100 until about 4 p.m. that day?-- No, I believe this was in reference to the earlier discussion where John Tibaldi and Terry Malone had a teleconference with officers from the Brisbane City Council. Officers from the Brisbane City Council put to Terry and John that if indeed we could limit flows at Moggill to less than three and a half thousand, that would be in keeping with maximizing protection to urban areas. John and Terry, as I understand, did some additional modelling, indicating that it was possible to maintain the releases at 2,000 without unduly increasing the lake levels or predicted lake levels, and I believe they came up with a number of about .2 of a metre increase. So, they endeavoured to accommodate Brisbane City Council's request at that time, but by around about 2.30 in the afternoon it became evident there was more rainfall and hence more runoff occurring in the upper Brisbane and we had to revert back to our original strategy of trying to achieve 2,600 CUMECS by Tuesday morning.

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And in fact, the 2,600 CUMECS was achieved but not until about 7 p.m. on that Monday?-- By 7 p.m. on that night, we actually achieved a rate of about 2,750 CUMECS, yes.

You may or may not be able to answer this, but do you know whether at 8.30 a.m. on the Monday morning there was any evidence of downstream flooding in Brisbane?-- I wouldn't be able to tell you that, I was - I was resting after my shift on the Sunday night, so, no, I wouldn't be aware at that point in time.

30

And even with the figure of 2,600 CUMECS that you were aiming for, you weren't anticipating urban flooding, were you?-- In accordance with the damage curves that were provided by the Brisbane City Council, we were aware that there are some properties and infrastructure that is impacted at flows certainly from 1,000 CUMECS up to 4,000. So, yes, we would have been aware that there was damage being incurred.

40

At 2,600, would that flooding have been limited to minor flooding?-- Yes, at that stage.

Now, it is the case, isn't it, that a release rate of 2,600 could have been achieved much earlier than 7 p.m. on the Monday?-- It could have been, but in light of the discussions between council and the Flood Operations Centre, I think it was appropriate we, indeed, tried to maximise the protection to those urban areas.

50

Do you have the Flood Event Log with you?-- I do, yes.

Can I ask you to open that, please, to - if you could go to the entries for Sunday, the 9th of January?-- Yes.

To 7.15 p.m.. Now, that entry reads - sorry, there are two entries at the same time, but the second of those says, "FOC

called direct Dam Safety advising him that FOC is now looking at much large flows and would have to ramp up releases to around 3,000 CUMECS by as early as midnight, which is likely to have flooding impacts in low-lying areas of Brisbane." Do you know who made that call?-- I believe that was John Ruffini. 1

Then at 7.20 said that, "Engineer 2 called BCC advising him of potential for high releases sooner than previously expected.", and just who is engineer 2?-- Terry Malone. 10

And the first of those entries suggests that John Ruffini at least knew that there had to be a very significant increase in the rate of release?-- Yes.

By as early as midnight on the Sunday?-- I can't actually vouch for the Flood Event Log entry because I wasn't actually present in the Flood Operations Centre at that time.

But would you agree that, in fact, there's virtually no increase in release rates until it got to 1,500 at 2 a.m. on the Monday?-- Yes. As I mentioned, we don't make releases from the dam until we are sure that public safety has been attended to. 20

Yes?-- So, until we were advised that the bridges were closed, we wouldn't increase gate releases.

And the release rate didn't increase to 3,000 until about 10 a.m. on Tuesday, the 11th?-- That's correct, yes. 30

So, in fact, what was not done was what the Director of Dam Safety was told was going to be done?-- As I said, I can't vouch for that entry in the Flood Event Log. I don't believe it is necessarily a true account of the discussion between John and Peter Allen.

Then if you could go to the entry for 12.55 on Monday the 10th of January, you will see that it says, "Engineer 3 called Dam Operations Manager to discuss BCC's view on damaging flow. Engineer 3 confirmed that if flows were kept below 3,500 the fuss plug would be triggered." Engineer 3 was John Ruffini?-- That's correct, yes. 40

And I note that in your statement you disagree with the proposition apparently put forward by Mr Ruffini that if releases were not increased at 3,500 CUMECS then the fuse plug would be triggered?-- Certainly the modelling results we had available at that time don't support that proposition. 50

However, it's true to say that later in the event you did become concerned that the fuse plug may initiate?-- When procedure W4 was invoked, yes.

