

**Canadian Nuclear  
Safety Commission**

**Commission canadienne de  
sûreté nucléaire**

**Public hearing**

**Audience publique**

**June 8<sup>th</sup>, 2011**

**Le 8 juin 2011**

Public Hearing Room  
14th floor  
280 Slater Street  
Ottawa, Ontario

Salle d'audiences publiques  
14e étage  
280, rue Slater  
Ottawa (Ontario)

**Commission Members present**

**Commissaires présents**

Mr. Michael Binder  
Dr. Moyra McDill  
Mr. Dan Tolgyesi  
Dr. Ronald Barriault  
Mr. André Harvey

M. Michael Binder  
Mme Moyra McDill  
M. Dan Tolgyesi  
M. Ronald Barriault  
M. André Harvey

**Secretary:**

**Secrétaire :**

Mr. Marc Leblanc

M. Marc Leblanc

**Senior Counsel :**

**Conseillère principale:**

Ms. Lisa Thiele

Mme Lisa Thiele

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Ottawa, Ontario

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--- Upon commencing on Wednesday, June 8, 2011  
at 9:03 a.m.

**Opening Remarks**

**MR. LEBLANC:** Bonjour, mesdames et  
messieurs. Bienvenue aux audiences publiques de la  
Commission canadienne de sûreté nucléaire.

The Canadian Nuclear Safety Commission is  
about to start a series of two public hearings this  
morning. We will start with the application by Atomic  
Energy of Canada Limited, or AECL, to renew its nuclear  
research and test establishment operating licence for the  
Chalk River Laboratories.

This afternoon we will hear from Canadian  
Light Source on their application for an amend to its  
particle accelerator operating licence.

The Commission meeting is scheduled to  
start at three o'clock this afternoon and resume tomorrow  
morning at 9:00 a.m.

During today's business we have  
simultaneous translation. Des appareils de traduction  
sont disponibles à la réception.

1                   Please keep the pace of your speech  
2 relatively slow so that the translators have a chance to  
3 keep up.

4                   Les audiences sont enregistrées et  
5 transcrites textuellement. Elles se font dans l'une ou  
6 l'autre des langues officielles compte tenu de la langue  
7 utilisée par le participant lors de l'audience publique.

8                   I would also like to note that the  
9 proceeding is being video webcasted live and that the  
10 proceeding is also archived on our website for a three-  
11 month period after the close of the hearing.

12                   Les transcriptions seront disponibles sur  
13 le site web de la Commission dès la semaine prochaine.

14                   To make these transcripts as meaningful as  
15 possible, I would ask everyone to identify themselves  
16 before speaking.

17                   As a courtesy to others in the room, please  
18 silence your cell phones and other electronic devices.

19                   Monsieur Binder, Président et premier  
20 dirigeant de la Commission canadienne de sûreté nucléaire  
21 présidera l'audience publique d'aujourd'hui.

22                   Mr. President, after you've shown the  
23 example.

24                   **THE CHAIRMAN:** I guess I always follow  
25 orders. Good morning everybody, and welcome to the public

1 hearing of the Canadian Nuclear Safety Commission.

2 Mon nom est Michael Binder, je suis le  
3 président de la Commission canadienne de sûreté nucléaire  
4 et je vous souhaite la bienvenue aux gens ici présents et  
5 à ceux qui se joignent à nous par web diffusion.

6 I would like to begin by introducing the  
7 members of the Commission that are here with -- with us  
8 here today. On my right are Dr. Moyra McDill and Mr. Dan  
9 Tolgyesi. And on my left are Dr. Ronald Barriault and Mr.  
10 André Harvey. We'll now hear from Marc Leblanc, the  
11 secretary of the Commission. And we have also with us,  
12 Ms. Lisa Thiele, General Counsel to the Commission.

13 Marc?

14 **MR. LEBLANC:** Before adopting the agenda,  
15 please note that seven supplementary Commission member  
16 documents were added to the agenda after publication on  
17 May 10<sup>th</sup>, 2011, and these are listed on an updated agenda  
18 that is available at the reception.

19 Mr. President.

20

21 **11-H4 / 11-H4.A / 11-H4.B**

22 **Adoption of the Agenda**

23

24 **THE CHAIRMAN:** Okay, to get going with this  
25 information, I'd like to call for the adoption of the

1 agenda by the Commission member -- as outlined, Commission  
2 member document 11-H4.b. Do we have concurrence?

3 For the record the agenda is adopted.

4 Okay, let's proceed now. The first item is  
5 the Atomic Energy of Canada Limited application.

6 Marc?

7 **MR. LEBLANC:** This is Day 1 of the public  
8 hearing, the notice of public hearing 2011, H-02, was  
9 published on April 5<sup>th</sup>, 2011. Submissions from AECL and  
10 CNSC staff were due by May 9<sup>th</sup>, 2011. June 1<sup>st</sup>, 2011 was  
11 the deadline for filing of supplementary information. I  
12 note that supplementary information has been filed by CNSC  
13 staff, ACL, and as well by the Emergency Management  
14 Ontario.

15 Commission member document, CMD 11H7.A, is  
16 confidential and will be discussed in closed session, if  
17 necessary, after the public portion of the hearing. I can  
18 mention right away, that there will not be such a session  
19 at the end of the day on security. This will be done  
20 after Day 2 in Chalk River or in Deep River.

21 Day 2 of the public hearing is scheduled  
22 for October 5<sup>th</sup> and 6<sup>th</sup>, and will be held at a Lion's Club  
23 Hall in Chalk River. The public is invited to participate  
24 either by oral presentation or written submission at the  
25 Day 2 hearing. The deadline for the public to file a

1 request to participate and a written submission is  
2 September 6<sup>th</sup>.

3 In a notice published on March 7<sup>th</sup>, 2011,  
4 the CNSC announced that it is allotting funds under its  
5 participant funding program to help members of the public,  
6 aboriginal groups, and other stakeholders interested in  
7 reviewing and commenting on the licence application to  
8 prepare for and participate in Hearing Day 2. This is the  
9 first time that participant funding is available for such  
10 a hearing.

11 May 20<sup>th</sup> was the deadline to file a request  
12 to receive participant funding. The Commission received  
13 four requests for funding.

14 A funding review committee, which is  
15 independent of the Commission, as it is made up of  
16 external members that are not related to the CNSC, is  
17 expected to render its decision in the next week or so.

18 Mr. President?

19 **THE CHAIRMAN:** Okay, we are now ready to  
20 start the hearing. And I'd like to call for a  
21 presentation from AECL as outlined in CMD-H7.1, 7.1A and  
22 7.1C.

23 And I understand, Mr. MacDiarmid, you will  
24 make the presentation. Please proceed, you have the  
25 floor.

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**Atomic Energy of Canada  
Limited:  
Application from Atomic Energy  
Of Canada Limited to renew its  
Nuclear Research and Test  
Establishment Operating Licence  
For the Chalk River Laboratories**

**11-H7.1 / 11-H7.1A / 11-H7.1C**

**Oral presentation by  
Atomic Energy of Canada  
Limited**

**MR. MACDIARMID:** Thank you very much Mr. President. I will begin the presentation, but I will be joined by other colleagues.

Thank you, Mr. President, members of the Commission. Good morning ladies and gentlemen. For the record, my name is Hugh MacDiarmid, President and CEO of Atomic Energy of Canada Limited.

We are before you today seeking to renew the license for the for the AECL Nuclear Laboratory's Chalk River site for the period 2011 to 2016.

Je voudrais vous présenter monsieur Bob

1 Walker, vice-président principal, Laboratoire nucléaire et  
2 Hank Drumhiller, vice-président et directeur général,  
3 Opérations et aussi plusieurs membres de notre équipe de  
4 gestion qui sont ici.

5 Mr. President, you and I began our  
6 respective positions at roughly the same time. We did  
7 quickly determine that a new tone was required between  
8 AECL as a licensee and the CNSC as the regulator. We  
9 jointly commissioned the Talisman Report to determine what  
10 each of our organizations needed to do, respectively and  
11 jointly, to improve our effectiveness.

12 That was followed up by the implementation  
13 of protocols as a tool to ensure accountability, a  
14 systematic process and transparency. This licence renewal  
15 is a top priority for AECL. Within this licence, there is  
16 a significant focus on the National Research Universal or  
17 NRU reactor.

18 I believe that the protocol for National  
19 Research Universal licensing activities, established  
20 between AECL and the CNSC in 2008, and revised in 2010, is  
21 a process that has worked well.

22 The protocol provided the framework, within  
23 which AECL and CNSC staff worked to prepare the necessary  
24 information for the Commission to assess the continued  
25 operation of the NRU reactor beyond the current licence

1 period. Let me add that AECL understands and respects the  
2 new CNSC licensing process and the licensing conditions  
3 handbook. It is a new tool that will prove very valuable  
4 to all licensees.

5 The nuclear laboratories are reliant on  
6 funding from the Government of Canada, including future  
7 investments to fully satisfy the regulator's licence  
8 conditions. I do believe funding support from the  
9 Government of Canada will enable continued investment in  
10 the critical infrastructure of the laboratories.

11 In particular, the reliability and safety  
12 of the NRU has been greatly enhanced by the isotope supply  
13 reliability program. ISRP is a key multi-year  
14 infrastructure improvement program which supports our site  
15 licence renewal application.

16 I would like to briefly describe AECL's  
17 restructuring in order to provide some context for today's  
18 proceedings. The government is moving forward with  
19 divestment of AECL's CANDU reactor division. The intent  
20 is to change the business model so that Canada's nuclear  
21 industry is positioned for commercial success domestically  
22 and internationally.

23 On divestment of the commercial operations,  
24 the ownership, policy mandate and funding of the nuclear  
25 laboratories will continue to rest with the Government of

1 Canada.

2 A subsequent restructuring of the nuclear  
3 laboratories will define its future. Decisions will be  
4 made by the government on the best management model so  
5 that a high standard of nuclear safety, reliable operation  
6 and human performance is assured.

7 Mr. President and members of the  
8 Commission, I would like to introduce more fully, Dr.  
9 Robert Walker. Dr. Walker recently joined AECL to lead  
10 the nuclear laboratories. He spent 33 years with the  
11 Department of National Defence and completed his career  
12 with the department as Chief Scientist, Assistant Deputy  
13 Minister of Science and Technology and CEO of Defence  
14 Research and Development Canada.

15 I will now ask Dr. Walker to provide some  
16 opening remarks.

17 **DR. WALKER:** Thank you for the  
18 introduction, Hugh. Good morning, Mr. President, and  
19 Members of the Commission. For the record, my name is Bob  
20 Walker, and I am the Senior Vice-President of AECL's  
21 nuclear laboratories.

22 Since joining the company in November of  
23 2010, I have focussed my attention on three areas of  
24 direct importance to the success of the laboratories:  
25 first, providing a foundation for the nuclear laboratories

1 in the near term, including, achieving the relicensing of  
2 the Chalk River site, and renegotiation of collective  
3 agreements; second, contributing to the Government of  
4 Canada's efforts for a restructuring of our company;  
5 third, proactively positioning the nuclear laboratory's  
6 value proposition.

7 À cette fin, je travaille avec mon équipe  
8 de direction pour s'assurer que le programme de science et  
9 technologie des laboratoires continue d'être aligné sur  
10 les activités qui offrent des avantages directs aux  
11 Canadiens dans le domaine de l'énergie, la santé,  
12 l'environnement et l'économie avec la confiance que la  
13 sûreté nucléaire et la sécurité sont assurées.

14 Underpinning these efforts is the  
15 dedication of our employees to meeting the commitments of  
16 our current licence, as well as our efforts towards the  
17 renewal of our site licence for the next operating period.  
18 This is a top priority of AECL. I fully respect the  
19 strong professional relationship that we have with the  
20 CNSC.

21 I believe the commitment made by our staff  
22 will continue to sustain the positive working relations  
23 between the Nuclear Laboratories and the CNSC placing us  
24 on a solid footing moving forward.

25 Our intention today is to demonstrate that

1 as Canada's National Nuclear Science and Technology  
2 Organization the nuclear laboratories is driven to  
3 continuously improve, and committed to meeting the  
4 obligations of our regulators and the expectations of the  
5 public as we work to fulfill a critical mandate on behalf  
6 of all Canadians.

7 I would now like to introduce Hank  
8 Drumhiller, AECL's nuclear laboratories Vice President of  
9 Operations, our Chief Nuclear Officer and site license  
10 holder for the Chalk River site.

11 Mr. Drumhiller will highlight process  
12 progress realized by the nuclear laboratories over the  
13 current license period, as well as activities planned for  
14 the proposed license period. Hank.

15 **MR. DRUMHILLER:** Thank you, Bob. Good  
16 morning Mr. President and members of the Commission.  
17 Excuse me. I'll start over.

18 Thank you, Bob. Good morning Mr. President  
19 and members of the Commission. For the record my name is  
20 Hank Drumhiller.

21 Our presentation today will cover four  
22 areas. I'll discuss the mandate of the nuclear  
23 laboratories, activities that have occurred during the  
24 current license period, items of special interest and  
25 activities planned for the proposed license period.

1 Ladies and Gentlemen, my core message is the following:

2 The nuclear laboratories management and its  
3 employees have an absolute commitment to safety. We have  
4 operated safely during the current license period and have  
5 made improvements that will continue to enhance safety.

6 We are well positioned with a robust plan  
7 to meet our obligations to the Commission through the  
8 proposed license period. And the license is essential to  
9 our success in our leadership role as Canada's National  
10 Nuclear Science and Technology organization.

11 The mandate of the nuclear laboratories is Canadians and  
12 the world receive energy, health, environmental and  
13 economic benefits from nuclear science and technology with  
14 confidence that nuclear safety and security are assured.  
15 This mandate aligns with the Federal Science and  
16 Technology policy objectives. It articulates how the  
17 laboratories contribute to public good.

18 The laboratories perform nuclear science  
19 and technology on behalf of Canadians. Our capabilities  
20 are far reaching. We have unique competencies in nuclear  
21 industry applications, nuclear safety and security,  
22 isotope reduction, radiation biology and environmental  
23 sciences. The nuclear laboratories are well connected  
24 through national and international networks.  
25 Our greatest asset at the nuclear laboratories is our

1 strength and the people. We are 2800 employees at the  
2 Chalk River site. They work on a wide range of activities  
3 covering many scientific and technological disciplines.

4 The safety of our employees is of our  
5 utmost importance to me and my colleagues. Our safety  
6 culture objective is to embrace the principle that we care  
7 for each other.

8 Second to our people but essential to our success as an  
9 S&T organization are our facilities. Many are unique to  
10 Canada. We have two operational nuclear research reactors  
11 on site. The National Research Universal, or NRU and Z2.  
12 We have the capabilities and the facilities for  
13 fabrication of fuel and storing radioactive waste.

14 Our specialized research and test  
15 facilities include our shielded facilities, isotope  
16 laboratories and engineering test facilities.  
17 We are known for innovation. For example, our unique  
18 biological research facility allowed Canada's  
19 participation in groundbreaking European study on the  
20 understanding the long-term effects of low-level  
21 radiation.

22 Our design for the generation for super  
23 critical water cooled reactor has led to a patent  
24 application for this high efficiency reactor concept.  
25 Through our nuclear reactor safety and security research

1 we have played a key role in addressing two important CNSC  
2 generic action items. Our molten fuel moderator  
3 interaction experiments have demonstrated that steam  
4 explosions are not a concern for events that involve  
5 ejection of molten material into the moderator. And we  
6 have developed our passive autocatalytic recombiners to  
7 mitigate hydrogen hazards during an accident scenario.  
8 I would like to discuss our performance during the 2006  
9 through 2011 license period through the areas shown on  
10 this slide.

11 With respect to the current license AECL  
12 has met all 22 dated conditions. Over the license period  
13 we've also completed an additional 2300 regulatory  
14 commitments that were made to the CNSC staff.

15 The NRU has three missions: to produce medical isotopes,  
16 to conduct materials research using neutrons, and to  
17 conduct research and testing in support of the Canadian  
18 nuclear industry.

19 Extensive maintenance and component  
20 upgrades were completed during the vessel repair outage  
21 2009 through 2010 through the first three bullets on this  
22 slide. These improvements have resulted in a reactor that  
23 is both physically and operationally in better condition  
24 today than it was at the beginning of the license period.  
25 In 2011 the World Association of Nuclear Operators granted

1 NRU full membership. This is the first time a research  
2 reactor has been granted membership. An essential  
3 condition of membership is demonstrated commitment to  
4 improvement.

5 One, a stringent peer review program will  
6 help accelerate our journey towards operational  
7 excellence.

8 The NRU Integrated Safety Review was a  
9 systematic evaluation of plant design, condition and  
10 operation. The ISR concluded that NRU can operate safely  
11 over the next license period and beyond through the  
12 successful execution of the integrated implementation  
13 plan.

14 The current planned outage is conducting  
15 NRU vessel inspections using a first of a kind tooling  
16 focused on assessing weld integrity and vessel corrosion.  
17 AECL will come out of this outage and restart NRU on June  
18 17th as scheduled.

19 In parallel with the inspection work we're  
20 completing a number of repairs and preventative  
21 maintenance in advance of the integrated implementation  
22 plan as explained on the next slide.

23 Our inspection results to-date prove two significant  
24 findings. First, the welds applied during the repair last  
25 year continue to be sound.

1       Secondly, there has been no evident change in the NRU  
2       vessel wall thickness, or stated another way corrosion, if  
3       any, is negligible. AEC will present the vessel  
4       inspection results for the Commission on the Day Two  
5       hearing.

6                   The integrated implementation plan, or IIP  
7       does not formally begin until the end of the current  
8       license period. However, many of the activities  
9       identified in the IIP are already underway. Work that  
10      will be addressed between now and November is referenced  
11      as the pre-IIP.

12                   Specifically a hundred and -- excuse me, 78  
13      hardware improvements are identified in the pre-IIP and  
14      are scheduled to be completed prior to November. Thirty-  
15      one of these improvements are being addressed during the  
16      current extended outage. And six of the higher profile  
17      activities are listed on this slide.

18                   Three programs have been established during  
19      the current license period to manage facility and  
20      infrastructure improvements. These are the Isotope Supply  
21      Reliability Program, the Nuclear Legacy Liability Program  
22      and Project New Lease. Each of these programs delivers  
23      significant funding from the Federal Government.

24                   With respect to human performance the  
25      Voyageur II improvement initiative has been put in place

1 to improve safety culture and human performance. Because  
2 our Day One hearing coincides with the requirement for a  
3 second six month CNSC review, I will take this opportunity  
4 to briefly update the Commission on this initiative.  
5 Voyageur II includes a comprehensive set of corrective  
6 actions to address the findings of both the NRU vessel  
7 leak root cause analysis and the 2008 safety culture  
8 survey.

9 Information gathered from these findings  
10 have given insights to management into opportunities for  
11 improvement in both performance and behaviours.

12 Our actions address the six key areas.  
13 Progress in all areas has been realized in the first six  
14 months of the initiative.

15 The plan for Voyager II extends to 2013-  
16 2014 timeframe and includes 98 actions in total.

17 In the first year, the planned 50 actions  
18 have been completed, covering all six of the key areas.  
19 Progress is reviewed monthly by senior management and  
20 issues are addressed.

21 Next to my review of progress during the  
22 current licence period is a review of decommissioning and  
23 waste management activities. Decommissioning activities  
24 have realized a successful return of spent fuel from the  
25 pool test reactor to the U.S, the successful

1 decommissioning and dismantlement of the 1950s  
2 radioisotope laboratory and the characterization and  
3 retrieval of six historic waste sites.

4           These activities have led to reduction of  
5 the liabilities associated with the site. During this  
6 period, AECL has implemented a formal waste management  
7 program. This program comprises waste management  
8 minimization, segregation and characterization.  
9 Improvements have been made in all areas.

10           AECL has also constructed four new waste  
11 management facilities, a waste analysis facility, two  
12 shielded modular aboveground storage units and a bulk  
13 material landfill.

14           Over the current licence period we have  
15 improved our interaction with the public. Distributing to  
16 the community newsletter "Contact" has continued. With  
17 the audience of over 45,000 homes, quarterly meetings have  
18 been held with local elected officials as well.

19           The two unplanned NRU outages identify the  
20 need for targeted communication with the public. This  
21 challenge was successfully met with the introduction of  
22 weekly status bulletins and periodic videos.

23           A special note has been the introduction of  
24 the voluntary public disclosure protocol. This protocol  
25 has provided guidance for public disclosure and was signed

1 in April of 2009 between AECL and the CNSC. It outlines  
2 in the protocol our specific criteria for communicating  
3 emissions or events to the public.

4 In addition, the Environmental Stewardship  
5 Council, which was formed in 2006, held 15 meetings over  
6 the licence period. The Council provides opportunity for  
7 local elected officials and interested groups to gain  
8 insight on AECL's activities and to provide feedback to us  
9 on behalf of their constituents.

10 Of the 14 CSNC safety and control areas,  
11 there are four particular areas I wish to highlight. The  
12 first two were noted by the CNSC staff as below  
13 expectations but improving.

14 The other two, radiation protection and  
15 environmental protection were rated satisfactory. Given  
16 their specific interest to the Commission, I'll report on  
17 these on the following slides.

18 In regards to the nuclear laboratory's  
19 management system, we have developed a manual meeting the  
20 requirements of Canadian Standards Association. This is a  
21 step towards a fully integrated management system. A  
22 transition plan is being developed for implementation  
23 during the licence period and it will ensure that all of  
24 the required processes are put in place.

25 With respect to fitness for service for the

1 NRU, the integrated implementation plan will ensure that  
2 both equipment and processes are in place to address aging  
3 management.

4 Preventive maintenance, including periodic  
5 inspections, are being put in place for all safety  
6 critical facilities and equipment across the site.

7 With respect to radiation protection, you  
8 can see from this graph of employee dose statistics that  
9 there has been stable performance over the licence period.  
10 Both average and maximum employee dose are well below  
11 regulatory limit.

12 In 2008, AECL implemented an integrated  
13 environmental monitoring program. It consolidated our  
14 monitoring processes to meet a dated licence condition.  
15 This program has three components: groundwater  
16 monitoring; non-radiological emissions and radiological  
17 emissions.

