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New Brunswick Board of Commissioners of Public Utilities

Delta Hotel, Saint John, N.B.

January 15th 2002

9:30 a.m.

IN THE MATTER OF an application dated July 12th 2001 by New Brunswick Power Corporation in connection with a proposal to refurbish its generating facility at Coleson Cove

Henneberry Reporting Service

New Brunswick Board of Commissioners of Public Utilities

Delta Hotel, Saint John, N.B.  
January 15th 2002  
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IN THE MATTER OF an application dated July 12th 2001 by New Brunswick Power Corporation in connection with a proposal to refurbish its generating facility at Coleson Cove

CHAIRMAN: David C. Nicholson, Q.C.

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CHAIRMAN: Good morning, panel and ladies and gentlemen. Any preliminary matters before we continue with cross examination? Mr. Hashey?

MR. HASHEY: Yes, Mr. Chairman. We have the documents that were requested by my friend Mr. Coon yesterday. And Mr. Marshall is prepared to answer the two outstanding questions.

The question I pose, is this the appropriate time for that? Or would you prefer that at the conclusion?

CHAIRMAN: No. I think this is the appropriate time. Go ahead, Mr. Hashey.

MR. HASHEY: Okay. There are two documents that I had asked to be distributed. These documents related to the questions that Mr. Coon was posing in relation to the NOx requirements.

One is a letter from Environment New Brunswick to NB Power to Mr. MacPherson dated March 22, 2001. And the second is the document entitled "New Brunswick Power Corporation Sulphur Dioxide Emissions Reduction Program, January 2001."

CHAIRMAN: Number, Mr. Hashey?

MR. HASHEY: The question I pose, would these be considered -- and I don't think it really matters to be exhibits of the applicant or exhibits of Mr. Coon.

CHAIRMAN: Well, I have got the applicant's page opened. So we will make them the applicant's exhibit.

MR. HASHEY: That is the logical answer.

CHAIRMAN: All right. So the letter addressed to Mr. Stewart MacPherson dated March 22, 2001 is A-13.

And the document which is headed "New Brunswick Power Corporation Sulphur Dioxide Emissions Reduction Program" dated January 2001 is A-14.

Go ahead, Mr. Hashey.

MR. HASHEY: Thank you, Mr. Chairman. There is one issue arising out of this. And I request a ruling or a clarification.

I would like to have Mr. Brogan address the issue as to whether there are other NOx requirements. You know, leaving these documents there by themselves may not be complete. And I would like reference to be made.

And the question is -- and I wanted to ask him about the EIA procedure and whether there are additional requirements.

Would you prefer that to be left for redirect? Or would you like that to be addressed now?

CHAIRMAN: Frankly if it adds clarification in reference to the line of questioning that Mr. Coon has, it is better to ask the question now.

Mr. Coon, what do you have to say about that?

MR. COON: I actually have a specific question to lead off with this morning with respect to other NOx requirements that appear in the evidence.

So perhaps I could just ask the question and he could respond.

CHAIRMAN: All right.

MR. HASHEY: That sounds like a sensible approach.

CHAIRMAN: Okay. Go ahead, Mr. Coon. Any other --

MR. HASHEY: Well, the only other two issues are the two undertakings that were given by Mr. Marshall. And he is prepared to answer those up front this morning.

The undertakings are contained at page 198 and page

221 of the transcript. The first undertaking -- would you like him to deal with those right now, Mr. Chairman, and get those out of the way?

CHAIRMAN: I think that is appropriate, Mr. Hashey.

MR. HASHEY: Thank you. Then, Mr. Marshall, referencing the transcript that I have -- and I will read what the Reporter has kindly given us.

Page 198, inside the PROMOD model, could you tell us what percentage the 2.53 million tonnes of CO2 emissions associated with exports is of the total CO2 emissions at the plant during that year within the PROMOD model?

MR. MARSHALL: Yes. And the response to that is 62 percent.

And I believe that actually was already given in evidence in response to Conservation Council interrogatory number 2 on page 2 of document A-7.

MR. HASHEY: Okay. The second one, Mr. Marshall, at page 221, I believe it reads "Would it be possible to reduce the SO2 emissions to the 40,000 tonne limit by reducing exports from the plant?"

Can you answer that?

MR. MARSHALL: The answer to that is yes.

MR. HASHEY: I think that completes the answers. And we turn it back over to Mr. Coon, Mr. Chairman.

CHAIRMAN: Thank you, Mr. Hashey. Any other parties, any preliminary matters? If not go ahead, Mr. Coon.

MR. COON: Thank you.

CROSS-EXAMINATION BY MR. COON:

MR. COON: And good morning. Yes. I would like to open with a line of questioning that will get at this question of regulated NOx limits.

And in the evidence I guess we could start on page 18 of exhibit A-6, Question 7, which deals with other factors that were to be considered in narrowing down the best alternatives during the screening process.

Lines 7 and 8 the response is "Yes. It is necessary that any alternative enable the total system emissions to remain within regulated limits. This is especially necessary for SO2 and NOx in the near term."

CHAIRMAN: Can you tell us again the reference to that so we can follow you?

MR. COON: I'm sorry. That is --

CHAIRMAN: It is A-6?

MR. COON: Yes, on page 18 --

CHAIRMAN: 18.

MR. COON: -- of the evidence, lines 7 and 8.

CHAIRMAN: Thank you.

MR. COON: It is in response to Question 7. So given that it suggests that one of the things that is necessary to consider in narrowing down for the alternatives was keeping SO2 and NOx within regulated limits.

My question is do any regulated limits exist for NOx at Coleson Cove?

MR. BROGAN: That is in the present operation?

MR. COON: Yes.

MR. BROGAN: No. There are no regulated limits that exist today.

MR. COON: In exhibit A-7 on page 17 --

CHAIRMAN: These are from the Conservation Council's interrogatories?

MR. COON: Interrogatories, yes.

CHAIRMAN: Page 17 of those?

MR. COON: So CCNB 17. And in response to this interrogatory it says in fact that there are at this time specific regulated requirements for SO2 and NOx.

And certainly you have explained yesterday about the regulated or what you expect to be regulated requirements for SO2.

But here I don't understand the difference between your answer you just gave me and the fact that in this response it says at this time there are specific regulated requirements for NOx.

MR. MARSHALL: I guess I should respond to that. The response to CCNB 17 was referenced in my evidence. And I prepared that response.

I guess the issue is at this specific point in time



there are no regulated limits on Coleson Cove. But as we explained in the evidence, our projection and indications from Department of Environment are there will be clear targets and limits that will be on us in the future.

And as a system planner our obligation is not just to operate the system for tomorrow or today. But our obligation is to operate the system over the life of the project. And so we need to evaluate the economics and the targets over the life.

So that is -- our projection is for sulphur and NOx limits in the near term. And that is why they are included.

MR. COON: Okay, Mr. Marshall. So that response is the incorrect one. And Mr. Brogan's this morning is the correct one?

MR. MARSHALL: The wording of that response, I would agree, at this time there are no specific regulated limits yet.

MR. COON: Thank you. Does the current licence to operate at Coleson Cove obligate you to develop an emission reduction plan for reducing NOx emissions as it does for SO2?

MR. MARSHALL: The last --

MR. COON: Is there any requirement to submit a plan for NOx reductions?

MR. MARSHALL: We have not had a specific request yet to

develop a plan for NOx.

MR. COON: And just to refresh our memories, the next -- the certificate to operate would be -- at the plant would come up for renewal in 2005, is that --

MR. MARSHALL: That is correct.

MR. COON: -- correct?

Okay. On page -- okay. Back to exhibit A-6 then of the evidence, on page 30. This is the section looking at existing supply options, life extensions and conversions, and specifically the one dealing with the Coleson Cove oil blend.

At the bottom of that page it says, at the last sentence it says "In addition significant capital investment for environmental controls to meet NOx standards would be required."

Can you explain which standards these are?

MR. MARSHALL: Our target of 18,000 tonnes of total system NOx emissions. Currently Coleson Cove, as submitted in the evidence, the actual emissions of Coleson Cove in year 2000 were about 15,000 tonnes of NOx.

That is currently about 60 percent of total system NOx emissions. If we are to reduce NOx levels down to the 30 percent reduction for 2007 then we have to do something at Coleson Cove to reduce NOx.

MR. COON: So would I be correct in inferring then that

where it refers to NOx standards here, what you have just said was actually to meet the NOx target that NB Power has established for itself?

MR. MARSHALL: It is to meet -- our best projection, current indication of targets that we will be required to meet.

MR. COON: So this refers -- significant capital investments to meet NOx standards are therefore -- it really should say something more like to meet anticipated NOx standards?

MR. MARSHALL: To meet project NOx standards, yes.

MR. COON: Projected. Okay. And these are the ones, just to be crystal-clear, these are the ones you expect to flow from the agreement between the New England Governors and the Eastern Canadian Premiers to reduce NOx?

MR. MARSHALL: More than that, I think there is agreements between Canada and the U. S. on reductions. I think they are referenced in the letter from the Department of Environment.

So there were two sources of NOx reductions. So it is not just the Governors and Premiers.

MR. COON: Okay. Thank you. If we can turn to the next page, page 31, again the last sentence.

Under "Environmental Impact" with respect to the oil blend it suggests that "This would enable NB Power to reduce total system NOx emissions by a 30 percent target by the New England Governors and Eastern Canadian

Premiers."

What percentage of New Brunswick's NOx emissions does the system, NB Power system represent?

MR. MARSHALL: I don't know.

MR. COON: So this -- then to be clear, this 30 percent reduction target yesterday, in response to a question from myself, I believe you said that that was a regional target, 30 percent reduction of NOx?

MR. MARSHALL: Yes.

MR. COON: Yes.

MR. MARSHALL: In the Governors and Premiers it is a 30 percent target across the region. The way we have interpreted that is without detailed analysis we look at that and say what would our -- what is a reasonable number for our contribution to achieve that target?

And we apply an allocation against ourselves to set that level. So we applied 30 percent against our own emissions to see whether we can achieve that and what it would cost to achieve it.

MR. COON: So you are just -- you are then making simply the assumption that this would be NB Power system allocation in the provincial context?

MR. MARSHALL: Yes.

MR. COON: Allocation of the target?

MR. MARSHALL: Basically we have allocated it against our

portion of the provincial emissions and the regional emissions.

MR. COON: Okay. If we go to page 32 now. Under other considerations. Since the project would need to be undertaken over a three year period, prior to the possible refurbishment of Point Lepreau and to ensure completion before the implementation date for new NOx limits, now which NOx does this refer to?

MR. MARSHALL: We are referring to the target for 2007, the issue being that we need to do the work prior to the outage of Lepreau because we would not be able to do it while Lepreau is out of service. So to wait to 2006, we would then have a double hit of having Lepreau out of service and have Coleson Cove units out of service at different times, that it would be very difficult to do. So we need to do the work prior to Lepreau out so we have Coleson Cove available and healthy and able to operate at high load factors without any environmental limitations on it so that we can provide for reliable supply for New Brunswick customers.

MR. COON: So once again this refers to the target date the governors and premiers had established to try and achieve a regional reduction of NOx emissions by 30 percent?

MR. MARSHALL: That's the target that we used, 30 percent reduction by 2007. Again, it's not just the governors and

premiers, there is also pressure on NOx reduction through the Canadian Acid Rain Action Plan and other strategy documents. So there are other -- it's not just the governors and premiers that are putting pressure on NOx reduction.

MR. COON: Are there target dates associated with those other pressures?

MR. WILSON: I'm not aware that there is a specific date attached to that.

MR. COON: Thank you. If we could turn to page 33. These lines aren't numbered. In the first paragraph at the top here under Environmental Impact, this refers to NOx control, let's see, 1, 2, 3, 4 lines down. The NOx control technology would be capable of meeting proposed NOx standards of 0.21 pounds per whatever that is, BTU -- MMBTU.

Is this proposed standard also the regional target under the governors and premiers agreement or is this something else?

MR. MARSHALL: No, that is a different standard. That is the point source standard for NOx emissions under environmental guidelines for Canada for new source standards.

MR. COON: So this applies to new sources?

MR. MARSHALL: Yes. New sources or major upgrades or

refurbishment of existing plant.

MR. COON: So this standard then wouldn't apply currently for Coleson Cove or it would only apply if refurbishment occurs? Is that when the standard actually has some legal authority?

MR. WILSON: Generally speaking, what you are saying is correct. The exception to that would be we have our approval to operate through the provincial government and the minister has the authority to make changes to that approval to operate at her discretion. So we would have to consider what the minister's direction is on that. And certainly the direction we are taking and everything we have received from Department of Environment is that there is pressure on to reduce NOx emissions.

MR. COON: This particular guideline which Mr. Marshall said was national applies to new and refurbished plants -- power plants, but it is a guideline. So can we reasonably assume that in the event of refurbishment, in the event of refurbishment that the minister would give this national guideline, provincial, legal oomph to obligate you to meet this in the event of at a refurbished power plant?

MR. MARSHALL: Yes. It is in the scoping document for the EIA for Coleson Cove that that is the guideline to be met.

MR. COON: Is there any reason to believe that this national guideline for new and refurbished power plants would be

applied to Coleson Cove if it were not refurbished?

MR. MARSHALL: No, it would not necessarily be applied to Coleson if it were not refurbished. In that section of the evidence, we are talking about Coleson Cove Orimulsion conversion and the guideline to be applied to Coleson Cove Orimulsion conversion is a projected guideline of .21. That was our estimate when we were doing the preparation.

It has since been confirmed by the Department of Environment in the scoping document for the EIA on Coleson Cove, which in the draft guidelines specify that we meet a target of .21.

MR. COON: So if the refurbishment goes ahead then, what you are saying is you would have to meet this legally. If it doesn't go ahead, you wouldn't? If one of the other alternatives were chosen? Let's break that into two questions.

If the refurbishment doesn't go ahead, would you have to meet the standard? If one of the alternatives were chosen, would you have to meet the standard?

MR. MARSHALL: I think the issue that we see is we have to reduce NOx emissions in some way at Coleson Cove. It is the largest emitter on the plant. And you can see in the same evidence on page 33, the next line down, the existing level of emissions is .70 pounds per million BT of NOx emissions. It is the highest emitter on the system. Is we



are going to address NOx emissions in any way we have to do something at Coleson Cove.

Once we start to do something to upgrade the system to deal with NOx, then the issue will be will the Department of Environment in our licensing require us to go all the way to the new source standards or will they accept some lesser upgrade to the plant.

It is speculative on our part. The current guidelines for oil fuelled plant were .26 pounds and that was the existing guideline for '95. And the reduced guideline for 2000 is .21. So we would expect that we would have to at least get down to .26.

MR. COON: So what I am understanding from your responses is that you anticipate regulated limits for NOx at Coleson Cove, you just don't know what those regulated limits will be exactly or when they would be imposed? Lots of uncertainty around those two questions?

MR. MARSHALL: There is some uncertainty around them, but it would be imprudent for us not to make some projection in order to do reasonable evaluation of costs of alternative projects.

MR. COON: But is it the case that you actually don't know what substantively the regulated limit will be or when it will be imposed?

MR. MARSHALL: We do not have a legal, regulated requirement

as yet. We have a reasonable estimate of what we believe the would be and that is what we have used in our evaluations.

MR. COON: Thank you. On page 24 of the evidence -- depart from NOx for a minute. And here in your conclusions, what you conclude as a result of your analysis, lines 10 through 13, you describe the Orimulsion project as cost effectively meeting all projected future emission targets.

Are you familiar with the specific Carbon Dioxide reduction targets agreed to by the New England governors and Eastern Canadian premiers for the electric power sector? Specifically for the electric power sector?

MR. MARSHALL: I'm not sure specifically for the electric power sector. We are familiar with the governors and premiers targets for emissions of stabilization at year 2010 at 1990 levels, 10 percent reduction by year 2020 of 1990 levels, and a further one applied to electric power being 20 percent of the rate of emissions by 2005 based on at current actuals. Is that the one you are referring to as specific to the electric power industry?

MR. COON: That's the one, yes. That one. So what I would like to do, Mr. Chairman, if I could, is introduce the New England governors and Eastern Canadian premiers action plan as an exhibit.

CHAIRMAN: Does anybody have any objections to this being

introduced as an exhibit? And I will wait until you have had an opportunity to see the paper.

MR. HASHEY: Mr. Chairman, I don't want to look like we are being obstructionists here. I assume that this is the correct document. It would seem more appropriate that if someone wishes to enter evidence that we have been given notice of the evidence. However, if -- I am quite prepared to make an exception as long as we -- somebody satisfies me that this is an accurate and complete document.

CHAIRMAN: Mr. Hashey, I agree with you. Mr. Coon, if you look at the procedure sheet that we had for May of 2001 in reference to exhibits is that if you intend to introduce an exhibit, this goes for all parties, then share it with your confreres at an early moment so they are able to have reviewed it and will know when it comes time to introduce it as to whether or not it has been checked over and they agree with it. Okay?

MR. HASHEY: It might seem appropriate that questioning on this document be delayed until the panel and other people have had an opportunity to check and make sure this is something that has relevance or is accurate and complete.

CHAIRMAN: Mr. Coon, is it your plan to go ahead and examine on this now?

MR. COON: I am actually not going to examine specifically

on the document in a sense in that Mr. Marshall already agreed that he was familiar or noted that he was familiar with the electricity sector target of this action plan.

So I have a question on that target.

CHAIRMAN: Well I am going to suggest we carry on and what I am going to do is I will mark this as an exhibit subject to after the next break the panel being able, or Mr. Hashey being able to comment on it. Is that --

MR. HASHEY: That is fair.

CHAIRMAN: Okay. Good. This will be CCNB-1.

MR. COON: So to get back to the question. The -- on page 24 of your evidence, your sort of concluding statement, you say that the Orimulsion project is one that will cost effectively meet all projected future emission targets. The electricity sector specific greenhouse gas reduction target which you just described as being -- reducing -- and this is on page 13 of this exhibit, if I'm allowed to use it at this point, which you describes as being a reduction of current emissions in the electricity sector by 20 percent on a per megawatt hour basis -- or you might not have said per megawatt hour but I think that is what you intended to say -- by 2025. My question is would it be reasonable to assume, given the assumptions you have been making about regulated targets for NOx flowing for the New England governors and Eastern Canadian premiers

other action plan, that in fact this target would fall in the category of projected future emission target?

MR. MARSHALL: It is a target of the governors and premiers and we responded to an interrogatory -- I don't have which one, I believe it was either from you or from the province -- on that specific question of 20 percent reduction in the emission rate per megawatt hour by 2025.

We showed in response to that interrogatory that under the stress case evaluation and analysis, that the reduction would be greater than 20 percent. And under that basis, that under our stress case evaluations as I laid out yesterday in the presentation, we are able to meet all projected emission targets.

MR. COON: So are you saying that this could be considered a projected future emission target?

MR. MARSHALL: Yes. It is a projected future emission target.

MR. COON: In that case, would the Orimulsion project as proposed be able to achieve this future emission target in a cost effective way?

MR. MARSHALL: In the evidence we have responded that we are able to show in the sensitivities clearly that we can meet the governors and premiers targets for 2010 and we can do that in the most cost effective way.

We have shown that under the stress case evaluations,

we can meet the targets for 2020 and the emission rate target for 2025 under the governors and premiers under the Orimulsion plan, in the least cost way. So what we haven't quantified is what the additional costs are to get to the stress case in terms of CO2 reductions.

But based on the analysis and the costs we have accounted for, Orimulsion is still the least cost option for us to achieve those levels.

MR. COON: In the stress case you say it could be achieved, but would the Orimulsion project achieve this in the standard case that is put forward, the base case?

MR. MARSHALL: No, none of the options achieve it in a standard case. Every option requires additional costs of CO2 reductions in order to get to these targets.

MR. COON: Now I am referring still specifically to the 2025 target to reduce CO2 emitted per megawatt hour by 20 percent, specifically that target. So the Orimulsion project base case cannot achieve that, correct?

MR. MARSHALL: Correct.

MR. COON: Would either of the other options that the evidence identifies as feasible, the other two options, the oil blend or the gas oil be able to achieve such a future emission target?

MR. MARSHALL: I am not certain. I don't think so, but we have not -- in response to that interrogatory we were not

asked to do that. I did not do those computations to determine the rate of emissions in the other options. We were asked to calculate the rate of emissions under the Orimulsion plan. It is subject to check, we will go back and look at that interrogatory or maybe you could help us out. I think it was your interrogatory.

If you could refer to what number it is, we could look at it.

MR. COON: If we could just have the answer provided for the other two feasible options as to whether this particular target -- projected future target could be achieved.

MR. HASHEY: Mr. Chairman, maybe this is the time I have to interrupt. Numerous massive numbers of calculations have been done at the request of the intervenors and I do not think that this is the appropriate time to be asking for many additional calculations. People are free to have done them themselves. People have the expertise to do that.

