

**Canadian Nuclear  
Safety Commission**

**Commission canadienne de  
sûreté nucléaire**

**Public hearing**

**Audience publique**

**October 11<sup>th</sup>, 2017**

**Le 11 octobre 2017**

**Public Hearing Room  
14<sup>th</sup> floor  
280 Slater Street  
Ottawa, Ontario**

**Salle des audiences publiques  
14<sup>e</sup> étage  
280, rue Slater  
Ottawa (Ontario)**

**Commission Members present**

**Commissaires présents**

**Dr. Michael Binder  
Dr. Sandy McEwan  
Dr. Soliman A. Soliman  
Dr. Sandor Demeter  
Mr. Rob Seeley**

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**Assistant Secretary:**

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**Ms Kelly McGee**

**M<sup>me</sup> Kelly McGee**

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**Avocate générale :**

**Ms Lisa Thiele**

**M<sup>e</sup> Lisa Thiele**

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Ottawa, Ontario / Ottawa (Ontario)

--- Upon commencing on Wednesday, October 11, 2017  
at 1:07 p.m. / L'audience publique débute  
le mercredi 11 octobre 2017 à 13 h 07

**Opening Remarks**

**MME McGEE** : Bonjour, Mesdames et Messieurs. Bienvenue à cette audience publique de la Commission canadienne de sûreté nucléaire.

Mon nom est Kelly McGee. Je suis la secrétaire-adjointe de la Commission et j'aimerais aborder certains aspects touchant le déroulement de cette audience.

The public hearing today is in regard to the request from Ontario Power Generation Inc. for the Commission's acceptance of their proposed revised financial guarantee for the future decommissioning of OPG's seven CNSC licensed facilities.

A Commission Meeting is scheduled to begin today at 3:00 p.m., or after the conclusion of this hearing. The meeting will resume tomorrow at 9:00 a.m.

During today's business, we have simultaneous translation.

Des appareils de traduction sont disponibles à la réception. La version française est au

poste 2 and the English version is on channel 1.

Please keep the pace of your speech relatively slow so that the interpreters are able to keep up.

L'audience est enregistrée et transcrite textuellement. Les transcriptions se font dans l'une ou l'autre des langues officielles, compte tenu de la langue utilisée par le participant à l'audience publique.

Les transcriptions seront disponibles sur le site Web de la Commission dès la semaine prochaine.

To make the transcripts as complete and clear as possible, please identify yourself each time before you speak.

I would also like to note that this proceeding is being video webcast live and that the proceeding is also archived on our website for a three-month period after the closure of the hearing.

As a courtesy to others, please silence your cell phones and other electronic devices.

Monsieur Binder, président et premier dirigeant de la CCSN, présidera cette audience publique.

Monsieur le Président.

**THE PRESIDENT:** Thank you, Kelly.

Good morning and welcome to the public hearing of the Canadian Nuclear Safety Commission.

Mon nom est Michael Binder. Je suis le président de la Commission canadienne de sûreté nucléaire.

Je souhaite la bienvenue aux gens ici présents and welcome to all of you who are joining us through the webcast.

I would like to start by introducing the Members of the Commission that are with us here today.

On my right is Dr. Soliman A. Soliman; on my left are Dr. Sandor Demeter, Dr. Sandy McEwan and Mr. Rob Seeley.

We have heard from our Assistant-Secretary, Kelly McGee, and we also have with us here at the podium Ms Lisa Thiele, Senior General Counsel to the Commission.

#### **CMD 17-H10.A**

#### **Adoption of Agenda**

**THE PRESIDENT:** I would like to start by calling for the adoption of the agenda, as outlined in Commission Member Document 17-H10.A.

Everybody okay?

For the record, the agenda is adopted.

**MS MCGEE:** The Notice of Public Hearing 2017-H-05 was published on August 24th, 2017.

The submission from Ontario Power Generation and the recommendations from CNSC staff were made available on August 4th, 2017.

The public was invited to participate by filing a written submission. September 11th, 2017 was the deadline set for filing written interventions. The Commission received two requests for intervention.

October 4th, 2017 was the deadline for filing of supplementary information and presentations. I note presentations at today's hearing have been filed by OPG and CNSC staff.

We will begin today's public hearing with the presentations by OPG and CNSC staff, followed by a review of the two written submissions filed by the intervenors.

The Members will have the opportunity to ask questions after each of the written interventions and the Commission will then hold rounds of questions on the submissions from OPG and the submissions and recommendations from CNSC staff.

We will end with a final round of questions from the members.

Mr. President.

**THE PRESIDENT:** Thank you.

I would like to start the hearing by

calling on the presentation from Ontario Power Generation, as outlined in Commission Member Documents 17-H11.1 and 17-H11.1A.

I understand that there are many people from Ontario Financial Authority here to answer questions, and they will be introduced formally by OPG. I also understand that we have a representative from Natural Resources Canada, Mr. McCauley, who is also here to reply to some questions.

So I'll turn the floor now to Mr. John Mauti for his presentation.

**CMD 17-H11.1/17-H11.1A**

**Oral Presentation by Ontario Power Generation**

**MR. MAUTI:** Thank you. We appreciate the opportunity to make this presentation.

For the record, my name is John Mauti. I'm the vice-president, chief controller with OPG. With me here today at the front table is Mr. Art Rob, the vice-president of Nuclear Decommissioning, and Mr. Gord Sullivan, the director of Eastern Waste Operations in DGR. Also with me to the far right from the Province of Ontario is Mr. Ronald Kwan. He's the assistant deputy minister for the Ministry of Finance. And we have a variety of support

staff that are also available to answer questions as needed.

OPG has requested the Commission's acceptance of a proposed financial guarantee prior to the expiration of the existing financial guarantee agreements on December 31st of this year. This presentation will provide a brief overview of OPG's proposed consolidated financial guarantee for managing all of the nuclear waste and decommissioning liabilities which result from the operations of the 20 nuclear reactors owned by OPG.

I will also outline how OPG plans to meet the CNSC requirements for financial guarantees by providing access to segregated funds established specifically to meet OPG's long-term obligations.

I will use the term "financial guarantee requirement" throughout the presentation. I just wanted to step through what that term means. There's three components to the financial guarantee. The first is related to decommissioning activities. Any facility that has radioactivity needs to be safety decommissioned. That includes our stations and our waste management facilities. This work is needed regardless of any future waste volumes to be generated. We often refer to these costs as our fixed costs.

There's also a fixed infrastructure cost



that's needed to manage nuclear waste operations. They will require the construction of DGRs, waste packaging facilities, and expenses to maintain those facilities over time. All of these are considered fixed infrastructure costs, and these are also included as part of our financial guarantee.

And the third deals with the waste generated to date. So any cost that's related to the actual spent fuel bundles or waste volumes generated to date or forecast to be generated over the next five years all form part of the financial guarantee requirement.

As an overview to our submission, there are four key points.

- First, OPG has maintained a consolidated financial guarantee for all of its licensed nuclear facilities.

- Second, we have a comprehensive cost estimating and update process that occurs at minimum every five years. This is in fact our fourth comprehensive submission to the CNSC. We use a combination of internal and external experts to both help create and challenge the cost estimates put forward.

- Third, with the guidance and support of the Province, we have established segregated nuclear funds, and those monies are managed by professionals with

expertise in fund management.

-And lastly, we're at a stage where strong fund performance in the past and updated cost estimates have eliminated the need for a provincial guarantee as currently forecast. But the Province is committed to and willing to provide a guarantee should the value of those funds fall below the financial guarantee requirements in the future.

OPG's proposed financial guarantee covers the facilities as shown on this slide. It's important to note that the financial guarantee includes the Bruce site. The Bruce is operated by Bruce Power under lease from OPG. Under that lease agreement and per the licence, OPG retains the accountability for providing the financial guarantee for the Bruce decommissioning and for all spent fuel bundles and waste generated at the site.

In terms of the sources of funding for the financial guarantee, OPG has established two segregated funds as per the requirements of the Ontario Nuclear Funds Agreement. That agreement is between the Province of Ontario and OPG and was created to ensure that sufficient funds were collected and managed during the operating lives of the stations themselves.