18 The next two slides address our  
19 radiological emissions.

20 The environmental impact of site operation  
21 is low. Overall trending indicates stable performance.  
22 The graph shows our local radiological emissions, airborne  
23 and liquid, for the last five years as a per cent of  
24 derived release limit.

25 The graph also shows the decreased

1 emissions over the last two years during the extended NRU  
2 outage. A return to levels closer to the five-year  
3 average is expected with NRU operating at a full-time  
4 basis.

5 This graph shows liquid emission levels.  
6 Similarly, it indicates a reduction over the last two  
7 years during the extended NRU outage.

8 I would like to turn to the third part of  
9 our presentation to discuss items of special interest. In  
10 May 2009, a small leak of water from the NRU was  
11 discovered, leading to the reactor down for a period of  
12 457 days to complete vessel repairs.

13 As I highlighted earlier, during this time,  
14 AECL took advantage of the extended outage to perform  
15 other important work in NRU. Significant activities  
16 included walk-downs of the seven NRU upgrades, inspections  
17 of the piping and the heavy water and processed water  
18 system, drainage of the heavy water for replacement with  
19 low tritiated heavy water and maintenance conducted on the  
20 processed water system.

21 Addressing the known leaks from the NRU rod  
22 bay is a priority under the Isotope Supply Reliability  
23 Program. The near-term approach is to replace the  
24 tritiated rod bay water with clean water before the end of  
25 2011.

1                   Ongoing groundwater monitoring has  
2 confirmed that the risk to workers, the public and the  
3 environment is low.

4                   The following slides address the Talisman  
5 review and impacts of Fukushima.

6                   In 2007, November, it was determined that  
7 the motor starters for two main heavy water pumps of the  
8 NRU were not connected to qualified emergency power.

9                   The reactor was subsequently shut down from  
10 November 19<sup>th</sup> until December 16<sup>th</sup>.

11                   Recognizing the seriousness of the events,  
12 as well as the opportunity for lessons learned, AECL and  
13 CNSC jointly commissioned Talisman International to  
14 identify the underlying causes of the outage and to  
15 examine the performance of both organizations.

16                   The Talisman Report included  
17 recommendations for specific short-term and long-term  
18 processes and procedure improvements.

19                   AECL completed all of their Talisman  
20 actions by March 2010.

21                   Following the earthquake and tsunami events  
22 in Japan on March 11<sup>th</sup>, 2011, there has been broad  
23 recognition that the nuclear industry must be better  
24 prepared for severe events at their facilities.

25                   AECL has been in discussions with Canadian

1 and world nuclear industry associations over the past  
2 three months. There are important lessons to be learned  
3 and there is a need for the nuclear industry to work  
4 closely with emergency response partners.

5 To date, AECL has verified the following to  
6 the CNSC for its Chalk River site. Procedures and  
7 equipment are available to mitigate conditions that could  
8 result from a severe event.

9 Supply of back-up power to its facilities  
10 is functional and valid.

11 Nuclear facilities are capable of  
12 mitigating credible flooding events.

13 In assessing the consequences of the  
14 Fukushima event, the emerging lesson is that mitigation  
15 for severe events must also consider the loss of onsite  
16 emergency response.

17 AECL is working with industry partners and emergency  
18 response organizations to explore possible mechanisms for  
19 having mobile equipment remotely stationed for deployment  
20 to nuclear sites in an emergency.

21 Finally, I'd like to review our planned  
22 activities for the proposed license period of 60 months.  
23 I will touch on the five items shown.

24 It's expected that the Federal Government  
25 will proceed with the divestiture of AECL's commercial

1 operation and the nuclear laboratories will then  
2 transition to a stand-alone national science and  
3 technology organization.

4 Activities are already underway to ensure  
5 the nuclear laboratories are well aligned with Government  
6 of Canada priorities in the public good. AECL will  
7 continue to ensure delivery on program commitments during  
8 this time of transition.

9 Through the nuclear legacy liability  
10 program AECL is continuing to reduce the liabilities  
11 associated with the Chalk River site. Program plans over  
12 the proposed license period include the decommissioning  
13 and dismantlement of the pool test reactor and the heavy  
14 water upgrading plant equipment. Improvements such as the  
15 installation of engineered covers and engineered treatment  
16 systems will be put in place to address contamination  
17 sources on the site.

18 Planning for appropriate waste management  
19 facilities for the waste produced from infrastructure  
20 decommissioning or environmental restoration is a key  
21 component of the NLLP.

22 The development of a very low level waste  
23 management facility to effectively deal with a significant  
24 portion of these wastes will be a high priority, as will  
25 the completion of the fuel packaging and storage project

1 and the stored liquid waste cementation facility.  
2 We are putting in place an administrative protocol with  
3 the CNSC staff to drive liability reduction.

4 Through the Isotope Supply Reliability  
5 Program and Project New Lease there will be continued  
6 infrastructure renewal. Plans are underway for a new  
7 science and technology research laboratory, as pictured on  
8 the screen.

9 The hydrogen program will be relocated to a  
10 renovated laboratory and the shielded facilities are  
11 planned for refurbishment. A new electrical switch yard  
12 and distribution upgrades will also occur.

13 As discussed previously the integrated  
14 implementation plan is the response to the NRU Integrated  
15 Safety Review. This plan covers a ten year outlook that  
16 includes the proposed five year licence period.

17 Over the first two years AECL will focus on  
18 improving the physical condition of the plant. This will  
19 include a robust equipment reliability program and the  
20 addition of dedicated system engineering staff who will  
21 sustain the equivalent reliability program.

22 The Voyager II improvement initiative will  
23 continue through 2014. Quarterly employee surveys have  
24 been initiated to assess safety culture. WANO peer review  
25 actions have been aligned with commitments in Voyager II.

1 We are enhancing our training on human performance  
2 fundamentals and embedding advocates in the line  
3 organizations.

4 In closing, Mr. President and members of  
5 the Commission, we are before you today seeking renewal of  
6 the licence for Chalk River site for the period 2011 to  
7 2016. We have operated Chalk River site safely during the  
8 current license period with due regard for the environment  
9 security in the best interest of Canadians.

10 With a renewed licence we will continue to  
11 fulfill a critical mandate on behalf of Canadians.

12 Thank you very much for your attention.  
13 The AECL Management Team and I will be pleased to answer  
14 questions.

15 **THE CHAIRMAN:** Thank you, very much. I'd  
16 like to take a five minute pause, if you don't mind,  
17 before we hear the CNSC presentation.  
18 Thank you.

19 **(SHORT PAUSE/COURTE PAUSE)**

20 **THE CHAIRMAN:** Okay. We're back with your  
21 presentation. Okay. We are now ready to hear the  
22 presentation with CNSC, Mr. Jammal, you have the floor.

23

24 **11-H7 / 11-H7.B**

25 **Oral presentation by**

1           **CNSC staff**

2

3                           **MR. JAMMAL:** For the record, it's Ramzi  
4 Jammal.

5                           Monsieur le président, membres de la  
6 Commission, avec moi aujourd'hui, monsieur Peter Elder,  
7 directeur général de la Direction de la réglementation de  
8 cycle et des installations nucléaires; monsieur Pierre  
9 Tanguay derrière moi qui est le directeur par intérim de  
10 la Division de l'autorisation et de la conformité des  
11 laboratoires de Chalk River, et à ma gauche, madame  
12 Nathalie Riendeau, agente principale, Division des  
13 installations de traitement.

14                           In addition, Mr. President, we have with us  
15 staff from Chalk River site office and the team of the  
16 CNSC staff to include our specialists who are involved in  
17 the re-licensing of Chalk River Laboratories or the  
18 official name as Nuclear Research and Test Establishment  
19 Operating Licence.

20                           This presentation, sir, is the highlight of  
21 CMDs 11-H7 and 11-H7.B. More detailed information is  
22 found in the CMD and, again, this presentation is a  
23 highlight.

24                           Mr. President, Members of the Commission,  
25 we at the CNSC do restructuring. Mr. Miguel Santini, whom

1       you know very well, used to be the Director of the Chalk  
2       River facilities and Compliance Licensing Division, has  
3       now been charged to oversee and be the director of the  
4       Regulatory Program Division in charge of Pickering  
5       facilities.

6                       Therefore, Mr. Elder and myself will be  
7       doing the presentation.

8                       I would just like to highlight major events  
9       that occurred in this licensing period starting in 2006.  
10      As it's well known, the events that occurred during this  
11      licensing period and after the extended shutdown, an  
12      independent review by a third party took place. The  
13      findings were presented in a report known as the Talisman  
14      Report.

15                      The CNSC did close all the actions and  
16      recommendations presented in the report.

17                      However, the report highlighted two main  
18      elements: communications and clarity, in specific,  
19      clarity and what constitutes licensing basis, i.e. what is  
20      in the licence and what is not.

21                      As part of continuous improvement, the CNSC  
22      has carried out licensing reform, hence before you the  
23      Licence Condition Handbook, which we'll refer to as the  
24      LCH.

25                      As part of clear communication, clarity and

1 transparency, both presidents and COs of AECL and CNSC  
2 signed, in 2008, an administrative protocol for the re-  
3 licensing of Chalk River Laboratories.

4 Members of the Commission, Mr. President, I  
5 would like to confirm to the Commission that all of the  
6 upgrades required to be in service during this licensing  
7 period are in service. That means they are installed and  
8 operational.

9 In May 2009, a vessel leak occurred  
10 resulting in extended shutdown that required the  
11 Commission approval to restart the NRU. This was done in  
12 July 2010 through a public hearing process.

13 The NRU was repaired and return to service  
14 safely and as a condition of approval, the NRU was to  
15 undergo a planned extended shutdown to inspect the vessell  
16 and to verify the corrosion rates.

17 We are currently in this planned shutdown  
18 that started May 15<sup>th</sup> and is scheduled to be completed on  
19 June 17<sup>th</sup>, 2011.

20 This planned shutdown has presented its  
21 challenges to AECL with respect to the available tools and  
22 the length of time required for the completion of all  
23 inspections, and we will provide you an update before Day  
24 Two with respect to the results of the inspections.

25 The events in Japan, Fukushima, has

1           impacted all of the nuclear facilities licensed by the  
2           CNSC to include the Chalk River facilities and the NRU.

3                        AECL did respond to the directive issued on  
4           March 17<sup>th</sup>, 2011. AECL presented its short-term action  
5           based on the early lessons learned from the Fukushima  
6           incident. AECL has completed the implementation of the  
7           short-term actions and is required to submit the long-term  
8           actions by July 2011.

9                        Mr. Elder will provide more details in the  
10          presentation.

11                      Mr. President, Members of the Commission,  
12          the re-licensing of Chalk River was taxing and was  
13          completed due to the dedication and commitment of CNSC  
14          staff.

15                      I would like to inform you that the CNSC  
16          has applied a 10-year safety case based on regulatory  
17          document RD-360 entitled Life Extension of Nuclear Power  
18          Reactors.

19                      This is the first of a kind in Canada and  
20          in major operators in the world to be applied to research  
21          reactors such as the NRU.

22                      The life extension was applied in a graded  
23          manner, recognizing that the NRU is not a nuclear power  
24          plant.

25                      As required in the regulatory document, the

1 licensee carried out an integrated safety review which is  
2 an all-inclusive and systematic evaluation against modern  
3 standards.

4 This integrated safety review has resulted  
5 in an integrated improvement plan which I will refer to --  
6 which is being referred to in this presentation and in the  
7 documents as an Integrated Implementation Plan or IIP.

8 What does this mean? It means that all  
9 improvements have been identified, prioritized and ranked  
10 according to risk and improvement needs. This plan  
11 constitutes the licensing basis and is referred to in the  
12 LCH.

13 AECL has to carry out the improvement  
14 initiatives, implement them during the next licence period  
15 of five years and, of course, after, if the Commission  
16 approves.

17 The CNSC staff will verify the  
18 implementation of the Integrated Improvement Plan and will  
19 report periodically to the Commission.

20 The integrated safety review resulted in a  
21 report of several thousand pages highlighting the gap  
22 analysis against modern standards. The IIP itself is over  
23 400 pages.

24 CNSC staff spent roughly 22,000 hours  
25 reviewing the Integrated Safety Report and the resulting

1 IIP. The elements of the IIP are in the LCH. They will  
2 be tracked and we, CSNC staff, as I mentioned before, will  
3 be reporting back to the Commission on the progress of the  
4 implementation.

5 The CNSC has executed on time the  
6 activities under the protocols without any compromise to  
7 safety in order to ensure long-term safe operations of the  
8 Chalk River facilities.

9 I now pass on the presentation to Mr.  
10 Elder.

11 **MR. ELDER:** Thank you and good morning, Mr.  
12 President, Members of the Commission.

13 The rest of the CSNC staff presentation  
14 will provide a brief description of the CRL site from a  
15 regulatory perspective and including the facilities and  
16 the licence application. Then we will discuss the staff  
17 assessment of AECL's performance against the standard  
18 safety and control areas during the current licence  
19 period.

20 While the CNSC staff CMD provides a  
21 comprehensive assessment of all areas, our presentation  
22 will further discuss four safety and control areas:  
23 management system; fitness for service; radiation  
24 protection and environmental protection, which are  
25 considered to be most significant for the CRL site licence

1 renewal.

2 And as I may also note that Emergency  
3 Measures Ontario will also provide their views on the  
4 offsite emergency preparedness in a separate presentation  
5 after this one.

6 Other relevant information is including the  
7 Integrated Safety Review of the NRU reactor and the public  
8 information program will also be presented.

9 Again, the CMD includes a complete view of  
10 all other items of regulatory interest.

11 Finally, we'll end our presentation with  
12 our conclusions and recommendations.

13 The Chalk River Laboratories are located on  
14 the south shore of the Ottawa River, 160 kilometres  
15 northwest of Ottawa. The site occupies a total of 37  
16 square kilometres with a built-up area containing  
17 approximately 160 buildings. Outside this built-up area  
18 there are several waste management areas for storage of  
19 both nuclear and non-nuclear waste.

20 Chalk River has been operated as a nuclear  
21 laboratory for more than 60 years, providing nuclear  
22 research and development, isotope production and other  
23 nuclear services.

24 All phases of a nuclear facility's  
25 lifecycle, construction, operation, safe storage and

1 decommissioning are taking place currently at Chalk River  
2 and will continue for a number of years.

3 AECL has produced a decommissioning  
4 strategy for the site and the waste management activities  
5 expected to continue for up to another 100 years.

6 The complexity of the site is compounded by  
7 the evolution of safety standards over the years. In  
8 their early years of operation, nuclear activities and  
9 waste management were conducted to the standards of the  
10 time.

11 Standards have evolved considerably since  
12 1944.

13 Therefore, AECL has had to actively manage  
14 a number of legacy issues, and further work on these  
15 issues will continue into the next license period.  
16 Under the proposed license AECL will be authorized to  
17 operate several nuclear facilities including the two non-  
18 power reactors, NRU and ZED2, three nuclear fuel  
19 facilities, several shielded facilities and radioactive  
20 waste facilities, as well as over 50 radio isotope  
21 laboratories.

22 NRCMD CNSC staff present a review of AECL's  
23 performance and programs in order to assess the  
24 application for license renewal. The current Chalk River  
25 license will expire on October 31st, 2011. AECL's

1 application for renewal for the site license were received  
2 in September, 2010. CNSC staff reviewed the application  
3 and are satisfied that the application is complete.  
4 AECL currently possesses a separate operating license for  
5 the dedicated isotope facilities. This is the MAPLE 1  
6 Reactor, the MAPLE 2 Reactor and the new processing  
7 facilities. AECL has requested these be included in the  
8 overall CRL site license.

9 This current license for these dedicated  
10 facilities is also set to expire on October 31st, 2011, so  
11 it coincides with the license renewal for the CRL site.  
12 Note that AECL placed these facilities into extended  
13 shutdown state in 2009 and they are expected to remain in  
14 this state over the next licensing period.

15 The license renewal does not require an  
16 environmental assessment. However, an environmental  
17 assessment was conducted for the continued operation of  
18 NRU Reactor for the next ten year period.

19 In March 2011 the Commission determined that there were no  
20 significant inverse environmental impacts for the  
21 continued operation of NRU Reactor and the associated  
22 infrastructure support required.

23 As noted earlier by the Secretary of the  
24 Commission, this is the first renewal that we, the CNSC is  
25 in a position to provide participant funding to support

1       intervener present participation in the license renewal  
2       process. And the actual intervener's receiving funding  
3       will be announced shortly.

4               Turning to compliance verification, I would  
5       just like to briefly go over the CNSC staff's approach to  
6       compliance activities on the Chalk River site.

7               The compliance activities are governed by a  
8       baseline compliance program that is informed by the  
9       relative risks of all the facilities on the Chalk River  
10      site. The risk rankings for these facilities are reviewed  
11      periodically, most recently in 2010.

12              Then the plan based on these ones also  
13      consists of onsite inspection, program assessments by  
14      special staff and its review and submissions of reportable  
15      events.

16              In accordance with this plan CNSC staff  
17      conduct compliance inspections of the facility. Focus  
18      inspections are also conducted in areas of weaknesses,  
19      where weaknesses of resorb, or based on AECL's activities.  
20      For example, there was a whole series of inspections  
21      around the NRU Reactor return to service in 2010.

22              In 2005 the CNSC decided to establish a  
23      site office in Chalk River to enhance regulatory  
24      oversight. The site office became fully operational  
25      during the current license period. Onsite inspectors have

1 improved extremely valuable for compliance work,  
2 especially during extended outages and the follow-up to  
3 events.

4 As Mr. Jammal mentioned, the CNSC and AECL  
5 have also put in place a number of protocols to clarify  
6 requirements. These also help to define compliance  
7 activity, compliance verification criteria and they  
8 heavily influence the staff approaches to compliance for  
9 the NRU return to service after the vessel and for the NRU  
10 Integrated Safety Review.

11 Before providing the details I'm going to  
12 give you our overall assessment, and that is that CNSC  
13 staff conclude that AECL has operated the facilities at  
14 CRL safely. AECL continues to maintain a comprehensive  
15 and mature programs. Especially good programs are in  
16 radiation protection, environmental protection, emergency  
17 preparedness and nuclear material management and  
18 transport.

19 Where performance does not meet CNSC staff  
20 expectations, specifically for management systems and  
21 fitness or service, AECL has put in place initiatives and  
22 improvements are already taking hold.

23 We note that since 2008 in the Talisman  
24 report CNSC staff had modified their regulatory approach  
25 in the areas to enhance regulatory clarity and oversight.

1 Overall CNSC staff continued to see improvements in the  
2 operation of the CRL site.

3 Turning to the four areas that we said we  
4 would provide highlights on, I'll start with the radiation  
5 protection.

6 CNSC staff overall conclude that AECL has a  
7 well-developed radiation protection program. During the  
8 license period no worker at site received effective dose  
9 exceeding the regulatory dose limits. Similarly no member  
10 of the public received the dose that approach or exceeded  
11 the one millisievert annual regular dose limit for a  
12 member of the public.

13 Radiological exposures associated with the  
14 operation of Chalk River site are due to alpha, beta,  
15 gamma and neutron radiation, and AECL has a program in  
16 place to deal with all these hazards.

17 Also AECL divides the site into  
18 uncontrolled and controlled access areas, and then further  
19 subdivides them into radiological safety zones. Within  
20 these zones various barriers are established to ensure  
21 worker protection.

22 In 2010 as a result of an alpha  
23 contamination event at a nuclear power generating station  
24 AECL was requested by the CNSC to review their alpha  
25 monitoring program and to identify any required

1 improvements.

2 While some of this work is ongoing due to  
3 the broad nature of activities that have always existed at  
4 the Chalk River site, CNSC staff confirmed that AECL's  
5 radiation protection program and license to dosimetry  
6 service have appropriate provisions in place to deal with  
7 alpha hazards. And these include specific  
8 instrumentation, training, work planning, protective  
9 equipment and those symmetry methods.

10 Turning to the actual dose data this graph  
11 presents information taken from AECL's annual safety  
12 reports for the years 2006 to 2009. These reports are  
13 independently reviewed by CNSC staff to make sure that  
14 their data is being presented appropriately.

15 AECL has recently submitted its 2010  
16 report. This is under a detailed review by CNSC staff,  
17 but overall numbers are in the same range.  
18 The average effective dose to workers at Chalk River  
19 during the period is low. Approximately .7 millisieverts  
20 or 1.5 percent of the annual regulatory dose limit. The  
21 maximum individual dose for a whole body dose for nuclear  
22 energy workers for this period was 17 millisieverts in  
23 2009.

24 Turning to environmental protection, over  
25 the license period AECL carried out a detailed review that

1 its environmental protection program as was required by  
2 the license. As a result several improvements were  
3 implemented, such as reviewing the action levels and  
4 derived release limits for the site. Producing detailed  
5 effluent flow diagrams and installing real time argon-41  
6 monitoring on the NRU reactor stacks.

7 These improvements contributed to the  
8 improvement performance trend in the Environmental  
9 Protection Program that was rated as below expectations in  
10 2006 and is now rated as satisfactory.

11 The airborne and liquid radiological  
12 emissions from the site remain as a fraction of the  
13 derived release limits. Note that these release limits  
14 relate the emissions of the radioactive material to the  
15 calculated dose to a most exposed member of the public.

16 For Chalk River the calculated dose to the  
17 most exposed member is approximately one-tenth of the  
18 annual regulatory dose limit of one millisieverts per  
19 year.

20 Results from the environmental monitoring  
21 programs and groundwater monitoring confirm that CRL  
22 operations have a low impact on the environment. However,  
23 there are legacy groundwater plumes that AECL will  
24 continue to address over the next five years under the  
25 nuclear legacy liabilities program.

1           As with other programs on the radiation  
2 protection, the AECL is required to put in place action  
3 levels for control of releases to the environment from  
4 licensed facilities.

5           The purpose of the action level is to give  
6 warning to the licensee and the CNSC of a potential loss  
7 of control. Therefore action levels are based on past  
8 performance and are significantly below regulatory  
9 emissions, limits for the emissions.