But I don't think that this is the appropriate forum to start asking for calculations to be done that require considerable amount of work and expertise.

CHAIRMAN: Mr. Hashey, I know where you are coming from. Let's just do something. The witness has asked you, Mr. Coon, to refer to which particular interrogatory that it was. Could you provide that information to him. So he

could take a look at it and see what it answered and sort of thing.

MR. COON: CCNB 27 in exhibit 7 on page 27. We did ask this question, I guess, in the interrogatory, but we didn't get the answer. Because the response -- the response refers only to the regional target of 10 percent reduction by 2020 in total carbon dioxide emissions, not the electricity sector target of 100 percent reduction on a megawatt hour basis for the electricity sector.

And that was -- that's my question. That, in fact, if this is, as Mr. Marshall has indicated, a projected future target, as it is electricity specific unlike all the other targets we are talking about, whether or not the orimulsion project base case could achieve it, or either of the other two feasible options that have been identified to compete with that.

MR. MARSHALL: That's not the interrogatory. There was an additional interrogatory where there was a quantification of the emission rates in response. That's the one I'm referring to. It may have been a supplemental or it may have been from the Province of New Brunswick.

MR. COON: Perhaps it was --

MR. MARSHALL: I'm just asking for some help in trying to find it.

MR. COON: Perhaps it was another Interveners



interrogatory, Mr. Chairman. It wasn't ours, the one Mr. Marshall is referring to.

CHAIRMAN: Well the witness would like to find it and I think we should attempt to assist him. Would the Province of New Brunswick help out, if they are able to here? If they are familiar with the interrogatory that the witness is referring to, give us the number.

MR. HYSLOP: We are having a look through our interrogatories to find if that has been answered for us, Mr. Chairman.

CHAIRMAN: Good. Thank you, Mr. Hyslop.

MR. HYSLOP: Mr. Chairman, just looked quickly, but perhaps Province of New Brunswick supplemental 12, page 34 of exhibit 10.

MR. DUMONT: Would you repeat that, please?

MR. HYSLOP: Yes. It's exhibit 10 or A-10. And it's Province of New Brunswick supplemental 12 which starts at page 34.

CHAIRMAN: Thank you, Mr. Hyslop.

MR. MARSHALL: In response to your question then, Mr. Coon, on page 35 of exhibit A-10 in response to supplemental -- PNB supplemental 12, part B, there is a table of the rates of emissions of CO2 per megawatt hour based on the history for 2000, based on the PROVIEW emission costs sensitivity case which shows a 9 percent reduction in 2020 and based

on the PROVIEW stress case evaluation which shows a 26 percent reduction. The 26 percent reduction in emission rates would meet the governor and premiers target of a 20 percent reduction for 2025. We did not evaluate the numbers on 2025 because we only had detailed modelling out to the year 2020. So we took 2020 as a test year to do that calculation.

MR. COON: Right. And as you had indicated just a minute ago that it could achieve it under the stress case but would it achieve it under the base case?

MR. MARSHALL: That's correct. And your question is whether other options would achieve it under the base case?

MR. COON: So you have said it wouldn't achieve -- it would not achieve it under the base case.

MR. MARSHALL: No.

MR. COON: Only under the stress case.

MR. MARSHALL: That's correct.

MR. COON: And my question then was would either of the other two options achieve it?

MR. MARSHALL: I said I don't know. We didn't do those calculations.

MR. COON: And so that gets back to my question as to whether that answer can be provided, whether or not either of the other two options can achieve this projected future target?

MR. MARSHALL: And at that point Mr. Hashey made some comment about doing additional work.

CHAIRMAN: What sort of magnitude of work are we talking about doing to get the answer to the question here? Is this running the PROVIEW once again, twice and how long would it take? What is the magnitude of the problem?

MR. MARSHALL: We could undertake to do this. There are no more required computer runs. You would have to go back to the existing computer runs for the other cases and then do the computation similar to the table picking the date out of those runs.

CHAIRMAN: Yes. Speak with your fellow panellists if you want. How long would you say reasonably would it take to get that information?

MR. MARSHALL: It would take my analyst probably 15 minutes, half an hour. Once -- it's a question of finding the right data and then the computations can be done in a short period of time. We possibly could undertake to do that and have it available after lunch or by tomorrow certainly, I think.

CHAIRMAN: All right. Well we will ask you to do that.

And, Mr. Coon, I just remind you of the Board's decision in the generic hearing. And I hope you will be making an economic case as a result of your cross-examination here. Because that's what the Board's jurisdiction deals with,

the economics of the situation.

MR. COON: Indeed, Mr. Chairman, and that's why I was referring to Mr. Marshall's evidence where we concluded that the Orimulsion project would meet cost effectively all future projected emission reduction targets.

CHAIRMAN: Okay. Thank you. Carry on.

MR. COON: Okay. I would like to shift now to a line of questions around the evaluation screening power supply options, if you could.

Starting with the diagram on page 16 of A-6, exhibit A-6 that's the Coleson Cove options levelized life cycle screening curves, page 16.

CHAIRMAN: That's replaced by A-12, is it not?

MR. COON: Yes. That is right. Okay. I first want to just make sure that we understand this clearly.

In this graphical representation of results, if the capacity factor considered is 40 percent or less, the oil blend option is more cost-effective than the Orimulsion project?

MR. MARSHALL: Yes.

MR. COON: Yes. Okay. Great. Now how does this change if the NOx controls for the oil blend option are delayed to 2014?

In other words does the oil blend remain the most cost-effective -- does the cost-effectiveness of the oil

blend option change in terms of the capacity factor we are operating at?

MR. MARSHALL: I believe we already responded to that in your supplemental interrogatory. Let me try to find it. I believe it is CCNB supplemental 16.

MR. COON: Now does this -- my question was with respect to the change that would occur if the oil blend option proceeded without NOx control until 2014.

This response contains the oil blend option still with NOx control?

MR. MARSHALL: Okay. I guess -- I know we had responded -- you had requested deferral of upgrades and NOx and other things until 2014.

I thought that it was in that response to that interrogatory, whereas I guess the response to that interrogatory were the combination plans.

And in the combination you treat the oil option differently than in the combination, was what that interrogatory was.

So to do a screening curve for the oil blend without the NOx control, we have not prepared that specific screening curve.

MR. COON: Would it be fair to say that without NOx control and the oil blend option that capital costs of that option would be lower?

MR. MARSHALL: Yes.

MR. COON: And would it be fair to say then that the capacity factor at which the oil blend would remain the most cost-effective option would be higher than 40 percent?

MR. MARSHALL: Yes.

MR. COON: Thank you.

MR. MARSHALL: It would be slightly higher as the NOx controls are not a significant part of the cost. I think we have to break down what the cost is.

But if you take a look at the screening curve, if you lower the intercept on the Y axis for the oil blend with NOx controls, you lower that intercept, the entire line would lower slightly. The slope of the line at 40 percent is quite high compared to the Orimulsion line.

So it would -- lowering the line would cause it to move slightly to the right on the intersection point. And I would estimate it probably crosses over at 41, 42, 43 percent.

MR. COON: I'm tempted to ask for the work to be done. But given my previous request I won't. But that is sufficient. Thank you.

Now if we go to -- sticking with this particular issue -- but we have to go to page 52, the table 3-1, "Summary of option parameters."

MR. MARSHALL: Yes. I have it.

MR. COON: Okay. For the Coleson Cove oil generation blend it indicates a capital cost of \$158 per kilowatt. How would this capital cost change if the NOx controls were delayed to 2014?

MR. MARSHALL: We were just checking the numbers or at least what we recall of the numbers. At this point it is my understanding that the capital cost of the NOx control, specifically in the oil blending and NOx control option, the NOx control is about half of that capital cost immediately in 2005.

The remaining capital cost is the upgrade and life extension in 2014. If the NOx control is deferred to 2014 and then it would be discounted back to 2005, the effective reduction in capital cost is probably about 25 percent.

Now that is a rough estimate based on our understanding at this time.

MR. COON: Thank you. Now if we go to page 56, the other table which is quite good, table 3-3, my question is why, if we look at the -- sorry, if we look at the comparisons between the Orimulsion and the oil blend options, why was a different capacity factor chosen, 65 percent for the Orimulsion project and 50 percent for the oil blend?

MR. MARSHALL: The difference capacity factors were chosen

as representative of what these options would do operating in the power system. Again this table 3-3 is a calculation of comparative power costs given one representative capacity factor.

So because you can only do the table and calculation at one capacity factor, we took what our estimate of the reasonable capacity factor would be with the operation of that option integrated into the existing system and operating into export markets.

And the 50 percent under the oil blend is in line with the PROMOD evaluations of the oil blend option out in 2008. And the 65 percent is in line with the PROMOD evaluations of the Orimulsion option out in 2008. So that is where the representative numbers come from.

MR. MARSHALL: The difference between the two is that the marginal fuel cost of the oil option is much more than the marginal cost of the Orimulsion option. And as a result it is not economic to sell into export markets and the amount of energy that is sold is much less. So that it dispatches at a lower level.

MR. COON: If you use the 50 percent capacity factor for both, how does this alter the total levelized life cycle annual costs?

MR. MARSHALL: I believe that was responded in another interrogatory.



MR. COON: You are correct. It was Province of New Brunswick supplemental 9. It should be exhibit 10.

MR. MARSHALL: Could you give me the page for that, please?

MR. COON: Page 31, sorry.

MR. MARSHALL: Yes, I have it.

CHAIRMAN: Mr. Coon, if you are familiar with an interrogatory that has been posed with reference to the same question, then it is appropriate that you refer the witness to that interrogatory and then reask the question.

MR. COON: Oh, I apologize for that, Mr. Chairman. Thank you for that advice.

With respect to the total levelized life cycle annual costs, is it fair then to say that the difference between the oil blend option with NOx controls and the Orimulsion project, when you compare them at the same capacity factor, is about half a cent a kilowatt hour?

MR. MARSHALL: How are you calculating the half a cent?

MR. COON: Well the difference between the total levelized life cycle annual costs at 5.35 cents a kilowatt hour for Coleson Cove oil blend and 4.82 cents for the Coleson Cove Orimulsion project.

MR. MARSHALL: Yes. That is in response on PNB supplemental 9. Those are the life cycle costs for oil blend and Orimulsion. So the difference at 50 percent capacity factor would be half a cent.

MR. COON: Thank you for verifying that for me. Now if we could go back to that first table, 3-1, on page 52, back in exhibit A-6 in evidence

MR. MARSHALL: Excuse me, is that table 3-1 or 3.3?

MR. COON: 3.1.

MR. MARSHALL: On page 52?

MR. COON: I'm sorry. No, we should say 3.3, page 56.

MR. MARSHALL: Thank you.

MR. COON: As both the oil blend option and the Orimulsion project have the same expected life of I believe 25 years, would it be fair to say that the total levelized annual costs represented here are a better indication of their relative cost effectiveness of those two options than the numbers which include the end effects?

MR. MARSHALL: In that case where the two options have the same lives, yes. But I think relatively they will be the same, but given that the lives are -- of each project are the same, you can compare two projects with the same lives one against the other without the end effects calculation and get a reasonable comparison.

MR. COON: If you delay the NOx controls to 2014 on the oil blend option, how does this change the total levelized life cycle annual costs for the oil blend here represented as 5.35 cents per kilowatt hour? How would that number change?

MR. MARSHALL: Based on the answer that I had just given that the reduction in capital would be estimated to be about 25 percent, it would reduce the fixed costs by about 25 percent. So the .73, one-quarter of that is about .16 cents so it would reduce the 5.35 to about 5.2. Again, that is just an estimate.

MR. COON: Thank you. Staying with that table. Did you carry out any sensitivity analysis for the comparison of levelized life cycle annual cost for anything other than the capacity factor which varies in this comparison here, table 3.-3?

MR. MARSHALL: Table 3.3?

MR. COON: Yes.

MR. MARSHALL: The only other sensitivity would be a change in gas prices which are provided at the bottom of the table. So the natural gas options were run at a lower gas price as well as the forecast price. Other than that the only difference would be evaluating the three primary options at both 50 and 65 percent, which was given on PNB supplemental 9.

No other sensitivities were done for the static calculations that are in table 3.3.

MR. COON: What would be the impact of using a higher discount rate in this table -- to this table 3.3?

MR. MARSHALL: The use of a higher discount rate would make

the capital cost of the -- would make the power cost of the higher capital cost option a little higher.

MR. COON: Sorry, can you repeat that? Power costs of the capital costs?

MR. MARSHALL: The power -- you know, discount rate -- a low discount rate favors a high capital cost project. A high discount rate disadvantages a high capital cost project.

So the ones that have a higher capital cost would end up with a higher life cycle power cost with a high discount rate. The ones with a low capital cost would also have a higher power cost but not as much higher because the capital cost is a smaller component.

MR. COON: So a higher discount rate in that explanation would disadvantage the higher cost Orimulsion project over the other two options?

MR. MARSHALL: Yes, it would.

MR. COON: You said the change would be a little. Could you provide a sense of the magnitude we are talking about here?

MR. MARSHALL: We did not do those calculations. As I said, we have done sensitivities with higher discount rates in the detailed evaluation where the projects are integrated into the system in the integrated resource analysis. And there we show the sensitivities over the whole life cycle integrated into the system. This table 3.3 is simply an

indicative cost of power projects to get an indication of which ones are cost effective relative to each other.

Then we move to the screening curves which show the cost comparisons by capacity factor so we get an indication -- a better indication as to how they would fit into the system. Then we do a detailed integration into the system.

With the detailed integration we did all of the sensitivities, including discount rates. But we did not do it for table 3.3.

MR. COON: Okay. Well let's move to the screening, these graphs. And if we could go to page 59, we see figure 4-1, an example of screening curves. To your knowledge, has this graphical representation of the screening process been used in other regulatory hearings?

MR. MARSHALL: Yes.

MR. COON: Where, when?

MR. MARSHALL: Before this Board in the generic hearings on capacity planning in 1991. Or it may have been 1990, not sure of the date. About 10 years ago before this Board.

MR. COON: Has it been used in other regulatory hearings outside of New Brunswick?

MR. MARSHALL: I believe so. That particular chart comes from our original integrated resource planning document that we did with Energy Management Associates of Atlanta,

Georgia, our consultants, who wrote the PROMOD and PROSCREEN programs. And we worked with them as consultants and they prepared the document with our assistance. This was their chart and their screening curve methodology. I presume that any other hearings that they have done consultation work with on integrated resource planning, that this particular chart likely would have been used by them in order to explain what a screening curve is. But again that is speculation on my part.

MR. COON: So when it was originally developed, was it developed by a consultant for NB Power for the purposes of the PUB hearings 10 years ago?

MR. MARSHALL: No. It is a methodology that was developed by the consultants for screening of power supply options for the power utility industry as a method of looking at alternative options and screening out the high cost ones and then taking the ones that are more cost effective into detailed evaluation.

MR. COON: Thank you. If we could go to page 61. The question is, is the methodology used to construct this figure, figure 4-2 on page 61 essentially the same methodology used to compare the levelized costs of the options in table 3.3 on page 56?

MR. MARSHALL: Yes.

MR. COON: So it was essentially the same?

MR. MARSHALL: The calculations are the same. Table 3.3 calculates numbers at one given capacity factor. The charts on page 61, figure 4-1 calculates the power cost at -- at 11 different capacity factors from 0 up to 100 percent in steps of 10 inclusive, and then plots those on the graph.

MR. COON: So they are essentially the same?

MR. MARSHALL: They are essentially the same methodology, yes.

MR. COON: That's helpful. Okay. If we go to page 69, I want to ask a few questions around the sensitivity analysis of emission costs. Now the sensitivity analysis on emission costs occurs graphically only in appendix A, the screening section here. And here it says in the -- on page 69, 4.6 regarding the sensitivity analysis for emission costs, that it is done -- this is the last sentence, second last sentence in the paragraph. This is done by pricing all emissions as residual emissions and then adding these as variable costs.

So just so I understand this, if we take a year say where the Orimulsion project emits 2 million tonnes of CO<sub>2</sub>, does this mean you add using your \$15 a tonne figure for CO<sub>2</sub> here, does this mean you add \$30 million to the variable costs of the project in that year as represented

graphically?

MR. MARSHALL: Yes.

MR. COON: So that is added.

MR. MARSHALL: And you can see that, just to help the Board to understand the response to that question. If you go back to figure -- the first screening curve, figure 4-2, which is the base case evaluations on page 61 you can see that the Orimulsion conversion option at 100 percent capacity factor, the intercept at 160 -- 100 percent capacity factor is just below the \$400 a kilowatt year line. And if you go over to the emission case, figure 4-6, you see that the Orimulsion conversion at a 100 percent capacity factor is now up at about \$550 a kilowatt. That increased cost is a -- where the intercept on the Y axis is still at the same point. The slope of the line has changed by adding that additional emission cost.

MR. COON: Okay. So it's added and it's reflected graphically. So in doing so is this in effect the equivalent to simulating a pollution tax at a rate of \$200 per tonne for SO<sub>2</sub> as indicated on page 69 and \$15 per tonne for CO<sub>2</sub> and \$2,000 per tonne for NO<sub>x</sub>?

MR. MARSHALL: Yes.

MR. COON: Mr. Chairman, I'm not sure what exhibit this is, or if it has an exhibit number. But we were provided -- all of us were provided with the term sheet of the



Orimulsion fuel supply agreement for the Coleson Cove Power Plant. And it was the item with --

CHAIRMAN: I am going to suggest, Mr. Coon, that we take our 15 minute break. And you can find out from the panel if that is an exhibit. Okay?

MR. COON: Yes.

CHAIRMAN: All right. We will take a 15 minute recess.

(Recess - 10:55 a.m. to 11:15 a.m.)

CHAIRMAN: Mr. Coon?

MR. COON: Thank you. So where we left off was Mr. Marshall had just agreed that graphically in effect they were representing, or simulating in effect a pollution tax at a tax rate as indicated \$200 per tonne for SO<sub>2</sub>, \$15 per tonne for CO<sub>2</sub> and \$2,000 per tonne for NO<sub>x</sub> in the comparison of these alternatives.

With respect to pollution or environmental taxes, I had a question. But it refers to this additional information which came from Motions Day. The term sheet of the Orimulsion fuel supply agreement for the Coleson Cove Power Plant.

I understand in discussion with the counsel for the applicant that this is not an exhibit, but he would have no objection to it being marked as an exhibit and we all have it.

CHAIRMAN: Is that the redacted?

MR. HASHEY: That is the redacted copy of that and we are having copies of that made right now and they should be here just momentarily. All right. So if it is going to be entered by my friend and we can then give everybody copies.

MR. COON: Thank you.

CHAIRMAN: Okay, Mr. Coon.

MR. COON: So can I refer to it, or not yet.

CHAIRMAN: We had better mark it. That would be CCNB-2.

And it's the redacted Orimulsion supply agreement?

MR. COON: Correct.

MR. MACNUTT: Mr. Chairman, I don't think it is a contract.

I think it is a term sheet might be the better word to describe it.

CHAIRMAN: Redacted Orimulsion term sheet?

MR. MACNUTT: Yes.

CHAIRMAN: Okay. That's fine by me. Thank you, Mr.

MacNutt.

MR. COON: Those have been distributed. So I would refer to page 10 of CCNB-2, section 12 entitled "Environmental Taxes", a topic of which we were just referring to.

Can you describe in general terms what the content of this section deals with?

MR. BROGAN: We are not able to do that because of our confidentiality agreement that we have with the fuel

supplier.

However the work done by Mr. Marshall, looking at emissions costs or credits, whichever you like, have adequately addressed I think the environmental tax component of the fuel contract.

MR. COON: Would it be fair to say that this term sheet for the agreement, of the agreement, since there is a section dealing with environmental taxes, anticipates the possibility of environmental taxes being imposed on the Orimulsion project?

MR. BROGAN: It anticipates the possibility, yes.

MR. COON: And would it lay out therefore whose responsibility it would be to pay those taxes?

MR. BROGAN: As I said, we cannot release any of the information or the subject matter within that clause of the fuel contract between ourselves and the fuel supplier BITOR.

MR. COON: Okay. So we will leave it at that, that your answer that this agreement with BITOR anticipates the possibility of environmental taxes being applied to Coleson Cove project and --

MR. BROGAN: It anticipates the possibility. And in the work we have undertaken that possibility of environmental taxes is included in all of the options looked at for the Coleson project and its alternatives.

MR. COON: And in those options you are assuming that -- are you assuming that NB Power pays those taxes on top of the cost of the fuel or that BITOR will somehow incorporate the cost of those taxes in the fuel price?

MR. BROGAN: Well --

MR. HASHEY: Mr. Chairman, I think at that point I have to object. I think this goes to the root of it. This was really the subject of a Motions Day matter.

CHAIRMAN: That is just asking the question through the back door, Mr. Coon. The witness has already responded. You can argue about whether or not that is an appropriate response. But he has already said that he considers it to be confidential in reference to the BITOR contract.