The financial guarantee forecast over the ensuing five-year window shows that OPG has more than

enough funds set aside segregated from OPG's operating cache to satisfy the financial guarantee requirement of the CNSC without the need for a provincial guarantee requirement.

I thought it would also be important at a high level to summarize some of the main changes in the 2018 to '22 financial guarantee reference period in relation to the previous reference period that expires at the end of 2017.

There have been changes to nuclear end of life, predominantly from the assumed full refurbishment of the six currently unrefurbished units at the Bruce nuclear site. To a smaller extent, the life extension of Pickering to 2024 is also a main estimate change.

There have also been changes in the two DGRs that are assumed as part of our program. The low and intermediate level waste DGR had an original in-service date of 2018, and in our new reference plan, that date is 2026. Similarly, the used fuel DGR that is being constructed by the Nuclear Waste Management Organization has an assumed in-service date that has moved from 2035 to 2043. And finally, we have adoption in the cost estimates of a new used fuel disposal container based on the needs of the CANDU fuel bundles, again that was put forward by the Nuclear Waste Management Organization.

As a result of our comprehensive updating of the various cost estimates, this table compares what we expected those costs to be from our programs from our previous reference plan to what the new cost estimates show and that underpin our new reference plan.

A standard basis when you look at cost estimates is to compare cost in what's called constant dollars. This assumes that the costs to execute the work are all prepared and assumed to occur at the time of estimate preparation without trying to forecast the specific years in which these costs will occur. This focuses on the work needed to execute these programs. The following slides detail the programs with the largest changes in these cost estimates.

The first is our decommissioning of our nuclear generating stations. This shows the largest increase of any of our programs between the two reference plans. There are three main drivers of this change. The first is a better definition of work during the preparation for safe storage period in areas such as the amount of plant modifications needed, the staffing costs, and various inputs such as energy consumption.

The second would be related to our Calandria and internal packaging costs. This is related to internal intermediate-level waste, and we have used a more

refined estimate for the container for decommissioning waste and the cost related to that has shown an increase.

And the third is a higher level of low and intermediate level waste decommissioning waste disposal costs, largely driven from a higher volume of waste and therefore forecasted volume of waste is primarily due to lower packaging density that has been assumed.

In order to address one of the concerns raised in the interventions about a key external service provider that we use, we've added this slide. Overall, we believe to have a robust and comprehensive process for estimating our decommissioning obligations.

OPG uses a key external service provider, TLG Services Inc., to assist in developing our cost estimates. TLG's principal business since the early 1980s has been providing decommissioning cost estimates, financial analyses, and related consulting services to the nuclear industry. TLG estimates incorporate large-scale decommissioning experience from recent projects such as the Maine Yankee and Vermont Yankee Nuclear Station decommissionings.

TLG is also providing decommissioning cost estimates for all the CANDU stations in Canada, and as well OPG regularly involves the services of other internationally recognized consultants to develop

decommissioning cost-estimate-related studies and assessments specifically to the CANDU technology. These studies and assessments have been incorporated into TLG's work.

I think we are working collaboratively to provide the most complete estimate possible when it comes to decommissioning.

Second program I'd like to talk to is the used fuel management program. By size, the used fuel management program represents more than half of the nuclear liability management costs that are related as part of this financial guarantee. It should be noted that the costs of long-term used nuclear fuel program largely come from the Nuclear Waste Management Organization, a joint venture, federal not-for-profit organization that was founded by the three nuclear utilities in Canada and the federal government.

The variances are driven by three main factors. First, as I've mentioned, the in-service date of the DGR changed from 2035 to 2043. And this has added an extra eight years in the siting and regulatory process, and that was added as part of the most recent update to the cost estimates.

Second, the extension of nuclear station operating lives and the resulting higher number of fuel

bundles that it generates. This means that those fixed infrastructure costs I referred to earlier are also going to be higher as we need to run the APM DGR for a longer period of time.

And as a bit of an offset to those two cost increases above is the newly designed used fuel disposal container that has been developed and brought forward by the NWMO.

And finally with the low and intermediate level waste program, the changes in cost estimates are as noted below. As the project is coming closer to construction, we believe it was more appropriate to include a more conservative and higher confidence cost estimate for the construction, which increases its cost in relation to the last reference plan. We have also put in allowances to address any of the Joint Review Panel recommendations that have come up in the last five years. And we have increased regulatory and oversight costs as a result of the longer-than-expected regulatory review process from the JRP and the federal minister.

In relation to our Western Waste Management Facility, we've also seen increased fixed infrastructure costs related to the Western Waste Facility, again impacted by a longer operating period.

So all the previous slides have dealt with

constant dollar cost estimates and the change in work or effort required in these programs. In order to come up with a process to come up with a financial guarantee requirement for CNSC purposes, we follow a two-step process to present the dollars in what's considered present value dollars.

First, the process is based that you take and escalate the constant dollars and figure out the years in which those costs are to be incurred in the future, and to apply the appropriate inflation factors to figure out those escalated dollars through that period. Then we use a discount factor to present value those escalated dollars back into today's dollars.

So given the very long time frame for the nuclear liability programs to execute, sometimes taking several decades into the future, this financing concept often plays a vital role at understanding the changes in the financial guarantee requirement calculations. I had mentioned previously some of the changes in planning assumptions that will be had, and this is how they basically impact the financial guarantee calculation.

With the longer station refurbishment and extension of station lives, this results in moving further out in time the need and the cost for decommissioning the stations. This has an effect of actually lowering the



present value for financial guarantee purposes.

I'd also talked about a later in-service date assumption for both the adapted phase management used fuel and L&ILW DGR. Those costs, those changes will also result and act in lowering the financial guarantee calculation as you're pushing large dollars, construction dollars further out into the future.

So in this table, as you can see, we have from a constant dollar basis approximately \$39.9 billion in constant dollars gets translated into about a \$16.5 billion financial guarantee requirements. Again, this represents the long time frame that nuclear liability management programs take, and it is not an unusual pattern that we see with other long-term industries and programs that span several decades.

When comparing this financial guarantee requirement from the previous one from the previous reference plan, we see a very small change of about \$30 million on a \$16.5 billion program, for basically a 0.2 percent different between the two reference plans. Now, there are changes between the different programs, but in total they net out to be fairly consistent between the two reference plans.

I also want to take a moment to address the provincial guarantee situation. The provincial

guarantee is no longer necessary for the proposed 2018 to '22 financial guarantee period for the following reasons: In OPG's prior financial guarantee plans, a provincial guarantee was required as a bridge between the value of the nuclear funds and the CNSC financial guarantee requirement. You'll see in the far left of this chart in 2013 the gap between the financial guarantee requirement and the nuclear funds was approximately \$1.5 billion, and that generated the provincial guarantee that has been in place through this 2013 to 2017 period.

We've experienced better than target rates of returns on our nuclear funds, and it has allowed the funds to grow faster than anticipated. So as a result, when you look at the 2018 to '22 forecast period, the value of the nuclear funds exceeds the CNSC financial guarantee requirement and that gap is actually projected to grow. As a result, there is no need for a provincial guarantee to provide any sort of a bridge.

But under the Ontario Nuclear Funds Agreement, the Province remains committed and legally obliged to provide a provincial guarantee should the value in the future of the nuclear funds fall below the CNSC financial requirement. The most recent example of this was in 2009 when the Province increased the provincial guarantee to meet OPG's financial guarantee requirement

when the value of the nuclear funds changed rather dramatically as a result of the global financial market crisis. At that point, our annual reporting identified a shortfall, and the value of the provincial guarantee at that time was increased by approximately \$700 million.

So to summarize our proposal, then, OPG has recently updated our cost estimates through a comprehensive and externally supported process that took over a year to complete. We have experienced strong financial performance with the professional management of our nuclear funds and have sufficient funds to cover our financial guarantee requirement. With that current expected forecast, we do not need a provincial guarantee at any point in the next five-year window. But should that situation change over time, the Province is committed to bridge any resulting shortfall through our provincial guarantee as they have demonstrated and done in the past.

That concludes our presentation. We'd be happy to answer any inquiries you might have.