10           No releases airborne or liquid exceeded  
11 AECL's action levels in 2006, 2007 and 2010. In 2008  
12 there were two weekly airborne releases that exceeded  
13 AECL's action levels although these were well below the  
14 regulatory limit approximately one one-thousandths of  
15 derived release limits. AECL implemented corrective  
16 actions after these events to reduce the probability of  
17 reoccurrence.

18           In 2009 the weekly releases exceeded, for  
19 Tritium exceeded AECL's action levels and these were  
20 associated -- for a number of weeks, sorry. Associated  
21 with the leak of the NRU reactor vessel.

22           While the tritium releases continued until  
23 AECL could safely drain the reactor vessel, the total  
24 tritium releases were a small fraction of derived release  
25 limits. This is demonstrated by the graph that presents

1 the tritium concentration in the Ottawa river near  
2 Petawawa.

3 The levels have remained stable at  
4 approximately eight bequerels per litre during the license  
5 period.

6 Turning to management systems, this is an  
7 area that was below requirements at the last license  
8 renewal in 2006. Given the longstanding issues with  
9 quality assurance in other areas, CNSC staff have focused  
10 on improving the regulatory oversight in this area  
11 especially since 2008, and requiring AECL to transition to  
12 a management system in line with modern standards.  
13 This transition is underway but will take a few years to  
14 complete. This is reasonable based on our experience with  
15 other large licensees.

16 The 2009 investigations into the leak also  
17 identified a number of organizational factors, and  
18 therefore a number of required improvements on safety  
19 culture.

20 AECL has taken positive steps to address  
21 these weaknesses through a developmentation of a human  
22 performance program and several initiatives to promote a  
23 strong safety culture. CNSC staff have observed  
24 improvements in the area since 2009, recognizing that  
25 safety culture -- changing the safety culture of a

1 program, of an organization is an ongoing activity that  
2 will take a number of years.

3 To ensure that progress is being made in  
4 these areas CNSC staff required AECL to develop a detailed  
5 improvement plan. The main vehicle for this is the  
6 Voyageur II program. The next two slides will provide an  
7 update on this program.

8 Since organizational factors were  
9 identified as a major contributor to the NRU reactor leak,  
10 CNSC staff requested AECL to analyze the organizational  
11 root causes for the event and develop appropriate  
12 corrective actions.

13 While it was recognized that any corrective  
14 action plan will be implemented over a number of years it  
15 was important to CNSC staff that AECL understood the root  
16 causes prior to restarting their reactor. Therefore this  
17 was a condition that we presented to the Commission in  
18 2010.

19 The root cause identified a number of  
20 contributing human factors issues, including a focus on  
21 short term production, ineffective use of operating  
22 experience and the acceptance of low standards in the  
23 plant operations.

24 As I've stated the corrective action plan  
25 is known as a Voyageur Phase II program which was formally

1       launched in 2010.

2                       It covers a broad range of activities from  
3       new policies to the development of a human performance  
4       program, the implementation of industry best practices in  
5       the area of safety culture. AECL has forecasted  
6       completion of the program in March 2014.

7                       During the hearings for the restart of the  
8       NRU reactor in 2010 CNSC staff recommended that AECL  
9       provided the commission with updates on this plan at six  
10      month intervals for the next first two years.  
11      The first update was provided in January 2011. Since then  
12      CNSC staff had carried up follow-up inspections the most  
13      recently in April 2011.

14                      We've been able to verify the status of 55  
15      actions and milestones. With 90 percent of the inspected  
16      milestones achieved, CNSC staff include that  
17      implementation of the Voyageur II program by AECL is on  
18      schedule and acceptable.

19                      Overall the rating of the management system  
20      remains below expectation until AECL can demonstrate  
21      sustainable improvements to the organizational human  
22      performance and safety culture.

23                      While AECL is on this road AECL needs to  
24      ensure that adequate resources and management oversight  
25      continue to be applied to the Voyager initiative so the

1 corrective actions are implemented and remain effective  
2 over time.

3 Fitness for service is the other area where  
4 CNSC staff have observed longstanding weaknesses in both  
5 AECL's performance and programs.

6 In particular aging of infrastructure and  
7 weaknesses in maintenance and monitoring programs at Chalk  
8 River has resulted in a number of events that are reported  
9 to the Commission over the last five years.  
10 Specifically the NRU vessel leak, the leaks from the NRU  
11 rod base, the grading of thermal wells in the fissile  
12 solution storage tank as well as leaks from radioactive  
13 waste storage and transfer lines.

14 Contributing to the below expectations  
15 trending in this area has been the lack of progress,  
16 initially the lack of progress on an aging management  
17 program for the NRU reactor, especially in early years of  
18 the current period.

19 Since this was a contributing factor to the  
20 2009 vessel leak, CNSC staff view was that the situation  
21 became unacceptable in 2009 given that known weaknesses  
22 caused a major outage.

23 This situation was a large factor in the  
24 staff recommendation that the Commission approved the  
25 restart of NRU following the repairs.

1 The protocol that was put in place for NRU restart defined  
2 the minimum standard that AECL had to meet to safely start  
3 the reactor and address these weaknesses.

4 And CNSC staff confirmed that AECL has put  
5 in place the measures to maintain the risk to people in  
6 the environment at an acceptable level.  
7 This also in 2008 these ongoing weaknesses in this area  
8 was a main driver for the CNSC staff to require AECL to  
9 undertake an integrated safety review of the NRU reactor  
10 to ensure that the facility could continue to operate  
11 safely in the future.

12 And I'd like to talk a bit about some of  
13 the consequences of how we're addressing the weaknesses in  
14 safety in fitness and service.

15 So a key part in approving fitness or  
16 service is the planning of extended outages that extended  
17 outages will be necessary currently and in the future to  
18 conduct required inspections and maintenance activities to  
19 maintain and improve the fitness service especially for  
20 the NRU reactor.

21 I would note that specifically that CNSC's  
22 acceptance of the fitness of service case for the repaired  
23 reactor requires periodic inspections of the reactor to  
24 monitor the integrity of weld repair and vessel corrosion.

25 The Commission in its decision concerning

1 the restart of the NRU reactor in July 2010 required AECL  
2 to carry out the first such inspection no later than nine  
3 months after the NRU reactor restart.

4 These inspections allow the fitness service  
5 case to be updated prior to one year of operation which  
6 was the period that AECL had made the case for.

7 As mentioned earlier, AECL has had problems performing all  
8 the scheduled inspections during the current outage.

9 After the outage, AECL must analyze the  
10 findings to determine what additional inspections are  
11 required to confirm the fitness for service of the reactor  
12 until the next extended outage.

13 AECL must provide technical dispositions  
14 for any uncertainties in the fitness for service case.

15 CNSC staff will evaluate AECL's inspection  
16 results and the need for additional inspections and report  
17 to the Commission at the Day Two hearing.

18 Note that CNSC staff consider the fitness  
19 for service of the NRU vessel to be ongoing activity that  
20 has to take into account the most recent inspection  
21 results.

22 As I've mentioned, the NRU Integrated  
23 Safety Review is a key element in determining the work  
24 required for the long-term fitness for service and  
25 reliability of the NRU reactor. This is all-inclusive and

1 systematic evaluation of plant design, condition and  
2 operation, including all aspects of operating organization  
3 and programs against modern standards.

4 Where standards specific to research  
5 reactors did not exist, AECL used the most appropriate  
6 power reactor standard.

7 The safety review culminated in a global  
8 assessment report that ranks the review findings based on  
9 their safety and operational significance and then the  
10 Integrated Implementation Plan that uses its rankings to  
11 develop detailed corrective actions and safety  
12 improvements.

13 It's been noted the main objectives of the  
14 plan are to make physical improvements to the NRU reactor  
15 and establish a plan for continued safe and reliable  
16 operation.

17 CNSC staff note that AECL has already taken  
18 actions based on the results of the Integrated Safety  
19 Review even while regulatory reviews continued.

20 AECL inspected and maintained several key  
21 NRU components such as the processed water system, the  
22 control rods and the fuelling machine in the 2009 extended  
23 outage. And more work is being done on the current outage  
24 related to the safety improvements.

25 Such an approach of implementing known

1 safety improvements as they've been identified is  
2 considered to be a good practice.

3 The Integrated Safety Review also considers  
4 the safety case for the NRU reactor. So this is its  
5 actual safety analysis, and this will incorporate CNSC  
6 staff comments on the updated safety analysis for NRU that  
7 was submitted in 2007.

8 The CNSC staff conducted a  
9 multidisciplinary review of this revised safety analysis.  
10 The CNSC staff concluded that the level of safety  
11 demonstrated by the NRU safety analysis is acceptable.

12 CNSC staff identified some issues that AECL  
13 is required to address in a longer term to provide  
14 assurance of the adequacy of the safety case will continue  
15 to be acceptable over the licence period and will take  
16 into account the actual plant conditions and the effects  
17 of aging.

18 AECL is addressing these as part of the  
19 Integrated Implementation Plan.

20 The CNSC staff review of the safety  
21 analysis did not find any issues that could impact the  
22 safe operation of the NRU reactor.

23 Another point that CNSC staff is requiring  
24 AECL to include in its improvement plan is the response to  
25 the accident at the Fukushima nuclear power plant in

1 Japan.

2 In March 2011, CNSC staff issued a formal  
3 request under Section 12-2 of the General Nuclear Safety  
4 and Control Regulations requiring AECL to review the  
5 initial lessons learned and to re-examine the safety cases  
6 and vulnerabilities for the facilities at the Chalk River  
7 site with a focus on external hazards such as seismic  
8 events and flooding.

9 Additionally, for the NRU reactor, CNSC  
10 staff requested AECL to reassess the priorities from the  
11 Integrated Safety Review and adjust the implementation  
12 plan accordingly, taking in light the information from  
13 Fukushima.

14 This resulted in improvements related to  
15 the severe accident management being accelerated by  
16 several years.

17 In April 2011, AECL confirmed that the  
18 procedures, including emergency response procedures and  
19 equipment are available to mitigate conditions that could  
20 result from beyond design basis events or severe or  
21 extreme conditions.

22 AECL also confirmed that the supply of  
23 backup power to their facilities is functional and valid.

24 To date, no significant issues requiring  
25 immediate corrective actions or mitigation actions have

1       been identified.

2                   AECL is committed to providing its final  
3 response to the CNSC by July of this year and, as has been  
4 noted, is working with nuclear power plant operators in  
5 this regard.

6                   As mentioned by Mr. Jammal, the Global  
7 Assessment Report and the Integrated Implementation Plan  
8 are the outcome of over three years of effort by AECL and  
9 the CNSC. The work was governed by a detailed protocol,  
10 and I can confirm that the ISR phase of the protocol is  
11 now complete.

12                   Overall, CNSC staff agree with the  
13 methodology used by AECL for the integrated safety review  
14 and with the overall conclusions and the risk ranking  
15 contained in the Global Assessment Report.

16                   After AECL had provided a number of  
17 clarifications on the Integrated Implementation Plan, CNSC  
18 found that plan acceptable at the end of May 2011.

19                   A key issue for CNSC staff was to confirm  
20 that the plan provided concrete and measurable actions to  
21 address findings from the safety review.

22                   CNSC staff are currently documenting the  
23 summary of this three-year review. A supplemental CMD  
24 detailing the results of the CNSC staff's assessment will  
25 be submitted in July of 2011, at least 60 days prior to

1 Public Hearing Day Two to allow adequate time for  
2 intervenors to review.

3 One of the things that we have already been  
4 able to determine is what licence conditions we are  
5 recommending to the Commission associated with the  
6 Integrated Safety Review, noting that the Licence  
7 Condition Handbook includes detailed verification  
8 criteria.

9 CNSC staff specifically recommend the  
10 inclusion of a licence condition requiring the  
11 implementation of future extended outages for the NRU  
12 reactor to carry out inspections and improvements. These  
13 outages must be scheduled annually or more frequently, if  
14 necessary, based on in-service inspection findings.

15 CNSC staff also recommend that AECL  
16 complete the improvements identified by the Integrated  
17 Safety Review and report on the status to the Commission  
18 annually. At the same time, CNSC staff will report on its  
19 monitoring of the progress.

20 Additionally, CNSC staff recommend that  
21 AECL develop and submit for the approval of the  
22 Commission, by June 30<sup>th</sup>, 2014, a plan for the end of  
23 operation or for continued operation of the NRU reactor  
24 beyond 2016. This will ensure that there is a defined  
25 approach for the future of NRU well before the expiry of

1 the proposed licence.

2 Finally, there's one area I would like to  
3 touch on before we do a summary; that is, AECL's Public  
4 Information Program.

5 AECL's Public Information Program is  
6 intended to provide stakeholders with timely and  
7 meaningful information on the activities at Chalk River.  
8 The program includes key elements such as quarterly  
9 meetings and community newsletters.

10 AECL has also made a number of improvements  
11 to its website in an effort to provide information to  
12 stakeholders. Information on AECL's environmental policy  
13 and health and safety policy is easily accessible on the  
14 website, as is routine data on emissions.

15 During the 2009 extended outage, AECL made  
16 extensive use of the website to provide timely information  
17 on the NRU repair activities.

18 As has been noted, AECL established an  
19 Environmental Stewardship Council for the CRL site in 2006  
20 with the objective of building relationships and creating  
21 opportunities for open dialogue from the communities.

22 This council includes representatives from  
23 local stakeholder groups, including First Nations,  
24 municipal governments, environmentally-focused  
25 organizations and landowner associations.

1                   CNSC staff participates as an observer in  
2                   the meetings of this council and also conducts public  
3                   consultations for various projects in the site. Overall  
4                   we, CNSC staff, consider that public information program  
5                   that AECL has put in place over the last five years is  
6                   fully satisfactory.

7                   The next two slides summarize AECL's  
8                   assessment of CNSC staff's assessment of the performance  
9                   in all the safety and control areas. Again, why I stress  
10                  that these ratings are for the entire site including NRU.  
11                  As we've discussed already there are two areas that do not  
12                  meet expectations, were below expectations, are a  
13                  management system and fitness for service. AECL has  
14                  acceptable plans to address these deficiencies and has put  
15                  in place mitigation measures where required.  
16                  CNSC staff will monitor progress against these plans  
17                  through the new license conditions and the *Companies*  
18                  *Licence Condition Handbook*.

19                  The *Licence Condition Handbook* also  
20                  includes detailed requirements for all areas and has been  
21                  developed to allow requirements to be applied in a graded  
22                  fashion. This means the license conditions apply  
23                  throughout Chalk River site, but the approach for  
24                  compliance may vary based on the safety significance of an  
25                  activity.

1           For example, workers at all facilities are  
2           required to be adequately trained, but the training  
3           requirements for an NRU engineer will differ widely from  
4           those of a technician in a radio-chemistry laboratory.  
5           The Handbook documents these and AECL is required to make  
6           sure that the documented use of the grade approach is  
7           appropriate.

8           Again, overall areas below requirements are  
9           balanced by AECL's comprehensive and mature core programs  
10          at CRL.

11          The next slide presents the ratings for the  
12          other safety and control areas, noting that security is  
13          rated separately in a protected CMD.

14          I would like to make a brief comment on the  
15          waste management area. Over the last five years AECL has  
16          put in place a modern infrastructure and programs to deal  
17          with the legacy waste issues.

18          Over the next five years the focus will  
19          shift to risk reduction with measures to make sure that  
20          waste, and especially current liquid waste, is put in  
21          stable form suitable for long-term management.

22          And we note that the trend in all areas is  
23          either stable and improving and CNSC staff observed  
24          improving trends in the areas that already are rated as  
25          satisfactory.

1                   In conclusion AECL has operated the  
2                   facility safely during the license period. AECL's  
3                   performance is acceptable overall and their programs are  
4                   functioning as designed. AECL has made several  
5                   improvements during this license period that have and will  
6                   continue to enhance safety.

7                   CNSC staff recommendation to outcome from  
8                   the Integrated Safety Review be included in the licence to  
9                   address the identified improvements and that detailed  
10                  compliance verification criteria in all areas be  
11                  documented in the *License Condition Handbook*.

12                  As is normal practice this Handbook will be  
13                  updated and finalized after the Commission decision to  
14                  ensure that it's consistent with the Commission's record  
15                  of decision.

16                  In conclusion CNSC staff recommends that  
17                  the Commission accepts AECL's proposal to issue a five  
18                  year license period, a license for a period of five years  
19                  with the draft conditions in the licence.

20                  That concludes the presentation of staff  
21                  and we now are available to answer any questions.

22                  **THE CHAIRMAN:** Thank you.

23                  Before we open up the floor for question I  
24                  think we're missing one piece of the equation and that's  
25                  the Emergency Management Ontario for their presentation.

1 And I understand Ms. Stuart, you will make the  
2 presentation. Please proceed.

3

4 **11-H7.2**

5 **Oral presentation by**

6 **Emergency Management Ontario**

7

8 **MS. STUART:** Thank you very much, Mr.  
9 President. I'm very pleased to be here on behalf of  
10 Emergency Management Ontario in my role as Assistant  
11 Deputy Minister And Chief of Emergency Management Ontario.

12 Throughout the rest of the presentation I  
13 promise to remember to say Allison Stuart for the record.  
14 With me today I have Dave Nodwell (phonetic) and Kathy  
15 Blair, Manager Of Planning and exercises and Nuclear  
16 Planning Officer respectively, and they are very aware of  
17 the programs that we'll be discussing today.

18 In terms of the role that Ontario overall  
19 plays in terms of nuclear emergency management, the  
20 *Emergency Management Civil Protection Act* requires the  
21 Lieutenant Governor and Council to have a plan to address  
22 emergencies that arise from nuclear facilities. The plan  
23 currently consists of a master plan and seven implementing  
24 plans.

25 The master plan and three of the

1 implementing plans were approved by Cabinet in 2009 and  
2 the remaining four plans, including the Chalk River  
3 laboratories plan are currently under revision.

4 With regards to the Section 3.4 of the Act,  
5 municipalities have been designated to prepare plans in  
6 respect of nuclear emergencies and those plans must  
7 conform to the provincial plan.

8 For Chalk River laboratories, the  
9 implementing plan here identifies both the towns of Deep  
10 River and Laurentian Hills as designated communities under  
11 the Provisional Nuclear Emergency Response Plan. Both  
12 those communities are thus required to have a nuclear  
13 emergency plan that conforms to the Provincial Nuclear  
14 Emergency Response Plan.

15 The Town of Deep River also serves as a  
16 host community to evacuating residents from within the CRL  
17 primary zone. And on this next slide we talked about the  
18 same sort of thing but with more of a visual for those who  
19 prefer a visual presentation.

20 The exclusion zone encompasses the land  
21 area of approximately six kilometre radius from the stack.  
22 And the approximate primary zone is nine kilometres.  
23 Population of the primary zone is approximately 2,080.  
24 And most of these, 95 percent of these residents live in  
25 Laurentian Hills.

1                   The Town of Deep River and the Town of  
2                   Laurentian Hills are designated municipalities in  
3                   proximity to the CRL facility.

4                   The Provincial Nuclear Emergency Response  
5                   Plan designates responsibilities for both the town and  
6                   some concomitant responsibilities for AECL CRL. And we  
7                   have selected some of those responsibilities to provide a  
8                   context for the discussion today.

9                   The towns must prepare a municipal  
10                  emergency response plan conforming to the Provincial plan.  
11                  Must maintain 24/7 contact for any nuclear notifications.  
12                  Must develop and maintain a public alerting zone, a system  
13                  for the primary zone, and have appropriate procedures in  
14                  place to implement any protective measures should they be  
15                  required. And to support nuclear emergency public  
16                  education through a public education program.

17                  Must also provide for the provision of  
18                  emergency information in the event of a nuclear incident  
19                  and maintain a liaison arrangement with the nuclear  
20                  facility and the host community that applies to Laurentian  
21                  Hills.

22                  There must be regular training and  
23                  exercises, as well as carrying out any emergency response  
24                  and implementation of Provincial directives should there  
25                  be an actual event.

1                   Finally, need to maintain a response  
2                   infrastructure that ensures that this can facilitate  
3                   appropriate action should it be required.

4                   In support of these requirements of the  
5                   towns the AECL at the CRL site is required to have  
6                   preparedness activities that include organizational  
7                   equipment and procedures development. Requires them to  
8                   notify the province and the designated municipalities of  
9                   incidents in accordance with the Provincial nuclear plan.  
10                  Resources the public alerting system for the towns of Deep  
11                  River and Laurentian Hills. Assists the Public Education  
12                  Program, provide personnel for response commitments,  
13                  provide infrastructure. Conduct and participate in  
14                  training and exercises, and as relevant and applicable  
15                  conduct studies and research to enhance public safety in  
16                  that area.

17                  I'd like to talk further about public  
18                  alerting. The Provincial Nuclear Emergency Response Plan  
19                  outlines standards for public alerting around each of  
20                  Ontario's nuclear facilities.

21                  The standard for the area around Chalk  
22                  River Laboratories is as follows: The operator shall  
23                  provide resources and assistance to the designated  
24                  municipalities to allow the establishment and maintenance  
25                  of a public alerting system in the primary zone.

1 The public alerting system must provide within 15 minutes  
2 of initial a warning to the population in the primary  
3 zone, whether they be indoors or outdoors and without  
4 reference to time of day or time of year.

5 The public alerting system coupled together  
6 with the public direction through emergency bulletins and  
7 so on that would be broadcast over radio and television  
8 are designed to ensure that the population within the  
9 primary zone will be notified in a timely and effective  
10 manner.

11 In terms of the status of the alerting  
12 around CRL the indoor alerting, there was a automated  
13 telephone notification system drill in April of this year  
14 which resulted with 73 percent of telephone subscribers  
15 being reached within the 15 minute timeframe.

16 This means that of the roughly 2200 customers in the  
17 primary zone, 589 of the calls failed. The results of  
18 this drill are under review to determine why the calls  
19 failed. Problems with the subscription list, number  
20 disconnected, those sorts of things.

21 In terms of outdoor alerting the current  
22 system involves sending loud hailer trucks into the  
23 primary zone. In a recent meeting with the mayors of both  
24 Deep River and Laurentian Hills there was agreement with  
25 Emergency Management Ontario that the current system does

1 not meet the standards outlined in the plan and there is  
2 general agreement to move forward with enhancements.