MR. COON: Thank you, Mr. Chairman. Okay. Well, we will move on from there then to some pages that are clearer.

Page 70, figure --

CHAIRMAN: I'm sorry. That is in exhibit --

MR. COON: I'm sorry. Yes. Exhibit A-6.

CHAIRMAN: Yes.

MR. COON: Yes. I forgot we had switched exhibits. A-6.

On page 70, figure 4-6, here we see emission cost sensitivities reflected in the figure I believe, is that -- that is the purpose of this figure, to reflect emission cost sensitivities?

MR. MARSHALL: The purpose of the figure is to compare the

alternative power supply options under the assumption that there would be an emission cost for CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub>.

So it compares -- it treats all options under the same methodology, adds the cost of the emissions to the cost of the power to get a comparative cost under the assumption that there would be in the future some type of an emissions tax or emissions extranality cost.

MR. COON: Okay. Thank you. Then my question is why in figure 4-6 didn't you include the low gas combined cycle option which you do use in your base case on page 61, figure 4-2? It doesn't appear in this comparison figure 4-6. We were wondering why.

MR. MARSHALL: Oversight I guess. The data -- we have provided the low gas case in the low gas sensitivity chart. We provided in chart 4-2 the natural gas combined cycle option with both modern gas and low gas prices.

We also provided in a chart where all the gas options are provided in the gas price sensitivity. And I believe it is chart -- figure 4-5 on page 68. But we did not count it again in the other one.

The issue here is that there are a lot of options. And these charts get pretty messy. In order to put all options on every chart it would be unintelligible to be able to sort one out from the other.

So it is necessary to select the more relevant options

and try to portray them in a number of charts.

MR. COON: Well, can I refer you to exhibit A-7 -- those are the interrogatories for CCNB -- page 36, CCNB-33 --

MR. MARSHALL: Yes.

MR. COON: -- where you kindly provided us with a graphical representation and low cost gas included in this graph, which doesn't appear in the other one.

So in looking in this figure that you provided us in response to your interrogatories, is it fair to say that the low gas option is the most attractive alternative to the Orimulsion proposal when you factor in the emission costs, as this does?

MR. MARSHALL: For capacity factors above 50 percent, yes. If you look at the chart you can see that the combined cycle low gas option crosses over the blending NOx control line at about 50 percent capacity factor.

So above 50 percent the combined cycle low gas option is the second lowest cost option, Orimulsion still being the lowest cost option. And below 50 percent the NOx -- the oil blend with NOx controls is the next option down, then it crosses over.

And inherent in there there is also the question of some hydro and wind generation where depending upon the capacity factors of those, if you have a high enough capacity factor, they would start to compete in that

range.

MR. COON: Would you expect LNG costs to fit into your low gas definition?

MR. MARSHALL: We do not have a price for LNG. If LNG is undertaken and sold at market prices for gas and competing into the gas industry, then if gas prices are \$3 and LNG is available at \$3 then it would be comparable to the combined cycle low gas case.

MR. COON: Are there factors which you would see that could increase gas supplies locally and drive down price?

MR. MARSHALL: Natural gas is traded in a North American market. There are pricing differentials for transportation.

If there were significant increases in gas supply in eastern Canada, the issue is whether or not that will drive down prices here? No.

Our indication is that the price that we will be paying for gas here is going to be a function of the value of gas in the larger market. We may get a net back differential on transportation. That is the current arrangement on pricing of gas.

The future arrangement on pricing of gas is still up in the air. There are indications that we may have to pay Boston market prices for gas even in the Maritimes and not get the net back differential.

So I guess the answer to your question is no. I don't see that any increase in gas supplies locally will in actual fact drive down gas prices in Atlantic Canada.

MR. COON: Okay. Thank you. Now I would like to move on from the screening curves discussion a little bit to appendix B back in exhibit 6 of the evidence -- A-6, sorry.

So back to appendix A -- or to exhibit A-6, appendix B, page 107. Now here in Appendix B where the three alternatives are being contrasted, the three most viable alternatives identified through your screening process, when you actually compare the three alternatives for their environmental emission costs, do you use the same methodology for analyzing the sensitivity of those results as in -- as in the screening in A, Appendix A?

MR. MARSHALL: The methodology is not exactly the same. We responded to that in an interrogatory which the CCNB had already asked. We outlined the difference and again I don't have that number right off the top, but you should have it. It's your question.

We responded and explained the difference between the two methodologies. The effective result of the comparison and the calculations are the same. So the comparative results are the same. The exact methodology is not the same.



MR. COON: Can you explain how it's different?

MR. MARSHALL: Well we have already done that interrogatory.

But I can summarize it for you without referring to it. In -- in the PROSCREEN evaluations using the detailed computer model we simulate a trading system for emission credits and costs. The simulation -- and we think that a trading system is a more likely means of CO2 control and that's consistent with the governors and premiers intention of setting up and pursuing a trading mechanism for CO2.

In the trading mechanism we calculate what the cost rate for CO2 or for any emission would be on a cost per megawatt hour. Those costs are added to the dispatch cost of fuel. And it gives you a shadow dispatch cost which would be -- this is the equivalent of doing it if it was a tax, an emission tax, but a tax that you don't pay until you determine whether you meet a limit. It -- you then dispatch the system with this emission tax shadow cost included, and that gives you the lowest cost dispatch in order to meet your fuel plus your environmental obligations. Then once you do that, you then calculate what the actual emissions are out of that operating run against the load requirement, and you compare those actual emissions against what your regulated limit would be.

Now in the case of CO2 we used the -- our 1990 limit

of 8.3 million tonne. So if, for example, the CO2 calculation, after you have done the analysis, was 7.5 million tonnes, if you are below the 8.3, then you get a credit. In other words, you can sell the additional .8 into the market to somebody else and you get paid \$15 a tonne for what you are below the level, because you assume that you can trade it into this larger market.

If you are above 8.3 million tonnes, you have to then go buy credits out of the market and pay for them. And those costs are added in. So that's the difference between the two models. Effectively you get the exact same comparative position between options whether you -- whether you compare them against a base line that you trade or whether you put all the base lines at zero and just add total cost as a tax on top, the differential cost between the options will be identical.

MR. COON: Okay. So just to make this clear to me, in the screening process you were simulating the effect of an environmental tax for CO2, SO2 and NOx. In the integrated resource plan comparison of three options, you assume in your analysis that credits -- some value can be assigned to achieving lower emissions than the regulatory target for sulphur dioxide emissions that you are supposed to meet, the 40,000 cap?

MR. MARSHALL: Yes.

MR. COON: And you are assuming that you will be able to receive credits or value for any emission reductions below the targets that you assume will be applied to NB Power by regulatory agency for NOx and CO2?

MR. MARSHALL: Yes.

MR. COON: What leads you to believe that such -- such credits may be available in Canada for SO2?

MR. MARSHALL: Again, this is a sensitivity to evaluate the effect of emission costs. Inside the United States today there is a market for trading of CO2 emissions -- or for not CO2, for SO2 emissions. And the market area is the entire United States. It's not regionally.

There is a market for trading of NOx emissions. There is a projected market for trading of CO2 emissions in the region of the eastern governors and premiers. With the deregulation of the electricity industry, and the movement forward where electricity is going to be moving to a larger regional market and trading of electricity across larger regions, we have made a projection for the sensitivity that emission costs should be treated equivalently across the whole region on an equivalent basis. So then that sensitivity we model trading of all of the omissions.

But, again, as I said, we could do the calculation strictly as an emission tax applicable only in Canada with

no consideration outside Canada, and we will get exactly the same comparative differences between the options.

MR. COON: This was the methodology used in the screening process?

MR. MARSHALL: That's correct.

MR. COON: That you are saying couldn't be applied to this comparison. But just to be clear on this, to your knowledge in Canada have governments indicated to NB Power that they are intending to establish a trading system for SO<sub>2</sub>?

MR. MARSHALL: For SO<sub>2</sub> there is some thought of it. Whether there will or will not be, we have had discussions. We at the power utility support trading of emissions as a means of driving the most economical investment for controlled technology. And that in that sense it will allow us to meet targets in the least cost manner and therefore be most beneficial to our customers. So we at the utility support trading of emissions of all types. The government Department of Environment has yet to adopt that position.

But there are other jurisdictions in Canada that have adopted trading positions. In Ontario they are implementing trading on NO<sub>x</sub> and SO<sub>2</sub>. And they are doing it outside the jurisdiction of Ontario.

They are including upwind areas into Manitoba and Michigan and other areas. So there is an international

trading mechanism being put in place in Ontario. This is the direction of environmental control in other areas. We think it's reasonable that it could possibly come to Atlantic Canada as well.

MR. COON: But has the New Brunswick government or Canadian government indicated to NB Power that they are contemplating establishing an SO<sub>2</sub> trading system to include New Brunswick?

MR. MARSHALL: They have not given us a specific indication of a plan as yet.

MR. COON: Has such indication been given for trading NO<sub>x</sub>?

MR. MARSHALL: Not as yet.

MR. COON: And CO<sub>2</sub>?

MR. MARSHALL: CO<sub>2</sub>, we have not had any discussions with the Department of Environment on trading of CO<sub>2</sub>, but with their participation with Premier Lord at the Eastern governors and premiers and the adoption of that, I think they must be considering it.

MR. COON: And any sense with respect to CO<sub>2</sub> when such a trading system might be operative that would apply to Coleson Cove?

MR. MARSHALL: Our assumptions in the -- this sensitivity analysis are that the trading systems are implemented when the limits are set. So we set a limit for CO<sub>2</sub> when the trading system is implemented in 2010 and it starts at

that point in time.

MR. COON: So that's your assumption on CO2?

MR. MARSHALL: That's our assumption.

MR. COON: And is that your assumption with NOx and SO2 at this point?

MR. MARSHALL: No. The NOx starts in 2007. And the SO2 starts in 2005.

MR. COON: Although as you have already indicated you have no indication that in fact such trading systems for SO2 or NOx might be established to include Coleson Cove in Canada?

MR. MARSHALL: Correct. But we -- we have raised it with the Department of Environment as our position that it should be included. And we would hope to achieve it in the licencing of Coleson Cove in 2005, that this be the method adopted in order to provide for economical achievement of emission targets in New Brunswick.

MR. COON: Now you have actually answered a question I am just about to ask. But just maybe you can confirm it again for me. How would your analysis change of the three options if a pollution tax were imposed in your analysis instead of the emissions reduction trading system assumption being used?

MR. MARSHALL: The -- if we use an emission tax methodology, the total costs of all of the options would increase

significantly. The total cost in each option would increase by the difference from zero to the limit. So whatever the amount of the cost of emissions up to the limits.

So for carbon, for example, we set the limit at 8.3. So 8.3 million tonnes multiplied by \$15 a tonne, whatever that cost is would be added to all three options. And then the comparison between the options, the differential comparison would be identical to the results in the report. The total magnitude of the net present value cost would be increased by the cost from zero to 8.3 million tonnes.

MR. COON: Now that will be the case, for example, for sulphur as well?

MR. MARSHALL: That would be the same for all, all of the emissions, yes.

MR. COON: And what would that mean then when comparing the gas option, the gas oil -- the gas oil option with the Orimulsion project when gas has no sulphur emissions?

MR. MARSHALL: That's already included in the calculations. There would be no difference then the results that are presented in the report.

MR. COON: So you are confident the analysis would not change --

MR. MARSHALL: Yes.

MR. COON: -- if you took the same approach as you did in screening. Okay.

If we can go to exhibit A-7 -- sorry, did I say A-7. It should have been A-10, supplementary -- Conservation Council supplementaries. I apologize for that. A-10.

On page 14 of A-10 -- that is CCNB-54. And I would refer you to your response to the question regarding the credit trading system that you used in the emission cost sensitivity analysis for comparing the three options, Orimulsion, oil blend and the gas/oil.

If we look at this table down towards the bottom which -- am I reading the table -- this was provided for 2008, yes, 2008 which we understand is a typical operating year, according to Ms. MacFarlane's presentation yesterday, that in this typical operating year 2008, under the regime where you assume that a trading system exists for SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>, that you again in that year, 22.1 -- roughly \$22.1 million worth of credits in total -- under cost or credit here there is a total figure of \$22.1 million worth of credits -- while generating in 2001 21,000 roughly tonnes of SO<sub>2</sub>, 13,000 tonnes roughly of NO<sub>x</sub> and 8.86 million tonnes of CO<sub>2</sub>, that you would gain \$22 million worth of credits or \$22.1 million worth of credits?

MR. MARSHALL: That is correct.

MR. COON: Okay. That is great. Thank you. Now if we can



go back to exhibit A-6.

MR. MARSHALL: And I might say that is in the emission trading sensitivity case only those credits would apply. They do not apply to the base case analysis or any of the other analyses, only in that emission trading case sensitivity and analysis.

MR. COON: Okay. I would like to look at a couple of the other sensitivity analyses. On page 96 in exhibit A-6, this deals with the load, on page 96, table 4.3. So that is a low load variation sensitivity analysis between the three options.

Now it says negative 13 percent beside low load. I just want to clarify. This is saying that load in 2020 would be 13 percent lower than your base case.

Is that -- am I interpreting that right?

MR. MARSHALL: Basically we have provided an interrogatory response on the details of the load forecast for the negative 13 percent and the positive 13 percent. So we have responded to the interrogatory exactly what that is year over year.

But my understanding is that we took our base forecast. In our load forecast that was subject to the generic hearing back in June, we do a base forecast. We then took out of that forecast our projection of gas incursion into the load, a substitution of electrical load

with gas. And we also took out a 150 megawatt projection of load exit through a market or self-generation of large industrial customers.

What we have done in the load forecast here is that we took the base forecast. We adjusted the base forecast down for a minus 13 percent forecast, then did the same adjustments on gas incursion and 150 megawatts to that lower forecast. I think that that is the methodology that was applied.

And I might point out the 13 percent reduction came out of the generic hearing back in June. It was a request I believe of the Province of New Brunswick as a reasonable sensitivity that we should look at.

MR. COON: But just to get this clear then, this is saying that the load number you are using or approach you are using would give you 13 percent reduction in load out to 2020, below the base forecast at 2020?

MR. MARSHALL: I'm not quite sure if the exact forecast would be 13 percent lower or whether -- again if we do the 13 percent on the base forecast and then we subtract the same amount of gas incursion at 150 megawatts of firm load exit, we won't get exactly 13 percent difference in the end results.

There will be somewhat of a bias differential there because of that. But other than that effect, yes, the

answer --

MR. COON: In the ball park?

MR. MARSHALL: -- is a ball park. Yes.

MR. COON: So how does that low load case out to 2020 compare to the current load?

MR. MARSHALL: Well, I believe we gave an interrogatory. If you give me a minute I think I could -- I believe in response to your interrogatory CCNB-52. It would be in volume -- exhibit 7.

Yes. On page 55 of exhibit 7 the year-by-year demand and energy numbers in the low load forecast are provided.

MR. COON: Okay. So 2020 peak demand, we are talking 2,808 megawatts compared to --

MR. MARSHALL: Which is the current one of 2,849. So basically about the same load as today in 2020.

MR. COON: About the same load. So then this can be characterized, can it, as essentially a no-growth scenario from today's load?

MR. MARSHALL: Yes.

MR. COON: Okay. So the low load approach you are using here in the sensitivity analysis is essentially a no-growth scenario from today? Okay. Well, that is clear.

MR. MARSHALL: I would point out that it may be a little more than a no-growth scenario. If you look at the response to CCNB-52 on page 55 of A-7 you can see that the

load actually goes down through the period 2005 to 2010 and then gradually starts coming back.

And so the load is significantly lower in 2010 than it is today by about 5' -- by about 300 megawatts. And then it works its way back up to be roughly equivalent to what it is today out in 2020. So I would consider it as lower than a no-low growth scenario.

MR. COON: How many megawatts roughly of self-generation and private generation beyond the 150 megawatts I think you mentioned is assumed in the load forecast to get you to the minus 13 percent figure?

MR. MARSHALL: None. We have only included the 150. We have applied the minus 13 percent against the base forecast of electrical end use consumption in the province.

MR. COON: So in this example where current load say is 2,849 megawatts, in 2020 it is project to be 2,808 megawatts, this would only assume 150 megawatts of generation outside of NB Power system?

MR. MARSHALL: Inherent in that it assumes the 150 megawatts of load exit in 2005 with no other assumptions beyond that, in that analysis.

MR. COON: But at the generic hearings you, did you not, have -- and in here in fact you have assumed, past 2010 in particular, a certain rate of growth in load?

MR. MARSHALL: In the generic hearing and in the base forecast there is I believe about a 1 percent increase beyond 2010. That is in the base forecast. It is inherent in this calculation.

And then the reduction from that is 13 percent. And the target was to achieve a 13 percent reduction by 2010 and then go beyond there.

So the 1 percent increase from 2010 I believe in this sensitivity applies a 1 percent growth on the 13 percent reduction from that point in time.

Now we haven't made any additional assumptions of more than the 150 megawatts inherent in the original forecast.

But clearly if we are going to have a load reduction of 13 percent from forecast, some of that 13 percent is likely made up of load exit of industrial customers. We haven't got into where it comes from or how it is.

This is an economic sensitivity to determine the effect of the economics of the project given that the loads are 13 percent lower than forecast.

MR. COON: So you wouldn't have an idea of how much additional exit of --

MR. MARSHALL: No.

MR. COON: -- industrial customers?

MR. MARSHALL: It is just -- again it is just an economic sensitivity of what is the effect given the loads with 13

percent lower.

We haven't got into why they might be 13 percent lower. We think that is a pretty extreme sensitivity. But that is the range.

And we have done it and shown that the economics under that sensitivity, Orimulsion is still the least cost of the three options.

MR. COON: Of course industrial loads would be exiting because of markets opening up.

What would the total contestable load be by 2020, do you expect?

MR. MARSHALL: I don't know. The contestable load when the market opens in 2003 is in the order of -- well, depending upon individual contracts. But the total eligible load that might be able to go is in the order of 900 megawatts in the 2003 to 2006 time frame.

Again subject to individual contracts where some customers are contracted to 2006, ignoring those contract requirements, the load is about 900 to 1,000 megawatts. Given that there is some load growth out in time, that that 1,000 megawatts might be -- by 2020 it might be 1,200 megawatts.

In this low load case the 1,000 megawatts would shrink probably to 800 megawatts by 2010. Because the reduction has to come out of that load as well as the rest of the

load. And then it would kind of grow its way back up to 1,000 by 2020.

MR. COON: Okay. Thank you. I would like to move on now to the discount rate sensitivity analysis, back to exhibit A-6, page 101.

This section deals particularly with the high discount rate part of the sensitivity analysis. And at the top of that page it indicates that a rate of 9.33 percent was applied for the high discount rate sensitivity analysis. How was that high discount rate determined?

MR. MARSHALL: That's the equivalent rate of a private corporation. I believe it's based on Nova Scotia Power's discount rate applied before the Utility Review Board in Nova Scotia.

MR. COON: In what year?

MR. MARSHALL: I don't have a detail here, but I think in recent hearings.

MR. COON: Recently?

MR. MARSHALL: Recent hearings.

MR. COON: What factors could make that go up, could make -- And we have very low interest rates today --

MR. MARSHALL: Yes.

MR. COON: -- I'm just wondering what the factor --

MR. MARSHALL: What could make it go up? Higher interest rates. Higher cost of capital.

MR. COON: So how would you characterize the 9.33 percent?

A reasonable expectation, on the high end or conservative, ambitious?

MR. MARSHALL: Well given that interest rates today are significantly lower than they were when we went into this, today the number should even be lower than 9.33.

MR. COON: Okay. If we can go to page 103, a brief question about the export market sensitivity analysis. The low market example here uses 1.8 terawatt hours, I think?

MR. MARSHALL: Yes.

MR. COON: That's correct? Has this level or lower of exports been experienced by NB Power in the past? Like historically is this a level that you have seen, or lower?

MR. MARSHALL: Again subject to check, I believe we responded given historical data on exports, and there was one year I think in the mid 90s in the year that Lepreau was out on this re-tubing -- not re-tubing outage but on the SLAR outage for about six months and we didn't have that available. That year markets were soft and we had very low -- very little surplus energy available because of the Lepreau outage that there were some pretty low export sales.

Again subject to check, but I believe that was responded in other interrogatories showing export levels year by year.



MR. COON: But roughly in that year you were somewhere in the vicinity of this low market --

MR. MARSHALL: That would be a low end -- that would be a low end number. Very low.

MR. COON: So the reasons you have just outlined to explain why your exports would have been at that more or less 1.8 terawatt hour figure where Lepreau was out, export markets were soft, was there anything else? Those were the two things?

MR. MARSHALL: In terms of history I think there was some low years through the mid 90s, that those would be the reasons.

MR. COON: Okay.

MR. MARSHALL: So that's -- well we have reflected that as a -- in lowering the quantity and in lowering the price.