**THE PRESIDENT:** Thank you. I'd like to move now to the presentation from CNSC Staff as outlined in CMD 17-H11 and H11.A. And I understand that Ms. Glenn will make the presentation. Over to you.

**CMD 17-H11/17-H11.A**

**Oral Presentation by CNSC Staff**

**MS GLENN:** Good afternoon, Mr. President and Members of the Commission. My name is Karine Glenn and I am the director of the Wastes and Decommissioning Division at the CNSC.

With me today are Dr. Milena Kostova, senior project officer with the same division, and Ms Amanda Wark, chief, Accounting Operations and Initiatives.

We're here today to present CNSC Staff's assessment and make recommendations to the Commission on Ontario Power Generation's proposed revised financial guarantee for 2018 to 2022.

The presentation today will provide background on Ontario Power Generation's, or OPG's, financial guarantee and summarize their current financial guarantee and financial guarantee proposal. I will then provide CNSC Staff's conclusions and recommendations.

Under the *Nuclear Safety and Control Act*, the Commission may require that licensees make adequate provisions of financial guarantee for the safe decommissioning of existing or proposed operations. OPG maintains a consolidated financial guarantee for

decommissioning of all OPG- and Bruce Power-operated nuclear facilities in Ontario. The financial guarantee is based upon preliminary decommissioning plans prepared by OPG for each facility.

Through licence conditions, the Commission requires that OPG have in place decommissioning plans, which at this time are preliminary decommissioning plans, or PDPs, and an acceptable financial guarantee which shall remain valid, in effect, and sufficient to meet decommissioning needs according to the most up-to-date PDPs. To ensure that, OPG is required to revise the financial guarantee and associated decommissioning plans and cost estimates at a minimum every five years or when requested by the Commission.

The CNSC licensed facilities covered under the OPG consolidated financial guarantee are listed in this table. OPG has maintained consolidated financial guarantees for those facilities since 2003. You will note that this includes the Bruce A and B Nuclear Generating Stations, as indicated by OPG in their presentation.

Before we continue, I'd like to note that since the submission of CMD 17-H11, CNSC Staff made corrections to the licence numbers listed in Table 1 on page 5 of the CMD. The licences listed in column 3 of this slide reflect the licences that are currently in effect for

the facilities covered under the OPG financial guarantee.

No amendment to the licences will be required to implement OPG's proposed updated financial guarantee.

The Commission last accepted OPG's current financial guarantee in 2012 for the period covering January 1st, 2013, to December 31st, 2017. In accordance with the criteria set in the Licence Conditions Handbook associated with the licences that were listed on the previous slide, OPG has updated the preliminary decommissioning plans, the associated cost estimates, and the financial guarantee for 2018 to 2022. And OPG is requesting acceptance of this revised financial guarantee.

The CNSC can access the Ontario Nuclear Funds Agreement, or ONFA, funds upon demand through the ONFA Access Agreement, signed between OPG, CNSC, and the Province of Ontario, who is the sole owner of OPG. If OPG's financial guarantee proposal for 2018 to 2022 is accepted by the Commission, an amendment to the agreement will need to be signed by all three parties prior to December 31st, 2017.

It is important to note that the ONFA funds are segregated and can only be used for approved decommissioning purposes.

I will now pass the presentation over to

Dr. Kostova.

**MS KOSTOVA:** Good afternoon Mr. President and Members of the Commission. My name is Milena Kostova, and I am a senior project officer with the Waste and Decommissioning Division.

To fund the financial guarantee for decommissioning of their facilities, OPG maintains Nuclear Funds. The Nuclear Funds include segregated funds established under the Ontario Nuclear Funds Agreement, comprising of the Decommissioning Segregated Fund and Used Fuel Segregated Funds. A trust fund for the long-term management of used fuel, established under the *Nuclear Fuel Waste Act*, is part of the Used Fuel Segregated Funds.

If the value of the Nuclear Funds is not sufficient to cover the present value of OPG's future decommissioning liabilities, OPG makes up the shortfall through the provision of a provincial guarantee.

For 2013, the beginning of the current review period, the OPG's decommissioning liability of \$14.2 billion was matching the total guarantee available of \$14.2 billion, and it was satisfied by the Nuclear Funds and a provincial guarantee.

Based on the estimates for the next 2018-2022 review period, OPG projects the total financial guarantee available to be higher than the total amount

required to cover for decommissioning liability in all years. Therefore, the required amount for each year in the 2018-2022 period is projected to be satisfied without a provincial guarantee.

For example, in 2018, the beginning of the next review period, the OPG's decommissioning liability is estimated to be \$16.5 billion, while the total guarantee available is projected to be \$18.5 billion satisfied by the Nuclear Funds only.

In support of the 2018-2022 financial guarantee proposal, OPG submitted updated decommissioning plans, cost estimates, and projected fund values. CNSC Staff reviewed the submissions against the CNSC regulatory documents as listed on the current slide. Based on the assessment of OPG's submissions, CNSC Staff concluded that they meet the criteria set in the regulatory documents listed on this slide.

The OPG's cost estimation structure is presented on this slide. OPG's consolidated financial guarantee covers costs associated with the physical decommissioning of OPG and Bruce Power CNSC-licensed facilities and costs associated with interim and long-term management of low and intermediate-level waste and used fuel.

The facilities covered under the



consolidated financial guarantee as presented on slide 4 include nuclear generation stations, Class 1 waste management facilities and waste nuclear substance licensed facilities.

Newly added is the cost estimate for decommissioning of the Spent Solvents Treatment Facility.

The individual cost estimates are combined to develop the total decommissioning cost. A contingency is applied to each cost estimate as specific provision for unforeseen elements of cost within the defined scope of the project.

This figure also shows the activities covered under the different segregated funds.

The physical decommissioning of all licensed facilities and the interim and long-term management of low and intermediate-level waste are covered under the decommissioning segregated fund, while the interim and long-term management of used fuel is covered under the used fuel segregated fund.

This diagram illustrates the percentage of costs estimated for the different activities covered under the consolidated financial guarantee.

As discussed, the decommissioning liability for OPG's facilities represents both physical decommissioning activities and waste management.

For 2018, the bulk of the financial guarantee is for nuclear waste management at about 68 per cent of the total, with spent fuel management being about 54 per cent.

The physical decommissioning of the nuclear generation stations represents about 32 per cent, while decommissioning of the waste management in other facilities, like the Spent Solvents Treatment Facility, represents less than one per cent of the total cost estimate.

In order to develop the financial guarantee projections, OPG summarizes all estimated costs for decommissioning of its facilities and waste management.

The table on this slide summarizes the projected annual minimum financial guarantee amount required to cover for decommissioning liability and the projected value of the nuclear funds as of January 1st of each year for the next five-year review period.

Since the projected value of nuclear funds exceeds the financial guarantee required amount for each year of the next 2018-2022 review period, OPG does not anticipate the need for a provision of provincial guarantee to make up for the minimum required amount.

OPG reports to CNSC annually on the status of the financial guarantee through a submission of

financial guarantee annual report and ONFA year-end statements.

CNSC staff report to the Commission on the status of the financial guarantee through the regulatory oversight reports.

Should the CNSC staff find that the nuclear funds' growth is less than projected, OPG might be required to make adjustments for the financial guarantee and, if necessary, to re-introduce the provincial guarantee. Any changes to the financial guarantee will need to be approved by the Commission.

I will now pass the presentation back to Ms Karine Glenn.

**MS GLENN:** Thank you, Dr. Kostova.

CNSC staff have concluded that the revised preliminary decommissioning plans and cost estimates meet CNSC regulatory criteria and that the proposed consolidated financial guarantee is adequate for the future decommissioning of OPG owned nuclear facilities.

CNSC staff, therefore, recommend that the Commission accept OPG's revised financial guarantee based on CNSC staff's assessment of the updated preliminary decommissioning plans, associated cost estimates and the financial guarantee funding proposal.

This concludes CNSC staff's presentation.

We are now available to answer any questions the Commission may have.

Thank you.

**THE PRESIDENT:** So, before we get into the question period, as per our normal procedure, I'd like to move to consider the written interventions.

And the first submission is from Bruce Peninsula Environment Group as outlined in CMD 17-H11.2.