3 The next steps that are anticipated around  
4 the indoor alerting, Emergency Management will work with  
5 the municipalities to assess the drill results. And based  
6 on the results of that review next steps will be  
7 determined as necessary to ensure that indoor alerting  
8 compliance is in place.

9 It depends on the root causes for the  
10 current rating and these will be examined to address what  
11 the next issues, steps will be. The assessment of the  
12 drill and recommended next steps will be presented in a  
13 report by the end of summer.

14 For the outdoor alerting the overall focus  
15 is to develop a work plan over the summer months. All the  
16 parties including AECL agreed to proceed with a study to  
17 identify an appropriate outdoor alerting system for the  
18 primary zone. An appropriate system will be installed  
19 based on the findings of this study.

20 The first step along that path is a  
21 presentation by Durham Region by current alerting  
22 technologies which will be provided at the Laurentian  
23 Hills, Deep River Nuclear Emergency Preparedness Committee  
24 early this summer.

25 By the end of summer a timeline will be developed to

1       conduct the requisite study and implementation of the  
2       proposed solution and this will include a schedule of  
3       regular updates for the Province and for CNSC. We would  
4       be able to provide an update on this at the October CNSC  
5       hearing.

6                       We would like to point out and acknowledge  
7       the support that's being provided by the local leadership  
8       in this move forward on public alerting.

9                       In summary the Provincial Nuclear Emergency  
10       Response plan of 2009 provides an effective response to  
11       nuclear emergencies in Ontario. The implementing plan for  
12       CRL is under revision, and I can assure this group that  
13       the local leadership and AECL, CRL have been actively  
14       engaged in the developing of that implementing plan.

15                      Emergency Management Ontario is working  
16       with the designated communities to support them in  
17       complying with The Provincial Public Alerting Standard and  
18       next steps have been clearly identified with respect to  
19       both indoor and outdoor alerting. A specific public  
20       alerting work plan will be developed over the summer and  
21       available for review at the next hearing.

22                      We will continue to work with the  
23       communities over the summer to identify any other concerns  
24       related to compliance with the nuclear emergency response  
25       plan for the Province.

1                   AECL and CRL is working in close  
2 cooperation with the designated communities and with  
3 Emergency Management Ontario. And we're willing to  
4 present at the next hearing to provide a full report on  
5 the compliance in the CRL area with the Provincial Nuclear  
6 Emergency Response Plan.

7                   Thank you for the opportunity to present  
8 and we're willing to of course answer any questions you  
9 might have.

10                   **THE CHAIRMAN:** Thank you very much. I  
11 would also like to mention that we have also Ms. Ella  
12 MacDonald from -- she's the Coordinator for Laurentian  
13 Hills and Deep River, that might be available to ask  
14 question from the local authorities.

15                   So let me open up the floor for questioning  
16 and I'd like to start with Dr. Barriault.

17                   **MEMBER BARRIAULT:** Thank you Mr. Chairman.  
18 I guess my first question since you've just presented --  
19 by the way, thank you so much for presenting.

20                   I've got a concern already with an area of  
21 37 square kilometers with 2,800 employees and what I'm  
22 hearing is that their system of alarm does not meet  
23 Provincial standards; is that correct?

24                   **MS. STUART:** Allison Stuart for the record.  
25 That is correct that the current setup does not meet our

1           expectations.

2                           **MEMBER BARRIAULT:**   Could I ask AECL to  
3           comment on this please?

4                           **MR. DRUMHILLER:**   Hank Drumhiller for the  
5           record.

6                           So we are aware of the results of the  
7           testing and as stated we are looking into different  
8           options to address the shortfalls, and are moving forward.  
9           We are working with the communities in trying to resolve  
10          the issue.

11                          **MEMBER BARRIAULT:**   We've had this  
12          discussion before if I remember correctly on the alarm  
13          system, and I guess the concern I have really is that  
14          here's an organization that's been there for 70 plus years  
15          and yet to not have an adequate alarm system that meets  
16          today's standards, it's a concern.   There's no need for  
17          comments, it's just my reflection on some of the issues.

18                          So tonight if we have an incident obviously  
19          the system would not meet standards.

20                          **THE CHAIRMAN:** Ms. MacDonald, do you want to  
21          make a comment?

22                          **MS. MACDONALD:**   Yes.   I would like to  
23          comment that it's not the employees, it's the population  
24          of the Deep River, Laurentian Hill area and it's spread  
25          over the I would say along the Highway 17 over about ten

1 kilometers long.

2 Now this population the procedure is in  
3 place to notify people in case there is an emergency. And  
4 if there's a notification that there's an emergency  
5 existing downwind population will be immediately notified  
6 within the 15 minutes. So we do meet that requirement.

7 Everybody in that primary zone is not  
8 notified, and according to the previous version of PNERP,  
9 only populations downwind are supposed to be notified. So  
10 the public would be notified and would be alerted.

11 **MEMBER BARRIAULT:** Immediately.

12 But what I'm hearing -- I understand what  
13 you're saying, that the local municipalities have a system  
14 in place, but the plant itself, I understand, does not  
15 have a system in place. Is that correct?

16 **MS. MACDONALD:** No, the plan is in place.

17 **THE CHAIRMAN:** I think there's two  
18 communities here. There is onsite of CRL community which  
19 is under the authority of AECL and then there's the  
20 population outside, and I think what Ms. MacDonald is  
21 talking about is what's happening outside.

22 I thought your first question was on the  
23 inside.

24 **MEMBER BARRIAULT:** The inside, 37 square  
25 kilometres.

1                   **MS. MACDONALD:** Okay.

2                   **THE CHAIRMAN:** The AECL facility, how do  
3 you get to all the workers who are onsite?

4                   **MS. MACDONALD:** All the workers -- excuse  
5 me, I would just make a comment that all the workers  
6 onsite at CRL are immediately notified as soon as the  
7 siren sounds.

8                   **MR. DRUMHILLER:** Hank Drumhiller, for the  
9 record.

10                                 In fact, we conduct drills on that and have  
11 proven effective onsite.

12                                 I apologize; I thought you were talking  
13 about working with the communities and supporting them in  
14 shortfalls and capability of meeting some of the recent  
15 drills there.

16                   **MEMBER BARRIAULT:** So there's two issues  
17 then. The first issue is onsite. You have adequate  
18 sirens to cover 37 square kilometres, that anywhere on  
19 that site you can hear a siren going off. Is that  
20 correct?

21                   **MR. DRUMHILLER:** If I could have just a  
22 moment?

23   **(SHORT PAUSE)**

24                   **MR. DRUMHILLER:** Hank Drumhiller, for the  
25 record.

1 I just conferred with one of my experts on  
2 it and he confirms that all employees onsite can, in  
3 effect, hear the alarms.

4 **MEMBER BARRIAULT:** That wasn't my question.  
5 My question was does it cover the complete 37 square  
6 kilometres?

7 **MR. DRUMHILLER:** Hank Drumhiller, for the  
8 record.

9 I'd like to turn this to John Osborne to  
10 specifically answer that.

11 **MEMBER BARRIAULT:** Thanks.

12 **MR. OSBORNE:** John Osborne, for the record.

13 The primary zone includes areas both owned  
14 by AECL and areas not owned by AECL. The alerting system  
15 owned by AECL is serviceable, fully functional and has  
16 been upgraded over the last couple of years.

17 I think the area of concern that's been  
18 identified by EMO is for the alerting in the primary zone  
19 but outside of AECL's property.

20 **MEMBER BARRIAULT:** So what I'm hearing then  
21 is that EMO's comment about AECL not being up to standard  
22 or provincial standard on their coverage is not correct?

23 I don't want to belabour the point.  
24 There's two issues here. One of them is onsite, 37 square  
25 kilometres, 2,800 employees, and what I'm hearing is that



1       you will, and the communities are responsible for beyond  
2       that, and it's not limited to where it's more highly  
3       populated. It's the entire zone, which is why we have  
4       concerns about the current state of readiness.

5               We also have concerns that the method of  
6       notification may inadvertently compromise the ability of  
7       the locale to respond and also could put the individuals  
8       responding at some personal risk.

9               Thank you.

10              **MEMBER BARRIAULT:** Thank you so much.

11              Thank you, Mr. Chairman.

12              **THE CHAIRMAN:** Let me jump on this.

13              First of all, thank you for being here, and  
14       let me ask a little bit more general question. Post-  
15       Fukushima, there's a really enhanced concern about  
16       emergency management, and my observation on -- you know,  
17       anytime there's a big event and a big incident -- and we  
18       can look at Katrina, if we look at BP Oil; we now have  
19       Fukushima -- the first casualties are the two regulators,  
20       you and I, are likely to be fired if we had the same  
21       situation that Fukushima has.

22              And normally, because there are all kinds  
23       of plans available and the plans are terrific. It's the  
24       execution of those plans that always fails because, as you  
25       see in Japan, for 40 years it worked, and I think -- I

1 don't know what happened to those systems. If nothing --  
2 if they don't get drilled in the real world, we always  
3 find some problem in the human interface when you have to  
4 execute.

5 So my question -- by the way, I really  
6 would like you to come back in October because I think  
7 there's going to be a lot more information as we do  
8 lessons learned of all our facilities, and I hope you're  
9 doing the review of all nuclear facilities, not only AECL.

10 In some of the other nuclear facilities, we  
11 may have even more challenges in terms of decision-making.

12 So my question is very, very specific. My  
13 observation is we see plans, I've read plans. What it's  
14 lacking is names.

15 Who does what in the first 15 minutes, the  
16 next 15 minutes, the next 15 minutes? Do they have the  
17 authority to push the button? Do they have the authority  
18 to evacuate? Do they have the authority to ventilate or  
19 do they have to go up the line and ask permission from  
20 somebody to do something?

21 What I want to understand is it is very,  
22 very clear, AECL, who does what in the first 15 minutes  
23 and from the Emergency Management, do the local  
24 authorities have to ask permission from you to declare an  
25 emergency, push the button, inform everybody, et cetera,

1 or do they have the authority and who has the authority in  
2 the local -- I mean, I'm talking about the name of an  
3 individual that will do that.

4 **MR. DRUMHILLER:** Hank Drumhiller, for the  
5 record.

6 I'm sorry, could you repeat the end of your  
7 question? I'm sorry.

8 **THE CHAIRMAN:** I want to know if a major  
9 disaster happens, who has the authority to decide it is a  
10 major event and decide to inform everybody either to  
11 evacuate or do whatever needs to be done in terms of  
12 mitigating the disaster?

13 **MR. WALKER:** Bob Walker, for the record.

14 Mr. President, perhaps I should respond to  
15 that.

16 I have, as Senior Vice-President, the  
17 overall authority in the matter in which you're referring.  
18 We have designated a number of senior emergency officers  
19 from our leadership team who are designated to be on watch  
20 to come in and deal with the emergency response in the  
21 timeframes you're talking about. They are fully trained  
22 in it. We regularly exercise the process through drills  
23 to bring the team together to actually walk through an  
24 emergency scenario to deal with the outflow to EMO and to  
25 the local communities and to inform appropriately inside.

1                   Of course, if the SCO is not onsite,  
2                   there's communication with the SCO, and as part of our  
3                   onsite emergency teams there is the ability to handle the  
4                   first few minutes.

5                   So there is a well-structured system here  
6                   with appropriately training of people that carried my  
7                   designation as the SEO to fulfill that function.

8                   **THE CHAIRMAN:**    Just a comment.  Normally  
9                   in the nuclear business we haven't got the luxury of  
10                  waiting.  So if you're not around the operator in the  
11                  control room of the NRU, does he have the authority to do  
12                  whatever needs to be done to shut down the machine, for  
13                  example, or whatever else needs to be done, rather than go  
14                  and seek you out which may, you know, again depending when  
15                  it is and where it is?

16                  **MR. WALKER:**  Bob Walker for the record, Mr.  
17                  President.  So this is a cascading scenario that you've  
18                  talked about.  I'll ask Mr. Drumhiller to speak in a  
19                  moment to the notion of our facility's authorities that  
20                  have that responsibility to deal with the immediate  
21                  shutdown action.

22                  What I was speaking to is the larger  
23                  umbrella that now we've got an event, how do we bring  
24                  together our emergency response dealing the matters of  
25                  safety and security, public communications and outreach,

1 to ensure that is as quickly as possible brought to bear  
2 on the events as it unfolds.

3 But certainly within that framework is the  
4 concept of the vested responsibilities and our facility's  
5 authorities to take appropriate, immediate action.

6 So Mr. Drumhiller.

7 **MR. DRUMHILLER:** Yeah. Hank Drumhiller for  
8 the record.

9 To be specific all the seniors and the more  
10 experienced or longer in the process if you would trainees  
11 to be seniors, I've personally spoken with all of them and  
12 made it very clear that it's my expectation that it's not  
13 only should they do it, but it is a requirement.

14 If they question that the operation of NRU  
15 is unsafe that they should trip the reactor immediately.  
16 They have that authority and that responsibility to do  
17 that.

18 **THE CHAIRMAN:** Well, we will be looking in  
19 October when we do the post-mortem, or the lesson learned  
20 from all the nuclear facilities post Fukushima, we will be  
21 looking for very specifics in those plants.

22 Ms. Stuart, you want to comment about the  
23 local authority?

24 **MS. STUART:** Allison Stuart for the record.  
25 Yes. The Mayor, or the Mayor's designate has the

1 authority to declare an emergency, any kind of emergency.  
2 In addition to that once CRL has identified an issue they  
3 notify both the municipalities and the Province within 15  
4 minutes. And that's been tested. And that's part of the  
5 expectation or obligation.

6 The Province will respond within 15 minutes  
7 with the level of emergency that is resulting from the  
8 information that's available and the appropriate actions  
9 to be taken. This does not prevent the Mayor from taking  
10 immediate actions for health and safety, you know,  
11 immediate health and safety issues.

12 Again, tested regularly and as one would  
13 anticipate, we do have 24/7 coverage of individuals that  
14 are able to take that call and initiate the action.

15 **THE CHAIRMAN:** Thank you. Mr. Harvey.

16 **MEMBER HARVEY:** Merci, Mr. President. Just  
17 a short comment then. I mean, we much recognize that all  
18 the efforts that have been made by AECL that have been  
19 devoted in different field and supported by a certain  
20 number of results, and which give I would say a higher  
21 confidence that things will be better in the future.

22 My concern though are in some field where  
23 it's (inaudible) why, what are the causes that there's a  
24 great difficulty to get to complain with the request and  
25 the expectations. So quite often staff notes the efforts

1       made, but not the results.  It's like if the target was  
2       always moving away.

3                       So two example.  The Voyager Phase II  
4       update it looks nice because it's 90 percent of the  
5       achievement.  But it's just one year after the start.  So  
6       if we are a 90 percent one year after what would be next  
7       year?  And the year before, it's a four-year program.  
8       So despite the fact that 90 is not so bad, I've got some  
9       doubt about the duration and that the project would be  
10      achieved inside those four years.

11                      Another example is the reactor that would  
12      leak.  That is astonishing that that has been I would say  
13      your choice have been that you will change such and such  
14      elements, but when we read at the end it looks good.  But  
15      at the end you see but, however, the full exchange maybe  
16      need to be divide until 2012 recognizing that in  
17      (inaudible) could a affect the (inaudible).

18                      So instead of saying that we will  
19      accelerate and do it before the winter, you say the winter  
20      will.  So we'd like just to have your comment and then  
21      maybe after the staff comments after that.  What are -- is  
22      there a will to be online with the expectation?

23                      **MR. DRUMHILLER:**  Hank Drumhiller for the  
24      record.

25                      The short answer is yes, very much so.  So



1 we'll keep making changes to it and implementing things as  
2 it develops, unfolds and takes its course, make midcourse  
3 adjustments to it.

4 We mentioned in the presentation we have  
5 the WANO peer review and we factored quite a bit of their  
6 comments into the Voyageur II, as well, and we'll continue  
7 to do things like that.

8 You ask about the rod bays. So I guess I  
9 would make probably two or three real comments on it. One  
10 is the source of the tritium and the rod bays is the  
11 primary water. During the outage we exchanged the primary  
12 water with low tritiated water so we gained a factor of  
13 ten improvement there, or another way to think of it is a  
14 reduction of factor of ten of what we were adding to the  
15 rod bay.

16 And we're also looking at ways that we add  
17 less of the heavy water to the rod bay and thus less  
18 tritium even that way.

19 In addition the rod bays' heat exchangers,  
20 we've had some problems with those. We have plugged the  
21 tubes on one and that heat exchanger is now whole.  
22 Another heat exchanger that we decided was beyond the  
23 ability to repair, we've replaced that heat exchanger.  
24 So for the first time in quite awhile we have two fully  
25 functional rod bay heat exchangers that are serviceable.

1 And then particularly about the rod bay water itself, we  
2 have a process designed and being implemented that allow  
3 us to use thermal stratification of the rod bay water to  
4 exchange that water with clean water, with detritiated,  
5 well, it's not detritiated, it is just clean water without  
6 any tritium in it. And that'll make a significant  
7 improvement then. And the schedule to do that is by the  
8 end of this year.

9 **THE CHAIRMAN:** Thank you. Mr. Jammal.

10 **MR. JAMMAL:** Ramzi Jammal for the record.

11 Mr. Harvey, your question is very valid. A  
12 couple things I would like to let you know: in the CMD  
13 itself, we don't give out the full history. It's not  
14 we're sitting back and waiting with respect to the Rod Bay  
15 leak.

16 As we reviewed the ISR and the protocols  
17 with respect to the licensing of the Chalk River  
18 laboratory, there were some actions taken with respect to  
19 the Rod Bay.

20 My point, what I'm trying to say -- the  
21 point I'm trying to make here is the following. Actions  
22 were proposed by the licensee, were reviewed, and then  
23 they implemented those actions. There has been a  
24 continuous decrease of the leak or the -- "la fuite" from  
25 the Rod Bay with respect to the tritium. They've taken

1 multiple actions and multiple measures because -- the  
2 reason I know this is because I had to approve them, and  
3 we were in direct communication with the CNO and we gave  
4 them the approval in order to put those actions in place.

5 So the reduction has been -- has taken  
6 place, and it has been a huge reduction. Are we going  
7 towards zero? We would love to go towards zero, but again  
8 it's based on the impact, and we're going towards zero,  
9 and AECL will have to commit towards zero over a period of  
10 time.

11 So the action that's being taken to date  
12 from sealing around Rod Bay, changing the water, and  
13 improvements, is reducing the leak from the Rod Bay. Your  
14 point is very well valid, is why don't you do it faster?

15 Priorities is one issue. And then we  
16 always have to balance from our compliance activity. We  
17 will never allow a licensee to be in non-compliance, but  
18 we have to take measures in place that they will be in  
19 compliance over a period of time.

20 **MEMBER HARVEY:** Thank you for that.

21 When did -- you're talking priorities, and  
22 I understand during the large outage that occurred for 167  
23 days, something like that, that some priorities have been  
24 pushed away and I understand that.

25 When that occurs is there discussion and

1 agreement between AECL and staff if some priorities are  
2 just -- say, okay, we'll just put it beside during the  
3 time that the other ones will be -- would prevail?

4 **MR. JAMMAL:** Ramzi Jammal, for the record.  
5 I'll start and then I'll pass it on to Mr.  
6 Elder.

7 You're correct. As we -- events occur and  
8 during the outage, there were planned activity. I just  
9 want to confirm and assure everybody, we don't put things  
10 on the back burner because it cannot be done. It's based  
11 on priority and risk and what's the biggest return with  
12 respect to the activity that needs to be done.

13 During the outage, yes, there were plans  
14 submitted by AECL. We hold them accountable against the  
15 plans, during this outage or the previous outage. And  
16 that's why in all of our discussions we said they have  
17 what we call a pre-IIP implementation, activities that  
18 they are taking right now towards the improvement  
19 initiatives for the 10-year safety case and the next  
20 licensing cycle.

21 Having said that, going back to the  
22 agreements, yes, we have discussions with respect to  
23 priorities. We have evaluations based on the actions  
24 taken by the licensee and determine, based on very well  
25 established risk informed decision. Can it wait? Not to

1 be put on hold, and then address issues as they become a  
2 priority.

3 To give you an example on the IIP, during  
4 the revision of the integrated implementation plan, or the  
5 improvement plan, the Fukushima events did take place.  
6 We've taken elements that they pertain to the severe  
7 action management guidelines, or the management of  
8 accidents, to be put forth in implementation with respect  
9 to the improvement plan.

10 My conclusion is the discussion is always  
11 ongoing without compromise to safety in order to establish  
12 the priorities and hold the licensee accountably to those  
13 plans.

14 I will pass it to Mr. Elder if he wants to  
15 add anything else.

16 **MR. ELDER:** I just want to add -- Peter  
17 Elder, for the record -- that one of the things that we've  
18 been working -- one of the things that did come of the  
19 Talisman was a lack of prioritization.

20 So that there were just issues and they  
21 weren't -- well, whether they were the most important  
22 ones. So one of the things that we've been working over  
23 the last three years is to make sure that there is -- both  
24 sides look at the priority of issues, communicate, and  
25 come up with a common understanding of what's going to be

1 done, and why you're doing that. And that's translating  
2 into -- and we -- as we're going, we're trying to write  
3 this down.

4 So this is why this licensing handbook is  
5 250 pages. And there are actually specific requirements  
6 about the outage. We're -- you know -- again, this  
7 current one is before the handbook is in place. But we're  
8 trying to follow the same practice. But that there would  
9 be very clear documentation before you start, two months  
10 at least before you start, of what you're going to do,  
11 what regulatory commitments you plan to address during  
12 that outage, and then dialogue if things change. And then  
13 at the end, the licensee has the responsibility to report  
14 on what was actually done. If they didn't get work done,  
15 what they were going to do in terms of schedule in the  
16 future, take actions to reduce the risk of that work not  
17 being done.

18 So really trying to formalize that because  
19 -- and you -- otherwise you put everything on the table,  
20 and everything is equally important -- is to come up with  
21 an actual scheme and communication around what needs to be  
22 done and how that's going to be done.