MR. COON: Now if we can move to page -- a graph on page 111 of the integrated resource plan. I just have a question about an assumption here on this graph, on the bottom graph on CO2 emissions comparison, base case emissions, figure 4.1. Are you assuming in this case -- you have got these New England Governors, Eastern Canadian Premier targets for the region, the total emissions of the region here, 8.3 million tonnes by 2010, 7.5 million tonnes by 2020. Are you assuming that the provincial government will allocate the entire 8.3 million tonnes in 2010 and

7.5 million tonnes in 2020 for the electric power sector entirely to NB Power generation?

MR. MARSHALL: That's our projection of NB Power's limit based on historical base line and based on -- as I explained yesterday and I think earlier today, we haven't done a differential allocation. We have taken what is a prorated and we just prorated the targets and applied them against the 8.3.

MR. COON: In your scenario here then how would there be any CO2 space left for a new private operator who might operate in the contestable market who might exit the system?

MR. MARSHALL: The 8.3 is not a provincial limit. It's the NB Power electrical generation amount.

MR. COON: So you are assuming that the provincial target at some point for the electric power sector in New Brunswick would be different than this figure you are using here?

MR. MARSHALL: It may be slightly different. It would be similar, I expect. The emissions from 1990 -- the provincial emissions are about 17 million tonnes. So New Brunswick Power emissions are -- I believe are in the order of 40 to 50 percent of the provincial numbers. I don't have those right off the top, but that's the range.

Now included in the total provincial emissions would be emissions from electrical power generation. Inside

industrial operations back in 1990, they are not included in these numbers.

MR. COON: Okay. But you are assuming that target would be NB Power's alone?

MR. MARSHALL: I beg your pardon?

MR. COON: You are assuming this -- these two targets on this graph would be NB Power's target rather than the target for the electric power sector?

MR. MARSHALL: Yes.

MR. COON: Thank you. Now at this time I would like to shift -- thank you, Mr. Marshall -- to David Thompson here who is going to ask a few questions around appendix D in exhibit A-6.

CROSS-EXAMINATION BY MR. THOMPSON:

MR. THOMPSON: Actually I would like to start on A-6 under the testimony of James Brogan on page 131. If we look down to lines 25 through 30, "an application for a new pipeline from Pier 10 to the Port of Saint John to connect the existing line is being prepared. NB Power is negotiating to lease these facilities at Pier 10 by the existing oil pipeline from Irving Oil. And examination of the existing line has been scheduled for November. The current project cost estimate for the fuel delivery system is adequate to provide for possible remedial requirements. NB Power is also negotiating with Irving Oil on the

Canaport option."

In respect to the Pier 10 option, what is the term of the lease that is being negotiated there?

MR. BROGAN: That term would be -- we would negotiate a lease to cover the full life of the project.

MR. THOMPSON: Would that be the same, you know, for the other option, the Irving Canaport option as well, is that what you would be looking at in that case of using that facility and having a lease option for the life of the plant?

MR. BROGAN: That's correct.

MR. THOMPSON: In respect to the Canaport option, and the what is being looked at, I guess the negotiations by you there, would that include, or are you looking at also use of the new multipurpose dock that is being proposed there for LNG?

MR. BROGAN: No. Our intention and our negotiations at Canaport would strictly involve use of the existing monobouy. Not new infrastructure -- offloading infrastructure.

MR. THOMPSON: There has been no discussion about using that loading infrastructure for anything there by NB Power?

MR. BROGAN: No, not at the present time. If that infrastructure is put in place, there may be opportunities for both parties in future to use that new infrastructure,

but right now the only thing actually available is the monobouy and that would be the agreement that we would put in place, is to use the monobouy. Anything else would be new information and subject to new negotiations in the future.

MR. THOMPSON: There has been no discussion on that proposed LNG pier?

MR. BROGAN: None that I am aware of.

MR. THOMPSON: In respect to the -- to that delivery option, and I guess -- am I correct in saying yesterday that -- in hearing yesterday that you said that the final decision wasn't made yet on which offloading option between Canaport and Pier 10?

MR. BROGAN: That's correct.

MR. THOMPSON: In respect to Canaport, have you been considering the situation there regarding possible congestion in that area? What I am talking about there is with this proposed LNG facility going in and the number of ship passages there and the need to move on and off of the monobouy and on and off of the dock there quickly in certain weather conditions? Have you been discussing and considering that in respect to your needed delivery schedule?

MR. BROGAN: It has been discussed, however, one of the advantages of going to Canaport is the reduced requirement

for vessels entering the Bay. So generally we would need slightly over one vessel per month at Canaport. It is 13 vessels per year, so approximately one per month. And we believe we can adequately schedule that around any deliveries to the LNG Terminal.

MR. THOMPSON: One a month?

MR. BROGAN: Yes.

MR. THOMPSON: In respect to that matter, possible -- and I'm thinking about the winter time when storms occur in the Bay of Fundy and offloading conditions might not be suitable at Canaport -- and the reason I am mentioning the new proposed dock or pier there is that there would be likely matters of safety involving, you know, no other ships around and that sort of thing with the transportation of LNG, that is pretty typical in harbours where it is transported, Boston being an example.

The situation for your offloading at Canaport, have you been negotiating a priority offloading of your Orimulsion if it is needed by you at that time? That you would get the priority in offloading if there were a number of ships waiting there, either to get into the LNG Dock or to the monobouy?

MR. BROGAN: We are factoring into our analysis issues around demurrage and those types of costs. However, even today or for the last two decades in our operation, Irving

Oil Limited do provide offloading services for us at Courtenay Bay and that is always an issue of scheduling vessels in at the priority time for each vessel. And that has been very successful and we wouldn't anticipate any problem at the monobouy at Canaport.

MR. THOMPSON: But would you have that put into an agreement, that, you know, you would have a priority unloading if you needed the product?

MR. BROGAN: I am actually not sure if that is in the proposed agreement. Around priority, our experience is that we have been able to address that issue on an ongoing basis, as I say, for the last 20 years in offloading at the Courtenay Bay terminal where it is even more congested than out at the monobouy. So I wouldn't anticipate a difficulty.

MR. THOMPSON: In respect to the option of offloading at Canaport, when do you expect negotiations to be completed on that?

MR. BROGAN: I would hope within two months that we can complete those negotiations and make our final decision on which of the offloading options we would select.

MR. THOMPSON: As it stands now in your filing with the Environment Department for the Province of New Brunswick, you have filed for the Number 10 Pier in Saint John West, is that correct?

MR. BROGAN: That is correct.

MR. THOMPSON: And that is what will be examined, you know, in the Provincial Environmental Assessment?

MR. BROGAN: That is correct.

MR. THOMPSON: When do you expect that process to conclude?

MR. BROGAN: We are targeting a completion of the Environmental Impact Assessment by the mid-year. Approximately July of this year. And if need be, there is one detail that is really holding up the decision on whether or not to go to Canaport. That is what is causing the delay of two months.

If need be, we would undertake the Environmental Impact Assessment work at both options. If need be. But at the present time we don't --

MR. THOMPSON: That wouldn't fit into your schedule and allow the public time to participate in that process?

MR. BROGAN: Yes, because the offloading option is not on the critical path. The scope of the work that we would have to undertake at Canaport or even at Pier 10 is not on the critical path and so we do have some time before we have to actually begin construction.

MR. THOMPSON: Canaport, there would be very little construction, wouldn't there?

MR. BROGAN: Well, the -- not correct. We will have to build at least one large storage tank at Canaport in order



to be able to offload the vessel within 24 to 36 hours.

So there will be a storage tank at Canaport of approximately a million barrels capacity.

MR. THOMPSON: Built and owned by you, rather than Irving?

MR. BROGAN: That is subject to the negotiations. At the present time we would fund the investment or the capital costs of putting the infrastructure in place.

MR. THOMPSON: And that would just be recaptured over time?

MR. BROGAN: Well, if we make the investment, it is a cost upfront that the total project does have to recapture over time, you are correct.

MR. THOMPSON: Looking at page 132 at lines 8 through 11.

An increasing number of utilities and an increasing number of countries around the world are coming to the same conclusion. The supplier of Orimulsion has also supplied heavy fuel oil to NB Power for many years.

The question I will pose here is that have other companies other than BITOR supplied heavy oil to NB Power or have they been the sole supplier over the years, and what has been the situation most recently in the past five years?

MR. BROGAN: The -- they have not been the sole supplier.

They have been a major supplier over the last 20 years, but there have been other suppliers as well.

And in the last five years we -- a lot of our oil has

been coming from Venezuela. I do not have the exact numbers but I could make those available.

MR. THOMPSON: Well what sort of a guestimate on the rough numbers, the percentages?

MR. BROGAN: I would guess it's 50 percent plus but that's subject to -- I would rather get the data for you.

MR. THOMPSON: Okay. Thank you.

MR. HASHEY: Is that an undertaking, Mr. Chairman? I just wanted to make sure.

CHAIRMAN: It sounded like one to me.

MR. THOMPSON: Yes. I think we want to find out what the arrangements are with that company.

MR. HASHEY: Okay.

MR. THOMPSON: What other companies have been major suppliers? Are there any others that have been comparable suppliers, you know, with BITOR, or are there a number of small players or who have been the other suppliers recently?

MR. BROGAN: An example would be Irving Oil Limited themselves have been a major supplier, although I don't believe in the quantities that are received from Venezuela, but they have -- that's an example of a major supplier.

MR. THOMPSON: Would that be product brought in or from the refinery?

MR. BROGAN: It is processed at the refinery or produced at the refinery. That's -- our purchase is normally from Irving Oil Limited. At other times the fuel comes out of the Gulf of Mexico from various suppliers.

MR. THOMPSON: Reading here -- again starting on line 6, The industry's experience with the supplier and the importance of the commodity to the economy of Venezuela provides a high degree of confidence that contracted supplies will be delivered. An increasing number of utilities in an increasing number of countries around the world are coming to the same conclusion.

What utilities have come to that conclusion and what countries?

MR. BROGAN: Some examples I can think of, the Danes or in Denmark they have been burning the fuel for -- early 90's. So it's being used in Denmark. It's now being used in Italy. And it's also being used in Japan. And most recently there has been an announcement that the fuel will be used in China.

So people using the fuel today are the Italians, the Japanese, and in the Danes, plus ourselves.

MR. THOMPSON: Which countries of those would be using it in similar volumes that you are proposing in a similar situation?

MR. BROGAN: I don't have those -- I don't have the

information on the volumes that they are using, although I believe the Japanese and the Italians, they are significant -- or not insignificant. They are large. But I do not have that information.

MR. THOMPSON: And how recently have they begun using the Orimulsion? When did they build these plants or convert them to use the Orimulsion?

MR. BROGAN: Most of the development around Orimulsion use has been in the latter half of the 1990's. Since '92, '93 onward is when the fuels really started to be used by the utility business.

MR. THOMPSON: Was that because of greater availability of the product?

MR. BROGAN: Yes. I guess the short answer is yes. In Venezuela they have been aware of the product, which is fundamentally bitumen as it comes out the ground, since I believe the 40s. The technology has been developed now to handle the fuel. It was developed in the late 80s. And so the country has taken on the -- an initiative to develop this resource. Very similar perhaps to what we have done here in Canada in the tar sands, which is a bitumen product as well. They both fundamentally start off as bitumen. So the Venezuelans have decided to build that piece of their industry.

MR. THOMPSON: In respect to your I guess historic use of

Orimulsion at the Dalhousie station, will this new contract negatively or positively affect your purchase price for fuel deliveries to the Dalhousie plant?

MR. BROGAN: There is a no impact on the cost of the commodity at Dalhousie as a result of the Coleson project.

There is a possibility around volumes, that if we needed additional volumes at our Dalhousie facility as part of the Coleson provision, that fuel could be made available to us.

MR. THOMPSON: When you say "could be made available to us", it would be made available directly by transport from the BITOR ships, by them transporting it, or would it be transferred from your tanks?

MR. BROGAN: There has been no discussions on how that would take place. It's the -- BITOR are supplying the fuel to Dalhousie right now. So I would anticipate anything we did at Dalhousie would be under the existing arrangements that we have at Dalhousie.

MR. THOMPSON: In respect to the contract with BITOR, which I guess we don't know very much about because it's been blacked out, a lot of it, has there -- if there are problems in the future for some reason or another -- I don't know what those might be -- you know, it could be anything from insurrection in Venezuela to a breakdown of facilities or -- I don't know what it might be. I mean,

we don't -- we don't have the contracts and negotiations to see.

But what I am asking is is there anything in the contract where BITOR has been supplying heavy oil for Coleson Cove, has been the major or one of the major suppliers for heavy oil for Coleson Cove, that they would supply Coleson Cove with heavy oil if for some reason the Orimulsion supply were to fail?

MR. BROGAN: Because of the confidentiality requirements of our negotiations with the fuel supplier, I'm just not able to or in a position to be able to give you that kind of information, what the remedies may be.

MR. THOMPSON: Well when might we find out that information? When is the information in the contract going to be made public, at what point in time?

MR. BROGAN: I do not anticipate it would ever be made public.

MR. THOMPSON: What contingency arrangements will be in place if the Orimulsion isn't available and the heavy oil is required?

MR. BROGAN: If that ever should be required then the provision will be made in the design of the plant to be able to convert to heavy fuel oil, the fuel oil we are using today, similar to the basic design that we have in our Dalhousie plant where we have had that capability to

convert back to heavy fuel oil.

MR. THOMPSON: I would like to go to Appendix D, page 151.

MR. COON: I'm sorry. Mr. Brogan, before we finish here, I had one question for you before we move on to further evidence.

And that is on page 130 of the evidence in exhibit A-6, 130 down at the bottom there, lines 23 to 26, it says that the most significant changes may relate to the NOx control strategy.

"As project costs were reviewed it became evident that the original concept of using selective catalytic reactors to reduce NOx emissions would be much more expensive than initially estimated."

What in fact were the costs of those SCR control technology?

MR. BROGAN: The initial or the estimates we received on the SCR came in at approximately \$150 million. And that was well above our estimates. And we went back to the basic requirement which is to meet a target of .21 pounds per million Btu for NOx emissions.

So we simply looked at other technologies once we recognized the cost of a large SCR and adopted another technology, the in-furnace technology to meet the very same objectives of .21 pounds per million Btu.

MR. COON: And just to be clear -- this is my favorite

topic, NOx standards -- this .21 pounds per million MMBTU is the regulatory standard that would be imposed in the case of refurbishment?

MR. BROGAN: In the case of refurbishment. And it is the standard that has been set out in the guidelines for the environmental impact assessment.

MR. COON: Right. For refurbishment?

MR. BROGAN: For refurbishment.

MR. COON: Yes.

MR. BROGAN: Yes.

MR. COON: So this is the figure that applies to the refurbished plant.

Now is that figure -- was there any discussion nationally about revising that figure downward?

MR. BROGAN: I believe there are, yes.

MR. COON: Do we know at this point what numbers they are talking about and when they would come into play?

MR. BROGAN: I have -- the numbers I recollect are that new requirements may be in the range of .12 to .15. So there are new, much more stringent targets being put forward for discussion this year.

MR. COON: So this alternative technology, the re-burn technology or approach that you are using instead of the SCR technology, could it achieve the .12 to .15 pounds per million MMBTU?



MR. BROGAN: Re-burn technology by itself cannot achieve those lower limits.

MR. COON: So as currently planned you would not be able to achieve at Coleson Cove the anticipated standards for NOx at refurbished plant?

MR. BROGAN: Well, in the standards that we have identified, and as I said which are in the guidelines, are .21. We have been told or been required to meet a more stringent requirement below .21.

MR. COON: So you are assuming that in a sense -- okay. In these discussions about tightening these NOx standards is there any sense when they might come into being to replace the current .21?

MR. WILSON: Perhaps what needs just a slight clarification there is that the new standards that you are speaking of -- and actually these stationary source standards, these are standards that are established by the federal government for new sources.

So if you are going out to build a new station, here is what we are trying -- here is what we want you to meet for standards.

It is the provincial government here in New Brunswick who takes a look at those and all the other conditions that happened to be around at the time and says what makes sense when we are refurbishing a generating station? What

makes sense to apply to this particular situation?

As Mr. Brogan mentioned, the draft guidelines that are out now has indicated that .21, which is in actual fact more stringent than what the guidelines are today, because those were proposed guidelines that have not been implemented, those are what are in the draft guidelines today.

And obviously those are significantly less than what the existing situation of say .7 is. So we are going from point let's say 7 as a rough number. We are dropping it down to .21.

Now it is possible that the federal government may come out with some new standard down the road that says if you are building a new station let's make it stricter again. We aren't sure when those would be out. We know there has been discussions on it.

And I expect maybe in a few more years there may be some other new numbers come out. And I -- because this tends to be the way environmental regulations go.

MR. COON: So is it possible that the refurbishment project would have to meet these 1.2 to 1.5 standards that are under discussion? It is possible the Province would require the project to meet those standards?

MR. WILSON: It doesn't -- I mean, you are asking, you know, sort of pick something out of the air.

The best information I can provide -- and I think that is what we are trying to do, is to provide you with the best information. And the best information we have today is that the draft guidelines indicates it is .21 pounds per million Btu.

And that is what our engineering people have looked at through the project. And that is the approach we are taking.

MR. COON: What kind of reductions can the SCR technology achieve? It says in the evidence here on line 3, page 131 that what you are proposing with the re-burn and so on would achieve an average of .21.

What in fact is the SCR technology able to achieve?

MR. BROGAN: Well, the -- we were able to achieve the same amount of NO<sub>x</sub> reduction with an SCR, the .21. And the work that we had undertaken was simply to size an SCR in order to meet the .21.

MR. COON: Can an SCR be sized to meet the 1.2 to 1.5 requirement, potential requirement?

MR. BROGAN: There are other issues around the SCR and an issue on the size of it. I would think the more stringent NO<sub>x</sub> reductions, if they ever should take place, the best strategy would in fact be to use both re-burn technology and an SCR.

MR. COON: Okay. Thank you, Mr. Brogan. We will move on or

not, depending on the Chairman's wishes.

CHAIRMAN: This is probably a good time for us to take our break. And let's try and be back about 1:45.

(Recess - 12:30 p.m. - 1:45 p.m.)

CHAIRMAN: Good afternoon, ladies and gentlemen. Any preliminary matters? If not, Mr. Coon? Mr. Thompson?

MR. THOMPSON: Thank you, Mr. Chairman. I guess we will start by looking at exhibit number 6 under Appendix D, page 151.

Looking at the third one down from the top, On Site Fuel Storage. Third sentence there -- or rather second sentence. Presently there are five petroleum storage tanks at the plant providing one months' storage of fuel oil, 182,000 tonnes, one tank dedicated to light oil of 40,000 tonnes. Under the refurbishment project all tanks will store Orimulsion, providing the total storage capacity of 222,000 tonnes or 25 days supply at full load.

In respect to the oil at the plant, and I -- correct me if my memory is wrong from yesterday, I don't have transcripts -- I think Mr. Brogan or someone said they were going to maintain the light oil there for start-up purposes at the plant. Is that correct?

MR. BROGAN: Oh, I did not say that. I did speak to the tankage at Coleson Cove but the plan would be to use all of the existing tanks at the station. Now they will need

modifications done to the existing tanks, but that's the plan. We will use all of the tanks for Orimulsion fuel and there will not be a requirement to instal new tankage.

MR. THOMPSON: What will be done for oil storage at the site?

MR. BROGAN: The Orimulsion?

MR. THOMPSON: No. The oil.

MR. BROGAN: The number 2 light oil?

MR. THOMPSON: Yes.

MR. BROGAN: The -- that will no longer be required once we convert the station to Orimulsion.

MR. THOMPSON: There will be no requirement to have oil on site?

MR. BROGAN: The number 2 oil that is referred to as light oil tank --

MR. THOMPSON: Yes.

MR. BROGAN: -- that's referred to here, it will be converted to Orimulsion and we will no longer need a supply of light oil at the site in that tank. We will only have a very small tank, which does exist today, and that's for start-up.

MR. THOMPSON: Yes. Okay. What about the option of heavy oil there? Would that -- where would the storage of that occur at?

MR. BROGAN: That is -- that is a provision we would make

only if Orimulsion was not available. We just -- we retain the capacity to revert back to heavy fuel oil. And so those same tanks could be re-used again to store heavy fuel oil.

MR. THOMPSON: Yes. So they would store the fuel no matter whether it was Orimulsion or heavy oil?

MR. BROGAN: That's correct. The same tanks.

MR. THOMPSON: In respect to the pipeline, in the interrogatories, A-7, Province of New Brunswick, page 116, under Response, A, examination of the existing line has been completed by Rosen, an expert inspection service company, for the owner Irving Oil Limited. And going down to number B, NB Power would expect to know the condition of the line by the end of February 2002. Do you know the condition of the line yet?

MR. BROGAN: We have not yet received the final report.

MR. THOMPSON: That report will be filed in the pipeline application?