And let me start -- let me open the floor with Dr. McEwan.

**CMD 17-H11.2**

**Written Submission from**

**Bruce Peninsula Environment Group**

**MEMBER MCEWAN:** Thank you, Mr. President.

This was a helpful intervention I thought and I'm just going to start with one question. The intervenor talks about the Douglas Point and points out that it's not actually overtly mentioned within the documentation.

So, is it covered by the guarantee of the costs understood and will it fit within this framework?

**MR. MAUTI:** John Mauti, for the record.

No, Douglas Point is not covered within

our financial guarantee. The guarantee for Douglas Point is provided by the federal government, I believe by the Canadian Nuclear Laboratories Organization now.

**MS GLENN:** Karine Glenn, for the record.

That's correct. AECL is the owner of the Douglas Point facility and they hold the liability. The CNSC staff presented a CMD to the Commission in April of 2016 updating on the status of that decommissioning and their provincial guarantee is provided by the Government of Canada through a letter by the Minister of Natural Resources.

**MEMBER MCEWAN:** Thank you.

**THE PRESIDENT:** Thank you.

Mr. Seeley?

**MEMBER SEELEY:** Perhaps just a question on the estimate for the overall cost of and the financial guarantee.

So, it was referenced that TLG Services were used for the decommissioning cost estimate, so I see they've got quite some experience.

But, you know, the majority of the cost is in used fuel management in terms of the overall financial guarantee. So, my question is, was TLG also used in the used fuel management cost estimate, or were there other expertise or internal house expertise for that? How was

that number arrived at?

**MR. MAUTI:** John Mauti, for the record.

The majority of the used fuel management cost estimate is developed by the Nuclear Waste Management Organization. That joint venture organization, federally incorporated, so they use a variety of internal expertise that they have within the NWMO. They also use engineering companies to help with the estimate for construction of their DGR, I believe companies such as SNC-Lavalin have been used and others as well within their cost estimates that they provide.

**MEMBER SEELEY:** Thank you.

**THE PRESIDENT:** Thank you.

Dr. Demeter?

**MEMBER DEMETER:** Actually, I don't have a question for this particular intervenor. I'll have general questions later, so I can ask later.

**THE PRESIDENT:** Later?

**MEMBER DEMETER:** Later, yeah. So, I'm good. My question's been answered.

**THE PRESIDENT:** Mr. Soliman?

**MEMBER SOLIMAN:** My question has been raised by Dr. McEwan and we received the answer.

**THE PRESIDENT:** So, anything on this intervention? If not, let me move on to the next

intervention which is a submission from Northwatch as outlined in CMD 17-H11.3.

**CMD 17-H11.3**

**Written Submission from Northwatch**

**THE PRESIDENT:** And let me start, Mr. Soliman?

**MEMBER SOLIMAN:** On this submission, page 2, first bullet. My question is to Northwatch if there is any representative here?

**THE PRESIDENT:** No. So, either staff or OPG or some other participant here.

**MEMBER SOLIMAN:** As a matter of fact, all my questions to them, so...

**THE PRESIDENT:** Okay. You don't have to ask questions.

Laughter / Rires

**THE PRESIDENT:** So, next is Dr. Demeter?

**MEMBER DEMETER:** So, Northwatch brings up an interesting comment. And these are economic analyses that will feed into my general questions later, but they ask specifically about the deep geological repository.

Were the economic analyses done with that in place and with it not in place; and if that was done,

which is the more expensive arm? Because if the estimate is less expensive if you don't have a DGR, then that's fine, but I want to know if that's been done because it's been assumed this is a model with an assumption base that the DGR is coming and the date it's coming has changed, but what happens if it doesn't come? So, would your financial guarantee cost change?

**MR. MAUTI:** John Mauti, for the record.

Are you dealing with both DGRs, the used fuel, the low and intermediate-level waste one, or...?

**MEMBER DEMETER:** Sure. I mean, most economic analysis you have a number of variables that have uncertainty and the sensitivity analysis of the worst case scenario that these don't come through and how does that impact your point estimate of cost?

So, what I didn't see in this document was, there was an assumption of that, but I didn't want to assume if that didn't come through it would still cost the same or cost less.

**MR. MAUTI:** John Mauti, for the record.

I think in general when you have a deep geological repository it's a large investment of dollars to construct and to operate and as have shown that sometimes with a deferral of a DGR it ends up reducing the financial guarantee requirement, that's because you're pushing out



further into time large expenditures that when you present value them they end up in a lower financial guarantee.

So, in essence, the pushing out of financial -- or a DGR program would tend to lower the financial guarantee requirement. So what we've tabled and put in front of you is what we believe to be a reasonable period of time for putting in those DGRs and in reality would probably have a higher level of financial guarantee than if they were soon to be pushed out even further.

**MEMBER DEMETER:** Thank you.

**THE PRESIDENT:** Thank you.

Dr. McEwan.

**MEMBER MCEWAN:** Thank you, Mr. President.

I think this is a follow-on question from Dr. Demeter's.

If I take the second-last bullet of the Northwatch letter, I think I understand the question but I think it would be helpful if you could explain how you address that issue and what the outcome of your discussions would be.

**MR. ROB:** Art Rob for the record.

Just to clarify the question, this is the question about the type of media that (indiscernible)?

Okay, thank you.

So the assumptions that were made in the

EPM cost development by Nuclear Waste Management Organization assumed that they're going to have found the DGR in crystal and rock, which is the most cost-conservative assumption, and the costs associated with that have been somewhat attenuated by actually finalizing the engineered barrier method they've chosen. But there is no current plan to have a dual type of media repository, it will be one or the other, and the conservative approach has been used in terms of cost for that.

**MEMBER MCEWAN:** Thank you.

**THE PRESIDENT:** Thank you.

Mr. Seeley.

**MEMBER SEELEY:** No further questions.

**THE PRESIDENT:** Okay. Any other questions to this intervention?

Okay. I thought that -- just for the record -- the intervenor was complaining about the lack of time given for this particular consideration and I see a member of the Secretariat who is going to explain it to us.

Go ahead.

**M. LEBLANC :** Merci. Marc Leblanc, Secrétaire de la Commission.

So it is accurate that the intervenors were provided 18 days to submit a written intervention, as opposed to the usual 30 days. This was because of unusual

circumstances here. This matter started as a hearing without interventions but was changed midstream to allow interventions in writing. So to enable this matter to be heard today, the Commission provided a shorter time period to submit interventions.

This was a one-off special situation and the Commission will continue to provide at least a 30-day period to submit interventions in normal circumstances. So this was really a one-off. We always feel it is important to provide enough time to intervenors. In this particular case the time period was shortened somewhat, but the intervenor did not request any extension and did not inform us of their concerns about the timing until we received the intervention.

**THE PRESIDENT:** Thank you.

I have only one other question. The intervenor asked the question about the spent solvents that were not considered before and now were considered. Can somebody explain why? What's the change here?

**MR. ROB:** Art Rob for the record.

So the Spent Solvent Facility was previously excluded from the 2012-2017 submission. It was added into the 2018-2022 submission. In actual fact there is a current project underway to decommission that facility and it will be completed in 2018.

**THE PRESIDENT:** But what was the rationale for excluding it before? Was it not viewed as waste?

**MR. ROB:** I believe the exclusion was the fact that that project had already been started. It started in late 2016, it's ongoing, so I think they assumed it would be completed before the end of 2017.

**THE PRESIDENT:** Okay. Any final questions?

All right. So now let's move into general questions and let's start with Mr. Seeley.

**MEMBER SEELEY:** Perhaps just a clarification. The overall cost estimate and the overall financial guarantee totals seem to match up and we don't need an additional provincial guarantee, but with respect to individual funds, the Used Fuel Fund, is it sufficient to cover the cost for long-term management of the used fuel? The used fuel component is the largest, \$21 billion. So is there any -- I guess my question is: Is there any restriction on how those three funds are used or can they be used, the three of them in total, to cover different activities even though the fund activity, for example, decommissioning fund, could still be used for used fuel activities, et cetera? So how do those three work together and do they cover off what's needed in the individual totals in the end?