23 We're trying to, again, write it down in a  
24 handbook, and that's the intention of what we're going to  
25 do going forward. Very formalized, very clear. But --

1 and the problem, again, the CMD as we've said, it's a --  
2 even though it's a long CMD, it only provides a snapshot  
3 of what happened.

4 From a risk point of view on the Rod Bay,  
5 the most important thing was reducing the amount of  
6 tritium in the water. That's been done, and then you're  
7 working on the lower ones.

8 Going back to something like Voyager,  
9 frankly, we're monitoring it because we have the same sort  
10 of concern. It's nice, you're making progress, but we  
11 want them to come back and talk to you, the Commission,  
12 every six months to make sure -- that's the indication  
13 that we think it's really important, that it's worthy of a  
14 discussion at the Commission level every six months. And  
15 to make sure that that continues to get appropriate  
16 management oversight.

17 Because on this sort of things, if you  
18 don't have the management commitment -- to date it's been  
19 there -- but if you don't have continued management  
20 commitment, you will not get the improvement. So we're  
21 making sure that what's important is very clear, and then  
22 that we track those things that are important very  
23 closely.

24 **MEMBER HARVEY:** I'm happy to hear that.

25 Another question, Fitness for Service of

1 the NRU, you mentioned in your presentation that that was  
2 a continuous activity.

3 Just an example, we are now in an outage,  
4 and it's supposed to end the 17<sup>th</sup>. Will the staff have  
5 the result -- the results at that time to permit the  
6 restart of the -- because they have to produce a report,  
7 you have to study the report? Or are you following it so  
8 close that you've got the answer right on the 17<sup>th</sup>?

9 **MR. JAMMAL:** There's a couple of points I  
10 would like to clarify, Mr. Harvey.

11 It's Ramzi Jammal, for the record.

12 Number one is: the restart of the planned  
13 outage is within the operation of the licence condition.  
14 So the operators can restart.

15 As Peter mentioned, my colleague, Mr. Elder  
16 mentioned, that the planned activity was established and  
17 AECL is executing the activity according to plan. Now,  
18 again, I want to confirm and then reassure of two things.  
19 They do not require the Commission for the restart;  
20 however they must complete the inspections that was placed  
21 on as a condition for carrying out the activity in order  
22 to ensure the integrity of the weld and the corrosion  
23 rate.

24 A fact of life is things can happen and  
25 technical difficulties can occur. The Fitness for Service

1 for the restart of the NRU was determined for a one year  
2 period, roughly until almost the end of August. And we  
3 have -- I want to caution everybody not to live by the  
4 hypothetical dates that has been presented. That means  
5 the Fitness for Service for one year does not mean it's a  
6 shelf life. After the one year, things will not be  
7 functioning.

8 So we are evaluating and looking at what  
9 does the Fitness for Service mean. If there are delays in  
10 certain inspections can they disposition the delay and  
11 establish the way forward so that all the inspections will  
12 be completed before day 2?

13 Anything else do you want to add?

14 **MR. ELDER:** Peter Elder, for the record.

15 Just to clarify your concern, and this is  
16 from experience that we've had with power reactors and  
17 other ones, the best solution is not actually to say you  
18 have to give the approval before they restart; it's to  
19 actually build into the process three or four months for  
20 them to do the analysis and us to review the analysis.

21 So when we say if you're good for -- if  
22 your case says you're good for, in this case, one year,  
23 you do your inspection at nine months. Then there's three  
24 months to sort out any uncertainties rather than trying to  
25 make a quick decision while the reactor is shut down.

1           So we always build into these fitness for  
2 service cases some margin for us to do the analysis, for  
3 them to do the analysis, us to review it, and that's how  
4 we're working in this case. Inspection at nine months  
5 because by one year, we want to confirm that the case is  
6 still good for another year or another two years or  
7 whatever.

8                   **MEMBER HARVEY:** Just one last short  
9 question to AECL.

10                   In your document you mentioned that you met  
11 the isotope demand, 100 per cent of the demand.

12                   So what is that demand and can we compare  
13 it to what it was before?

14                   **MR. DRUMHILLER:** Hank Drumhiller, for the  
15 record.

16                   So the demand is running right now  
17 approximately 50 per cent of what the demand was before  
18 the extended outage that started in May of 2009.

19                   There's multiple reasons for that. There  
20 are more suppliers that are in the marketplace now, but  
21 one of the major reasons is that significant efficiencies  
22 were gained during that outage in the use of isotopes and  
23 those efficiency gains have continued since we've come up.  
24 So the market -- the demand worldwide is less. Not that  
25 fewer people are receiving treatments; they're just doing

1           it more efficiently with less isotopes.

2                         **MEMBER HARVEY:** Thank you.

3                         Merci, monsieur le président.

4                         **THE CHAIRMAN:** Okay. We're continuing.

5           We'll see if we can have the staying power until noon  
6           here.

7                         The next question is for Dr. McDill.

8                         **MEMBER McDILL:** Thank you.

9                         I think my comments follow Monsieur Harvey.  
10          AECL has presented a positive and optimistic presentation,  
11          as they usually do, and staff has presented a cautious,  
12          somewhat conservative response, as they usually do. We've  
13          been assured that progress is being made.

14                        My observation is that AECL continues to be  
15          in the awkward position of playing catch-up or responding  
16          to, you know, a leak that was maybe unexpected.

17                        Mr. Elder made a really important comment.  
18          He said a key phrase is -- or his key phrase was a known  
19          weakness caused a major outage. And with these grades, if  
20          you like, of below expectations, I think we have known  
21          weaknesses, weaknesses in the management system,  
22          weaknesses in fitness for service, problems with safety-  
23          related instruments.

24                        So my question to -- first to staff and  
25          then to AECL, how far below expectations? I know I'm

1 asking you to find where in the grey zone you are, but a  
2 little below, a lot below?

3 **MR. ELDER:** Peter Elder, for the record.

4 So first I'm going to start in terms of  
5 when we get to a licence renewal, there are two things  
6 we're looking for. The rating is actually their  
7 performance. So there are two points. You know, when  
8 you're looking at the performance, it's actually the  
9 program and the implementation.

10 At the licence renewal, we focus a lot on  
11 making sure, going forward, the program is solid. And we  
12 have done that in terms of, in this case, saying they're  
13 now in a position where the programs are all acceptable.  
14 It's a question of then they actually have to implement  
15 them. And I think that's a major change in how we've  
16 tried to look at this one, saying we want to be in a  
17 position that all the programs from October 1<sup>st</sup> are  
18 acceptable. It's now a question of AECL actually  
19 implementing those programs.

20 So in terms of -- but I can't say right now  
21 that the performance in those areas is satisfactory right  
22 now because their implementation history is not there yet.

23 I wouldn't be recommending that you issue a  
24 licence if I thought they were going to stay at below  
25 expectations. I think there is a clear path forward on

1           how, if they do what they said they were going to do, they  
2           will get to satisfactory and in a relatively short period  
3           of time.

4                           And I think Mr. Jammal wants to add  
5           something.

6                           **MR. JAMMAL:** Ramzi Jammal, for the record.

7                           It's very important to recognize, as Mr.  
8           Elder mentioned, the program itself.

9                           You asked, Dr. McDill, how low is below?  
10          There has been improvement to date. Improvements, that  
11          does not allow us to give them satisfactory or acceptable,  
12          and our oversight is not going to be on a short-term  
13          basis. That means that AECL will have to implement their  
14          program as presented to us, which is acceptable, and it's  
15          no longer in bits and pieces. It's a holistic approach,  
16          overarching approach to ensure that the licensee is  
17          implementing what they said.

18                           And that's why below expectation is in  
19          place.

20                           If you look at the trending in that below  
21          expectation, there has been improvements, bits and pieces,  
22          but we still need to see the full implementation of the  
23          program as presented to us.

24                           **MR. WALKER:** Bob Walker, for the record.

25                           Perhaps I could offer some comments for the

1 Commissioner. We want and expect to be measured by our  
2 performance. We are not where we need to be. We have  
3 plans to move forward and improve. The engagement that we  
4 have with the CNSC staff is focusing on what's important,  
5 the priorities, and through my engagement with my  
6 leadership team to ensure that we have the focus, the  
7 management oversight, the people leadership and the  
8 commitment of our effort to do better.

9 The plans that we've laid forward in the  
10 CMD are just that; it's the journey for moving forward.

11 I think there's a core theme that's been in  
12 the comments by a number of the Commissioners here. It's  
13 hard to improve equipment. It's harder to change people.

14 And the first issue that we have come to  
15 acknowledge and accept is that we have issues in our  
16 culture that have to be addressed and we are taking  
17 proactive measures to try to move that forward.

18 And I will come back to the remarks by Mr.  
19 Drumhiller that gets to the essence of it. It's the core  
20 acceptance of our people that our people's human  
21 performance has been a fundamental weakness, and it's not  
22 just the equipment.

23 And I would suggest that's performance  
24 throughout, because I'm not talking about operators. I'm  
25 talking about managers as well.

1                   So the embracing of a journey to improve  
2                   our organization is one that has to be inclusive. It has  
3                   to deal with the equipment issues. It has to deal with  
4                   the management processes. It's fundamentally a question  
5                   of leadership.

6                   I believe through the CMD, we've put  
7                   forward a comprehensive approach to address the issues,  
8                   move forward. I do welcome the opportunity to be back  
9                   before the Commission on a regular basis to talk to you  
10                  about our progress and to interact on a daily basis with  
11                  the CNSC staff at multiple levels to get this right. This  
12                  is important. This is our future and that's where we want  
13                  to be.

14                  **MEMBER McDILL:** Thank you.

15                  My first request for Day Two, since I'm not  
16                  sure it's worth going through them item by item, but in  
17                  the CMDs that were presented there are a lot of "report  
18                  due in May," "report due in June," "intention to hire 40  
19                  engineers in the summer". If for Day Two we could have a  
20                  list of how those all transpired by then?

21                  But I'll ask you how is the hiring of 40  
22                  engineering staff going?

23                  **MR. DRUMHILLER:** Hank Drumhiller, for the  
24                  record.

25                  Actually, quite well. We've had several

1       fairs. We've been successful. We don't have all of them  
2       identified and hired, but the number is about half of them  
3       have been identified and we're moving along in making or  
4       conducting the interviews, making selections and bringing  
5       them on board.

6                   **MEMBER MCDILL:** Thank you. With respect to  
7       the AECL document on page 3-3 there's a reference to a  
8       safety review committee which is an internal body  
9       providing independent oversight.

10                   Where do they report on the organization  
11       chart, which is the page before 3-2?

12                   **MR. DRUMHILLER:** Hank Drumhiller for the  
13       record, excuse me. I don't actually see them on the chart  
14       but they do report to me.

15                   **MEMBER MCDILL:** That was my question, it's  
16       hard to put every committee on an org chart. So they  
17       report to you?

18                   **MR. DRUMHILLER:** That is correct.

19                   **MEMBER MCDILL:** And how do they maintain  
20       their independence, since you've just identified that the  
21       problem is from leadership down? How does this committee  
22       retain its independence and stay separate from the line?

23                   **MR. DRUMHILLER:** Hank Drumhiller for the  
24       record.

25                   I think it's multiple ways. Almost one is

1 a bit how they were created their history and some of the  
2 personalities involved is a piece.

3 But I think more importantly than that  
4 we've added several external members to the organization.  
5 Some are external to the site, but still part of AECL and  
6 there are others, there are two members that are not part  
7 of AECL at all.

8 We're looking at potentially adding a third  
9 member, and we have found those to be quite valuable in  
10 maintaining a very open and different view and insightful  
11 view at least for me on the performance of our  
12 organization and shortfalls.

13 **MR. MCDERMOTT:** May I make an additional  
14 comment as well? Hugh McDermott for the record.  
15 I personally chair our organization wide Health, Safety,  
16 Security And Environment Business Performance Council, and  
17 that is a committee of offices from across the corporation  
18 that provides oversight on all of those matters and that  
19 reports to the Board of Directors as well.

20 And as part of that the Safety Review  
21 Committee is one of the key standing committees that we  
22 consider under that umbrella, and we have regular about  
23 six meetings per year of that group that hear directly  
24 from the Safety Review Committee on key issues.

25 **MEMBER MCDILL:** How many times has the

1 Safety Review Committee met in the last year let's say,  
2 and how many recommendations rough numbers have come out  
3 of it?

4 **MR. DRUMHILLER:** Hank Drumhiller for the  
5 record.

6 They have met multiple times. I don't have  
7 a specific number but it is a high number of meetings. In  
8 general -- hang on just one moment if you would.

9 (SHORT PAUSE/COURTE PAUSE)

10 **MR. DRUMHILLER:** Hank Drumhiller for the  
11 record.

12 The requirement is to meet at least  
13 quarterly, but they meet much more often than that.  
14 Recently they've been meeting at least once a month as a  
15 full committee and they also meet as needed as  
16 subcommittees. A subcommittee could be two or three of  
17 the members that meet.

18 And as far as recommendations I don't have  
19 a specific number, but it is a high number. They have a  
20 very free hand in what they look at and what their  
21 comments are.

22 And speaking back maybe to your other  
23 question, you know, my advice to the Chairman of it is I  
24 need information, you know, I'm not telling him what to go  
25 look at or what to do. But I need information, I need an

1 outside view.

2 So he has very little direction from me on  
3 what to look at just that I need an independent review and  
4 to find out things that we're missing or that we're not  
5 looking at.

6 So they do a good job of that, of  
7 identifying issues for where the line has maybe fallen  
8 short.

9 **MEMBER MCDILL:** Would staff like to comment  
10 on that Committee? Have you had any interaction with them  
11 or are they completely separate?

12 **MR. ELDER:** This is Peter Elder. I'll  
13 start because there are a couple things.  
14 We don't tend to interact directly with them, but we  
15 occasionally look at their outputs because it's important.  
16 They play, from a regulatory purview they play two roles  
17 in terms of the AECL's program.

18 They're part of their change control  
19 process, because they do look at any significant  
20 modifications to the facilities and they're part of their  
21 corrective action program because they look at event  
22 reports.

23 So what we will do is when, if there's an  
24 event that we're reviewing, we will often go in and say,  
25 we want to see what the SRC said. We want to see, you

1 know, to look at -- and there are two things, one to make  
2 sure they are actually functioning as they're supposed to  
3 as being that independent review, but also making sure  
4 that AECL is actually taking their recommendations  
5 seriously and addressing the recommendations.

6 And we do the same thing when we're looking  
7 at engineering change control. They're an important part  
8 of the process. If you're asking us for this approval,  
9 often we will go back and say, I want to see what the SRC  
10 said. and I want to see how you address their comments.  
11 And that's a routine function both from our site office on  
12 the event side and then from our project officers,  
13 engineers in Ottawa.

14 So we put a fair, you know, they're an  
15 important part of AECL's oversight and so we look at that  
16 oversight and make sure it is functioning as it's supposed  
17 to.

18 **MEMBER MCDILL:** Thank you. That brings me  
19 to the last question in this round.

20 With respect to engineering change control  
21 in the 2009 findings, what's the progress on that? I know  
22 there was a bit of a delay because of NRU but where are we  
23 on engineering change control now? It's on page 31 and 2  
24 of the staff document. I can ask AECL to start if they're  
25 ready.

1                   CNSC staff are satisfied that the process  
2                   improvements designed to address are progressing well, but  
3                   define progressing well.

4                   **MS. RIENDEAU:** Nathalie Riendeau for the  
5                   record.

6                   And there was -- we are satisfied, there  
7                   was a recent update by AECL in May and those actions to  
8                   address the finding from 2009 are progressing well.  
9                   The changes to the engineering change control process were  
10                  overall very positive and staff are satisfied with the  
11                  progress to-date.

12                  Thank you.

13                  **MR. DRUMHILLER:** Hank Drumhiller for the  
14                  record. I'm going to turn this over to Randy Lesco our  
15                  Chief Engineer. But I would just say the comment I made  
16                  earlier about the one individual that said we had to  
17                  follow the process, it was the ECC process he was talking  
18                  about.

19                  And with that point I'll turn it over to  
20                  Randy for his answer.

21                  **MR. LESCO:** Randy Lesco for the record. We  
22                  had been making improvements in terms of our change  
23                  control process based on some of the findings that the  
24                  CNSC staff have made, and we're well and aware.

25                  In fact we're in the middle of actually

1 revising our process to making sure that it's improved as  
2 well.

3 **MEMBER MCDILL:** So are we 90 percent of the  
4 way there, 95 percent of the way there, someone want to  
5 hazard a guess?

6 **MR. LESCO:** So Randy Lesco for the record.  
7 Basically within come March of next year we  
8 should have updated our process to completion to address  
9 those findings.

10 **MEMBER MCDILL:** So by March did you say?

11 **MR. LESCO:** That is correct.

12 **MEMBER MCDILL:** Maybe Day 2 we could have  
13 sort of an idea of where we are on that line.

14 Thank Mr. Chair, I have more for round 2,  
15 but that's it for now.

16 **THE CHAIRMAN:** Thank you. Mr. Tolgyesi.

17 **MEMBER TOLGYESI:** Merci, Monsieur  
18 Président.

19 I will go back for to question about this  
20 emergency situation.

21 One is, does your, and directed to AECL,  
22 does your outer system notification is based on the direct  
23 personal access that means every employee has something  
24 which is alerting him that it's an emergency, or it's a  
25 sound alert, which is saying that sirens are starting to

1 blow through the property and you expect that all 37, or  
2 how many square kilometres everybody will hear it.

3 **MR. DRUMHILLER:** Hank Drumhiller for the  
4 record.

5 It is the latter. It is a set of sirens  
6 throughout the facility for people, to alert people for  
7 them to hear it whether they're outside or inside of  
8 buildings, and to respond to the alarms.

9 If they're in the buildings there's also PA  
10 announcements that go along with it to add additional  
11 direction.

12 **MEMBER TOLGYESI:** And we were talking about  
13 two municipalities, it's Deep River and Laurentian. What  
14 about the other side of the Ottawa River? What's the  
15 communication? It's some population there, some  
16 communities, some cottages and whatnot, and how do you  
17 alert them? Because we had the same question when we were  
18 at Gentilly. It was in the south shore, it was about  
19 executed communication, but it was much less with the  
20 other side of the river.

21 **MS. STUART:** Allison Stuart for the record.

22 The responsibility of the Province of  
23 Quebec is to look after obviously the residents of Quebec.  
24 What we do at a Provincial level is we have a direct  
25 contact to our counterparts in Quebec and we will advise

1           them of any information of this sort that we get from  
2           Chalk River.

3                       **MEMBER TOLGYESI:** The question was not  
4           directed to you, to AECL, because my question was, how  
5           they do that? What I understand they do nothing.

6                       **MR. DRUMHILLER:** Hank Drumhiller for the  
7           record. So I'd like to ask Kathy Fisher, Our Emergency  
8           Preparedness Manager to respond to that question.

9                       **MS. FISHER:** For the record, Kathy Fisher.  
10                      Because the Chalk River site is located on  
11           the river, when the sirens go on, on the site they can  
12           actually be heard on the other side of the river. There  
13           are only two cottages that are within that zone. And so  
14           we have direct contact with those cottagers that they know  
15           what the process is if they actually hear those sirens.

16                      **MEMBER TOLGYESI:** Is there -- there's no  
17           authorities, like municipal or whatever, local authorities  
18           which you could communicate with, or you do directly with  
19           those two cottagers?

20                      **MS. FISHER:** So at this point we do it  
21           directly with the cottagers, but that is in addition to  
22           the fact that we let the Quebec management authorities  
23           also know as part of our process that we have an incident  
24           on the site. So our process includes notifying Emergency  
25           Management Ontario, notifying the municipalities and

1 notifying the Province of Quebec.

2 **MEMBER TOLGYESI:** Okay. On the staff  
3 presentation there was on the slide 11 you were saying  
4 that AECL's environmental and groundwater monitoring  
5 program confirms that CRL operations do not significantly  
6 impact environment. What's that significantly is, is how  
7 much? Is it kind of while you, it's a personal guess, or  
8 how you evaluate that?

9 **MR. JAMMAL:** Ramzi Jammal for the record.

10 Sir, we don't have personal guesses. We're  
11 based on the facts, so I'll pass it on to Mr. Mike Rinker,  
12 but what we're trying to say here that no health effect  
13 from the releases from the site itself. And everything is  
14 without any impact on the environment, and the significant  
15 becomes based on DRLs, based on action levels, based on  
16 indicators: on monitors of existing in place indicating  
17 that there is minimal impact on the environment. I'll  
18 pass it on to Mr. Rinker, for more detail.

19 **MR. RINKERT:** Mike Rinkert for the record.  
20 For the record, I'm director of the Environmental Risk  
21 Assessment Division.

22 In general groundwater protection is based  
23 on what is the use of the groundwater? It's pretty clear  
24 at Chalk River there is no -- groundwater's not a resource  
25 between the facility and the river. There's no drinking

1 water access for groundwater, irrigation water, et cetera.

2 So what we look at for protecting  
3 groundwater, or protecting the environment is, what would  
4 migration of that plume of groundwater, how would that  
5 affect the environment downstream? So it would be the  
6 Ottawa River.

7 And we see through monitoring and through  
8 evidence that the river is not being impacted, and the  
9 drinking water sources downstream in the river are not  
10 being impacted. And so therefore it's the basis for our  
11 conclusion that there is no significant effect.

12 **THE CHAIRMAN:** Can I ask, why is there no  
13 data for 2010? I thought there were monthly data for  
14 tritium in water being measured all throughout the Ottawa  
15 River. And particularly since coming back, you know, 2009  
16 I'm just trying to remember whether 2010 or even 2011  
17 would be a better indication of the ongoing low impact.  
18 So what happened to the data?

19 **MR. DRUMHILLER:** Hank Drumhiller for the  
20 record. I'd like George Dolinar, one of our experts in  
21 environmental practices to speak to that. George.

22 **MR. DOLINAR:** For the record, George  
23 Dolinar.

24 So the question is, why in the AECL CMD and  
25 also I guess the CNSC CMD, why there is no data for 2010.

1 AECL produces an environmental monitoring report that is  
2 due for submission to the CNSC at the end of June. So at  
3 the end of June that will be submitted; that covers the  
4 calendar year 2010.