So, after the dam level rose past 74 metres?-- Yes.

And it was, in fact necessary to increase releases to above 3,500 to prevent initiation of the fuse plug?-- The

requirement in W4 is to increase releases until such time as the lake level - the rising lake level is arrested.

1

So, it was necessary to increase-----?-- Yes, it was.

-----releases above 3,500-----?-- Indeed, yes.

-----to avoid initiation of fuse plug?-- Yes.

So, in that sense Mr Ruffini was correct, wasn't he?-- He - in that sense, yes, that's correct.

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COMMISSIONER: Can I just ask you, Mr Ayre, how can you tell in the dam log whether the CUMECS referred to are outflow from the dam and the flow past Moggill, which is another thing you have to worry about?-- Well, in many case, that hasn't been differentiated and I think that's led to some of the confusion.

Because in the previous entry the reference to 3,500 CUMECS will be the Moggill flow, won't it?-- Yes.

20

MR RANGIAH: Now, can I ask you to go back to paragraph 91 of your statement? This is a situation report prepared at about 1.14 a.m.?-- Yes.

And by this time, very heavy rainfall had been recorded in the upper Brisbane and Stanley Rivers in the last 12 hours?-- Yes, that's correct.

30

And a severe weather warning remained current for heavy rainfall in the dam catchment areas?-- Yes.

Now, by this time, the objective under the W3 was firmly entrenched?-- Yes, it was.

And by this stage, you are no longer concerned with impacts on rural communities because the bridges have already been closed?-- That's correct.

40

And at page 33 you said that the current release rate was 1,400 and that the gate opening would start to be increased, the release would increase to 2,600?-- Yes, that's correct.

At paragraph 94 in the last two sentences, you said, "In summary, the process of increasing the releases from Wivenhoe Dam to the estimated peak release of 2,600 commenced when safe to do so while minimising the impact on rural communities by not prematurely inundating those areas." Then you also say that - I'm sorry, before we get on to next thing, can I just ask you whether that sentence is still reflective of a concern for that objective of minimising disruption to rural communities?-- I think it's meant to reflect the closure of the bridges. Yes, it would be minimising disruption to those downstream communities in that context.

50

Then you also note, "These increased releases could not have been made while downstream bridges remained open to the

public.", but I want to suggest to you that, again, the emphasis that you were giving was on the subjective of minimising impacts to rural areas when the primary objective was preventing inundation of urban areas?-- I think all I was trying to do in that statement is indicate that we did not increase release rates from Wivenhoe until we were sure that the bridges had been properly closed and public safety was considered important. So, we couldn't actually move to the strategy targets until that had occurred.

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Now, could you go to paragraph 97, and this is a situation report at 6.30 a.m. on Monday the 10th of January and moderate to heavy rainfall had been reported and a severe weather warning remained current for heavy rain in the dam catchment area?-- Yes.

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Page 36, under the heading, "Wivenhoe Dam.", it's said that the dam level was rising quickly?-- Yes.

And later it's said, "The dam will reach at least 73.3 metres during Tuesday morning?-- Correct, yes.

20

And was that based on a no rainfall model?-- Yes.

And I suggest that a model run using predicted rainfall showed an expected dam level of over 74 metres at 2 a.m. on Monday the 10th of January?-- I'd have to check the Schedule 1A again.

Yes?-- Just bear with me. That was a situation report at 6.30 a.m. on Monday morning, is it?

30

Yes, and I am asking you to look at the model that was run at about 2 a.m. Monday morning. I am suggesting that it shows with predicted rainfall an expected dam level of 74.7 metres?-- Yes, that's correct.

And throughout the day, the modelling with predicted rain showed levels consistently above 74 metres?-- It did, yes.

40

So, for example, a model was run at 10 a.m. which showed a predicted dam level of 74.5 per cent?-- 74.5 meters.

I'm sorry, 74.5 metres?-- Yes.

At 3 p.m., 74.2 metres?-- Yes.

And at 8 p.m., 74.3 metres?-- Yes.

And that level of 74 metres is a significant one, isn't it?-- It is indeed, yes.

50

Because it's the trigger to move into the W4 strategy?-- It's at that point where we do invoke our strategy W4, yes.

And that's a level that recognises that the primary consideration is now protecting the structural safety of the dam?-- That's correct, yes.