**MR. MAUTI:** John Mauti for the record.

The requirements as part of the Ontario Nuclear Funds Agreement are very specific that the programs that each fund is able to manage cannot be mixed. So the management of the used fuel in the long-term used fuel program is funded from the Ontario Nuclear Funds Agreement Used Fuel Fund. I'm just trying to see if the actual value -- it's not looking at the constant dollar term, just the present value calculation. We would have to see if the value of the Used Fuel Fund was sufficient for that. For financial guarantee purposes for the CNSC, it's done on a consolidated basis, so it's the value of all the funds together in comparison with all of the financial guarantee requirements. When it comes down to the actual execution of the work, we would have to be very careful and specific between the value of the funds themselves and the value of the programs. In terms of the Access Agreement to the funds that the CNSC would have through access to the ONFA funds, I don't believe there are any restrictions on how the CNSC can access and use those funds as part of the Access Agreement. So depending on the situation, it would depend. If we were continuing to manage this program, we look at it fund-specific to fund programs, and if there's a shortfall in any one of those funds, for ONFA purposes we would have to start to contribute more dollars back into

that fund even if there was extra sitting in the other funds. So as we're managing and executing, we keep track of the funds separately.

**MEMBER SEELEY:** Right. So I guess my question would then be: For the Used Fuel Fund, how much is in that fund today versus the PV estimate for the used fuel management?

**MS GLENN:** Karine Glenn for the record. Perhaps we could ask Mr. McCauley from Natural Resources Canada to provide a little more information, but it's really important for the Commission to know that these estimates are revised on an ongoing basis and when planning assumptions change. Albeit, as we saw, OPG updated -- the planned in-service date for the used fuel Deep Geologic Repository has now been pushed by eight years. So they revise their estimates to account for that. So at a minimum every five years they will be revising their cost estimates to ensure that they are still current and reflect their liabilities as they stand today based on the best available planning assumptions. Should something like, I'll use an example, the OPG DGR not be given approval to proceed, then OPG would be required to revise their cost estimate and if there's any impact on their financial guarantee to submit a revision to that financial guarantee.

Specifically to the *Nuclear Fuel Waste Act Fund*, I will ask Mr. McCauley from Natural Resources Canada, as the agency responsible to approve the funding formulas for that fund, to elaborate on that.

**MR. McCAULEY:** Thank you.

My name, for the record, is Dave McCauley. I'm the Director of the Uranium and Radioactive Waste Division at Natural Resources Canada.

A question was put as to what the amount is in the Nuclear Fuel Waste Act Fund at this time, and it's just over \$4 billion.

A couple of other questions were raised. First of all, in terms of restrictions on the use of that fund, that fund is only available to the Nuclear Waste Management Organization for expenditures on the construction and operation of the eventual APM DGR after it has received a construction licence from the CNSC. So it's only the NWMO that is able to make expenditures on that facility and there's a restriction as to when those monies can be used.

**MR. MAUTI:** This is John Mauti for the record. Just a little further clarity on that.

The value of the nuclear fuel waste trust fund may be a bit in excess of \$4 billion. That's one of the components of our Used Fuel Fund. I just looked at

what the breakout of the segregated fund expectation is and the value of the Used Fuel Fund is in excess of \$9 billion currently, and the value of the financial guarantee for the used fuel component, as we saw in our presentation, was approximately \$8.9 billion. So even if you look at just the Used Fuel Fund in isolation in the Used Fuel Management Program, there's sufficiency right now in the Used Fuel Fund to cover it.

**MEMBER SEELEY:** Thank you for that.

**THE PRESIDENT:** So just to piggyback on this, NRCan, do you do your own independent due diligence on that fuel fund?

**MR. McCAULEY:** Dave McCauley for the record.

The funding formula was approved by the Minister in 2009 and it set out the basic concepts associated with what the contributions will be from the nuclear energy corporations and Atomic Energy of Canada Limited to the fund. The Department discusses changes to the assumptions involved in the cost estimates with the NWMO at least annually, and certainly when there are major changes they consult with us on that. On an annual basis we review the allocations that the NWMO makes for the contributions for each of the participants in the NWMO and we ensure that we receive audited statements from the



nuclear energy corporations and the AECL that indeed they have made their contributions to the fund.

The legislation provides that, as I indicated, the minister approved the funding formula back in 2009 once the APM approach to long term management was selected. The minister will have another opportunity to approve the funding formula after a licence has been issued for the construction of the facility, so to provide assurance that funds will be available for the construction of the facility before construction proceeds.

**THE PRESIDENT:** I am a bit out of scope but I can't resist asking the question. So you know the legislation right now talks about spent fuel, not any other high level waste. So I know at one time there was consideration about amending the legislation because there is no place to put high level waste. It's not intermediate, it's not low, and it's not fuel. So is any consideration being given -- I thought the industry at time was pondering about what to do with this.

**MR. McCAULEY:** Thank you. Dave McCauley for the record.

The definition actually is nuclear fuel waste in the legislation, and you're correct that it seems rather exclusive to fuel bundles produced by generating these commercial power facilities. In fact, I think that

the NWMO in its proposal for the adaptive phase management approach and the concept that it put forward to government for approval took a rather broader perspective on the types of high level waste that would be included in the facility to include, for example, research reactor fuels that might be at some of the research reactors.

**THE PRESIDENT:** Okay. I will leave it at that now. I am moving to Dr. Soliman.

**MEMBER SOLIMAN:** Thank you very much.

My question is on CMD 17-H11.1, page 4, section 4 about the waste management and decommissioning cost estimate. I understand that we calculate the -- that identifies the activities and then divide these activities into labour and material, and calculate the cost with today's dollar and then escalate the material with an escalation factor for a certain period of time together with the labour, and then return back every activity by applying a discount factor to calculate the PV today, or 2018.

I would like to know, we estimated -- or the escalation factor of 2 for the material and 3.4 for the labour, is this annually for every year?

**MR. MAUTI:** It's John Mauti for the record.

Yes, these would be escalation factors

that would be applied to each year that those costs would be expended. So if the cost was expended 10 years from now, you would have 10 years of escalation for materials at 2 percent per year for those 10 years.

**MEMBER SOLIMAN:** Okay. It's not mentioned here that this is yearly in any way.

If you -- if the economic factor changed from one year to the next then you -- this number or this escalation factor will be different. So this is an average for them or the high calculated escalation or what is it exactly because it is different from one year to the next?

And I would like also to know what is the economic factor that you have used to calculate these numbers, and have these numbers been verified or not?

**MR. MAUTI:** John Mauti for the record.

As stated in the DIS, we use an independent third party. The University of Toronto has an economic forecasting series that we use consistently over various reference plans. So this would be external experts' expectation of escalation. What they actually produce is a short-term change in those escalation factors for between five to 10 years and then a long term factor that's applied for every year after the short term series is produced.

So they recognize that, given certain

expectations in the economy there could be fluctuations in the short term. They tend to normalize to a long term value, and then that long term value is used for each and every year past the short term series.

So we use the University of Toronto. They've had experience in doing this, obviously. They vet them. I think they have produced twice a year annually -- twice a year changes to those assumptions. So we used the most recent one that was available in advance of the setting or cost estimates as part of their escalation series. So we believe it to be a sort of valid and credible third-party vetted process to come up with those escalation factors. It does recognize short term changes and fluctuations, again based on an expected value that they would have.

**MEMBER SOLIMAN:** I presume that if there is a fluctuation on these numbers, in order to be conservative you have to pick up the maximum, the biggest number, the biggest -- take escalation number, if it is 2 and 2.5 and 2.6 then you have -- in order to be conservative you have to pick up the 2.6 and apply it. Did this happen? Because you are giving one number, I don't know what this number is. Is it average or maximum or minimum? And this is why I am asking did a sensitivity analysis on that number has been done in order to firm the

present value.

**MR. MAUTI:** John Mauti for the record.

Two things that we do, I think, that could provide some comfort to you. One is in our annual reporting process we actually replace what the forecasted value was with what the actual historical value was and try to figure out if that's had a change in the financial guarantee requirement process going forward. So we actually do convert from forecast to actual to track what that process is like.