5 You were also correct, we monitor on a  
6 regular basis, on an ongoing basis. So that data is  
7 available, but for the entire calendar year that report  
8 will become available only at the end of June.

9 I can tell you that there's nothing unusual  
10 that happened in 2010, nor in the, you know, the several  
11 months, the six months of 2011 now, either.

12 **THE CHAIRMAN:** But correct me if I'm  
13 wrong, I thought we went through this in the 2009 leak and  
14 there was an agreement on proactive disclosure that you  
15 would put on your website almost monthly data. Am I  
16 wrong? What happened to that?

17 **MR. DOLINAR:** George Dolinar for the  
18 record.

19 So you are correct and we do put up an  
20 environmentally, a monthly environmentally performance  
21 report. That's updated every month. It's not the entire  
22 set of monitoring data that AECL has. It is focused on a  
23 few areas of concern, or most interest to the public.  
24 The content of that environmental performance report is  
25 largely based on feedback we get from the Environmental

1 Stewardship Council.

2 So for example, they've asked for updates  
3 on argon-41 admissions and tritium in the river and things  
4 of that nature. Greenhouse gas emissions are also updated  
5 on a monthly basis.

6 So, yes. It's an environmental performance  
7 report. It's available on AECL's website. But it's not  
8 the entire set of monitoring data that we generate. It's  
9 a small subset, but it is done monthly.

10 **THE CHAIRMAN:** But it would give, you  
11 know, up-to-date data that I would imagine if the trend is  
12 the same would give comfort level that in fact things are  
13 working according to plan. I also would like to see the  
14 up-to-date data.

15 Mr. Tolgyesi.

16 **MEMBER TOLGYESI:** Merci, Monsieur le  
17 Président.

18 What we are, right now we are in the first  
19 plan of extend outage, which is currently taking place.  
20 Have you evaluate the progress of the present outage, are  
21 you there what you expected to do, you are following the  
22 schedule, or you are behind, you are ahead?

23 **MR. DRUMHILLER:** Hank Drumhiller for the  
24 record.

25 So as of 7:30 this morning we were eight hours ahead of

1 schedule in the outage. And we're on track now to start  
2 up as scheduled on the 17th of June.

3 **MEMBER TOLGYESI:** Sorry. I will get here  
4 to my question.

5 **MEMBER TOLGYESI:** You were talking about  
6 Japan. So how do you determine or what's your criteria  
7 for seismically-qualified system? How could you confirm  
8 this is seismically-qualified system or we should resist  
9 to that kind of activity, seismic activity?

10 **MR. DRUMHILLER:** Hank Drumhiller, for the  
11 record.

12 So at the current time, we use a once in a  
13 1,000 year seismic event as our criteria.

14 As the CNSC staff has pointed out, Japan  
15 has caused many things to be looked at again, including  
16 that number. And so that is one of the items in the IIP,  
17 as talked about, that has been brought forward. And so  
18 we're talking about that now, at potentially re-looking at  
19 that number on a more near-term basis. As I recall, it's  
20 within about a year timeframe to see if that really is the  
21 right number.

22 **MEMBER TOLGYESI:** So right now, it's one in  
23 1,000 years.

24 And what's the value of that?

25 **MR. DRUMHILLER:** Hank Drumhiller, for the

1 record.

2 I would ask Randy Lesco, our chief  
3 engineer, for the specifics.

4 Randy?

5 **MR. LESCO:** Randy Lesco, for the record.

6 Basically, that return frequency of one in  
7 1,000 years represents a peak ground acceleration of about  
8 .24 Gs.

9 **MEMBER TOLGYESI:** Of what?

10 **MR. LESCO:** About .24 Gs.

11 **MEMBER TOLGYESI:** M'hm.

12 And I'm just back to if it's a blackout,  
13 what's the maximum delay the reactor could withstand  
14 without major consequences regarding cooling, confinement?

15 Say the system doesn't work, the emergency  
16 doesn't work, diesel system doesn't work?

17 **MR. DRUMHILLER:** Hank Drumhiller, for the  
18 record.

19 I'm going to ask John Osborne to answer  
20 that question, and he may need some help from Randy as  
21 well. We'll see.

22 **MR. OSBORNE:** It's John Osborne, for the  
23 record.

24 If I could just clarify the question? Your  
25 question is how long can we maintain the reactor in a safe

1 state after a seismic event? Is that correct?

2 **MEMBER TOLGYESI:** Or whatever event with a  
3 blackout, you know, there's no power there.

4 **MR. OSBORNE:** The reactor is designed to  
5 withstand a seismic event. The timeframe is at four days  
6 that we would be able to supply power, and we have fuel  
7 supplies available do that for four days.

8 Some of the lessons learned that we are  
9 currently learning from Fukushima are making us look at  
10 that requirement, and we will need to re-evaluate that  
11 going forward. That is our plan and we have made that  
12 commitment to the CNSC to do that by the end of July.

13 **MEMBER TOLGYESI:** Did I understand well you  
14 said it's four days, but you should use -- these are  
15 generators or without any power?

16 **MR. OSBORNE:** John Osborne, for the record.  
17 That's with the use of qualified emergency  
18 diesel generators.

19 **MEMBER TOLGYESI:** Okay.

20 And you are saying on page 4.3 of this  
21 H7.1A that "all diesel generator units have sufficient  
22 fuel capacity to maintain 24 hours of full load, and the  
23 seismically-qualified emergency power system is also  
24 available to power." That means it's another system or  
25 the diesel system is part of this seismically-qualified

1 emergency power system?

2 **MR. OSBORNE:** John Osborne, for the record.

3 I don't know the technical answer to that  
4 question.

5 **MR. LESCO:** Randy Lesco, for the record.

6 Basically, we have two emergency power  
7 supply systems. One is seismically qualified to deal with  
8 seismic events.

9 **MEMBER TOLGYESI:** And it consists of what?

10 **MR. LESCO:** Randy Lesco, for the record.

11 I didn't hear your question; I'm sorry?

12 **MEMBER TOLGYESI:** It consists of what?

13 Because you said you have two systems. One is a diesel  
14 generator system and what's the other one?

15 **MR. LESCO:** Randy Lesco, for the record.

16 It is also a diesel generator system.

17 **MEMBER TOLGYESI:** Okay. It's two diesel  
18 generator systems, independent. Okay.

19 **THE CHAIRMAN:** But only one is qualified  
20 seismically. Is that what you said?

21 **MR. LESCO:** Randy Lesco, for the record.

22 That is correct.

23 **THE CHAIRMAN:** Okay. And you're now  
24 reviewing the whole emergency system here for post-  
25 Fukushima, right?

1                   **MR. LESCO:** Randy Lesco, for the record.

2                   That is correct.

3                   **THE CHAIRMAN:** Thank you.

4                   **MEMBER TOLGYESI:** Maybe my last question  
5                   this round will be when you are talking about lost-time  
6                   injury frequency, you are saying that the performance is  
7                   good. It's .5 about, .26 in 2009-10, and that for Ontario  
8                   Power Generation, Darlington and Bruce are reporting lost-  
9                   time injury frequencies are .02 and .01. This is about, I  
10                  would say, 15 to 20-fold difference.

11                  And you are saying that AECL does recognize  
12                  that there may be some differences in the classification  
13                  of injuries. I thought that according to the Ontario  
14                  Compensation Board, the definitions are there, are  
15                  precise, and their application probably and interpretation  
16                  could vary.

17                  So what do you mean by these differences?  
18                  How do you qualify them and what's your comments on these?

19                  **MR. DRUMHILLER:** Hank Drumhiller, for the  
20                  record.

21                  So on the two aspects, the one on the  
22                  differences, it is precisely what you're saying. It's how  
23                  people interpret the definitions. Are they really  
24                  comparing apples and apples even though, as you say -- and  
25                  you're correct -- that there is a standard set of

1 definitions.

2 As far as how our performance is, the  
3 comment in general "good" is a comparison to just  
4 industrial companies in general in Ontario, and we do  
5 recognize, if we compare ourselves particularly to the  
6 CANDU power reactors, that our performance is off the  
7 mark.

8 And as I mentioned in my notes, my speaking  
9 notes, we are committed to high levels of industrial  
10 safety and we're not there yet. But it's one of the  
11 programs that we're continuing to work on, and this focus  
12 of taking care of each other is a fairly new concept on  
13 the site. We believe it will add to further improvement  
14 in our industrial and radiological safety as well, where  
15 everyone is really looking out for each other and trying  
16 to make sure everyone has the right standards when they go  
17 out to perform work.

18 **MEMBER TOLGYESI:** Because, you know, if  
19 it's much higher, there's two reasons. One is because  
20 there's much more accidents or, number two is that when  
21 you interpret -- accept what's an injury, it's more lax.  
22 Your definition is quite wide. That's what I'm  
23 questioning, you know, how you apply these standards when  
24 you define these injuries?

25 **MR. DRUMHILLER:** Hank Drumhiller, for the

1 record.

2 My perception is that we try to apply them  
3 as straightforward as possible and count them as they're  
4 intended to be counted.

5 **MR. WALKER:** Bob Walker, for the record.

6 You're addressing a very important issue  
7 for us. We would very much want to have our safety  
8 performance higher. Compared to the industry at large,  
9 our numbers are favourable. Compared to the utilities,  
10 the indicated utilities, we have room to improve.

11 I would highlight that the specific data  
12 for Chalk River show that our area of greatest safety  
13 concern recordable lost-time injury relates to slips and  
14 falls on the site. A large part of that is related to the  
15 geography of the site. It is also climate-dependent.  
16 Certainly we do have more of those events when it's winter  
17 conditions.

18 And our procedures to ensure the right  
19 footwear, the appropriate following of paths, the  
20 appropriate cleaning of the site, the use of sand and salt  
21 are key elements to mitigate the effects of slips and  
22 falls.

23 **MEMBER TOLGYESI:** And you didn't comment on  
24 severity. Does this difference apply also to severity,  
25 according to your performances? In 2009-10, it was 2.3,

1 the lost-time injury severity, which is the number of days  
2 lost.

3 It is also that kind of difference, 10-fold  
4 difference with your peers.

5 **MR. DRUMHILLER:** Hank Drumhiller, for the  
6 record.

7 Sir, we have Roger Blair here, our safety  
8 manager, and I would like Roger to answer that specific  
9 question.

10 Roger?

11 **MR. BLAIR:** Thank you very much. Roger  
12 Blair, for the record.

13 We don't have that data. All we have is  
14 the recordable lost-time injury data. That's the only  
15 thing that's published.

16 So for AECL, we do have severity rates  
17 which are listed in our CMD report, but we do not have the  
18 data from our peers on that.

19 **MEMBER TOLGYESI:** What about staff?  
20 Because if I remember well, we saw that. It was injury  
21 frequency but also severity.

22 **MR. JAMMAL:** Ramzi Jammal, for the record.

23 We will provide you with that information  
24 with respect to your question in comparison to power  
25 reactor sites and we'll provide you with that information.

1 We don't have it at the tip of our fingers, so we'll  
2 provide it to you right away.

3 **THE CHAIRMAN:** Okay. I think it's a good  
4 time for us now to break for lunch, and we will reconvene  
5 at one o'clock.

6 Thank you.

7 --- Upon recessing at 11:59 a.m.

8 --- Upon resuming at 1:03 p.m.

9 **THE CHAIRMAN:** Okay. We are back.  
10 And I am informed that you have some  
11 updates for us, CNSC staff. Please proceed.

12 **MR. ELDER:** Thank you. Peter Elder, for  
13 the record.

14 There was a question in the end about what  
15 the accident and severity rates were for the NPPs. So I  
16 have some general, not going into who, but for 2006 to  
17 2009, the industry average was between 1.7 and 3.4, and  
18 that's in comparison to AECL in the -- AECL is within that  
19 range. That's severity of accidents.

20 So there were two things. There was the  
21 frequency and then the severity. So while AECL is much  
22 higher on the frequency, they were actually in line with  
23 the power plants on the severity.

24 **THE CHAIRMAN:** Mr. Tolgyesi?

25 **MEMBER TOLGYESI:** And those are accidents

1 in the year -- which happened in a year?

2 **MR. ELDER:** Yes.

3 **MEMBER TOLGYESI:** It's number of days lost  
4 per year?

5 **MR. ELDER:** It's ---

6 **MEMBER TOLGYESI:** Per accident of the year?

7 **MR. ELDER:** The definitions are exactly the  
8 same. These are normalized to 200,000 person hours of  
9 work. So it's exactly the same as AECL defined it. Its  
10 severity is the total number of lost workdays per 200,000.

11 **MEMBER TOLGYESI:** And the number of  
12 accidents which you count, it's independent if the day is  
13 lost due to accident from a past year?

14 **MR. ELDER:** I don't have all the details on  
15 that. It's just --

16 **MEMBER TOLGYESI:** Okay.

17 **MR. ELDER:** -- the standard industry way of  
18 reporting this data. But if someone came in you would  
19 have to include past year's data. You know, if someone  
20 was off in between years they would be -- you don't know  
21 beforehand if someone's off at the end of the fiscal year  
22 how long they're going to be off. So you have to include  
23 them in the next year's data as well.

24 **MEMBER TOLGYESI:** M'hm. So that's, you  
25 know, that's my question, That if you have an accident say

1 in 2009 and you lost maybe no days, or one or two days, or  
2 whatever, and or a week. And after the following year you  
3 don't have an accident which is consequence of previous  
4 year's accidents that you have lost days for some reasons.  
5 How do you calculate that?

6 Because I think what you do is that the  
7 number of days lost in the year due to accidents happening  
8 in the year.

9 **MR. ELDER:** Okay.

10 **MEMBER TOLGYESI:** That's what I think what  
11 -- how you calculate this. But you know, it's a detail,  
12 what's -- probably we should not discuss right now, but we  
13 could find.

14 **MR. ELDER:** It's a -- this is a standard  
15 indicator that we've used for the power plant. So there's  
16 a detailed definition. I don't have it in front of me  
17 right now, but it is worthy I think when you get to the  
18 NPP annual report to ask those type of questions.  
19 What we were able to get quickly was a comparison between  
20 AECL, which is using the same definitions, numbers, and  
21 the power plant numbers.

22 **THE CHAIRMAN:** Okay. That sounds good.  
23 And just as on aside, if you, in the annual report if you  
24 cannot, if there are such, start to compare the nuclear  
25 sector with a utility sector, or an industrial as well,

1 that would be really useful too.

2 **MR. ELDER:** Peter Elder for the record.

3 And that is the intention for the NPP annual report that  
4 will include that sort of comparison.

5 **THE CHAIRMAN:** Okay, thank you. I would  
6 like to start the second round of questioning and Dr.  
7 Barriault, you're on.

8 **MEMBER BARRIAULT:** Thank you, Mr. Chairman.

9 First question is in slide 12 of CNSC  
10 presentation. I looked at the information and it says  
11 there was no release exceeded action levels in 2006, '7  
12 and '10. And yet we don't have the tritium concentration  
13 in the Ottawa River for 2010. I guess could you explain  
14 how you come to that conclusion?

15 **MR. ELDER:** So Peter Elder for the record.

16 There are two different things we're  
17 reporting on. Action levels are reportable right away, as  
18 soon as they happen. As soon as they exceed an action  
19 level they must report to us. The figure is actually the  
20 annual summation, the annual average for the year.

21 **MEMBER BARRIAULT:** Okay. So when would you  
22 expect to have that, because we're half way into 2011 now?

23 **MR. ELDER:** I believe it's mentioned before  
24 that that report is due to us in June. So we will have  
25 the data.

1                   **MEMBER BARRIAULT:** So would AECL have that  
2 data now?

3                   **MR. ELDER:** AECL would have that data now,  
4 yeah.

5                   **MEMBER BARRIAULT:** And how does it compare,  
6 if I can ask AECL?

7                   **MR. DRUMHILLER:** Hank Drumhiller for the  
8 record.

9                   We did discuss that a little earlier, but I  
10 will let George Dolinar --

11                   **MEMBER BARRIAULT:** Well, I know it was  
12 discussed earlier, but the question was not answered and  
13 that's why I'm wondering.

14                   **MR. DRUMHILLER:** So as I understand we do  
15 have the data.

16                   **MEMBER BARRIAULT:** Okay.

17                   **MR. DRUMHILLER:** So I'll let George  
18 specifically answer.

19                   **MEMBER BARRIAULT:** Thank you.

20                   **MR. DOLINAR:** For the record, George  
21 Dolinar.

22                   So we do have data for the year, calendar  
23 year 2010 as well as for the first several months of 2011.  
24 And for 2010 for the calendar year the average is very  
25 similar to what you see for 2009. It's all within that

1 range.

2 **MEMBER BARRIAULT:** Okay.

3 **MR. DOLINAR:** Anywhere from five to eight  
4 Becquerel's per litre for the last number of years. So  
5 2010 is no different. And the data for the first part of  
6 2011 is also sort of within that same range.

7 **MEMBER BARRIAULT:** Same range, thank you.  
8 So there's been no I guess release exceeding the action  
9 levels for 2010 then?

10 **MR. DOLINAR:** That's correct.

11 **MEMBER BARRIAULT:** Okay, thank you.

12 Next question if I may. One of the issues  
13 that kind of came to my mind really when I was going  
14 through all your documentation is the issue of fitness for  
15 work of employees. We seem to have a common denominator  
16 from a point-of-view of management problems.  
17 Fitness of equipment, equipment breaking down, leaks  
18 whatever. And I guess the question I ask and ask myself  
19 really, is that has anybody looked at employees and their  
20 fitness for duty, from a knowledge point-of-view, from a  
21 physical point-of-view, from an emotional point-of-view?  
22 I know that Chalk River is a research facility. And I ask  
23 myself well, you know, has there been any research done  
24 into the human factor in a nuclear industry. And maybe,  
25 you know, if anybody's got some answers to this I'd be

1 interested in hearing your comment on it.

2 And also if there's a possibility it  
3 exists, to have maybe more information on what you plan to  
4 do with fitness or duty of your employees.

5 **MR. WALKER:** Bob Walker for the record.

6 Thank you for the question. I guess the  
7 dimension of fitness for duty has multiple perspectives to  
8 I here, sir.

9 **MEMBER BARRIAULT:** Exactly.

10 **MR. WALKER:** I think there's clearly a  
11 notion of "are people trained for the job"?

12 **MEMBER BARRIAULT:** Exactly.

13 **MR. WALKER:** And we do have an extensive  
14 organizational development and training program that  
15 ensure people are appropriately trained for the tasks at  
16 hand.

17 **MEMBER BARRIAULT:** So that's the knowledge  
18 side of it?

19 **MR. WALKER:** That's the knowledge side of  
20 it.

21 **MEMBER BARRIAULT:** Yes.

22 **MR. WALKER:** We do have a constructive  
23 relationship with our union leadership to regularly meet  
24 with the union leadership and hear from our union leaders,  
25 issues that might be playing into questions of employee

1 morale from that important perspective.

2 We have regularly conducted employee  
3 surveys to ask the employees' opinions on whether they  
4 feel they have the instruments to do the job, whether they  
5 are observing any of the challenges in our management team  
6 around communications. These are shared with the  
7 employees.

8 Recently we've got a number of focus groups  
9 flowing from surveys to come back in with our employees to  
10 explore the kinds of things that we could do better to  
11 move forward.

12 One of those has led to a number of  
13 commitments that I have with my 175 managers of how we  
14 will look to enhance our leadership skills, leadership of  
15 people around issues such as communications and  
16 empowerment to help with the question of people feeling  
17 part of the team and engaged and moving forward.

18 I appreciate a number of these points are quote, unquote  
19 soft skills. It's about the organizational health. And  
20 we're working hard to improve those kinds of perspectives.  
21 We have, as Mr. Drumhiller indicated, one of the things we  
22 had done as part of Voyageur II is implemented our  
23 quarterly employee surveys on safety culture. The first  
24 has just been completed. So we will be seeing the data  
25 over the coming days so we can factor that into our

1 thinking as well.

2 So we are taking a number of steps to try  
3 to address the soft side of this. It's perhaps not a  
4 surprise that one of the issues that Mr. McDermott has  
5 asked me to keep a close look on, is whether there's  
6 issues around divestiture and the uncertainty around the  
7 future that's playing into peoples' morale and that plays  
8 back into attention in the workplace.

9 And we've done that through the business  
10 performance counsel that he made reference to, to come  
11 back and constantly ask ourselves, are we seeing any  
12 concerns in the workforce that would see the issues around  
13 restructuring uncertainty playing into any apparent loss  
14 of attention to people in the workplace.

15 And to-date we have not seen indications of  
16 that, but we have been closely monitoring it. So that's  
17 perhaps what I would offer --

18 **MEMBER BARRIAULT:** Yeah.

19 **MR. WALKER:** -- to start.

20 **MEMBER BARRIAULT:** But the other issue  
21 obviously is physical fitness. Are the employees fit to  
22 do the job for which they're hired. The other issue  
23 obviously psychological. There's any (inaudible) or issue  
24 of substance abuse in the workplace. I guess I would have  
25 found it useful to have a list of issues that you've

1 identified that you would like maybe to explore to enhance  
2 your human performance, if I can use the jargon I guess  
3 and to look really at fitness for duty of the employees.

4 That's all really and so you know, I'd find  
5 that useful. I don't know if you've done any work in that  
6 direction at all?

7 **MR. WALKER:** Bob Walker for the record. We  
8 would be pleased to provide you data on that Commissioner,  
9 to move forward. I guess I would just highlight that one  
10 of the programs that is very much supported in partnership  
11 with our unions and our employees is our Employee  
12 Assistance Program. And I just draw attention that on an  
13 annual basis The Association Of Employee Assistance  
14 Programs in North America provides two awards to Canadian  
15 and U.S. businesses, one for Canada and one for the U.S.  
16 on an annual basis for excellence. And for 2010 AECL  
17 Nuclear Laboratories received the single award in Canada  
18 for our excellence in our Employee Assistance Program.

19 **MEMBER BARRIAULT:** Very good. Thank you so  
20 much.

21 Thank you, Mr. Chairman.

22 **THE CHAIRMAN:** Thank you.

23 Next, Monsieur Harvey?

24 **MEMBER HARVEY:** Merci, monsieur le  
25 président.