MR. BROGAN: I'm not aware of any decision whether it's filed or not. The intention would be that our consultant hired to do the pipeline inspection would simply file a summary report on its condition and identify the requirements to ensure that its life can match the life of the station.

MR. THOMPSON: You said "our consultant". In here it says

that Rosen Inspection Company for the owner, Irving Oil Limited, would that be the only inspection, or are you going to have a consultant inspect the line as well?

MR. BROGAN: No. I'm sorry. It is the same consultant but we have been working together jointly with IOL for this undertaking. So --

MR. THOMPSON: Yes. So working for both parties.

MR. BROGAN: Yes.

MR. THOMPSON: Looking at exhibit A-10, Public Utilities Board, page 18, reading, NB Power has -- under Response, A, NB Power has a contingency plan for a total new pipeline to Coleson Cove. NB Power engaged an expert consultant who completed the route selection process for fuel delivery from Pier 10 to Coleson Cove. The route selection process has identified alternative routes.

When will that become available?

MR. BROGAN: I think the emphasis at this time would be to receive the report on the existing pipeline and once we understand the condition of the pipeline in the long-term -- there are no concerns about the near-term, the short number of years here in the future -- but once we get the report, understand the condition of the pipeline and its availability for the long-term, then we can make a decision as to whether or not we can continue to use that pipeline or a new pipeline with a new route would have to

be selected.

MR. THOMPSON: If you buy the pipeline from Irving or instal a new pipeline which you own, what are the contingency plans and who will be responsible for payment of clean-up costs if spills occur into the marine environment? We noticed in your evidence that the shipper is responsible for spills from the ship, but who will be responsible for the spill clean-up costs and liability from shore based spills at the dock which might enter the water, a pipeline break which might enter the marine waters, or a tank spill that might end up there?

CHAIRMAN: Mr. Thompson, I will let the witnesses answer that question but I think we are getting off -- well off the track here frankly as to what is relevant in reference to this hearing. As to the environmental assessment concerning the pipeline, the Department of Environment looks after that. And the pipeline application will come before this Board in a totally separate application. If you have -- if you want to narrow in on the costs involved as to if there is contingencies there or something, that's fine. But we have had --

MR. THOMPSON: Okay.

CHAIRMAN: -- enough on the pipeline I think.

MR. THOMPSON: Okay. Well let's narrow in right at the wharf then, if there is a spill at the dock side after the



product becomes yours, at the hook-up of the flange, if there is a spill at the dock there, have -- are you going to enter into an agreement also with ALERT?

MR. BROGAN: Yes, that is correct.

MR. THOMPSON: Has that agreement, you know, been negotiated?

MR. BROGAN: No, I don't believe it has been concluded. However, it is a given that ALERT will support our operation whether we are at Pier 10 or at Canaport.

MR. THOMPSON: In respect to the -- sorry -- exhibit A-6, page 153 under Water Supply, second paragraph, Water will -- rather first paragraph, first sentence -- The addition of the scrubber will increase demand for fresh water by 7,000 cubic meters per day under normal operating conditions. And second paragraph, Water will come from two sources, the stations' water supply, Spruce Lake, the City of Saint John.

In respect to the increased water demand or supply will there be an effect on the Musquash generating station?

MR. BROGAN: Well the effects of the water supply -- or that study is actually being undertaken as part of the Environmental Impact Assessment.

So we have a requirement under that assessment to look at the impact of the increased water usage from that

watershed and its total effect.

So I really don't know -- I do not have the results of the study and whether or not there will be any impact on the Musquash station.

MR. THOMPSON: You operate the Musquash station of course. Don't own it but operate it.

MR. BROGAN: That's correct.

MR. THOMPSON: In respect of this, has there been discussions -- of course this water system, the Spruce Lake water, what we are talking about, actually is the Musquash water shed because the lake doesn't have capacity now it's pumped, you know, frequently during the year. And has there been discussions regarding the use of that water with Natural Resources and Energy, you know, since that Musquash watershed is now one of the provincial protected areas in the province under the protected area strategy?

MR. BROGAN: Well the situation today at the plant is that water for the station is drawn from Spruce Lake, and that is provided under contract with the City of Saint John. It is our understanding that additional water requirements would be provided by the City of Saint John. So that is who we would actually procure the water from, is the City of Saint John.

MR. THOMPSON: So there is no permission required from

Natural Resources to seek excess water from the -- you know -- what will be the protected area now.

MR. BROGAN: I'm not aware of the arrangements between the City of Saint John and any other group.

MR. THOMPSON: Thank you. Going to page 156. Last paragraph under Cost Estimates, "A local engineering firm was engaged to complete a conceptual design cost estimate and contracting strategy for the project."

What engineering firm did that?

MR. BROGAN: That effort was led by ADI based in Fredericton for the balance of plant work.

MR. THOMPSON: And has that report been filed ?

MR. BROGAN: The -- I'm sorry. Which report?

MR. THOMPSON: The report that they did on the cost estimates?

MR. BROGAN: Yes. It has been filed -- or I'm sorry, received by ourselves.

MR. THOMPSON: But it hasn't been made available?

MR. BROGAN: No, it has not.

MR. THOMPSON: Could you make that report available?

MR. BROGAN: There are some concerns in releasing that report in that it gives the detailed estimates of the project and identifies our anticipated costs in a number of areas.

And we have a concern releasing that information to

potential future suppliers to the project.

MR. THOMPSON: Well, you know, given that and given the history of the BITOR oil purchase agreement, you know, could you release it in a similar fashion to the PUB?

MR. BROGAN: Well, certainly if that is a requirement that it be released. But we have certainly provided all of the -- or the high-level estimates in our presentation when the hearings began.

The ADI report only takes that information and provides much more detail on the specific line items that are needed to accomplish the project.

MR. THOMPSON: Going to page 162 under 5 (1), second paragraph, "With regard to NB Power's use of Pier 10, federal environmental and marine safety assessments are required before work can proceed at the wharf."

What marine safety assessments are required?

MR. BROGAN: Well, as I understand it, we will have to undertake an ecological risk assessment. And we will have to have in place spill response plans. Those are two examples.

MR. THOMPSON: What will be your estimated cost of those studies?

MR. BROGAN: They are approximately \$600,000.

MR. THOMPSON: And when will that work begin?

MR. BROGAN: It is undergoing -- it is well under way right

now. It has not been completed. But those studies, as part of the Environmental Impact Assessment, they are now under way at the present time.

MR. THOMPSON: Will they be part of the option as well of whether to go with that or whether to go with the other location at Canaport?

MR. BROGAN: We see both options as viable. Either one of them actually can support the project. And so we recognize that we will have to undertake similar studies at either location. So that is simply what we are doing at the present time.

MR. THOMPSON: Going to page 163, the last paragraph, "Solid waste management area", last sentence, "A suitable area has been identified adjacent to the station."

Where exactly will this location be at this site?

MR. BROGAN: It is actually the -- it borders right on our existing property line. And the property we are interested in purchasing belongs to the New Brunswick government.

So we would expect to buy that property adjacent to the existing site from the provincial government.

MR. THOMPSON: What would be the cost of acquiring this property? And how much property would you acquire?

MR. BROGAN: I don't -- I'm afraid I don't have that information right now. But as I recollect, it was in the

order of \$50,000. And it would be procured at fair market value, I believe. That was the kind of an estimate I had heard one time.

MR. THOMPSON: Going to page 166, first paragraph, "The environmental process allows for significant involvement. NB Power is committed to an ongoing communication strategy involving the general public and interested parties."

And then going to the last paragraph on the page, "These types of consultations will continue throughout the project in addition to the requirements of the legislative processes."

Well, what specific consultations are you referring to?

CHAIRMAN: That is the environmental assessment, okay. And if you want to find out exactly what NB Power is going to do in addition to what the EIA requires, then please ask the representatives outside the hearing.

Let's stick with the economic issues. That is what the Board has jurisdiction over.

MR. THOMPSON: That is all the questions I have. Thank you.

MR. COON: And Mr. Chairman, that ends our cross examination of the panel. Thank you, panel members.

CHAIRMAN: I think we will take a break so that the next cross examiner can come up to the front table. And I'm

just looking for my list of Intervenors.

And it indicates that Bowater Maritimes Inc. was not here yesterday. Are they represented here today? Okay. The Canadian Unitarians for Social Justice indicated that had no questions, as did the City of Saint John. We have heard from the Conservation Council.

And there was no appearance from Fraser Papers Inc. Are they represented today? No. And Mr. Gillis indicated that there would be no cross examination. Irving Oil Limited, no cross. J. D. Irving Limited, no cross.

So it will be Province of New Brunswick as represented by DNRE will be next up. And we will take a 10-minute recess.

(Recess - 2:10 p.m. - 2:29 p.m.)

CHAIRMAN: I see Mr. Hashey would like to say something.

MR. HASHEY: Yes, Mr. Chairman. This morning there were undertakings, two more given I believe. One was the matter of doing a calculation.

Mr. Marshall informs me that that is complete. And I would ask him possible to put that on the record. I have indicated that to Mr. Coon that we do that now.

CHAIRMAN: Yes. I think it is an appropriate time. Go ahead, Mr. Marshall.

MR. MARSHALL: Yes. The question related to the Governors and Premiers emission rate for electrical generation in the tonnes per megawatt hour of CO2 emissions in 2025.



The Governors and Premiers target was for a 20 percent reduction in electrical rate of emissions.

And the question from the Conservation Council was what the rates were for the Orimulsion case, the oil blend case and the gas/oil case under the base case evaluations.

And under the base case evaluations the Orimulsion case would result in 2020 in a 7 percent reduction from 2000 emission rate. The oil blend case would result in a 15 percent reduction. And the gas/oil case would result in a 15 percent reduction.

None of the three cases meet the required 20 percent reduction or the projected 20 percent reduction from the Governors and Premiers.

MR. DUMONT: Could you repeat?

MR. MARSHALL: The Orimulsion? The Orimulsion case in 2020 is 7 percent low what the rate of emissions is in tonnes per megawatt hour in the year 2000.

And again the issue, the Orimulsion case -- none of the options meet the requirement. The economics, the Orimulsion case is lower cost in economics than all of the others.

The question is whether the additional cost of meeting the target at that time will make a difference to the overall economics of the project.

And our position would be that it would not. The

project basically, as submitted in evidence, the project pays for itself in six or seven years.

So by 2002 the Orimulsion project economics would have well paid for the project and be well ahead. And then we could look at how we deal with those issues at that point in time.

CHAIRMAN: Is that it, Mr. Hashey?

MR. HASHEY: Yes.

CHAIRMAN: That is it? Thank you. I just have one quick question. And that is why on earth can't we state all these things in common terms?

Like there you are so many pounds for MMBTU. And then on other occasions it is so many metric tons a year. And I mean, I have a hard time grasping just one system of measurement let alone two or three.

That is a rhetorical question.

MR. MARSHALL: That is why I tried to express it in percentage reduction. That language you can understand.

CHAIRMAN: Okay. Thank you, Mr. Marshall. Mr. Hyslop?

CROSS-EXAMINATION BY MR. HYSLOP:

MR. HYSLOP: Thank you very much, Mr. Chairman and Commissioners of the Board. I would like to begin just briefly by having on the record the specific areas of expertise of each of the members of the panel.

As I understand it, Ms. MacFarlane, you are qualified

with regard to the financial aspects of New Brunswick Power, is that correct?

MS. MACFARLANE: That would be correct.

MR. HYSLOP: Yes. And Mr. Marshall, your qualification and expertise is with regard to the overall policies and planning of the New Brunswick Power Corporation?

MR. MARSHALL: Certainly the planning aspect and some influence on policy. But I'm not the senior policy witness.

MR. HYSLOP: Very good. And Mr. Brogan I assume would be the senior policy witness?

MR. BROGAN: Yes.

MR. HYSLOP: Thank you. And any other area of your qualification, Mr. Brogan?

MR. BROGAN: I'm Vice-President of the Generating Plants. So I would have overall responsibility for this particular project, the undertaking, the conversion and the future operation.

MR. HYSLOP: And thank you very much, Mr. Brogan. And Mr. Thomas, I understand your expertise is in the area of development of the construction costs of the project and the completion of the project within those costs?

MR. THOMAS: Yes.

MR. HYSLOP: And Mr. Wilson, you are here to keep us advised with regard to the environmental aspects of the project?

MR. WILSON: That is correct. Primarily on the Environmental Impact Assessment work that is being undertaken.

MR. HYSLOP: Thanks very much.

I would like to begin perhaps by zeroing in if I could on the cost of the oil and gas mixture. And I refer, Ms. MacFarlane, to exhibit A-11 and in particular I guess slide number 50 as identified on A-12. Correct that. It is slide 51.

MR. HASHEY: That is A-11?

MR. HYSLOP: Yes.

CHAIRMAN: The numbered rendition.

MS. MACFARLANE: Okay. We have it.

MR. HYSLOP: Thanks very much. And in particular in slide 51 it indicates under natural gas/oil blend project spending is \$475 million?

MS. MACFARLANE: Yes.

MR. HYSLOP: And that 475,000,000 is the capital cost of all the construction if that particular option was to be undertaken?

MS. MACFARLANE: It is the capital spending relating to the conversion to natural gas/oil blend at that period of time.

MR. HYSLOP: Thank you.

MS. MACFARLANE: There was further work required in 2014.

MR. HYSLOP: Okay. That would be similar in the presentation of the capital cost spending for example for the Orimulsion conversion at 747,000,000?

MS. MACFARLANE: Yes. All the work -- all the work in the Orimulsion conversion is done at the time of conversion.

MR. HYSLOP: Very good. And later work is not included in the Orimulsion conversion, for example work in 2014, a rewinding of turbines?

MS. MACFARLANE: I would ask Mr. Thomas just to clarify that.

MR. THOMAS: When you say "all the work" would you specify?

MR. HYSLOP: All the capital expenditures related to the conversion to Orimulsion that will be taken between now and November 2004, is that the \$747 million figure?

MR. THOMAS: Yes.

MR. HYSLOP: And is the \$475 million figure for the natural gas/oil blend all the work that would be required in the next two to three years to complete that conversion?

MS. MACFARLANE: Yes, it would be.

MR. HYSLOP: So I'm comparing apples and apples with regard to the numbers under project spending on slide 51?

MS. MACFARLANE: That is correct.

MR. HYSLOP: Thank you. Now can somebody briefly break out for me what the \$475 million consists of?

MS. MACFARLANE: We don't have the documents with us to

outline the nature and at a detailed level of what is included in those capital costs.

But it is basically a 400-megawatt gas plant. And then whatever work would be required in the existing oil operation, to take it out to a period of time that would match the life of the natural gas plant.

MR. MARSHALL: I might give you -- Ms. MacFarlane is correct. In the 475,000,000 again just a rough estimate.

The spending at that point in time I think on the oil blend. There is some spending at that point in time.

Most of the -- almost all of the money is for the natural gas combined cycle power plant. Some is for the existing operation on oil.

And then in 2014 there would be the NOx upgrades for the existing plant and generator rewind on the existing plant.

MR. HYSLOP: If I'm correct in reading the project spending, the natural gas/oil blend conversion, Ms. MacFarlane, would be approximately \$270 million less than the Orimulsion conversion?

MS. MACFARLANE: Approximately, yes.

MR. HYSLOP: Yes. Thank you.

Now I know this ground has been covered. But perhaps just to establish the record, the use of natural gas does provide, and I would direct this to Mr. Wilson, it does

provide significant advantages over the use of Orimulsion in terms of emissions?

MR. WILSON: I think you are correct in saying that this has been covered before. But there are different emissions which are associated with different fuels.

MR. HYSLOP: Yes.

MR. WILSON: And obviously there is different advantages to different fuels. And it depends on where you use them at and in what application.

I mean, we could take this to its extreme. And we could talk about that natural gas should be used in homes. And of course that might be the best application for it.

So from a power plant point of view, natural gas does have practically zero sulphur emissions. It does have a fair amount, a substantial amount of nitrogen oxide emissions. And it certainly has carbon dioxide emissions as well.

MR. MARSHALL: In the evidence, I refer you to table 3.1 on page 52 of exhibit A-6. the specific environmental rates of those three emissions for all of the alternatives that were considered are provided.

MR. HYSLOP: Yes. I appreciate that, Mr. Marshall. And I'm just asking you to set the general pattern and the scheme here.

As I understand it, Mr. Wilson, then on the use of



natural gas is basically no sulphur emission?

MR. WILSON: At the point of use there is very little sulphur emissions. That is correct.

MR. HYSLOP: And with nitrogen, although there is nitrogen emission, I do understand it to be less than the nitrogen emission from the use of Orimulsion or heavy fuel on a million Btu basis?

MR. WILSON: That would be correct.

MR. HYSLOP: Yes. And I also, and I don't have an exact number, but I do understand that in equal quantities of power production that natural gas would give about a 30 percent advantage over Orimulsion in terms of emission of carbon dioxide.

Would that be a reasonably accurate statement, Mr. Wilson?

MR. WILSON: Yes. I'm -- it is probably -- I'm a little reluctant to say specifically. Because it depends on how you are using natural gas and in what type, or whether it is simple cycle or combined cycle or what other use you are using of it.

But there is some understanding that it would be less CO2 emissions than --

MR. HYSLOP: Perhaps --

MR. WILSON: -- other fossil fuels.

MR. HYSLOP: -- I will refer you to --

MR. MARSHALL: Again I might refer you back again to table 3.1. The specific numbers are given. And we could calculate the exact ratios you are looking for.

MR. HYSLOP: Yes. Thank you very much, Mr. Marshall. But I have got a reference here that perhaps I will refer to.

And I refer specifically to exhibit A-6 at page 34. And, Mr. Wilson, under carbon dioxide on oil it's 177 pounds per million BTU would be the rate and operation on gas would 122 pounds per million BTU weight, is that correct?

MR. BROGAN: Actually can I suggest that Mr. Marshall answer the question? This is Mr. Marshall's evidence.

MR. HYSLOP: I understood that environmental issues were the expertise of Mr. Wilson. I do understand as a panel that you are free to offer whichever person may be most qualified and I was under the understanding that Mr. Wilson was your environmental witness, but that's the discretion of your panel.

MR. BROGAN: I think Mr. Wilson offered that he could provide input on the environmental impact assessment and obviously he can contribute to the environmental questions. But this detail is more appropriately answered by Mr. Marshall.

MR. HYSLOP: I am prepared to allow Mr. Marshall to answer. I'm not going to interfere. I was just trying to direct

the answer to what I understood to be the appropriate witness.

MR. MARSHALL: I think just to add to what Mr. Brogan has said, the issue of system emissions and how we meet systems emissions is really a planning exercise and is part of the planning studies of which I am responsible for. And so it's in my evidence. The studies were undertaken by my department and provided to the corporation. We work with Mr. Wilson but this evidence has been prepared by my department.

MR. HYSLOP: Very well. I appreciate that. I don't want to cause any jurisdictional squabbles between the witnesses.

In any event, the point I am making is on page 34 of exhibit A-6 there are two factors given for oil and gas for carbon dioxide. One for the oil is 177 pounds per million BTU and operation on gas is 122 pounds per million BTU, is that correct?

MR. MARSHALL: Yes. That's what is stated in the table.

MR. HYSLOP: And I also understand that there is a slight -- I think your evidence was three percent advantage of Orimulsion over heavy fuel oil?

MR. MARSHALL: Yes. There is some efficiency improvement in the heat rate.

So the data -- just for the Board to understand, the data provided on page 34 in the table referred to by Mr.

Hyslop gives the input quantity. So it's the amount of emissions based on the fuel input to the power plant, not necessarily on the conversion in the fuel emission output versus electrical production.

So there is a change in rates when you look at it on a BTU basis compared to on a megawatt hour basis.

MR. HYSLOP: Would the advantages of the normal emission rate per million BTU, would that not be converted through the megawatt hour basis, Mr. Marshall?

MR. MARSHALL: They can be converted to a megawatt hour basis, and as I referred to you before, they are provided that way on table 3.1 of the same document, appendix A, page 52.

So in table 3.1 the emission rates for all of the options are provided in a pounds per megawatt hour basis.

MR. HYSLOP: I understand that. And on that -- to go back again, as I understand the carbon dioxide on a pounds per megawatt hour basis, you are showing Orimulsion at 1649 pounds.

MR. MARSHALL: That's correct.

MR. HYSLOP: And the Coleson Cove for a combined cycle of the new unit would be 793 pounds per megawatt hour.

MR. MARSHALL: That's correct.

MR. HYSLOP: Right.

MR. MARSHALL: On a combined cycle basis it would be 793.

And if it -- as Mr. Wilson said, it depends how you use the gas. If you use the gas for straight refuelling in the existing boilers at Coleson Cove then the conversion rate would be the corrected numbers that we provided for line 3, it would be 1232 would be the emission rate.

MR. HYSLOP: That's for -- I'm referring to the Coleson Cove combined cycle new unit about -- under new generation options --

MR. MARSHALL: Yes.