And in terms of whether we use conservative values for this, what I can suggest is the labour escalator which is by far the largest of the two with 3.4 percent, there is no assumed delay for productivity or any labour savings that is built into that long term forecast which many others would use as part of an escalation process for costs.

So we use what we consider to be a fairly conservative 3.4 percent escalator per annum on labour in perpetuity going forward. So we do believe that is on the conservative end of the forecasting series, yes.

**MEMBER SOLIMAN:** Okay. I have an earlier question which you didn't answer: What is the economic factors that go into the escalation number and the discount

number and are they different?

**MR. MAUTI:** John Mauti for the record.

In terms of the escalation series we do rely on the economic experts within the University of Toronto that provide those estimates to us.

What I can say for the discount factor is what we use for discounting purposes is a 5.15 percent discount rate. That discount rate is selected because that's the targeted growth in the nuclear funds going forward. So it's the source of funding to satisfy the financial guarantee requirement so it's an appropriate discount factor to use for that.

**MEMBER SOLIMAN:** I am asking about in order to evaluate the discount number and the escalation number, what is the economic factors? They are the same or not? If they are the same then I am questioning the 5.15 because if you take a certain amount of money and you escalate it for a certain period of time with the escalation percentage and then you bring it back to the same year and the economic factors is the same, then this number should be the same.

And 5.15, has this number been verified regardless of source? Did you verify this number from many -- by other means? Because five point -- these three numbers, the escalation on labour and material and the

discount number, can give you any number you want. I have done some calculations and this discount number, any sensitive -- it is very sensitive. Any change in it can give you a different answer of billions of dollars.

**MR. MAUTI:** John Mauti for the record.

I do agree, given the long time period we're talking about with these programs, the economics on escalation and discounting play a very large role in determining those numbers. On the discount rate itself, it was a discount rate that is agreed to with the Province of Ontario in terms of using a long term CPI in addition to real rates of return that are expected. That rate is a rate that is accepted by the province. It's what we use to actually target the growth of our nuclear funds and it's the same target that we use for discounting the liability.

As I mentioned in terms of the escalation, I think we used a conservative end of the spectrum when it comes to labour which is the predominant feature as part of our financial guarantee and our cost is labour-based. We do believe that 3.4 percent is a conservative number for that escalation so, if anything else, that produces a high value in the financial guarantee itself.

So I am trying to sort of understand -- I do agree that the interplay between those factors is key and it drives the substantial change in the value of those.

I'm just trying to sort of articulate that the escalation process we follow we believe to be nothing if not a conservative value which would, therefore, increase the level of the escalated dollars that we're using.

**MEMBER SOLIMAN:** Regardless who agree with you or not agree with you, I'm asking about how do you verify the 5.15. Did you go into other industries and see how much this number is?

This number is excessive, and this is why we start with a present value, that we end with a very low present value.

And by the way, this will decide, at the end, if you need a guarantee from provincial guarantee or not.

So this number is very sensitive. Like the difference between four and 5.15 can be huge, and it can be a factor for -- for you to need a guarantee from the provincial government or not.

So the answer up to now, I'm not convinced, quite honestly, that you answered my question.

**THE PRESIDENT:** I think it's time to get -- if the Department of Finance of Ontario is anything like the federal Department of Finance, they've looked into this with great attention. So the question is, are you satisfied with the analysis and the forecast?



As a famous intellectual said -- it's Yogi Berra I'm talking about -- if you want to be a good forecaster, forecast often.

And since we're going to get an update on actual basis forecast, I'm not too concerned about the accuracy because it's going to be annually updated.

But I am interested in Department of Finance view because our finance department would never allow us to be in surplus position. Any surplus position they get the central government will scoop, so why would you -- what's the logic of you allow them to actually maintain a surplus rather than increase the dividends they're paying you?

**MR. KWAN:** Ronald Kwan, for the record.

I will state that the Ministry of Finance and the Ontario Financing Authority implementing the Ontario Nuclear Funds Agreement on behalf of the province does review on a five-year basis OPG's submitted reference plan for the purposes of the Ontario Nuclear Funds Agreement.

Part of that review includes the economic assumptions that Mr. Mauti was speaking to with respect to both the escalation factors as well as the discount rate used by -- we can confirm that we do review the economic projections provided by U of T. We check against their

consistency with respect to our own Office of Economic Policies projections for those periods.

I would say as well that we do take comfort that there is a consistency between them, the escalation factors and the discount rate used. With respect to the 5.15 percent that Mr. Mauti referred to is composed of both a 3.25 percent real rate of return assumption as well as a 1.9 percent assumption on the growth of Ontario Consumer Price Index.

So the -- there is a consistency between both the escalation of the costs as well as the discounting of those costs, so we take comfort in that as well.

We also take comfort, as Mr. Mauti has said, that there is conservatism with respect to not including an assumption on a growth and productivity factor so that we are not assuming that -- in these programs that there is productivity improvements. So again, we take that as a conservative factor to be built in to the economic assumptions used to generate these liability estimates.

With respect to the surplus that you refer to and the surplus in the Ontario Nuclear Funds, there are -- there are provisions within the ONFA Agreement that there are, as Mr. Mauti has -- or as noted, there are -- there is a surplus right now in the funds.

There is a surplus with respect to the

financial guarantee requirement. There is also a surplus with respect to how it was calculated for the Ontario Nuclear Funds Agreement purposes.

When the ONFA reference plan was brought forward to the Ministry of Finance for approval, there is an opportunity for the Minister to say if the province could have access to its share of a surplus under the ONFA agreement.

To date, the province has never chosen to scoop those amounts, as you said, I think in part because we do treat seriously the need to have the nuclear liabilities funded for but also, in part, I would say that the -- that the -- as you may recall from previous times when we had the opportunity, there are certain rate of return guarantees that the province provides with respect to a portion of the used fuel fund. And that rate of return guarantee provides some certainty for the value of the funds, but it also means that, under that rate of return guarantee, if the province were to take some of that excess amount gained to this point, if, at some point, the financial markets were to be less robust, then the province would also be obligated to return those funds, interest to the used fuel segregated fund.

So that also has consideration in the province and the Ministry of Finance on whether or not it

chooses to take the surplus out of the funds at this point.

**THE PRESIDENT:** Thank you.

I also would like -- what kind of economic surplus or whatever you -- or financial analysis staff at CNSC does about reviewing all those numbers?

**MS GLENN:** Karine Glenn, for the record.

I'll ask Ms Amanda Wark to provide an answer to that, but perhaps to add another level of comfort to the Commission, the numbers that we're seeing put forward for both the escalation and the discount rates are very similar to those we've seen from other financial guarantees that have been put forward by other utilities in the other provinces, so Hydro Quebec and New Brunswick Power.

So I'll pass it on to Ms Wark.

**MS WARK:** Amanda Wark, for the record.

In terms of the 5.15 percent escalation factor, discount factor, also we've also looked at the historical performance of the fund. And over the past 10 years, there has been historically greater than five percent rate of return from these funds, so we consider just the -- from a high level what has been factored into this analysis and concur with what OPG has presented.

**THE PRESIDENT:** I'd like to move now to Dr. McEwan.

**MEMBER MCEWAN:** Thank you, Mr. President.

This sort of -- particularly the surplus piece, it sort of reflects a little bit one of North Watch's comments, but also something that I didn't understand as I was reading through this. And that is just the cost -- if we take the nuclear generating stations and the cost of the decommissioning -- and I think you have a figure identified in there. And that's clearly dependent upon the end of state after decommissioning and the costs associated with that.

What are the error bars associated with those costs, and how much is the -- how much is the degree of those costs going to be varied by the definition of what the end of state decommissioning is?

**MR. MAUTI:** John Mauti, for the record.

Just to make sure that I understand the question, it's more the impact of the end of life assumptions for the station?

**MEMBER MCEWAN:** So sort of impact of the end of life, but also the whole process. And if the definition of "end of life" changes, is that likely to have significant impact on the total cost of the decommissioning?

I think what I'm trying to say is we've discussed this surplus, the nominal surplus, I guess. Is

that required to cover the error bars that would be associated with the costs of decommissioning and any ongoing changes that would be in the end of life decommissioning state?