1                   **MR. JAMMAL:** It's an AECL document or the  
2                   CNSC?

3                   **MEMBER HARVEY:** That's in the AECL, but I  
4                   think the other one was in the staff, but I've got some  
5                   difficulties to find the page.

6                   But anyway, we might -- I don't mind  
7                   starting with the staff because Mr. Jammal, you think  
8                   you've got the page to know what I'm talking about.

9                   **MR. ELDER:** Peter Elder, for the record.  
10                  I'll start if AECL is still trying to find  
11                  it.

12                  What we're looking in terms of NRU is it  
13                  was designed as a research reactor. It was designed,  
14                  actually, as a quite large research reactor. And over the  
15                  years, there's also been extra safety coverage put in  
16                  because of -- for specific experiments.

17                  And what they tend to do is they put it in  
18                  to do a specific experiment. After that experiment, you  
19                  usually don't take that extra coverage out. So that over  
20                  the years, actually, in terms of shutdown -- and the first  
21                  question in an accident, "Will the reactor shut itself  
22                  down automatically?"

23                  The point we were trying to make is from  
24                  that perspective, from the shutdown's perspective, we have  
25                  very high confidence that NRU will shut down in terms of

1       there are more shut-off rods than it needs to stop the  
2       reaction based on physics calculations, and there are also  
3       many ways to detect the need to shut down. And that's the  
4       point we're trying to get.

5                       So when you get into accident scenarios,  
6       you know, you start with control, contain, cool. Control  
7       is shut it down. Cool is keep the water there. Contain  
8       is keep the building intact.

9                       So we're saying from that first step of the  
10       control, there's quite a high confidence that you will  
11       have control, that you will be able to stop the reaction  
12       very quickly and without any consequence to the fuel.

13                      Then the issue would be how robust is the  
14       next steps, the cool -- so we focus a lot on the cooling  
15       because that's the next important stage.

16                      Whereas you look at some of the reactors,  
17       you spend a lot of time on the first one, on the control.  
18       That's the only point we were trying to make.

19                      **MEMBER HARVEY:** Okay. It was on page 2-5  
20       of your document.

21                      **MR. DRUMHILLER:** Okay. Thank you.

22                      Hank Drumhiller, for the record.

23                      I'm going to ask Glen Archinoff to step  
24       forward -- he worked extensively on this document -- and  
25       have him address that question.

1 Glen?

2 **MR. ARCHINOFF:** Thanks, Hank.

3 Glen Archinoff, for the record.

4 I was the technical manager for the project  
5 that produced the Global Assessment Report.

6 Mr. Elder's explanation is consistent with  
7 what we concluded in the global assessment, that the  
8 reactivity depth available in NRU is far more than the  
9 minimum needed to shut the reactor down and keep it down.

10 So it's an indication of the level of  
11 defence in depth of NRU that it can cope with the  
12 accidents that it's designed to cope with and there's  
13 extra margin leftover as well.

14 **MEMBER HARVEY:** Okay.

15 What about the cooling system? If my  
16 understanding is correct, there is an automatic reaction,  
17 and if it's not working, there is a manual reaction. Am I  
18 correct or how does it work?

19 **MR. DRUMHILLER:** Hank Drumhiller, for the  
20 record.

21 I assume you're asking AECL that question?

22 **MEMBER HARVEY:** Well, I was looking at you.

23 **MR. DRUMHILLER:** Yes, I'm sorry.

24 Again, I would like to have John Osborne  
25 answer that question from NRU.

1 John?

2 **MR. OSBORNE:** I can't answer that.

3 **MR. DRUMHILLER:** You can't?

4 Sir, I'm sorry, we'll have Glen respond to  
5 that, but there is an automatic transfer.

6 **MR. ARCHINOFF:** Glen Archinoff, for the  
7 record.

8 In the event that additional cooling is  
9 needed there, there's what's called a new emergency core  
10 cooling system that could -- that would automatically  
11 bring coolant to the reactor. It's one of the seven  
12 safety upgrades that's been installed over the last while,  
13 and it's in service and it's effective, and it will  
14 provide the extra cooling that's needed automatically.

15 **MEMBER HARVEY:** And if it's not working?  
16 Is there a guarantee?

17 **MR. ARCHINOFF:** Glen Archinoff, for the  
18 record.

19 It's a safety system and it has to meet  
20 very stringent reliability requirements. It's tested  
21 regularly. I believe the facility cannot operate if it's  
22 not working. So it would be shut down. If for some  
23 reason NECC was not available, NRU would be put into a  
24 safe shutdown state.

25 **THE CHAIRMAN:** Dr. McDill, do you want to

1 follow up on this?

2 **MEMBER McDILL:** Yes. In the reactor  
3 cooling section and in the Fukushima response, there's the  
4 suggestion that the system could be replenished using the  
5 AECL Fire Department. I think that's where Monsieur  
6 Harvey was -- what if the fire department is busy putting  
7 out fires? Because if we have a situation like this,  
8 presumably it's a little bit extreme, right?

9 **MR. DRUMHILLER:** Hank Drumhiller, for the  
10 record.

11 You're touching on a very important aspect,  
12 and so the responses we gave there were more the -- I  
13 would classify them as the short term, do we have these  
14 capabilities, and we do.

15 But you're asking the more long-term  
16 question about -- and as I mentioned in my talk, we need  
17 to look at if a lot of our capabilities aren't there, and  
18 that could be one of them. How do we address it? So  
19 we're taking that look as part of the more long-term  
20 approach.

21 What if we don't have that capability or  
22 the fire department is doing something else, are not able  
23 to get to the NRU to back that system up?

24 As we talked earlier, I think that is  
25 something that I'm sure we'll be talking about for the Day

1 Two because the response is due at the end of July.

2 **MR. ELDER:** Peter Elder, for the record.

3 I mean, only to add, I would have said all  
4 the same thing. This is exactly the type of things we  
5 want them to look at in terms of response from Fukushima,  
6 is rather than -- you know, don't stop at the, "Well, I  
7 can use this." Add, "My backup is this fire water," if  
8 you have an event that could take out your fire water.

9 So we're always looking at it's much more -  
10 very much -- worst-case scenario what do you do is the  
11 question they have to ask themselves, where there is no  
12 access to the site at all. Similar to what you get on  
13 Fukushima, they had no access to the building. How do you  
14 deal in that situation?

15 And this is exactly what we've requested  
16 all the licensees to look at in terms of response to  
17 Fukushima, this worst-case planning, what can you feasibly  
18 do and what preparation should you make in such a case?

19 **THE CHAIRMAN:** I think this is a very  
20 important issue. That we've got to be really clear in the  
21 kind of questions we are asking. And without pre-empting  
22 the outcome a bit later on there -- our tendency is to try  
23 to define a credible worst case scenario. And I think the  
24 question that everybody's asking is the non-credible worst  
25 case scenario.

1                   In other words, earthquake magnitude 9,  
2                   forget about the historical data, a tsunami or flood, and  
3                   a fire all simultaneously, and you're writing off the  
4                   site.

5                   Nevertheless, how do you make sure that you  
6                   can cool it, and make sure there is no emission to the  
7                   population? So it is not a credible worst case scenario  
8                   necessarily, but we have to be able to answer the question  
9                   nevertheless.

10                   If you are ready to write off NRU, let's  
11                   say, what is it we will need to bring from outside in the  
12                   emergency situation to deal with this particular issue?  
13                   And those are the issues that are really difficult for us  
14                   as a community to come up with, to -- with some  
15                   description that people can understand.

16                   **MR. DRUMHILLER:** Hank Drumhiller, for the  
17                   record.

18                   That's precisely the question we're asking  
19                   ourselves, you know. That -- I describe it if Chalk River  
20                   site is not recognizable for whatever reason, you still  
21                   have to cool the core, so how do we do it? You know, and  
22                   that's where we're trying to get our arms around.

23                   **THE CHAIRMAN:** So we're looking forward to  
24                   the answer.

25                   **MR. DRUMHILLER:** So are we.

1                   **MR. JAMMAL:** It's Ramzi Jammal, for the  
2 record.

3                   To answer your question, is this is where  
4 we're going and reviewing it. And as you can see in the  
5 IIP, we put the emphasis on requesting AECL to implement.  
6 On the technical terms, what you're talking about is the  
7 severe action management guidelines. And that's where  
8 we're having pushed for right now, in order to put the  
9 program in place and implementation in place that's beyond  
10 the credible scenarios that you were talking about.

11                   **THE CHAIRMAN:** Thank you.  
12 Monsieur Harvey?

13                   **MEMBER HARVEY:** About the Pressure Boundary  
14 Program, CNSC staff note that there have been many  
15 improvements to the Pressure Boundary Program for the CRL  
16 site during the current licence period. What is the  
17 status of the Pressure Boundary Program? There has been  
18 improvements, but where are we? And are you satisfied,  
19 very satisfied, completely satisfied with the program?

20                   **MR. ELDER:** Peter Elder, for the record.

21                   This is one of the areas where you get into  
22 a legacy issue, is that a lot of these systems were  
23 designed to older codes -- standards of codes.

24                   So when you're looking at -- we're  
25 satisfied with the program, but there is some work that

1 they still need to do to make sure that the older systems  
2 respect the newer program. And you can imagine on a site  
3 where you've got buildings and facilities that were built  
4 over a 50 or 60-year period, that not everything meets  
5 modern codes right now.

6 So on the pressure boundary is that they  
7 have a way to classify these things, and when -- and if  
8 they make -- so you know -- so they identify their systems  
9 that really are important, and then make sure that those  
10 systems have appropriate pressure boundary controls in  
11 place.

12 So we are satisfied with the program, but  
13 it is an ongoing thing because there are lots of legacy  
14 issues that will continue and have to be continued to be  
15 addressed.

16 **MEMBER HARVEY:** How can you verify what is  
17 done by the licensee? How do you do that?

18 **MR. ELDER:** In this case, when there's a  
19 change to the program -- in change to a pressure boundary  
20 they are required to do a -- this is required to be  
21 inspected by an authorized inspector. In this case, this  
22 is the Technical Services Association, TSSA, which used to  
23 be the Ontario Inspector.

24 So there's a certified independent  
25 inspector who has to certify all the work. And if there's

1 any deficiencies -- if that inspector identifies any  
2 deficiencies, those deficiencies are brought to our  
3 attention. So everything gets a third party review.

4 **MEMBER HARVEY:** Okay.

5 Maybe a last question. At page 39, 41 of  
6 the staff document, it's about aging management. I  
7 thought about the same question, where are we? It's not  
8 easy to have a simple understanding of that. Because it  
9 appears to me that aging is one of the important points  
10 about the safety and security. So what's the status of  
11 the aging management program?

12 That's 39 and 41 of it.

13 **MR. ELDER:** I'll start, but I think the  
14 details of where they are, are going to have to come from  
15 AECL. But this is a key part of the integrated -- the  
16 safety review. It was the need to do this one. The date  
17 for completion -- that means all programs there in place -  
18 - is March 31<sup>st</sup>, 2013.

19 You'll see when you -- I'm in a position  
20 that we haven't presented you with the details yet of how  
21 we're going to monitor to make sure that they get there,  
22 but there are a number of intermediate steps to make sure  
23 that there is progress. So that by that date that program  
24 is not a program, it's a program that is working. It's  
25 fully implemented and is working.

1                   There are a number of steps that AECL is  
2 taking right now. In fact, the engineers they talked  
3 about hiring. A lot of those engineers are to work on  
4 this program.

5                   **MEMBER HARVEY:** I see.

6                   Would AECL comment on that?

7                   **MR. DRUMHILLER:** Hank Drumhiller, for the  
8 record.

9                   And so what Mr. Elder stated is exactly  
10 correct. The -- and maybe a little more detailed. But  
11 the program has been developed, but it is just at the  
12 early stages of being implemented, and so that's what's  
13 left to do.

14                   And as stated, the engineers that we're  
15 bringing in, that's a key piece to the implementation of  
16 it. So it's bringing it up to speed, fully developing the  
17 program, fully implementing the program over about a  
18 three-year period of time to be a fully effective program.

19                   **THE CHAIRMAN:** Thank you.

20                   Dr. McDill?

21                   **MEMBER McDILL:** Thank you, two questions.

22 With respect to the amendment to the derived release  
23 limits in Section G of the licence, those were amended in  
24 the fourth month of 2011. What was the reason for  
25 amending the DRS?

1           So Appendix G of the licence is modified as  
2 follows, it's an amendment -- amendment number 8.

3           They're in ---

4           **MR. ELDER:** Just for clarity in terms of --  
5 you're talking about the current licence and then it's got  
6 a table of the amendments?

7           **MEMBER McDILL:** Then one step forward after  
8 that. Yeah, there's a table of amendments.

9           **MR. ELDER:** Right. So if you -- I believe  
10 we mentioned in the presentation one of the things, the  
11 tasks, that AECL had to do over this licence hearing was  
12 actually go back and recalculate all the derived release  
13 limits. So once we had -- they had done that -- we put  
14 the new ones into the licence. And this is based on the  
15 CSA standard.

16           **MEMBER McDILL:** So almost all of them went  
17 up except one, which actually decreased, it would appear.

18           **MR. ELDER:** So, sorry -- it's just that the  
19 answer is most of them -- I think you reached the  
20 conclusion that most of them went down and one ---

21           **MEMBER McDILL:** No, most went up but one  
22 went down.

23           **MR. ELDER:** One, went down, right.

24           **MEMBER McDILL:** Yeah.

25           **MR. ELDER:** And there is going forward we

1 are actually putting -- in the past, in the old -- the  
2 current licence, there's just a limit, and there's a limit  
3 for each isotope.

4 What we're saying in the -- going forward -  
5 - actually the limit should be a cumulative limit. So  
6 it's all isotopes should be -- give you less than a  
7 certain dose.

8 So we're actually -- we're not making it  
9 any more restrictive on one particular isotope, but in  
10 total, we are being more restrictive to make sure that  
11 they don't -- you can't have all of these go up to the  
12 limit a the same time.

13 **MEMBER MCDILL:** And can you point me to  
14 that in the Licensing Handbook? We can go onto another  
15 question and you can come back.

16 **MR. ELDER:** It's actually in the proposed  
17 licence if you go to the appendix at the back of the  
18 licence.

19 **MEMBER MCDILL:** Yes, I found them there and  
20 I'm just wondering ---

21 **MR. ELDER:** And it should be ---

22 **MEMBER MCDILL:** So the total -- where is  
23 the total?

24 **MR. ELDER:** The total number is in -- I'm  
25 having trouble finding the specific number right now. It

1 is there, next page. Sorry. In Appendix A of the  
2 licence, release limits, the first one, this is page 12 of  
3 12 of the draft licence. It says:

4 "The dose to the critical group due to  
5 the sum of all releases in any one  
6 period shall not exceed .3  
7 microsieverts."

8 So it's the last page of the draft licence,  
9 at Appendix A of the draft licence, page 12 of -- sorry,  
10 it's page -- normally it's page 120 of the CMD, but I'm  
11 not sure if it's fully paged.

12 At the back of the CMD, there's current  
13 licence ---

14 **MEMBER MCDILL:** Okay. I've got 3 of 12.  
15 I'm heading for 12 of 12 now.

16 **MR. ELDER:** Yeah. And on that one, point  
17 one has that sum of releases being less than .3.

18 **MEMBER MCDILL:** Thank you.

19 So all of those changes have now been  
20 incorporated into that bottom line?

21 **MR. ELDER:** All the changes have been put  
22 in, and what we've done on the list of the second list is  
23 list just the isotopes that actually could get to .3. I  
24 mean, routinely, the highest releases are there and  
25 they've got separate numbers besides the .3 as well.

1                   **MEMBER McDILL:** Okay.

2                   And a similar question in the current  
3 licence, I think it is, because it's Amendment Number 8,  
4 there's a statement:

5                                 "The licensee shall not change the  
6                                 ownership, possession or use of the  
7                                 lands described without prior written  
8                                 approval."

9                   As the business case changes, how will that  
10 clause be affected?

11                   **MR. ELDER:** In terms of -- the business  
12 case would not -- we want to make sure that if there was  
13 any -- the licence covers the whole site, so that if  
14 someone wanted to take over half the site, there would  
15 need to have a separate licence for that half.

16                                 So it's just clarifying what was already  
17 there. We cannot transfer the licence. So anybody else  
18 coming in would need a new licence.

19                   **MEMBER McDILL:** Would AECL like to comment  
20 or you agree with that?

21                   **MR. MacDIARMID:** Just to be clear -- Hugh  
22 MacDiarmid, for the record.

23                                 Questioning the possibility of a change of  
24 ownership of the site?

25                   **MEMBER McDILL:** A hypothetical. You

1 introduced it at the beginning.

2 **MR. MacDIARMID:** Again, Hugh MacDiarmid, in  
3 response.

4 At this point in time we're not aware of  
5 any scenarios under which a change of ownership would be  
6 contemplated. When I used the term "restructuring" in  
7 that context, it was the introduction of contract  
8 management or other approaches, but not a change of  
9 ownership, to my knowledge.

10 **MEMBER McDILL:** Thank you, Mr. Chair.

11 **THE CHAIRMAN:** That's an opportunity for  
12 me to ask a delicate question which you may not be able to  
13 answer.

14 Assuming that the new government will make  
15 decisions quickly, who is going to be appearing in front  
16 of us in October?

17 **MR. MacDIARMID:** That is indeed a  
18 challenging question for me to respond to.

19 Hugh MacDiarmid, for the record.

20 I can assure you that it will -- that the  
21 team will include the senior leadership group of AECL.

22 **THE CHAIRMAN:** But the issue, you know, to  
23 be a bit serious here, is maybe to staff, do we want --  
24 you're not recommending putting in a licence condition  
25 where the mandate of the facility changes as a result of a

1 new mandate, government, a new vision for the  
2 organization. Will they have to come in front of us or  
3 should they come in front of us and articulate this new  
4 concept?

5 And also, there is going to be a huge  
6 commitment by somebody to deal with some of the legacy  
7 issues.

8 So I'm just wondering whether at the time,  
9 in October, we'll need the new, if you like, facility  
10 management plus the government? I'm a bit in the dark  
11 looking for advice here.

12 **MR. MacDIARMID:** Mr. President, Hugh  
13 MacDiarmid, for the record.

14 To my knowledge, first of all, with respect  
15 to the legacy liabilities, as you're aware, we have just  
16 come to the end of the first five-year period of the  
17 Nuclear Legacy Liabilities Program. The next multi-year  
18 approval is very much -- very well advanced and has been  
19 postponed only by the election and change of government.

20 And so we fully expect that the extension  
21 of the NLLP, which will be well beyond October, will occur  
22 before. I anticipate it will occur before Day Two.

23 With respect to the mission of the site,  
24 clearly the stated policy of the government is continued  
25 isotope production through 2016, so the duration of the

1 licence period. And I think that is a very significant  
2 driving factor in terms of the mission for the facility.

3 So we would expect no material change  
4 during the licence period.

5 **THE CHAIRMAN:** Not to belabour the issue,  
6 but we, in October we are looking for a five-year licence  
7 renewal here, and the question I have is by October, all  
8 the financing needed for executing the five-year plan, et  
9 cetera, will be in place -- must be in place for this to  
10 make sense.

11 And if not, you've got to have almost like  
12 a spot where demanded changes, we need to hear about this  
13 somehow.

14 **MR. MacDIARMID:** Hugh MacDiarmid, for the  
15 record.

16 I certainly do believe that it will be an  
17 appropriate spokesperson for the Government of Canada who  
18 would need to respond to that funding commitment.

19 Certainly I have no personal knowledge of  
20 any reluctance or any hesitation to provide it, but it  
21 would be outside the normal course funding in terms of the  
22 way we conduct business today.

23 But it is certainly a matter that could be  
24 brought forward back at that time.

25 **THE CHAIRMAN:** Thank you.

1 Mr. Tolgyesi?

2 **MEMBER TOLGYESI:** Merci, monsieur le  
3 président.

4 I think it's a staff document, H7.1. It's  
5 saying that:

6 "During the licence period and planned  
7 events at the CRL site have continued  
8 to reveal weaknesses."

9 I suppose it's related to number of  
10 unplanned events and it's just a number or you integrate  
11 or factorize in some potential consequences of unplanned  
12 events, what happened?

13 Because an unplanned event could be that --  
14 I don't know -- somebody forgot to close the door, but it  
15 depends which type of door he forgot to close. The  
16 consequence in one or risk could be much higher than the  
17 other one.

18 It's on page 11-H7, page 17. Document 11-  
19 H7, page 17, at the top, "Management System and Quality  
20 Insurance".

21 **MR. ELDER:** Peter Elder, for the record.

22 I touched a bit on this in our  
23 presentation, and what we were actually talking to was  
24 events that we actually thought were serious enough that  
25 we brought to the Commission's attention in our event

1 reporting.

2 So, you know, when we say number of  
3 unplanned events, yes, you would look at the severity as  
4 well as the number, which are of significance, like the  
5 vessel leak and things like that. So it's not a -- it's a  
6 total -- you know, events have to be serious enough to  
7 actually conclude that there's a weakness in the program,  
8 not just a random failure of a part. It's actually when  
9 you do the analysis of that event, there were  
10 organizational factors behind the event.

11 **MEMBER TOLGYESI:** Okay. Merci.

12 **MR. PETER:** There were organizational  
13 factors behind the event.

14 **MEMBER TOLGYESI:** M'hm. Okay, merci.

15 In the presentation of I suppose this is presentation from  
16 AECL on page 3-21. There is overdue preventative  
17 maintenance jobs and it's going from starts out there from  
18 August 2008 to February 2011. And there was, there is a  
19 kind of peak between August -- October, 2009 to maybe  
20 June, April, June, 2010, which was I suppose this severe  
21 leak where you were delayed, but after you are the same  
22 level as before. That means those overdue preventative  
23 maintenance jobs are similar now, same as before.

24 Do you expect some improvement there, that  
25 this preventative maintenance jobs, because it's

1 preventive, I expect that you would like to prevent  
2 incidents, or accidents, or consequences, so you would  
3 like to complete them; there's no improvement?

4 **MR. DRUMHILLER:** Hank Drumhiller for the  
5 record.