MR. HYSLOP: -- and it would be 793 for that?

MR. MARSHALL: Yes.

MR. HYSLOP: Yes. Also since we are on table 3.1, the emission rates, just to confirm, the sulphur dioxide for Orimulsion is 5.8 and it would be zero for the combined cycle new unit?

MR. MARSHALL: That's correct.

MR. HYSLOP: And under the nitrogen dioxide the rate would be two pounds per megawatt hour for Orimulsion and it would be 0.6 pounds for the new unit?

MR. MARSHALL: Yes.

MR. HYSLOP: Yes. So you would agree with me then on a megawatt hour basis the use of gas presents considerable efficiency or improvement over Orimulsion in terms of emissions?

MR. MARSHALL: It provides a lower rate of emissions. When

you use the word "efficiency" that implies other parameters besides emissions. Cost efficiency, other things. So it provides a lower rate of emissions, yes.

MR. HYSLOP: Now refer briefly to exhibit A-6 at page 33. Sorry. Make sure I have the right reference. Just one second. I will pass on that and come back to it.

Now the emissions on natural gas. They are lower than the -- lower for sulphur dioxide, nitrogen dioxide and for carbon dioxide and particulates. That's an understood advantage of natural gas.

MR. MARSHALL: Given that you are using that fuel in the same boiler or producing one megawatt hour of electricity from those different options, the rate of emissions is lower. The magnitude of the emissions depends upon the cost of the fuel, the relative dispatch order, the load level in the system and the full integrated operation to the system to minimize costs.

So the magnitude of emissions is given in response -- the evidence under figures in the integrated resource planning study which quantify the total magnitude of emissions in 2010, 2015 and 2020 for all the operation in the existing system.

MR. HYSLOP: And I still want to get back, Mr. Marshall -- I appreciate what you are doing. You are looking at the cost of the different elements going in and producing

rates, but what I am saying is if I produce one megawatt of power with Orimulsion I am going to produce more carbon dioxide, more sulphur dioxide, more nitrogen oxygen and more particulate than I am if I produce a megawatt of power with gas.

MR. MARSHALL: Yes.

MR. HYSLOP: Thank you. I think in the evidence -- and correct me if I am wrong, but I believe it was Mr. MacPherson's that the statement was clearly made that the use of Orimulsion is not a solution to address the CO2 issue. Would you agree with that, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: Now you are familiar and we have talked about a document called New England governors, Eastern Canadian premiers Action Plan. CCNB number 1.

MR. MARSHALL: Yes.

MR. HYSLOP: And the concern I have is -- again to review the -- one of the features of this is the stabilization by 2010 of CO2 emissions to 1990 levels, is that correct?

MR. MARSHALL: Yes.

MR. HYSLOP: And also one of the features of this plan is the reduction in CO2 emissions by 2020 to ten percent of the 1990 levels, is that correct, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: And there was also discussion of the third

restriction relating to the use of the production of power by the utility which is 20 percent by 2025, is that correct, Mr. Marshall?

MR. MARSHALL: Reduction in the --

MR. HYSLOP: CO2.

MR. MARSHALL: -- rate of CO2 per megawatt hour of electrical generation by 2025, yes.

MR. HYSLOP: Thank you. Now one of the questions was, What is the base, the 1990 base, that we are dealing with. And I understand that you have suggested that that's 9.3 --

MR. MARSHALL: 8.3.

MR. HYSLOP: -- 8.3 million tonnes of carbon dioxide. My question is, is that the actual emissions in 1990?

MR. MARSHALL: No.

MR. HYSLOP: No. There are some adjustments.

MR. MARSHALL: Yes.

MR. HYSLOP: And what are those adjustments, Mr. Marshall?

MR. MARSHALL: In 1990 we were purchasing significant quantities of energy from Hydro Quebec under a contract while the Belledune power plant was under construction. We took the -- we had environmental impact assessment improvement and operating permits to construct and build the Belledune plant. So adjustments were made to the actual 1990 emissions to account for the operation of Belledune that had environmental approvals at that point



in time. There were some other minor adjustments in average, to take hydro to an average year of hydro generation, an operation of that sort. So the numbers were adjusted to get to that 8.3.

MR. HYSLOP: And do you recall the unadjusted number of the emissions of CO2 in 1990, Mr. Marshall?

MR. MARSHALL: Subject to check, I think it's 6.3.

MR. HYSLOP: Could you undertake to make that check for me?

MR. MARSHALL: Yes.

MR. HYSLOP: Thank you very much. So in terms of your approach to what the limits are on carbon dioxide, you assumed that the 8.3 would be your base starting point for 1990, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: And have you had any government agency or the New England governors, Eastern Canadian premiers accept your hypothesis and assumption that it would be 8.3 and, although subject to your check, and not 6.3?

MR. MARSHALL: We certainly had discussions with the provincial government Department of Energy and Department of Environment. It has been my understanding that they well understood the rationale and the calculations behind the 8.3 and did accept it.

We have had discussions with the Canadian Electrical Association and in all numbers provided to the federal

government in negotiations on climate change for the electrical industry in Canada and for positions the 8.3 number has been recognized and reported through those discussions.

MR. HYSLOP: Now would I be correct in saying that you have taken some steps to provide a comfort level that the 8.3 would be the base, there is perhaps at some point in time a risk factor that someone might pin 6.3 as your base?

MR. MARSHALL: The 8.3 was reported back in 1995 when work was being done on climate change through the different working groups, through the National Clean Air emissions mechanisms that the provincial government were involved in, that industry sectors across the country were involved in. The numbers were reported through that process. We have registered those numbers as part of the emissions registry program with the federal government, and there have been to my knowledge no one has come forward since 1995 when all of this information has been reported and we have been operating on to disagree and disapprove of the 8.3 number.

MR. HYSLOP: And I'm going to go back to my question now. And my question was, is there some risk or can you state unequivocally that at some point in time the New England governors and Eastern Canadian premiers may not review your emissions levels and tie you to the actual 6.3? Can

you tell me that unequivocally?

MR. MARSHALL: Unequivocally?

MR. HYSLOP: Yes.

MR. MARSHALL: No.

MR. HYSLOP: Thank you. I refer you, Mr. Marshall, to page 84, I assume, of exhibit A-6.

MR. MARSHALL: Yes, I have it.

MR. HYSLOP: There are levels of emissions recorded on table 2.1?

MR. MARSHALL: Yes.

MR. HYSLOP: And can you tell me if the emissions for carbon dioxide on table 2.1 are actual emissions for 2000, or have they been in any way adjusted?

MR. MARSHALL: I believe they are -- they are actual when the -- these were taken out of a report we did back in the spring and out of the CO2 reduction plan. We laid down emissions there. They were calculated and done last January, I believe. They include actual emissions month by month up to November, and there was a projection on December in this. So the final number may be a slight change in the last digit.

MR. HYSLOP: So it's based on 11 months actual and one month projected when you did your -- when you did your analysis.

MR. MARSHALL: Well but it -- the month -- when it was done, the month was over. The environment people had the data.

They did not have the -- they had indications of the energy and the numbers. They made a projection. They did not have the detailed monitoring emissions data for the last month, so there could be a very minor adjustment.

MR. HYSLOP: Thank you. There is a -- they are not totalled on the exhibit, but I believe the CO2 total is 9.3 million tonnes for 2000, Mr. Marshall?

MR. MARSHALL: I believe that's correct.

MR. HYSLOP: be close. Can you confirm to me, subject to check, if that was the actual amount of emissions in 2000?

MR. MARSHALL: Yes, we can do that.

MR. HYSLOP: Thank you very much. Now just to follow, briefly, if we were to deal with a scenario where the 6.3 million tonnes was imposed on the province of New Brunswick, the 9.3 would represent a need to reduce the 2000 emissions by approximately 30 percent by 2010 to meet the objective. Would that be correct, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: Now going back to my earlier premise that natural gas offers some benefits. And I'm trying to keep it generic as possible, and I appreciate that there may be a loss of accuracy. But natural gas has a lower emission rate than carbon -- a lower emission rate of carbon dioxide than Orimulsion. Would it not stand to reason,

Mr. Marshall, that in fact the use of natural gas creates increased flexibility dealing with carbon dioxide emissions?

MR. MARSHALL: Again, I take issue with your word, flexibility. It provides a lower rate of emissions on a megawatt hour basis. The flexibility comes in what is the cost relative to other costs, and how much does it cost you to buy that.

MR. HYSLOP: Ignoring the whole concept of cost then, am I correct in stating to you that natural gas emission rates on carbon dioxide present some advantage over Orimulsion emission rates of carbon dioxide?

MR. MARSHALL: Yes. I already answered that question.

MR. HYSLOP: Thank you. Now I know this, I think, was touched on this morning, and I apologize, but it helps to refresh for the -- for the line of questioning.

Referring to, I believe, exhibit A-7 and in particular, the Province of New Brunswick interrogatory 55, which would be page 67.

MR. MARSHALL: Yes, I have it.

MR. HYSLOP: Thank you. I will just wait for everybody else. Thank you. In the response to A sets out a cost price of \$14.7 per tonne of carbon dioxide from the -- or for CO2 emissions. Can you just walk me through how you arrived at that 14.7 using that graph, Mr. Marshall?

MR. MARSHALL: Certainly. The first column -- there are two options. And this summarizes the -- as I laid out in the presentation yesterday, that there are two measures that we have used to determine an estimated cost as to what we can do to reduce emissions by about 1 and a half million tonnes of CO<sub>2</sub>.

The two options are to redispatch lower emission energy ahead of higher emission energy. The other was to reduce exports.

The first line of the table is the redispatch option.

The first column gives the amount of energy that would be redispatched, which is 1,500 gigawatt hours.

The second column gives the reduction in emissions for the redispatch. Now the .2 relates to the difference in emissions rate between Orimulsion and coal. Coal has an emission rate of about .96. Orimulsion is about .7675. So using .2 tonnes per megawatt hour saving by redispatching the 1,500 gigawatt hours, you multiply the 1,500 by the .2 and you get .3 million tonnes of CO<sub>2</sub> would be saved, would be reduced.

The cost of the redispatch is assumed at \$2 a megawatt hour differential cost for the electricity from coal to Orimulsion. So you multiply the \$2 a megawatt hour multiplied by the 1,500 gigawatt hours and you get a cost of \$3 million. So the cost per tonne is \$3 million

divided by the reductions of .3 and you get a cost per tonne of \$10 per tonne.

When you go to the next line on exports, the export we assume 1,500 gigawatt hours of exports. And assuming that all of the exports are made from Orimulsion the rate at .75 tonnes per megawatt hour, the reduction is .75 times 1,500. We get 1.125 million tonnes of CO2 avoided. Multiply times a cost differential, and this is as I explained yesterday, the low margin sales that we would forego, that we are assuming a lost revenue, marginal revenue on the export of \$12 multiplied -- so the \$12 multiplied by the energy of 1,500 gigawatt hours gives you \$18 million of cost. The \$18 million divided by the 1.125 million tonnes of CO2 gives you \$16 per tonne of CO2.

Now when you get -- you add up the columns, the total amount of energy involved is 3,000 gigawatt hours. The total amount of carbon reduction is 1.425 million tonnes.

The total cost is the sum of the 3 million and 18 million is 21. You take the \$21 million and you divide it by 1.425, and you get a weighted average cost of the reduction of \$14.7 per tonne.

MR. HYSLOP: Thank you, Mr. Marshall. And what this is is a cost that has been calculated by NB Power on the basis of its internal methods of producing hydroelectricity, or producing electricity. Am I correct?

MR. MARSHALL: Yes. As I said yesterday, these are actions we can take unilaterally on our -- on our own in order to reduce emissions by about 1.5 million tonnes.

MR. HYSLOP: And as I understand the situation, this is looking solely at your cost of production and where you are selling your -- your electricity. Is that correct?

MR. MARSHALL: That's correct.

MR. HYSLOP: So there is no outside factors or market forces directly related to this calculation of this cost?

MR. MARSHALL: Other than the \$12 export price in dollars per megawatt hour is an external market factor that influences --

MR. HYSLOP: Can vary.

MR. MARSHALL: That can vary, can influence the cost.

MR. HYSLOP: It can go up. It can go down.

MR. MARSHALL: It could go up or down. But we look at it as a lower margin sales that we would forego.

MR. HYSLOP: Right. Now we have talked about the lower margin sales that you had to forego. That, of course, assumes that you don't have to forego all of your export sales?

MR. MARSHALL: That's correct.

MR. HYSLOP: If you had to forego all of your export sales, then you would be into the higher margin and more profitable sales. Is that correct, Mr. Marshall?



MR. MARSHALL: Yes. And we already responded in order to do reductions of greater than 1 and a half million tonnes the cost would go up.

MR. HYSLOP: Yes. Now are you aware of any methods of disposal of carbon dioxide that exist at the present time with present technology other than just simply putting it up into the air?

MR. MARSHALL: There is research going on into sea crustacean of carbon into mine shafts or other areas. And we are working in discussions with Alberta Power, Edmonton Power. There is a lot of work going on in Alberta looking at some of that, so we are aware of that. And we are -- we are following what potential there is -- there is for that.

MR. HYSLOP: And that would be -- I guess that's instead of putting the carbon dioxide in the air --

MR. MARSHALL: You put it --

MR. HYSLOP: -- you submerge it down into old wells or something?

MR. MARSHALL: Yes.

MR. HYSLOP: Or old mines?

MR. MARSHALL: That's correct.

MR. HYSLOP: Yes. Is there any other methodology or technologies that you are aware of at the present time, Mr. Marshall? I'm not aware. I'm just asking.

MR. MARSHALL: I am not aware of any other.

MR. HYSLOP: Okay. Has this method of putting carbon dioxide down into mines, have we reached the point in time where we are getting a handle on what this might cost per tonne of carbon dioxide?

MR. MARSHALL: I do not have any information yet on the costs.

MR. HYSLOP: Okay. Would you suspect that it's likely to be higher than \$15 per tonne?

MR. MARSHALL: I have no idea.

MR. HYSLOP: Now, also in addition to redispach and export, part of the strategy with the Orimulsion option is to -- to, I guess, play the market if one develops with regard to CO2 credits. Is that correct, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: And my understanding from the evidence at the present time is that there is an expectation this market may develop some time around 2010?

MR. MARSHALL: Yes. We have assumed that in the sensitivity cases where we are looking at emission trading and costing of the emissions, that the market was in place in 2010.

MR. HYSLOP: Okay.

MR. MARSHALL: There are discussions about potential markets, whether they are the Eastern governors and premiers have laid out in their action plan an intent to

pursue the set up of a market. There are other discussions for wider trading markets. As of yet there are no operating trading markets for CO<sub>2</sub>, other than there are a few small pilot projects.

MR. HYSLOP: And in fairness, it's almost speculative that these markets may even develop?

MR. MARSHALL: I would say no, it is not speculative. I think that's it's pretty well understood that the electrical industry in Canada and a lot of other industries, I believe that trading mechanisms are required and are a reasonable means of trying to work towards achievement of carbon targets, so it's more than speculation. I think it's recommended by a number of different entities that that be an avenue to be pursued by governments.

MR. HYSLOP: Well then if -- I'm happy to hear that, quite frankly. But given the fact that a market would develop, I would suggest to you though that it would be speculative at this time to try to ascertain what the price per tonne of carbon dioxide might be in 10 years on a trading market?

MR. MARSHALL: Absolutely. And that's why we didn't do that. We calculated what are costs are and used that, \$15 a tonne.

MR. HYSLOP: That's right. Of course if you are in a

situation where your only option is to buy and sell credits, and we have no idea of what the price may be to buy a credit, that I suggest presents some risk down the road for carbon dioxide in the Orimulsion process, would you agree with that, Mr. Marshall?

MR. MARSHALL: Yes, it would prevent -- provide some risk. And in response to interrogatories, we did a sensitivity -- I believe it was your interrogatory where you asked us to determine the break even cost for CO2 credits and trading costs for CO2 at which Orimulsion would no longer be the lowest cost option.

We provided that response to you that for CO2 costs of \$130 a tonne or less, Orimulsion is the lowest cost and at 130 and higher there is another -- then the all natural gas combined cycle case is the lower cost option

MR. HYSLOP: Now -- and I appreciate that -- for the record that I believe is the province of New Brunswick interrogatory 55.

MR. MARSHALL: No. It is not 55. I think it was 32.

MR. HYSLOP: I am looking at 55, Mr. Marshall. I refer you to exhibit A-7, page 67. The answer is (c).

MR. MARSHALL: Is it? It may be. 67?

MR. HYSLOP: Page 67.

MR. MARSHALL: Okay. Yes, sorry. I stand corrected. It is 55 (c).

MR. HYSLOP: And given the fact that by your own admission, and I think correctly so, that we could be dealing with a market, the speculation as to what the price may be, it could be \$100. We don't know.

MR. MARSHALL: No, we don't. But we certainly hope it's not \$100 because it will have serious impacts on costs of all energy to our society.

MR. HYSLOP: Yes. I appreciate that. Now I would like to refer to exhibit A-10, and province of New Brunswick interrogatory -- supplemental interrogatory number 16.

CHAIRMAN: What page?

MR. HYSLOP: Page 40, Mr. Chairman. I'm sorry.

MR. MARSHALL: Yes, I have it.

MR. HYSLOP: I'm just waiting for everyone else. Now under answer (b) there is a table that you have prepared. And in that table I'm a little confused because if there is some advantages to natural gas on emission rates, can you explain to me why if the price per tonne of CO2 goes up, the relative -- I would suggest would be the expected benefit or better positioning of natural gas and oil blend does not occur?

MR. MARSHALL: Could you rephrase the question again?

Because I see --

MR. HYSLOP: Yes. Well perhaps I will take you through it. We have agreed that the emission rate -- without

reference

to price that the emission rate of carbon dioxide for natural gas is less than the emission rate per megawatt hour for Orimulsion, therefore, there is more carbon dioxide going into the air with Orimulsion. But when I look at the price under the different scenerios, as the price per tonne of CO2 goes up Orimulsion option according to this table becomes more advantageous vis-a-vis the oil blend and natural gas combined cycle.

Now can you give me an explanation as to why that occurs?

MR. MARSHALL: I would have to look at the computer runs behind this, whether the expansion plans change. As you go forward with the different CO2 prices, the initial expansion would be the three options, conversion, oil blend and gas combined cycle. The expansion beyond the initial requirement out in time changes. And I think in all cases above the \$15 a tonne nuclear units start to get built and now you are into affects and redispatch of systems relative to that.

So I would have to go back and check the computer runs. And I believe all of the information is given in the additional responses to interrogatories, but rather than try to speculate at this time what it is, we could take that as an undertaking and review that information and present a response later.

MR. HYSLOP: I would accept that undertaking, Mr. Marshall.

But perhaps in the hope of perhaps adding some clarity, I would refer you to exhibit A-7, and in particular CCNB interrogatory 32, which occurs at page 32. It is on page 32.

MR. MARSHALL: Yes, I have it.

MR. HYSLOP: Thank you very much, Mr. Marshall. And I would point out that the answer to the interrogatory runs from pages 32 to 35. Now I believe that those different scenerios set out the methodology of -- or the down the road steps that would have to be taken if the price of CO2 reached certain levels, is that correct, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: And we will deal perhaps with the scenario of \$100 a tonne because you agreed a moment ago that although it is speculative and it would be very bad and very costly, that if CO2 market prices were \$100 per tonne, but dealing with that the solution in the earlier interrogatory we looked at, that would be achieved by the process set out on page 33 of the evidence. Is that correct, Mr. Marshall?

MR. MARSHALL: Excuse me?

MR. HYSLOP: I will back --

MR. MARSHALL: I wasn't referring to page 33 of the evidence. So what --



MR. HYSLOP: Page 33 of A-7, which is the second page of CCNB 32 interrogatory.

MR. MARSHALL: Okay. I have that. That is the expansion plan for \$100 a tonne CO2 beginning in 2010.

MR. HYSLOP: Yes. And to run that through, if -- to keep the advantage with Orimulsion, I just want to go down the line. We would do the Orimulsion conversion that you are proposing at the present time?

MR. MARSHALL: Yes.

MR. HYSLOP: And in 2006 and '7, there would be a short term purchase. I assume that would be during the construction phase of Point Lepreau?

MR. MARSHALL: Yes.

MR. HYSLOP: And then 2007 and '8, you would retube Point Lepreau?

MR. MARSHALL: Yes.

MR. HYSLOP: 2009, 2010, you would have to construct a 400 megawatt nuclear facility?

MR. MARSHALL: Yes.

MR. HYSLOP: And in 2016 and 2017, you would construct another 400 megawatt nuclear facility?

MR. MARSHALL: That's correct.

MR. HYSLOP: And I take it that -- and I get confused between PROMOD and PROVIEW, but I guess it's PROVIEW which is the long-term?

MR. MARSHALL: Yes.