**MR. MAUTI:** John Mauti, for the record.

I could deal with the time estimate or what happens with end of life. And as we tried to go through in the presentation, decommissioning is maybe a simple example. Decommissioning still has to happen.

At the Bruce B station, for example, with the extension of 30 plus years of operations that quantum of decommissioning effort happens, but it happens much later in the process, deferred by 30 years. So that -- because of the time value of money and discounting, that will lower the price and value holding all other things constant.

So the extension of the Bruce lives and, to a much smaller extent, extension -- life extension working off of Pickering will have the impact of lowering the decommissioning present value for financial guarantee purposes.

That's one of the reasons why the level of funds that we have may be higher than the financial guarantee requirement in some part on the decommissioning side, is because of that.

And I'll ask Mr. Art Rob to maybe go through some of how the decommissioning cost estimates themselves may change and how the surplus may be used for that.

**MR. ROB:** Art Rob, for the record.

So just to clarify the question, looking at the submission from North Watch, there is a question about what end of life for the site might be, and of course the definition of "end of life" and what the final end state of the project would look like is something that will still change as the project -- the projects are evolved and we do more definition work on it.

Currently, of course, with the five-year resetting of the financial guarantee, there's ample opportunity with the discount period to make some of those adjustments still in assumptions for end of life for the stations.

Currently, we carry assumptions for release limits and stuff that we're doing and we assume, of course, what the end state would be to have prepared the estimate in that kind of format.

**MS GLENN:** Karine Glenn, for the record.

So the end states that are assumed for all the facilities that are to be dismantled is that as brown field, so the removal of all radiological and hazardous

material to a level to which they could be released for industrial reuse.

And as a conservative end state assumption, it is one that would involve the most removal of the -- of the material from the site. Obviously not included in that would be any deep geologic repositories where the material is expected to remain there.

Because we are still working on preliminary decommissioning plans and OPG has an opportunity to revise their decommissioning plans as they progress through their operations and get nearer to decommissioning, they would have an opportunity to revisit that end state if they so desired and reflect that in their cost estimates.

Right now, the preliminary decommissioning plans do not authorize them in any way, shape or form to actually conduct those decommissioning activities.

With respect to conservatism, the cost estimates include contingencies that vary widely, and by widely it's dependant on the risk and the uncertainty associated with a particular activity. So there is an activity-specific contingency that is built into the cost estimates and that varies, again, based on risk and uncertainty. Then, in addition to that, there is an overall contingency percentage that is applied to the entire



amount.

So there is a large level of conservatism that is built into the cost estimates, even before we add in then the economic assumptions.

**MEMBER MCEWAN:** Thank you. Just remind me, this is updated every year in the ROR, isn't it?

**MS GLENN:** That's correct. Karine Glenn, for the record. Every year we provide an updated value of the current value of the fund for that year, as reported to us by OPG.

**THE PRESIDENT:** Thank you. Mr. Seeley.

**MEMBER SEELEY:** Maybe just on the point we talked about earlier. In fact, there are two major activities we're talking about here; the decommissioning activity, and the used fuel management activity, and each of those has to essentially be covered by its own funds. There are different funds for different activities.

So it's worth maybe, in the summary, showing how those totals tally up so that there are sufficient funds for each activity covered. So maybe in the future that could be done.

Maybe just before we give away some of the surplus and dividends, Mr. President, it's worth noting that these cost estimates -- of course the value of a cost estimate and the accuracy and degree of confidence has a

lot to do with what information is used to build it up, and the level of knowledge of the activity building it up.

These cost estimates usually then have either classes or -- that define the level of confidence. So Class 1, 2, 3, 4, and they often go with plus or minus numbers, so plus or minus 10 per cent, plus or minus 15, 20, plus or minus 50 per cent if you're into kind of a Class 4 estimate, which is probably where...

You know, I guess my question is, you know, where are we in terms of our degree of confidence in these estimates? Just for the record, I'd like to have a response on that. Thank you.

**MR. ROB:** Art Rob, for the record.

So TLG Services Inc. is an internationally reputed agency, and they provide the estimates for the North American plants. They actually look at several things to adjust and accommodate some of the uncertainty in the scope of work we're given.

So during their preparation of their estimates they actually, like Karine had indicated, they use allowances and certain work factor corrections that are done to the work scope as it's done. On top of that, then a contingency is applied to cover off the general uncertainty in the estimate.

For this, based on what's requested in the

regulatory documents, the uncertainty of the estimates somewhere around Class 4, like you indicated. With that Class 4 uncertainty, depending on the amount of definition we completed, the uncertainty can be as high as 50 per cent on the high side and 30 per cent on the low side.

Right now, as we continue to refine the definition, the definition is about 1 to 15 per cent for a Class 4 estimate, and we're in that range of definition as well to refine our estimate and give us confidence that we actually do have a Class 4 estimate.

**MEMBER SEELEY:** Thank you.

**THE PRESIDENT:** Thank you. Dr. Soliman.

**MEMBER SOLIMAN:** Thank you. I have a question for the Staff, CMD 17-H11, page 16. Now with an average of 2.7 per cent, the first paragraph at the top of the page:

"In order to develop the final estimate, OPG has used the economic forecasts from the University of Toronto Institute of Policy Analysis Economic Forecasting Series which averages approximately 2.7% per year."

Does the average give you the same value as -- the average of percentage give you same dollar value

as the percentage? Like, if there is percentage escalation on the material and the labour is 2.0 and 4.3, and you just add these two together and you say the average is 2.7. If you work the 2.7 into the equation or you work the 3.4 and 2.0 into the same equation, does this give you the same answer?

**MS WARK:** Amanda Wark, for the record.

We don't redo all of OPG's calculations. What, from a finance perspective, we do, we review the high-level economic considerations. So we review the 3.4 and the 2.0 per cent to ensure that they are reasonable and done by a reputable source. But we don't redo the calculation in terms of would it give us the same answer if we to use the average as it would if we were to use the breakdown separately.

**MEMBER SOLIMAN:** Okay. This is a political answer to a mathematical question. The answer is no.

The only case where the average can give you the same answer, if the cornerstone value of the material and the cornerstone value of the labour is the same. That's the only way. Since they are not the same, this will not give you an answer. By the way, for the percentage, there is no equivalency in the percentage. That is what we call -- there is equivalency, but there is no average.

You cannot average percentage, but you can average -- based on the principal value and based on the rate of escalation there is a formula for that. If you like, I can send it to you, where you can get completely different numbers than the 2.7. That's number 1.

Number 2, the figure -- the figure at the same page, it is not million, it is billion. Right? Do you agree with me?

**MS GLENN:** Yes, that's correct.

**MEMBER SOLIMAN:** Okay.

**MEMBER DEMETER:** So I just wanted to reflect that some of the comments made here I totally agree with. That for me to look at this document and have confidence that this is an adequate guarantee, that doesn't provide me the methodology for how this was approached. So to say we consulted with the U of T and consulted with our consultants, their information's not on the table.

So it would be really nice to have what are the major cost drivers, what was the sensitivity analysis, and at what point did you draw your line to make it robust? Did you do it the 75<sup>th</sup> -- like, if you've got a range of X to Z for all of them and you set them all at the highest cost, then you pick a percentile that drives how robust or how conservative...

So a simple explanation of the major cost

drivers and how conservative you dealt with them would be really helpful to give someone like me who's just read this, what was presented, confidence that the estimate was appropriate.

But the comment I had here though, and I hate to revisit it, but your discount factor you said was a mix between the CPI, consumer price index, 1.9, and your return on investment of 3.1. But that's sort of mixing a discount factor with an operating cost. If you use the money for this or you use the money for that, you might lose out on something. But you're actually making money on that money by interest anyways.

So your discount factor -- and it's not an opportunity cost, because you don't have a choice. You have to put money aside. You can't say, well, I'd rather not put money aside for this, because I'd rather use it for something else. You have to put money aside for this, so it's not really an opportunity loss because it's a mandate.

Just to give you an example. The 5 per cent sort of caught me off guard. Because in the healthcare sector the standard discount factor in 2017 for future costs for healthcare technologies is 1.5 per cent. So the 5 per cent seemed very robust and seemed to be a mix of discount factors and operating costs, which there surely shouldn't be a mix, because you are making some money on

that money as it's invested.