And it enables releases over 4,000 CUMECS to be made then?--
It has an unlimited release rate, yes.

And as a matter of fact, the peak level of the dam was, I think, 74.95 metres on Tuesday?-- It was 74.97 metres at 7.30 on Tuesday evening, yes.

Thank you. Even if the no rainfall prediction was not used, it was still getting close to that 74 metre mark by the Monday?-- It was, yes.

10

And you knew, didn't you, that if rainfall increased, then you can get to that level of 74 metres even on a no rainfall model?-- Well, no, the no rainfall model were showing less than 74, but with the forecast rain was showing in excess of the EL74, yes.

If there was an increase in rainfall in whichever model you used, you could quickly get to 74 metres?-- Yes.

20

But on page 36, it's indicated the current release rate from Wivenhoe Dam was still only 1,753?-- Yes.

That's at the time of the situation report?-- 6.30 on Monday morning, yes.

And this is despite on one possible measure there being cause to invoke strategy W4?-- Yes, but that's not necessarily the interpretation we use.

30

You indicated, though, didn't you, that you use a predicted rain model - rainfall model when you are getting close to that transition?-- Yes.

And so in this case, wouldn't it have been appropriate to take into account that the with rainfall model consistently showed a predicted level of over 74 metres?-- Well, given the consequence of making releases in excess of 4,000 cubic metres a second, we wanted to be confident in the fact that the lake level in Wivenhoe would, indeed, exceed the EL74. The only way we can be confident in that is to use the no rainfall model approach.

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Even without moving to W4, you were able to release up to 4,000-----?-- Yes.

-----CUMECS; is that right?-- The maximum release rate under W3 is 4,000 CUMECS, yes.

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But at this stage, even though since 2 a.m. with rainfall modelling it had been showing an expected dam level of 74 metres, you were still only releasing 1,753 metres?-- We were - those dam levels were not expected till the following day and we were in the process of increasing the releases.

And they were not expected until the following day, but you knew that if you had to go to W4, then there were going to

have to be significantly increased rates, didn't you?-- Yes, we did. 1

And significantly increased release rates would mean a significantly higher risk of urban inundation?-- Possibly, yes.

So, one method of avoiding or trying to avoid higher risk of urban inundation would have been to increase release rates?-- Not necessarily, because if you had increased the release rates dramatically on that Monday morning and no further rainfall occurred, you would have needlessly inundated properties as such. 10

But there was forecast heavy rainfall, wasn't there?-- There was an awareness of forecast but there's no guarantee that forecast rainfall will eventuate.

And it could eventuate?-- It could eventuate and it could, indeed, fall on downstream tributary catchments which would, in fact, exacerbate a heavy prerelease strategy in which case you'd get worse flooding than would otherwise have occurred. 20

Or it could be significantly greater than is predicted?-- The rainfall could be significantly greater, yes.

Which is what, in fact, happened here?-- Indeed, yes.

In paragraph 100, you refer to your expectation that the rainfall - I'm sorry, you talk about the rainfall producing a system moving south and contracting towards the coast, so your expectation was that metropolitan Brisbane and the Bremer River would bear the brunt of rainfall on Monday and Tuesday, and that was another reason why you didn't want to greatly increase the rate of releases?-- Yeah, that's true. We were concerned that the downstream tributaries would, indeed, increase and, indeed, that did eventuate, especially in the case of Lockyer Creek. 30

Is that factor mentioned anywhere in that situation report?-- No, I don't believe so. 40

Is there any reason for that?-- No, I can't recall.

But you say that that was a critical issue?-- It was a bearing or taking into account the forecast as was available at that point in time.

It was a critical issue but you neglected to mention this in your situation report?-- I believe we have included in terms of the outlook in that we were - we are going to continue to monitor the situation and provide six hourly updates until the situation stabilised. 50

I thought you agreed you hadn't mentioned this factor about the rainfall producing system moving south?-- We didn't explicitly include that forecast, but I believe that the statements in the outlook encaptures the fact that we were

concerned about what was happening.

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MR DEVLIN: Commissioner, in fairness to the witness, would the questioner please refer to paragraph 91 relating to the previous situation report?

COMMISSIONER: I am not sure how that's going - what do you mean by that, Mr Devlin? Could you be precise? What about paragraph 91?