MR. HYSLOP: This is the scenario that is printed out by this model?

MR. MARSHALL: The very detailed --

MR. HYSLOP: Well refined model.

MR. MARSHALL: -- production costing --

MR. HYSLOP: I know you have that, Mr. Marshall.

MR. MARSHALL: Yes.

MR. HYSLOP: It is an exciting tool for management to use.

But I am going to ask notwithstanding that PROVIEW would suggest that the proper models to do this, are you suggesting that if the price of carbon dioxide went to \$100 per tonne that you would in 2007 and '8 retube Lepreau? 2009 and '10, build a new nuclear reactor? And in 2016 and 2017 build a second nuclear reactor? Do you think that that model will work in New Brunswick and be something that New Brunswickers would want to have happen?

As a manager. Don't tell me about the theoretical model, tell me as a manager.

MR. MARSHALL: I think that the results point to the seriousness of the level of the issue that we have to face with CO2 reduction. If the cost of CO2 is \$100 a tonne this is the resulting least cost plan from all of the options that are available. So it says that beyond 2010 the kinds of generation to be built have to be zero

emission cost generation. Essentially that's what it's telling us. And the lowest zero emission cost generation that were put in the evaluations were nuclear units.

MR. HYSLOP: And I appreciate that. But again, if the public said we do not want more nuclear units in New Brunswick?

MR. MARSHALL: Then we have a problem.

MR. HYSLOP: And you have a real problem in terms of the most efficient way to go forward. And I'm going to suggest to you that an awful lot of what we have done with this PROVIEW model is simply hypothetical, isn't that correct, Mr. Marshall?

MR. MARSHALL: We don't consider it hypothetical. The -- we put into the model what all of the possible options are. We have costing information on a second nuclear unit. The nuclear unit that we have modelled here is essentially a unit similar to Lepreau and we are under the assumption that if a unit would be built part of it would be sold throughout other parts of the Maritimes and 400 megawatts of it would be for New Brunswick. That's what the option is.

We put it into the model. We put in all the costing data and information with it. And then we run the model to determine what is the least cost option. We do not make judgments when we are running the model, what is

acceptable to society or not. We are trying to calculate what are the hardcore economic results. After we have all those results, we then look and we quantify what are all the other things to go with it, emissions. What are the rate of emissions? What are the magnitude of emissions? What are the actual costs, and is it financially or not in order to build nuclear units?

There are other issues that get considered in the whole process. But at this point in time given that we were asked to calculate, given the CO2 credits or costs were \$100 a tonne, evaluate the three alternatives and determine what the costs would be and what would result in the options on a comparative basis, we evaluated the three of them as requested with our model to determine the relative differences.

MR. HYSLOP: I might refer you to the preceding page, page 32. We observe that even at \$50 per tonne, CO2 cost we would be into a nuclear reactor by 2009, 2010 under your PROVIEW model?

MR. MARSHALL: Yes. And I would like to point out also on page 32 that you see there is no nuclear unit in 2016 or '17.

And the reason there is no nuclear unit in 2016 or '17 is because of the low-cost energy from Orimulsion which is continued to be usable in the system --

MR. HYSLOP: I'm sorry --

MR. MARSHALL: -- at that point in time.

MR. HYSLOP: -- Mr. Marshall. I don't mean to interrupt.

But I have lost you in terms of what you were referring me to.

MR. MARSHALL: Well, if you look on page 32 you can see that in 2016 and '17 there is only one nuclear -- there is no nuclear unit in the Orimulsion case. But there are nuclear units in the other two cases.

If you turn the page to page 33, you will see that in the Orimulsion case there is now a nuclear unit added in 2016 and '17.

MR. HYSLOP: Yes.

MR. MARSHALL: The reason it is added is because of the additional cost of CO2 from \$50 a tonne to \$100 a tonne.

MR. HYSLOP: But I'm going back. This is your model. This is your theoretical model.

MR. MARSHALL: This is not a theoretical model, sir.

MR. HYSLOP: I'm going to take the view that you are letting this theoretical model make the decisions that management at NB Power are blessed with having to make.

You are substituting this model for your management skills?

MR. MARSHALL: No, sir. What we do is we have a very detailed model. I think it is prudent that I take a

little time to explain what is in this model so the Board can understand what it does.

MR. HYSLOP: No. You can deal -- I haven't asked what is in the model. I'm suggesting to you that you take the results of this model as they come out. And that is the basis for your management decision, Mr. Marshall.

MR. MARSHALL: No. That is the basis of our -- we have done evaluations as requested by you, sir, and your associates to answer questions on sensitivities of carbon dioxide costs. We have run our model on that basis.

We run the model in order to determine what is the cost of meeting our obligations into the future to provide electricity for the province of New Brunswick.

Now this model is accepted throughout the industry. It is used by many different utilities. And it provides a costing mechanism which simulates the operation of the system into the future. So it is a well-founded and accepted model.

We get the results -- I do, in the Planning Department, get the results. Management decisions are not made totally on my recommendations or my results from the calculations in our department. They are then reported to management.

And other considerations, as I said, related to what the social impact may be or what other things are or

emissions and other things, all of this comes together.

And senior management then makes a decision on that basis.

MR. HYSLOP: I'm going to pose a bit of a hypothetical to you, Mr. Marshall. I'm going to assume in 2009, 2010 you are the President of NB Power. And gas prices -- or carbon dioxide market prices are scheduled to come in that year at \$100 per tonne.

Are you telling New Brunswickers that your recommendation, what they should do at that point in time is build another nuclear power plant?

MR. BROGAN: I think the question is purely hypothetical, as you stated yourself.

MR. HYSLOP: I am. But I asked Mr. Marshall on this, Mr. Brogan. I think it is a question fairly directed to him in view of his evidence.

MR. HASHEY: Mr. Chairman, I don't think that is a fair question to Mr. Marshall vis-a-vis what his decision would be if he was the President. It is extremely hypothetical.

All the factors that would come into play --

CHAIRMAN: It is hypothetical, Mr. Hashey.

MR. HASHEY: -- who knows where we are going to be in 2010?

CHAIRMAN: It is hypothetical.

MR. HYSLOP: It is hypothetical.

CHAIRMAN: As to who can answer the question, it is a panel.

MR. HYSLOP: I appreciate that, Mr. Nicholson.

CHAIRMAN: The panel can answer, whomever chooses. Now do you want to put the question again --

\ MR. HYSLOP: Yes.

CHAIRMAN: -- and we will go from there?

MR. HYSLOP: Mr. Brogan, you are the President of NB Power in 2010. And we have just introduced a market for carbon dioxide emissions. And the base price on that market is \$100 per tonne.

Are you -- would you as President be of the view and undertake at that time to construct a 400 megawatt nuclear power plant? Would that be the decision you would make?

MR. BROGAN: Right. I think where we would be in 2010, assuming you have the same analysis, you look at what are our obligations in 2010.

Number 1) it is to have a reliable source of energy. Number 2) to meet all of the environmental standards of that day and to meet it in the most economic fashion.

If the results were that the most economic fashion or economic way to deal with a \$100 a tonne CO2 is a new nuclear plant, we would weigh that evidence at the time and make a decision at that time as to whether or not to go to a Public Utilities Board, similar to where we are at today, seeking approval on that project.

CHAIRMAN: Okay. That is a very good place for us to take a break, Mr. Hyslop.



MR. HYSLOP: Thank you very much, Mr. Chairman.

(3:30 p.m. - 3:45 p.m. - Recess)

CHAIRMAN: Mr. Hashey is indicating he would like to speak again.

MR. HASHEY: Mr. Chairman, if it is the wish of the Board, there is -- the one undertaking given this morning and one given this afternoon could be answered now.

I don't want to throw off Mr. Hyslop. It is -- they are short answers.

CHAIRMAN: He can withstand that diversion. I think it is the timing.

MR. HYSLOP: Sure. I think it is appropriate whenever possible to do it.

CHAIRMAN: Yes.

MR. HASHEY: Okay. Thank you. Mr. Brogan, would you then give the answer to this morning?

MR. BROGAN: Yes. The answer was -- or the question came from Mr. Thompson. And the question was the fuel usage in the last five years at the Coleson Cove facility and what the volumes were in that supply.

So in the five years ending December 2001 we received 52.49 percent from Venezuela. I would like to correct. I may have said that that was supplied by BITOR. In fact it was supplied by their parent PDVSA. But it is 52.49 percent from Venezuela.

Another 25.79 percent was supplied by Irving Oil Limited over the five-year period.

There are also smaller quantities supplied from the US Gulf Coast. 7.85 percent from Glencore out of the US Gulf. 6.31 percent from Vitol, also out of the US Gulf Coast. 3.84 percent from Kosh, also out of the US Gulf Coast. And another 3 1/2 percent from Novarco, also out of the US Gulf Coast.

And a very small quantity originated from another supplier here in Canada, .18 percent from Imperial. That is the fuel supply for the last five years to the Coleson facility.

CHAIRMAN: Thank you, Mr. Brogan.

MR. HASHEY: Mr. Marshall, you have a --

MR. MARSHALL: I had one earlier that we did.

CHAIRMAN: Yes.

MR. MARSHALL: We have one under way, we are cross-checking numbers on. We will do it when that is finished.

MR. HASHEY: Okay. Thank you.

CHAIRMAN: Good. Thanks. Mr. Hyslop?

MR. HYSLOP: Thank you very much, Mr. Chairman. Just one last question relating to the line of questioning that we had before the break.

If we assume that the PROVIEW model was to be applied and we were looking at bringing a nuclear power plant on

in 2008, 2009 what type of leadups are needed to construct and build a new nuclear plant?

MR. BROGAN: Well, I really don't know the answer to your question other than to say it has got to be in the order of five years if not longer.

MR. HYSLOP: That is fair. Thank you very much.

If I might refer to exhibit -- I numbered the pages. But it is the refurbishment project, exhibit A-11. And if you look at the numbered version of it, the black and white version, it would be number 40, which I understand is environmental emissions for carbon dioxide.

I tried to do some calculations. But I think this illustrates it best. Would I be approximately correct in saying that the level of CO2 emissions from a gas/oil mix is perhaps three-quarters of a million to 800,000 tonnes less than the Orimulsion emissions? Does that number seem about correct?

MR. MARSHALL: Yes. I believe I responded yesterday to Mr. Coon that it looks like about a 10 percent reduction. So that would be about 800,000 tonnes.

MR. HYSLOP: Thank you. Now in addition to that, the Orimulsion conversion is a replacement of the existing capacity at Coleson Cove?

MR. MARSHALL: Yes.

MR. HYSLOP: And I believe after the conversion -- and we

are somewhere in the area of 950, 970 megawatt capacity,  
is that correct?

MR. MARSHALL: I believe it is about -- the information is  
given in table 3-1. We -- I think it was 978 there.

MR. HYSLOP: Yes.

MR. MARSHALL: Again detailed engineering. It may -- a  
megawatt or two around there will we finalize -- all of  
the details are finalized.

MR. HYSLOP: Okay. And the suggestion with the use of a gas  
unit to go with what is at Coleson Cove, the heavy fuel  
oil, in fact one of the things that results from that is  
we would be adding 400 megawatts of capacity, is that  
correct, Mr. Marshall?

MR. MARSHALL: It if is a combined cycle gas unit, yes.

MR. HYSLOP: So one of the results would be that instead of  
having 970 megawatts we have now got 1,370 megawatts or in  
that vicinity?

MR. MARSHALL: Yes.

MR. HYSLOP: Yes. Now Point Lepreau I understand somewhere  
in the area of 630 megawatt unit?

MR. MARSHALL: Yes. 635.

MR. HYSLOP: 635. So one of the effects in terms of overall  
capacity of adding a combined combustion gas turbine unit  
at Coleson Cove would be to provide replacement for a  
large -- for approximately two-thirds of the Point

Lepreau. Would that be correct?

MR. MARSHALL: That's correct.

MR. HYSLOP: And if I might suggest that perhaps that increases your flexibility in dealing with the Point Lepreau situation.

And might I suggest that -- have you considered that instead of doing Point Lepreau we would do a combined gas combustion turbine and then perhaps look at a proposal to -- for a request for proposals to make up the rest of the energy?

MR. MARSHALL: We have done a sensitivity analysis without Lepreau. If you look at the table 412 on page 106 of the original evidence, A-6, we have an analysis done where we assume that Point Lepreau does not proceed to go forward.

And in that evaluation the economics of the project are that rather than a 400 megawatt natural gas plant we would be better off to wait until 2007 and '8 and do a new Orimulsion plant at that point in time. And the economics favor the Orimulsion conversion.

MR. HYSLOP: In any event, you would agree with me that the combined combustion gas turbine unit, if added, would make up two-thirds approximately of what is produced at Point Lepreau?

MR. MARSHALL: Yes

MR. HYSLOP: Now I want to talk a little bit about -- if I

understand your evidence and Mr. MacPherson's evidence -- the big risk or concern of NB Power with regard to the use of gas is the volatility of its prices. Is that an accurate statement of your position, Mr. Marshall?

MR. MARSHALL: Yes.

MR. HYSLOP: And are you the right person to ask these questions or should I be directing them to --

MR. BROGAN: I think we will work together on the response.

MR. HYSLOP: Okay. Very good. I don't want to offend anybody by asking the wrong person.

MR. MARSHALL: But in addition to the volatility there is the question of availability of quantities of gas to be able to contract for the quantities required for a project in that time frame.

MR. HYSLOP: And in that regard you deal with the issue of price and supply, have you had discussions with any gas producers or gas marketers regarding the supply of gas for a combined combustion gas turbine unit?

MR. MARSHALL: We have had discussions with the pipeline, with a number of developers. We have recently run a request for proposal for a construction of a new gas fired co-generation power plant. We have done it to try to attract investment to build a gas plant at our Belledune facility. We originally had discussions with Tractebel. And in -- last summer we went out for request for

proposal. We submitted it to about 25-odd developers in the power development business, a number across North America. We were attempting to get investment in capacity that could then utilize the Neptune project to take transmission on Neptune, because it will need more capacity in the Maritimes to take service on that.

Out of the response that we received from the 25-odd parties, we had -- we began negotiations with three parties that were clearly interested in proceeding. Since then two of those three have dropped out. There is only one left that is considering an option. And the reason that at least one of the two that clearly dropped out, after they spent some money investigating possibilities at Belledune, that they dropped out and they cited to us clearly the availability of gas, that there was not sufficient availability for a project to go forward.

MR. HYSLOP: Would there be any discussion with actual producers, PanCanadian, Mobile, Exxon or Shell?

MR. MARSHALL: I have not had direct discussion with any of those. I'm not aware whether -- Mr. MacPherson may have had some or other people in the company, but I have not had direct discussion with them.

We have had discussions with Maritimes and NorthEast on their direction and what -- what their plans are for development of the pipe. And from discussions with

Maritimes and NorthEast, it is our understanding that PanCanadian will be coming on-line around 2005 and that the expansion is to expand the pipe through New Brunswick -- through Nova Scotia and New Brunswick and through Maine into New England, and PanCanadian intend to sell their gas into the Boston market.

And there are other indications from discussions that the price that PanCanadian would want would be at Boston prices, not at net back prices into the -- as we are currently getting from suppliers from the existing Sable offshore energy project.

MR. HYSLOP: I refer you to exhibit A-7, province of New Brunswick interrogatory number 1, and at page 2.

MR. MARSHALL: Yes, I have it.

MR. HYSLOP: That's a listing of prices for natural gas and heavy fuel oil from 1979 to 2001?

MR. MARSHALL: Yes.

MR. HYSLOP: And with respect to 2001 you are setting a price of \$4.55 in US dollars?

MR. MARSHALL: Yes.

MR. HYSLOP: Now my question is given that this evidence was filed on approximately November 1st of 2001, that price wasn't for the full year, is that correct, Mr. Marshall?

MR. MARSHALL: I'm not certain whether the numbers here are on a calendar year basis for gas or not. Gas is normally



contracted on a contract year from November 1st to October 31st. So I'm not sure whether they line up that way, but subject to check we can determine whether that was the price up until November or whether it was a contract year from up until the end of October 31st in terms of gas reported for 2001.

MR. HYSLOP: Perhaps rather than check specifically on the 4.55 and the timing, perhaps you could check and determine if I am correct in stating that when the year ended the price was slightly under \$4 US for natural gas?

MR. MARSHALL: Which price would we be talking about, a spot price, a contract price, for what term?

MR. HYSLOP: The same price that got listed on exhibit PNB 1.

MR. MARSHALL: Okay. So let me understand the question. If the data here for 2001 the 4.55 is a calendar year average price, whatever, then you want to know what the price was as of the end of December 2001, is that correct?

MR. HYSLOP: That's correct, Mr. Marshall, yes.

MR. MARSHALL: Okay.

MR. HYSLOP: Thank you. And can you confirm that the 2002 price at the present time is -- well my understanding is approximately \$2.40 US, spot price -- using the spot price?

MR. MARSHALL: My understanding the current spot price of

gas is down in that range, yes.

MR. HYSLOP: Thank you.

MR. MARSHALL: I don't know if that's the contract price for the year. That's the current spot price for this month.

MR. HYSLOP: That's what we are after, Mr. Marshall. Thank you. Now --

MR. MARSHALL: But I might add that the seven year forward strip price at this time is significantly higher than the current spot price.

MR. HYSLOP: Thank you. Now with regard to variation of the price of Orimulsion -- and I don't think I am going on new ground here, Mr. Chairman -- but my reference would be exhibit A-6, page 13. And I am referring to line 6 and it states that electricity from Orimulsion is similar in variable costs to electricity from coal. And my question is in view of that statement are you aware at the present time the Nova Scotia Power has asked for regulatory approval for a significant increase in rates due to an increase in the world coal prices?

MR. MARSHALL: Yes, I am aware that they have asked for a nine percent increase.

MR. HYSLOP: And the reason for it, you also understand that to be tied to world coal prices, Mr. Marshall?

MR. MARSHALL: I believe that their reason is it is tied to fuel prices total. And likely as well, gas prices,

because they incurred extremely high gas prices last year and through their converted plant at Tuft's Cove, probably had some losses because of gas. So I would say it's related to fuel prices total, not specifically coal.

MR. HYSLOP: And I understand that a significant portion of Nova Scotia Power's production of electricity is coal fired?

MR. MARSHALL: Yes, it is.

MR. HYSLOP: Thank you. And under the -- taking into account the statement of Mr. MacPherson that Orimulsion is similar in variable cost to electricity for coal, is there any reason for us to have concern that with rising prices of coal, the cost -- the variable cost price of Orimulsion on the in-service date may be somewhat different than it is today?

MR. MARSHALL: I don't want to get into the Orimulsion contract. It's confidential. But I can say that the contract for Orimulsion is a 20 year contract. And there is an escalation mechanism in the contract that is far less volatile than market prices for coal or other fuels.

MR. HYSLOP: And does the escalation start at the time of signing of the contract with a price that can be flexible or does it start the day that the Coleson Cove goes into service, Mr. Marshall?

MR. MARSHALL: Again, I don't want to get into the details

of the contract. It's confidential. But again I report back that the auditor reviewed the contract, reviewed the pricing, and confirmed that our treatment of the pricing and escalation of pricing and everything is here is as it was in the contract.

MR. HYSLOP: I am asking for a directional answer, Mr.

Chairman. And I didn't open the door with the statement, electricity from Orimulsion is similar in variable costs to electricity from coal. And what I am saying is if in view of what's happened in Nova Scotia where there is an anticipated increase in the price of electricity due to a change of coal prices, and the clear implication from page 13 is that Orimulsion is tied to the price of coal, I think it's a fair question to be answered that whether or not this price can go up if the price of coal goes up?

CHAIRMAN: Mr. Marshall, my interpretation of your response was that it was not tied to an index of the price of coal or oil or any other fuel. Is that a paraphrase of what you said?

MR. MARSHALL: That's correct.

CHAIRMAN: So we go back to that. So say again what your argument as to why we should pursue this further? Mr. Hyslop?

MS. HYSLOP: Well I --

CHAIRMAN: As I interpret it that it's not tied to an index,

which is tied to the price of coal or oil or other fuel.

MR. HYSLOP: So then the statement of Mr. MacPherson, and I am going to quote it, "is electricity from Orimulsion is similar in variable costs to electricity from coal," that statement by Mr. MacPherson in his evidence is incorrect?

MR. MARSHALL: No, that statement is not incorrect. The current pricing of Orimulsion is priced somewhat similar to coal. What happens to coal in the future and what happens to Orimulsion in the future are unrelated.

MS. HYSLOP: The words -- you are telling me that it's not related to coal, but Mr. MacPherson says that it is similar in variable costs to electricity from coal?

MR. MARSHALL: At this time. But will not -- are not related in the future.

MR. HYSLOP: So if I understand it, what your evidence would be is that the base price is somehow tied to coal, but not the indexing?

MR. MARSHALL: No, I didn't say that either. I said there is a base price and that the index is not tied to coal.