If you lower that discount your estimates will go up quite a bit. It is a very elastic variable in your modelling. So I really question the 5.15 per cent given the way it's set up. I think it's way too high and it undervalues the cost -- it discounts it way too much.

**MR. MAUTI:** John Mauti, for the record.

I would have to counter that with I guess the economic principle that when you're looking at a series of future cash flows to present value, you need to look at the source of financing that you're dealing with to exercise those obligations. In this case, there's a very clear line between the source of financing, being the money that we specifically set aside. In our segregated funds, they are targeted to grow through evaluation and expert input, and evaluation of our assets and liabilities. They are targeted to grow at a rate of 5.15 per cent.

So that's the source of financing that's used to discharge these obligations. I think it is the most appropriate way to look at value of discount in the series of future cash flows.

It's really no different than if you look at how pension plans are valued. For funding purposes you look at the future value of your obligation stream for pension plans. You actually discount that at the same

targeted rate of return that your pension fund assets are put aside, because you're matching those two.

So I accept that it may be different than other discount factors that are used and how they come about. But in our instance, I think we have specified funds set aside that are used to discharge those obligations, and that would be the most appropriate basis for the discount.

**THE PRESIDENT:** So that brings me to a question. Is the LTG report itself, which I assume, together with the Toronto forecast report, are all of these available or are they confidential proprietary reports? Because I assume -- I don't want to ask to be the expert around calculating this stuff, but we're trying to understand, if you like, how good the expert advice is into it? I assume they are in those reports. Are those reports accessible by Staff, for example? Do you see the TLG report? Do you see the University of Toronto forecast, and you look at the methodology and all that stuff?

**MS GLENN:** Karine Glenn, for the record.

Yes. CNSC Staff do have access to the TLG report. Unfortunately, the methodology that is used by TLG is proprietary to them, and that's why that document cannot be made public.

The decommissioning plan, which outlines what activities are covered are public, and OPG has those



posted on their website. But the actual cost estimates, the detail of the costs estimates, is not available. OPG, however, has provided this cost DIS, this information summary document, in order to provide the high-level costs to the public.

Typically, other than the total value of the financial guarantee, this information is not made public, as is the case with the other financial guarantees that we've put before the Commission in the past.

**THE PRESIDENT:** So if I understood correctly, theoretically you could have at least provided some of that documentation, the technical analysis, to the Commissioners? We should be careful what we wish for but, you know, sometimes you may need to give us all the details so we don't spend a lot of time trying to understand them here. Is that a yes?

**MS GLENN:** Karine Glenn, for the record.

The Commission is always welcome to request any of the references in the CNSC Staff CMD. The costs estimates were referenced in the CMD, we didn't provide them because of the volume of information that is contained in those documents.

But if the Commission would request them to be provided going forward, that can be arranged, yes.

**THE PRESIDENT:** Thank you. Any other...?

Go ahead.

**MEMBER SOLIMAN:** I don't have anymore technical questions, but this is an illustration on H11.1, Appendix A. There is a flow -- I cannot call it a flow diagram, it is just an illustration showing how the used fuel or -- this illustration is very confusing. I would like somebody to explain to me what the cycle, for example, for the used fuel and whether the Darlington and Pickering two boxes need more bullets.

**MS GLENN:** Karine Glenn, for the record.

Maybe I'll start and then OPG can describe the diagram in further detail.

Currently, OPG's waste is stored in three locations: the Pickering Waste Management Facility; the Darlington Waste Management Facility; and the Western Waste Management Facility.

All low-level waste is stored at the Western Waste Management Facility. The Pickering Waste Management Facility has some intermediate-level waste from the refurbishment of the station, and has used fuel that is stored at that facility. With Darlington as well, there will be some intermediate-level waste that will be stored at that station from the ongoing refurbishment and the used fuel from that station, from the Darlington Station, is stored at the Darlington Waste Management Facility.

The Western Waste Management Facility houses all the other waste; low and intermediate-level waste that is generated at all of OPG's facilities, and it also stores the used nuclear fuel from the Bruce Station. That's where the fuel is currently stored on an interim basis. All used fuel is slated to be disposed of in the Adaptive Phase Management Deep Geologic Repository project. I would like to point out that the Nuclear Waste Management Organization will be coming before the Commission to give an information update at the November Commission meeting.

With respect to all of the low and intermediate-level waste that OPG has currently stored or will generate in the future, that is currently slated to be disposed of in the OPG Deep Geologic Repository, which is currently with the Minister of the Environment for an environmental assessment decision.

**MR. SULLIVAN:** Gord Sullivan, Director of Eastern Waste Operations at DGR.

The description that was just provided to you is accurate. We do maintain three nuclear waste facilities: one at Western; one at Pickering; and one at Darlington. As described, each does have a variety of waste. We do process used fuel at all three of those facilities. We have a central Western Waste Management Facility that we take our low and intermediate-level waste

to, where it is stored on an interim basis.

As we await for approvals for our low and intermediate-waste DGR, which is adjacent to the site where we currently store the waste, that's where we'll position our low and intermediate-level waste from our operations and refurbishment. We do await for the used fuel repository to move our used fuel, which is currently stored in our dry storage facilities in dry storage containers. We wait for that used fuel repository to be in place before we can move that fuel to that location.

**MEMBER SOLIMAN:** All what I'm saying here is that you need to write something about this illustration, because there is arrows coming from every direction to another direction, and that is very confusing.

For example, the operational waste is coming from Darlington and Pickering and going to Western Waste. Then there is no -- where it will go after that is not illustrated in this illustration.

The used fuel from Pickering into the used fuel repository. You need to highlight that this is used fuel, there's just an arrow and it doesn't really show.

So I mean, in terms of clarity of this illustration, it's not very clear for the reader. That's all what I'm...

**MR. SULLIVAN:** Gord Sullivan, for the

record.

We appreciate your comments, and we'll certainly do a better job next time around. Thank you.

**THE PRESIDENT:** Can I piggyback on this? I'm trying to understand how Bruce deals with you guys on the cost. Are they part of this analysis? Obviously they have to pay for their waste. How does it work? Do they also do some scrutiny to these financial guarantees or you just send them a bill and they pay?

**MR. MAUTI:** John Mauti, for the record.

I wish it was that easy. The assumptions that we use in terms of how the fuel is going to be generated at the Bruce site and how that's going to be stored there and eventually moved, whether it's the used fuel or the low and intermediate-level waste, all form part of the information and we then sit down with Bruce to determine a rate to charge them.

We actually update those rates every five years, and we update our cost estimates. So a lot of the same information that you see here then is also tabled with Bruce who will look at, will ask questions, will challenge. In the end we negotiate a commercial arrangement with them so that we charge them for the amount of fuel bundles they generate and the cubic metres of low and intermediate-level waste they generate as well.

**THE PRESIDENT:** So they do their own financial due diligence on all of this?

**MR. MAUTI:** John Mauti, for the record. Yes, they would look at our estimates. Some of the estimates we have come from them in terms of, you know, their assumed generation, their outage plans, the amount of operational waste they will generate. So it's a bit of a process of getting information from them. We would then use that to come up with our cost estimates. We would then table that with them. There's a challenge process back and forth, and negotiation, and we strike sort of a price for the next five-year period to deal with the cost of waste.

**THE PRESIDENT:** Okay, thank you. Anybody else have any other questions?

So just an aside. I like Appendix B, by the way. So I don't need much explanation on that one. But I sure would like to see an update of this on an annual basis. It tells us really the timelines that are being assumed here, and we'll see how good forecasters you are.

Anyhow, on that note, I'd like to bring it to a close. Okay, thank you. Thank you all.

**MS MCGEE:** With respect to this matter, I propose that the Commission confers with regards to the information that has been considered today and then

determines if further information is needed, or if the Commission is ready to proceed with a decision. We will advise accordingly.

This concludes the hearing on the request by Ontario Power Generation for the acceptance of its revised financial guarantee.

The Commission meeting will begin at 3:00 p.m.

Thank you very much for your attendance and participation.

--- Whereupon the hearing concluded at 2:48 p.m. /

L'audience s'est terminée à 14 h 48