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MR DEVLIN: There was a form of words used at 1.14 a.m. about the system tracking south, just that it's just the previous situation report. He's being asked about leaving it out of the 6.30 a.m. situation report, but there's a reference to it in the 1.14 a.m.. I just thought the questioner might like to take him to that and ask him what he meant by that.

COMMISSIONER: I would have thought you might have saved that for your own re-examination. But, anyway, Mr Rangiah, up to you whether you do it or not.

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MR RANGIAH: I will leave it to Mr Devlin. Now, in paragraph 100 you talk about this factor about the rainfall producing a system moving to the south and that was a factor in your release strategy?-- That's a consideration, yes.

And this was in terms of the rate of release within Strategy W3?-- It's a consideration that we wouldn't necessarily ramp up releases in a rapid fashion, because allowing for the travel time of releases from Wivenhoe Dam to Brisbane City, there's a possibility that if Lockyer Creek and the Bremer River did, indeed, respond to rainfall, we would have the situation of making heavy releases into an already flooded situation.

30

So, isn't this a case of taking into account predicted rainfall in terms of your decisions about rates of release within a particular strategy?-- It is, indeed, yes.

So, you were prepared to use that approach on this occasion for this situation report?-- I believe we take them into account in all situation reports or - in determination of all strategies or decisions related to strategies.

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Perhaps I have got this wrong, but I thought you said earlier in your evidence that the manual didn't permit you to take into account predicted rainfall forecasts?-- Are we talking about quantification of rainfall or are we talking about the forecast in terms of the storm movement?

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Sorry, could you repeat that? I didn't quite catch the last part?-- Are we talking about rainfall estimates in terms of depth or are we talking about the overall synoptics in terms of how the storm is moving or travelling through the system?

Well, firstly, earlier we were talking about two ways modelling could be done using rainfall. One is actual rainfall that has fallen?-- Yes.

And another is predicted rainfall?-- Yes.

And I understood your evidence to be that in determining rates of release for within a particular strategy, the manual did not permit you to take into account predicted rainfall?-- I didn't say it necessarily didn't allow us to take it into account, I said that our usual method is to use the no rainfall forecast scenario so far as a basis of our making operational decisions.

10

And I understood you to say that you were only permitted to use predicted rainfall when you are considering a transition from one strategy to the other?-- No. Again, we can use it at any time, it's not necessarily limited to that point, and we do take it into account, but it is most - well, used most usually when we're transitioning between strategies.

So, moving to paragraph 102, you say Mr Ruffini issued directive number 9 and this was - this was in accordance with the previously agreed strategy of increasing the rate to 2,600?-- Yes.

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And then if I could jump over to paragraph 114, you are referring to a telephone call at 8 p.m. on Monday the 10th of January, and by this time there was a new development which is what you were referring to a little bit earlier in your evidence, the flash flooding in the upper Lockyer Creek?-- Yes, that's correct.

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And that led to an increase in the flood of the Brisbane River below Wivenhoe?-- Due to the contributions of Lockyer Creek and residual catchments, yes.

And after this event, it became more difficult or more problematic to increase releases from Wivenhoe?-- Well, to keep within the objectives of stretching W3 and limiting the release rates to 4,000 CUMECS or combined flow rate - sorry, the combined flow of Moggill to 4,000 CUMECS, yes, it became more problematic.

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If you can go to Tuesday now, the 11th of January, paragraph 132? In fairness to you, I think I should note that you said there that Tuesday the 11th of January saw some of the highest rainfall ever recorded in Brisbane River and Pine Rivers Basin and then you set out at page 47 some of the levels of rainfall that were recorded. At paragraph 139 you say at 4 a.m. a further model was run in the FOC and you noted that the lake level was predicted to rise to 74.1-----?-- Yes.

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-----by that model. And that is on a no rainfall model?-- It is, yes.

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And still by this time the with rainfall models were showing consistently above 74?-- Yes, that's correct.

And the release rate at this stage was 2,750 CUMECS?-- Yes.

And it was still open to you to increase the release rate within W3 without moving to W4?-- That's correct, yes.

COMMISSIONER: Mr Rangiah, it is 4.30. Mr Ayre has had a long weary day. I think we might adjourn.

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MR RANGIAH: Thank you.

THE COMMISSION ADJOURNED AT 4.30 P.M. TILL 10.00 A.M. THE FOLLOWING DAY

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