MR. HYSLOP: : Well look, we have got the right to bring Mr. MacPherson back and perhaps that's where I will leave it, because with the greatest respect I am confused by this statement and what's coming back.

MR. BROGAN: Could I offer -- today the price of Orimulsion is very competitively priced to coal. That's a statement

as to where we are at today. The price of Orimulsion is fixed. And in future it is not linked to the price of coal. As of today, it's very competitive to coal. But there is no future linkage.

MR. HYSLOP: So the price under the term sheet was fixed at the time of the setting -- signing the term sheet?

MR. BROGAN: That's correct.

MR. HYSLOP: Thank you. I would like to move on. And this question is perhaps directed to Mr. Thomas, getting into the issue of the potential variation of the capital costs of the project. And you recall yesterday from your evidence, Mr. Thomas, and I am referring to exhibit A-11 with numbers, and I would be referring to slide 57 or item 57. And in this project cost breakdown --

MR. THOMAS: 53 or 54?

MR. HYSLOP: 57.

MR. THOMAS: 57. Okay.

MR. HYSLOP: Do you have it, Mr. Thomas?

MR. THOMAS: Yes, I do.

MR. HYSLOP: Thank you. And dealing with the first item --

MR. BROGAN: Can we just clarify that we have the numbering correct? Different from ones --

MR. HYSLOP: Okay. Yes, the item is identified, Project Cost in Process, Project Cost Breakdown. And it has item, the first one would be boiler modifications, the second

column would be expected costs, and the third column is percentage of total costs?

MR. THOMAS: Yes.

MS. HYSLOP: Yes. The boiler modifications you have indicated were an expected cost of \$184 million?

MR. THOMAS: Yes.

MR. HYSLOP: And as I understand it, that you are in the process of completing contracts with regard to the boiler modification?

MR. THOMAS: Yes.

MR. HYSLOP: The contracts are not yet complete?

MR. THOMAS: True.

MR. HYSLOP: And I also understand that these are a fixed price contract for a turn-key operation on the boiler modifications?

MR. THOMAS: Yes.

MR. HYSLOP: So there is no additional cost or provision for additional costs in any manner tied to the contract?

MR. THOMAS: Not for the scope that will -- that would be negotiated and finalized in the contract.

MR. HYSLOP: Not for the scope that will be initiated in the contract? Can you repeat?

MR. THOMAS: Negotiated in the contract.

MR. HYSLOP: Can you perhaps explain that further for me, Mr. Thomas?

MR. THOMAS: What we have done is we have discussed over the last six months through a cost estimating process with the equipment, the original equipment manufacturer, you know, what is to be done as far as this project? And what we would do, the strategy is to have an engineer construct and procure turn-key type contract for the scope defined in the boiler modifications.

MR. HYSLOP: And in that regard is this a fixed price contract you are negotiating?

MR. THOMAS: Yes, we are.

MR. HYSLOP: And you haven't quite settled the contract yet?

MR. THOMAS: It's very close to be settled. But before you can go into a large amount contract of this nature, we need to have further approval. So it's conditional. And we have, you know, offers on the table, and it won't take a lot of effort to reach a contract.

MR. HYSLOP: And on this fixed price contract, signed in the form you have negotiated it, there is no contingency or no situation that would result in the cost being in excess of \$184 million?

MR. THOMAS: In a contract of that size, you know, there are a number of risks that can occur. And the risks have been assumed to be taken by the boiler vendors.

MR. HYSLOP: So I go back to what I just asked you, given the terms of the contract you have negotiated, it's my



understanding from your evidence, there is no possibility the price will go in excess of \$184 million?

MR. THOMAS: We can't have that 100 percent, no.

MR. HYSLOP: Would the contingency in the project cost breakdown cover any additional costs over the \$184 million?

MR. THOMAS: Any additional that would come, if they do come under a fixed price contract, it's negotiated for the scope, the contingency would take care of any, you know, unforeseen costs. And again, in a fixed price contracts, they would be very, very limited.

MS. HYSLOP: Yes. The use of a fixed price contract limits the ability -- the chance of the price getting away from you?

MR. THOMAS: Definitely, yes.

MR. HYSLOP: But to say it's exactly \$184 million, it could be plus or minus? Probably plus, a little extra?

MR. THOMAS: Plus or minus, very small number.

MR. HYSLOP: The same scenario hold true with the scrubber and wet-ESP?

MR. THOMAS: We are at a different stage of the process there, and because we are in the process of negotiation, the price that we have there, yes, would be in the same scenario. We are about at the same stage, but it's a different scope and there are different issues there,

so --

MR. HYSLOP: What are those different issues?

MR. THOMAS: Well we are negotiating at this stage and I cannot discuss these issues at this stage. But as I said yesterday, when we combine the two, okay, we did some calculation, and we are within plus 4 million, if you combine the two, or minus 10 million under fixed price contract. And that's pretty solid for this stage of negotiation.

MR. HYSLOP: When do you anticipate finalizing the negotiations, Mr. Thomas?

MR. THOMAS: For the whole contract we would have to receive approval for the full release of the project. As far as finalizing the details and agreeing on a commitment required prior to full approval, that could happen within a month.

MR. HYSLOP: Now dealing with the -- now I take it with the remaining items you are not quite as far along with your contracting?

MR. THOMAS: That is true.

MR. HYSLOP: And could you outline to me which of those items you perceive or believe that there could be a risk that the numbers that you have stated for the expected cost might vary more than 10 percent?

MR. THOMAS: All those numbers actually on the other items

were -- when we started the process -- when we filed the evidence November 1st, they were actually closer, you know, they were more into the plus and minus 5 percent.

However, with the stage in the negotiation of boiler and on the scrubber with the ESP at the time, those could have been a little higher than plus or minus 10.

However, where we are now, the overall estimate is definitely within -- you know, we have a higher level of confidence today with the stage of negotiation on the 40 percent -- 40 to 50 percent of the direct cost being in the first two items.

MR. HYSLOP: Are you attempting to negotiate fixed price contracts on those items as well?

MR. THOMAS: Yes, in some of them. Like the stack, that would be our approach. And the plant distributor control system that would be our approach, the fixed price contract.

However, for the plant distributor control system it's too early to do that. You need to have the scope of the scrubber. You have to know what the final process will be in there. Who are the manufacturers. What type of equipment. So this would actually occur later on in the process.

But based on our experience at our Dalhousie plant where we -- we went through the same type of plant

distributor control system, we are very confident that we are in the right ball park.

MR. HYSLOP: I would like to move on slightly to the next page. My number is 58 and -- but because the numbering seems to vary, it's the project costing process continued, balance of plant costs break down and we have three columns, materials handling, expected cost and percentage of BOP cost which, I guess, is balance of plant cost.

There is -- there is an item for \$60 million for fuel delivery and storage?

MR. THOMAS: Yes.

MR. HYSLOP: Is that 60 million intended to cover the entire costs from the point of landing to the point of delivery of any fuel used in the Orimulsion conversion?

MR. THOMAS: Please define your point of landing?

MR. HYSLOP: Okay. From the point -- where it comes off at dockside to the point that it reaches the storage tanks at Coleson Cove.

MR. THOMAS: Yes. It would cover from the unloading sites, whether Canaport or pier 10, and including the six tanks that were referred by Mr. Brogan earlier today.

MR. HYSLOP: Now if one of the scenarios here -- and maybe I'm wrong because I don't know what type of bargains are being negotiated. But one of the scenarios is that you might have to build a completely new pipeline?

MR. THOMAS: It is unlikely, but it is a possibility.

MR. HYSLOP: And if that possibility were to arise, would \$60 million cover the bill?

MR. THOMAS: What is included in that \$60 million, okay, is a -- a complete unloading new facility at either site. And depending on the final design between the budget of \$60 million and some contingencies, we could easily cover the construction of a new pipeline if necessary.

MR. HYSLOP: So to go back to my question and perhaps just to focus on it, would \$60 million cover the new pipeline?

MR. THOMAS: Not in all cases.

MR. HYSLOP: If we had to build a brand new pipeline in a worst case scenario, would \$60 million cover the cost of building a pipeline?

MR. THOMAS: Yes. The price of a new pipeline is estimated to be in the vicinity of \$10 million. And when we -- when we did our estimate, okay, for the complete fuel delivery system, we have assumed the worst case scenario as present -- as presented in our evidence.

And we -- you know, based on where we are, we do believe that within the 60 million a portion of that budget will cover part of the pipeline. So we would have to possibly -- we would have to probably go to the contingency. However, within the plus or minus 10 percent contingency which for 60 million equates to \$6 million, we

would be able to put a new pipeline if necessary.

MR. HYSLOP: So if you had to put a new pipeline in, it would add \$6 million to the cost of the delivery system?

MR. THOMAS: Yes, that's the likely -- that's the worst case scenario.

MR. HYSLOP: Thank you. Perhaps going back to Mr. Marshall and dealing with this \$747 million, was there ever any question or discussion with BITOR America as to whether or not they might take an equity position in this conversion?

MR. MARSHALL: It's my understanding that the issue of a potential equity position may have been raised early on in discussions a year or so ago or more, prior to moving to a term sheet and conditions. But it -- it didn't go anywhere. But I think it was raised, but never really pursued by the two parties, because I don't think they were interested in that.

MR. HYSLOP: Would NB Power not consider trying to find an equity partner for this project given the substantial capital cost involved?

MR. BROGAN: Yes, there are substantial costs but there are substantial benefits. And the economics of this project are extremely attractive. So we actually took a position that we were not interested in having an equity partner for this project.

MR. HYSLOP: And on the theory is that the economic benefits

will look after the increase in debt in due course. Is that correct, Mr. Brogan?

MR. BROGAN: Well, yes. The whole project is so attractive that the economics are just -- are so compelling that it makes no sense to share the benefits with a third party.

MS. MACFARLANE: I might just add. It's also the case that we view this project as a relatively low risk project. And that comes largely from our experience at the Dalhousie plant.

Even though an equity partnership may have been more costly than managing it ourselves, if we did view this as a high risk project that might be a reason to look for an equity partner. But we certainly don't.

The economics are compelling. And certainly our experience at Dalhousie would tell us that this is well within our expertise to manage.

MR. HYSLOP: Sure. But \$747 million sounds like a lot of risk to put out in terms of capital. But I understand your point.

Talking about the experience with Dalhousie in this regard, perhaps again Mr. Thomas or whoever is familiar with the plant might be able to help. What is the length of the pipeline at the Dalhousie facility?

MR. THOMAS: It is around 1 kilometre.

MR. HYSLOP: Yes. And I know there is two or three

scenarios which can affect the result. What was the length of the pipeline to Coleson Cove from each of the options you are considering?

MR. THOMAS: We are talking approximately 17 kilometres of existing pipeline. And, you know, there is a slight difference between the two, maybe between 2 to 5. I would have to check the exact distances there.

MR. HYSLOP: So it is a significantly longer distance we will be dealing with the pipeline for Coleson Cove than we will be from Dalhousie?

MR. THOMAS: Yes.

MR. HYSLOP: Okay. And what type of operational difficulties have you encountered at the Dalhousie plant? Have you had any?

MR. BROGAN: No problems that I can recollect.

MR. HYSLOP: I was in Dalhousie once. And I got some stuff on my car from the place. How was that dealt with?

MR. BROGAN: First my comment. I thought you were referring to the pipeline.

MR. HYSLOP: Okay.

MR. BROGAN: And I'm not -- I don't know what was on your car or what the problem was.

MR. HYSLOP: Was there a particular problem at anytime with the Dalhousie facility?

Mr. Wilson, do you have something to say on that?



MR. WILSON: No. I'm not aware of -- specifically. Unless there was something you can be more specific about, I would be happy to address it.

MR. HYSLOP: Thank you.

MR. BROGAN: I have just been reminded that it was during commissioning --

MR. HYSLOP: Yes.

MR. BROGAN: -- perhaps in '94 --

MR. HYSLOP: Yes.

MR. BROGAN: -- in that time period. There was an incident at that time, if that is what you are referring to.

MR. HYSLOP: Yes.

MR. BROGAN: And that occurred during the commissioning of the plant.

MR. HYSLOP: Right. Was Dalhousie originally equipped with an electrostatic precipitator? Or was that added subsequently, Mr. Brogan?

MR. BROGAN: That was added subsequent to the conversion.

MR. HYSLOP: And was that part of what was needed to resolve the problem?

MR. BROGAN: The wet precipitator was added at Dalhousie to remove SO<sub>3</sub> emissions, a particled emission. And that is the purpose for installing it at Dalhousie.

MR. HYSLOP: And you are putting an electrostatic precipitator on this plant I understand?

MR. BROGAN: That is right. Based on our experience at Dalhousie we recognize the need to do that at Coleson.

MR. HYSLOP: Given the longer pipeline, Mr. Thomas, if we were to develop a leak or a break that took the pipeline out of commission for an extended period of time, what type of contingencies do you have in place to look after the Coleson Cove plant?

MR. BROGAN: Well, perhaps I can answer that. We have had experience with a long pipeline to Coleson now ever since it was commissioned in the mid 70s.

So we are aware of the issues around operating a pipeline for that many years. So we don't -- there will be nothing new with the conversion to Orimulsion basically.

We do have storage capacity at the plant, 25-day storage capacity. In the event that there was a problem with the pipeline it can be evacuated and cleaned out easily. And we have adequate storage at the station to keep the plant operating while the pipeline is being repaired.

And as well we will have significant storage at Canaport for example if we went there, where that once the line was put into service, again there is a ready supply of fuel for the plant.

MR. HYSLOP: One of the issues relating to the pipelines,

apparently you have done a study in November relating to the structural integrity of the pipeline?

MR. BROGAN: Yes.

MR. HYSLOP: And I understand from your earlier evidence today that that -- we are still waiting the final report on that study?

MR. BROGAN: Yes, we are.

MR. HYSLOP: And so I'm going to leave up the possibility that it might be likely that the pipeline would have to be replaced in the future, say 10 years?

MR. BROGAN: Well, the actual -- the arrangements that we have on the analysis around the pipeline is the work is being undertaken by IOL, using a consulting firm that had been used previously on the pipeline.

Once those results are obtained, those results go to an independent consultant to give a final report on the long-term life of the existing pipeline and any remedial measures that may have to be undertaken. And that will be received in February.

As well, within the project estimates there are allowances that would allow us to build a new pipeline in 10 years time.

MR. HYSLOP: Thank you.

MR. MARSHALL: I would just like to add to Mr. Brogan's earlier response on the Orimulsion pipeline contingency.

The fact that there is 25-day storage at the plant for Orimulsion capability compared to our current operation on gas with the Maritimes pipeline and production from offshore, when offshore production ran into a problem this past Sunday and there was a curtailment of supply into the pipeline, there is no storage capability on gas in the Maritime area. And the Bayside power plant was curtailed on Monday and shut back in production.

With Orimulsion we have the capability to continue running for 25 days, okay, at full load to be able to provide reliable supply.

MR. HYSLOP: Are you aware at the present time that gas storage is another consideration and also connections to western Canada to take care of the gas situations?

MR. MARSHALL: Yes, I am aware there is some consideration of that, and my understanding is there is yet no commitment to construct any storage facilities or yet to construct a connection to other gas supplies.

MR. HYSLOP: Just talk at this time?

MR. MARSHALL: Talk at this time, that's all.

MR. HYSLOP: Okay. Now I want to deal a little bit with Orimulsion, and perhaps refer to exhibit A-10, Province of New Brunswick supplementary interrogatory number 28.

One of the questions we asked was what happens --

CHAIRMAN: Give us that citation again?

MR. HYSLOP: I'm sorry. It's exhibit A-10 and it's PNB supplemental number 28, which would be page 62. Sorry, Mr. Chairman.

Now one of the questions we were concerned about is some of the properties of Orimulsion as it gets below a certain temperature. And there was rather -- a response there, but as I understand the long and short of it, if Orimulsion cools below 10 degrees centigrade it gels or congeals and can't be loosened up or again liquified, is that correct, that information?

MR. BROGAN: Well I think our real concern is that there is water in Orimulsion and you don't want it to freeze.

MR. HYSLOP: Yes.

MR. BROGAN: However, when we looked at the suggested time frames, up to seven days, the oil tank itself is heated storage. So if there was a loss of heating medium to the tank we do not believe the tank would ever approach 10 degrees or approach freezing. So we don't see a problem because of oil storage tank loss of heat.

In the line itself the solution to keeping it above 10 degrees is to keep product moving through the line, which we do already with the bunker oil we are using. It's a concern for bunker oil as well, that you don't want it to go cold.

MR. HYSLOP: Well I appreciate your answer, Mr. Brogan, and

it's telling me some of the things you will do so you never have this problem, but again, I want to go back and ask my basic question. What happens to Orimulsion if it was to be left at a temperature below 10 degrees centigrade for seven days? Would it not gel to the point that you would then have a congealed substance that would not be able to be again liquified, is that correct?

MR. BROGAN: I don't know what it would actually turn to at that point. We accept that it's a problem and we don't want it to happen.

MR. HYSLOP: Okay.

MR. BROGAN: And we understand how to prevent that.

MR. HYSLOP: And I appreciate your answer but again you say -- your words were, it's a problem and you don't want it to happen. If this stuff were to completely gel in the pipeline would that render the pipeline unusable?

MR. BROGAN: Yes. I'm not sure whether or not we could actually free the product up and clean the pipeline. However, that is identical to the situation we have today on bunker oil. There is nothing different.

What we would make provision for is equipment to evacuate the line and clean the Orimulsion out of the pipeline. It's called a pigging process.

MR. HYSLOP: My understanding is if you got it into the pipeline and it congealed that would render the pipeline

inoperable and there would be no remediation that would be possible to the pipeline, is that correct, Mr. Brogan?

MR. BROGAN: I don't know if that's a fact but it would certainly be a problem. I don't disagree. And it's no different than the problem we have today on bunker oil.

MR. HYSLOP: Are you sure that bunker sets up as solid and can't be reliquified, Mr. Brogan? Is that something that you would need to check?

MR. BROGAN: Once it is set up, separated out, separated out of the water from the bitumen, you ask can it be reformulated and brought back to a liquid?

MR. HYSLOP: No. My question was on oil.

MR. BROGAN: Oh.

MR. HYSLOP: This heavy oil, would it set and not be able to be more easily liquified than Orimulsion?

MR. BROGAN: No. No. My suspicion is that it might be easier with Orimulsion. With bunker oil it will definitely go solid and is difficult to get --

MR. HYSLOP: What temperatures would you be dealing with with bunker oil?

MR. BROGAN: Without knowing -- the exact temperature I'm not sure of, but bunker oil it would solidify, go viscous, be impossible to pump at ambient temperatures in the summer.

MR. HYSLOP: Pardon me?

MR. BROGAN: 20 degrees centigrade it would have gone solid and not -- you couldn't pump it at that temperature.

MR. HYSLOP: And it's 10 degrees for Orimulsion?

MR. BROGAN: With Orimulsion.

MR. HYSLOP: Is there any of your evidence that you would be comfortable checking in regard to what you have presented to me, Mr. Brogan?

MR. BROGAN: Yes. Just the way you ask me to describe what does it become at 10 degrees centigrade, I would check that and understand what does it really become.

MR. HYSLOP: Okay. Also is there any heating mechanism for the pipeline itself?

MR. BROGAN: No, there is not.

MR. HYSLOP: The heating mechanisms for the storage tanks at Coleson Cove, will they have to be upgraded as a result of this conversion?

MR. BROGAN: Yes, they will be.

MR. HYSLOP: And what type of heat will that be using? In terms of quantity.

MR. BROGAN: The technical process would be that we have to -- we would store the Orimulsion at a lower temperature than the existing bunker oil. So there would be modifications to lower the temperature and we would heat the Orimulsion with glycol.

MR. HYSLOP: It would be electricity heat that you would be



using from the plant itself?

MR. BROGAN: We use steam from the process. We do not -- it's not electric heat.

MR. HYSLOP: Mr. Chairman, I note the time is 20 to 5:00. I tried to pick a few short areas off. The next areas of questioning I would like to get into are fairly extensive. I do not want to break up in the middle of the point. And I might suggest it would be perhaps a good time to adjourn.

I would think with what is left, I would be finishing my cross-examination by noon tomorrow.

CHAIRMAN: I have on occasion used staying until you finish to speed counsel up, but I certainly won't do that on this occasion.

Just before we do adjourn, I just had one question that dealt with the pipeline. And we have heard evidence here today and we could go through a lot more perhaps on the Board's questioning, but in the sums that you have been mentioning in case you had to build an all-new pipeline, do you include the cost of a right-of-way, because it's my understanding that one of the Irving companies presently owns that right-of-way that your oil comes through, is that correct?

MR. BROGAN: No, we have not included the cost of the right-of-way in that 10 million dollar estimate.

CHAIRMAN: Okay. 9:30 tomorrow morning. Thank you.

(Adjourned)

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best of my ability.

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