6 So the increase there is during the outage  
7 and availability of equipment and manpower as well, our  
8 resources to work on it is the increase that you're seeing  
9 there. We do have a program, we are trying to drive those  
10 numbers down.

11 I'd like to ask John Osborne if he -- he  
12 can add more on some of the activities we're doing in  
13 trying to drive some of the backlog down on PMs.

14 **MR. OSBORNE:** It's John Osborne for the  
15 record.

16 I think it's important to note, it also  
17 states in the CMD that there is consistently zero overdue  
18 regulatory and mandatory preventative maintenance  
19 routines. So from a safety perspective that's an  
20 excellent piece of data.

21 There are organizational changes we've made  
22 in the NRU organization, which will drive overdue  
23 maintenance to a more acceptable level. These include  
24 some of the programs we've already spoken about with aging  
25 management and system health, where increased resource

1 will be focused on system performance and will be  
2 optimizing preventative maintenance programs.

3 We've also introduced a preventative  
4 maintenance group that looks at opportunities to improve  
5 efficiencies, grouping preventative maintenance routines  
6 together in similar compartments, or on similar pieces of  
7 equipment. So we do expect to be able to further improve  
8 our preventative maintenance programs.

9 **MEMBER TOLGYESI:** Looking on a page from  
10 2.9 through 2.12, there are several leaks find on the  
11 site. It was regarding radioactive waste tanks, and drain  
12 leaks, and rod bay leaks, and fissile solution storage  
13 tank leaks. What's the monitoring, or emergency system,  
14 or preventative maintenance you have on these lines?

15 **MR. DRUMHILLER:** Sir, Hank Drumhiller for  
16 the record.

17 So it varies for which system that you're  
18 talking about. So for the active drains we have  
19 monitoring. It's a pipe within a pipe and we have  
20 monitoring in the annulus if you would between the two  
21 pipes to detect any leakage from the one pipe; the inner  
22 pipe to the outer pipe.

23 You talked about the rod bays. One of the  
24 main things we do there is we put additional wells in and  
25 then we sample these wells to monitor whether the leakage

1 and to be able to understand the leakage from the rod  
2 bays.

3 You talked about FISST and particularly  
4 it's a thermal well. And so we have leak detection  
5 sensors that are in those thermal wells to detect if  
6 there's leakage there.

7 So we do have different ways to monitor  
8 depending on what system it is. It is, we've talked about  
9 aging management in many cases. This is an aging  
10 management issue. Although the active drain piping, that  
11 pipe that started leaking is only about 50 percent at best  
12 of its age. So that one may not be age related and we're  
13 looking at it, but some of these others age appears to  
14 have been some factor in it, although I'm not so sure. I  
15 would just definitely say it's aging management.

16 **MEMBER TOLGYESI:** You're saying that  
17 (inaudible) discontinued you replaced. Did you replace it  
18 for something else and what?

19 **MR. DRUMHILLER:** Hank Drumhiller for the  
20 record. And you're speaking to the FISST?

21 **MEMBER TOLGYESI:** Yes, yes. In a fissile  
22 solution storage page 212, right at the top. You said a  
23 leak detection using the wet/dry test has been  
24 discontinued. It was replaced by some other method, or it  
25 was not replaced, you don't do this test?

1                   **MR. DRUMHILLER:** If I could have just a  
2 moment? Sir, I'm going to ask Joan Miller, our Vice  
3 President of decommissioning on waste management to speak  
4 to that.

5                   **MS. MILLER:** Joan Miller for the record.  
6 Yes. We've replaced the leak detection method so we have  
7 a continuous leak detection method in place now. So it's  
8 just a replacement, but we do have leak detection.

9                   **MEMBER TOLGYESI:** Could you tell me, is  
10 there some waste, radioactive waste stored on CRL's site,  
11 which is not coming from your site specifically, but it's  
12 coming from outside?

13                   **MR. DRUMHILLER:** Hank Drumhiller for the  
14 record. Again, I'd ask Joan to respond to that. Joan.

15                   **MS. MILLER:** Joan Miller for the record.  
16 Yes. We do provide waste management services for  
17 radioactive waste from hospitals or universities.

18                   We also provide services for Nordion for  
19 some of their wastes that are produced in their Kanata  
20 facilities; that comes to the Chalk River site as well.

21                   **MEMBER TOLGYESI:** And what's -- right now,  
22 what's the capacity. Do you have capacity to continue  
23 this, or you should add some capacity to store this  
24 outside waste?

25                   **MS. MILLER:** Joan Miller for the record.

1                   That does depend on the type of waste that  
2                   is being delivered to Chalk River. We do have a number of  
3                   facilities for low level waste. We have recently  
4                   constructed a new shielded banks above ground storage  
5                   facility.

6                   We are looking at our waste facilities,  
7                   their capacity and the waste sources, because not only do  
8                   we have waste from external organizations, we also are  
9                   producing waste from our decommissioning activities. So  
10                  this past year we undertook a development of an integrated  
11                  waste plan that looks at all of the waste sources, when  
12                  waste volumes would be coming into the waste management  
13                  area, and the types of facilities that would be required.

14                  We do have some limited capacity in certain  
15                  facilities for intermediate level waste and we are working  
16                  various scenarios to see how we can increase that  
17                  capacity. We just put in place additional capacity for  
18                  the storage of NRU fuel and isotope processing waste so we  
19                  have sufficient capacity for that type of waste now.

20                  **MEMBER TOLGYESI:** Okay. Could you tell me,  
21                  is isotope production a core business of CRL at the site,  
22                  or it's just part and what's the importance of this  
23                  isotope production compared to the whole business, full  
24                  business at the site?

25                  **MR. WALKER:** Bob Walker for the record.

1           Isotope production is certainly a core  
2 business for the nuclear laboratories; of our six large  
3 program areas it is one. It is certainly a mandate that  
4 we exercise on behalf of the Federal Government as part of  
5 government policy.

6           And we'll continue to do so as long as the  
7 government wishes us to do so.

8           This, of course, has us with a unique  
9 capacity for the management of the targets, the irradiation  
10 and then the extraction of the particular isotope product  
11 for ultimate transmittal to Nordion in the case of the  
12 molybdenum change for processing.

13           So it's certainly a significant part of our  
14 business. It's a public good and we will continue to  
15 exercise that public good as long as the federal  
16 government wishes us to do so.

17           **MEMBER TOLGYESI:** When you say significant,  
18 it means what, 25-50 per cent of your business on the  
19 side?

20           **MR. WALKER:** In terms of the margins  
21 generated for the production of isotopes, it's a  
22 relatively modest part of our margins. The government,  
23 through the program such as the Isotope Supply Reliability  
24 Program and Project New Lease, is subsidizing us in the  
25 production -- in the isotope generation.

1                   So if one actually looks at the total  
2 funding streams that we get, the ones that actually play  
3 into enabling us to execute the isotope business are  
4 significant.

5                   I would be hard-pressed to put a number on  
6 it, but it is multiple tens of per cent.

7                   **MEMBER TOLGYESI:** My question was not  
8 necessarily the margin money-wise but, you know, workload-  
9 wise. You said you had 3,000 employees on the site. Of  
10 these 3,000 employees, how many are related to isotope  
11 production?

12                   **MR. WALKER:** Bob Walker, for the record.

13                   Some analysis has been done for us in  
14 looking at our costing model, which suggests about a third  
15 of our workforce is engaged in directly supporting the  
16 isotope mission.

17                   **MEMBER TOLGYESI:** Okay.

18                   You were talking about some intellectual  
19 property assets. Is, I suppose, some part of these  
20 intellectual property assets are related to isotope  
21 production also. And if it's related, what will happen to  
22 -- you will stop production of isotopes in 2016, what will  
23 happen to these assets?

24                   **MR. MacDIARMID:** Hugh MacDiarmid, for the  
25 record.

1                   There's no contemplation of any disposition  
2                   or any commercial transactions surrounding those IP  
3                   assets.

4                   So at this point in time, I would simply  
5                   assume that they would be retained for future benefit,  
6                   should that arise.

7                   **MEMBER TOLGYESI:** And my last question will  
8                   be, Mr. President, how the nominal end of isotope mission  
9                   will impact on decommissioning of operations?

10                  **MR. MacDIARMID:** Hugh MacDiarmid.

11                  We'll all perhaps take a try. First of  
12                  all, we don't necessarily equate the end of the isotope  
13                  mission with the end of the NRU's life. Those are two  
14                  separate decisions.

15                  So it is indeed possible that there will be  
16                  research and development and other support missions for  
17                  the NRU beyond, should 2016 be the end of the isotope  
18                  production life for the NRU.

19                  **THE CHAIRMAN:** Thank you.

20                  Any other?

21                  I've got a couple of quick -- we don't have  
22                  time, so I'd like to ask a quick question and expect quick  
23                  answers.

24                  A couple of times, you mentioned WANO as  
25                  appearing in there. Would you like to give us a bottom

1 line, what was the rating that they attributed to you vis-  
2 à-vis presumably other nuclear research facilities?

3 **MR. MacDIARMID:** Hugh MacDiarmid, for the  
4 record.

5 The WANO process of peer review, as they  
6 conducted it, they have a very well established  
7 methodology and that includes an exit interview with the  
8 CEO, which did take place. And during that meeting, they  
9 conveyed that at this time, it was standard practice that  
10 they not issue an evaluation of the facility in the first  
11 iteration.

12 So we are benefiting from all of their  
13 advice but not from an explicit rating at this time.

14 But they will be back and the next natural  
15 iteration would be one where we do receive a rating.

16 I must say, though, just to anticipate the  
17 question again in the future, those ratings are treated  
18 rather carefully by the organization, and so we would have  
19 to be thoughtful about how much we should disclose that in  
20 a public forum.

21 **THE CHAIRMAN:** No, we respect the  
22 confidentiality here, but I just wanted to know whether  
23 they gave you some good insight as to the health of the  
24 organization, and I'm sure some gratuitous advice even  
25 though it's not a written ---

1                   **MR. MacDIARMID:** Hugh MacDiarmid.

2                   I believe Hank is best positioned to  
3 respond to the specific areas they gave us because they  
4 did give us, indeed, some very specific advice in areas  
5 that you'll find quite relevant to this discussion.

6                   Hank, over to you.

7                   **MR. DRUMHILLER:** Hank Drumhiller, for the  
8 record.

9                   They summarized their areas for  
10 improvement. We ended up with 15 different areas for  
11 improvement. And they group those together into three  
12 main areas, those being worker behaviours, worker  
13 performance on a very broad or -- they called it, in some  
14 cases, fundamentals. So basically how operators operated,  
15 how people worked as far as radiological protection, you  
16 know, kind of just basic -- how people did business, if  
17 you would, conducted their jobs.

18                   Equipment reliability was another one. And  
19 as you're aware, we do have equipment problems.

20                   And the last one was really management  
21 setting clear standards and -- well, really just setting  
22 clear standards and expectations.

23                   **THE CHAIRMAN:** Nothing surprising there, I  
24 gather.

25                   **MR. DRUMHILLER:** Hank Drumhiller, for the

1 record.

2 I would say the key -- no real surprises,  
3 but they did provide a lot of good insights and ideas on  
4 how to maybe better address some of these items.

5 The other thing that I saw in the  
6 organization, I would call it some lights started to go  
7 on, you know, where it allowed some of these concepts to  
8 more take seed, if you would -- maybe is another way to  
9 put it. It certainly engaged -- it caused the  
10 organization to become engaged and better aligned. That  
11 was an observation I made on it, at least.

12 Thanks.

13 **THE CHAIRMAN:** My next question is you  
14 know we have other regulators besides us that are watching  
15 you, and I've got to ask you, on -- this is the AECL  
16 document, page 335, and it's dealing with the non-  
17 radiological liquid effluent.

18 And what I'm trying to understand is, is  
19 Environment Canada okay with your accident frequencies? I  
20 mean, do they check you? Do they monitor you? Are they  
21 happy with your performance?

22 **MR. DRUMHILLER:** Hank Drumhiller, for the  
23 record.

24 I'm going to have to go to George again to  
25 respond.

1                   **THE CHAIRMAN:**    I'm looking at Table 3.5  
2 here that shows the frequency is systemic from 2006 to  
3 2010, you know, roughly 20 exceedances, I assume a year,  
4 you know, is quite high.

5                   **MR. DRUMHILLER:**   George?

6                   **MR. DOLINAR:**   George Dolinar, for the  
7 record.

8                   So I'm looking at Table 3.5, but I'll start  
9 my answer by saying that yes, Chalk River gets inspected  
10 by Environment Canada on a regular basis.

11                   In this particular instance, with liquid  
12 effluents, what Environment Canada looks at is the portion  
13 of the *Fisheries Act* which they are responsible for, and  
14 that's deleterious substances.

15                   This table, 3.5, looks at exceedances of  
16 AECL guidelines. AECL guidelines are a combination of --  
17 so unlike -- I'm just trying to provide a contrast here --  
18 unlike the radiological side of things where we have admin  
19 levels and action levels and we're moving towards that on  
20 the non-radiological side, at present we have AECL  
21 guidelines.

22                   And AECL guidelines are a mixture of these  
23 types of limits. So this doesn't mean that you're  
24 exceeding a licence requirement, for example, or something  
25 that Environment Canada would expect you to comply with.

1                   So being very specific, for example, the  
2                   waste treatment centre, one of the more notable ones there  
3                   in 2010, we had 20 exceedances of AECL guidelines. Well,  
4                   pretty much every month during 2010, we had exceedances of  
5                   Phenol X. And the AECL guideline is a very low value, so  
6                   that's, sort of the nature of what's captured in this  
7                   table. It's a combination of what we would have on the  
8                   radiological side of admin levels and action levels.

9                   **THE CHAIRMAN:** I assume that all means  
10                  that Environment Canada is aware and accepting. We do not  
11                  want to be surprised, as we were recently, with some zero  
12                  tolerance concepts from Environment Canada that came very  
13                  hard on some licensees -- other licensees, not you --  
14                  about, you know, uncontrolled emissions to waters, if you  
15                  like.

16                  So all I'm looking for is, is Environment  
17                  Canada okay with all of this? And while I've got the  
18                  floor here and also on fish impingement, is DFO okay with  
19                  the so called, plan, that you have about monitoring impact  
20                  on fish?

21                  **MR. DOLINAR:** George Dolinar, for the  
22                  record.

23                  So I'll deal with the second question  
24                  first, and this is the fish impingement one. So for a  
25                  number of years, at least over the last decade, AECL has

1       been looking at fish impingement.

2                   I can provide you some numbers, but your  
3       question was specifically regarding DFO. And in 2006, DFO  
4       looked at fish impingement at Chalk River, and we have  
5       some correspondence back and forth between the two  
6       organizations. And based on their assessment in 2006,  
7       they indicated they expected no adverse impacts to the  
8       fish population from fish impingement from Chalk River  
9       operations.

10                   So DFO is on the record indicating that  
11       they do not feel that there is any adverse impact from our  
12       operations on fish impingement.

13                   Nevertheless, we continue to monitor fish  
14       impinged in our intake system. It might be interesting to  
15       note, and this is sort of in contrast and maybe some other  
16       circumstances with which you are aware. We impinge about,  
17       you know, anywhere from 100 to 200 kilograms of fish per  
18       year. We have a deep water intake of relatively low  
19       velocities, and I guess, one of the more interesting  
20       species of fish that we take is a forage fish.

21                   So it's a source of food for pickerel on  
22       the river, and pickerel are a game fish, so they're of  
23       some interest. And so this forage fish is called trout-  
24       perch, not trout and perch, but trout-perch. And the  
25       amount of trout-perch which is, you know, 20 percent of

1 the biomass on an average year provides food for about 30  
2 pickerel. So I think I'm just trying to put a little bit  
3 of perspective on our fish impingement issue at Chalk  
4 River.

5 On your first question and following on  
6 from the previous one, yes, Environment Canada is aware of  
7 our effluence to the Ottawa River.

8 **THE CHAIRMAN:** Staff, do you agree?  
9 There's no surprises coming at us?

10 **MR. RINKER:** George Dolinar, for the  
11 record.

12 I agree with everything that AECL has  
13 mentioned. We've been working with DFO over the last  
14 several years at the risk to the fish communities in the  
15 Ottawa River is very low. But nevertheless, AECL has a  
16 very strong monitoring program to ensure that that doesn't  
17 change. And we do work together with Environment Canada  
18 on assessing releases of deleterious substances.

19 **THE CHAIRMAN:** Thank you.

20 My next question is for staff. On page 68,  
21 there is a list of proposed decommissioning of some old  
22 facilities. It really didn't mention end game. When is  
23 this commissioning -- are we all on the same page, 68?

24 There's a lot of environmental assessment  
25 going on and things like this. When will we expect the

1 actual facilities to be decommissioned? AECL? Staff?  
2 Whoever has the answer?

3 **MR. DRUMHILLER:** Hank Drumhiller, I'd have  
4 Joan Miller respond.

5 **MS. MILLER:** Joan Miller, for the record.

6 For the facilities that are listed on page  
7 68, we are currently preparing and finalizing the  
8 environmental assessments. Some of these facilities have  
9 the detailed decommissioning plans under review. And the  
10 actual decommissioning work, we'll start on some of these  
11 in the next three-year period, and these facilities would  
12 be decommissioned over the next -- so by the time all of  
13 them are completed here -- probably over the next 10-year  
14 period.

15 **THE CHAIRMAN:** And you've got the funds to  
16 do the job?

17 **MS. MILLER:** We have the funds for the  
18 current phase. Our initiatives and program has begun, and  
19 as was mentioned earlier, the federal government will  
20 confirm funding in the next coming weeks for this current  
21 phase that we're progressing on now.

22 **THE CHAIRMAN:** Okay.

23 So bring me to page 72 on staff, and  
24 there's this number. I just want to verify that the  
25 number -- under 4.5.1, there's a number that says that the

1 cost for the decommissioning of the CRL site is a net  
2 present value of 3.08 billion dollars. Whose number is  
3 this, and is the government of Canada aware of this  
4 particular number?

5 **MR. MacDIARMID:** Hugh MacDiarmid, for the  
6 record.

7 I believe that is a number that is shown on  
8 our published corporate balance sheet as our  
9 decommissioning liability. It is the subject of very  
10 exhaustive and exhausting calculations to come up with the  
11 number, and the accretion of it and so on is done  
12 according to accounting principles, and so the government  
13 is well aware.

14 **THE CHAIRMAN:** So just for clarification,  
15 and maybe I should ask our legal here, do we have the  
16 authority to make sure that this is spent on  
17 decommissioning?

18 In other words, is this money really booked  
19 into the fiscal framework, designed, designated guarantee  
20 for this purpose? Anybody who knows the answer to this?

21 **MR. ELDER:** Peter Elder, for the record.

22 My understanding, I think this is something  
23 you may want NRCan to confirm at Day Two. But that this  
24 is -- we have on record letters from ministers of Natural  
25 Resources, reconfirming that this is a recognized

1 government liability.

2 **THE CHAIRMAN:** And I understand -- I  
3 almost understand that. But I just want to know how one  
4 taps into it.

5 **MR. ELDER:** How one -- currently, in terms  
6 of the total amount, I'm not sure what is being funded to  
7 reduce liabilities is the Nuclear Legacy Liability  
8 Program, AECL is being funded by the federal government to  
9 actually reduce these liabilities.

10 **THE CHAIRMAN:** Can we get some kind of a  
11 confirmation from NRCan for Day Two?

12 **MR. ELDER:** Yeah.

13 **THE CHAIRMAN:** All right.

14 My last question ---

15 **MR. ELDER:** Would you like Joan Miller to  
16 respond to that?

17 **THE CHAIRMAN:** By all means.

18 **MR. ELDER:** Joan?

19 **MS. MILLER:** Joan Miller, for the record.

20 Just to add to what Mr. Elder has said,  
21 yes, the amount is booked on the government's liability.  
22 The estimate is reviewed annually by the officer of the  
23 Auditor General -- Office of the Auditor General.

24 And in terms of accessing the funds, the  
25 process that we use is that we work with NRCan, we submit

1 a plan for a five-year program, a three-year program. We  
2 submit a program plan, and NRCan has their discussions  
3 within cabinet, and then within treasury board for both  
4 approval of the program and authorization or authority to  
5 spend the funds.

6 So that process has been undertaken both  
7 for the first five-year program, it's been undertaken just  
8 recently and we have begun the next phase of carrying out  
9 the program and the funding announcement will occur.

10 **THE CHAIRMAN:** Somewhere in the document,  
11 for planning purposes, somebody made the assumption that  
12 the site will be around for 100 years. Does it mean that  
13 the 3 billion dollars -- I mean there's no time limit as  
14 to when and how you want to spend that money for  
15 decommissioning. I'm just wondering whether it's part of  
16 this 100-year life of the site.

17 **MR. ELDER:** Peter Elder, for the record.

18 There is -- while it's being funded in  
19 five-year blocks, there is also a master program that  
20 NRCan has put together that has a 70-year span currently.  
21 That gets reviewed again every five years to see on that  
22 one. So their current estimate would be that it will take  
23 them 70 years to do all the work that has to be done for  
24 that 3 billion dollars.

25 **THE CHAIRMAN:** I wouldn't mind seeing it a

1 very high level. This kind of a plan.

2 My last question is on page 74, there's a  
3 statement which I don't understand. Again, 4.7.1, "AECL  
4 may" -- the last sentence in this paragraph:

5 "AECL may during the proposed licence  
6 term require nuclear liability  
7 insurance for the CRL site."

8 What is this about?

9 **THE CHAIRMAN:** Staff, it's part of your --  
10 -

11 **MR. ELDER:** I'm sorry. As the Commission  
12 may or not remember, is that the current *Nuclear Liability*  
13 *Act* was put in place in the mid-seventies, and there have  
14 been proposals a number of times to actual modernize that  
15 Act. Under the last proposed Bill that was tabled to  
16 Modernize The Nuclear Liability Regime, AECL would be  
17 required to carry coverage.

18 So what we are saying is, under the current  
19 Act they are not required, but we keep on writing this --  
20 I mean, if that bill gets reintroduced as is AECL would be  
21 required to carry the coverage in the future.

22 **THE CHAIRMAN:** But if it remains a  
23 government entity normally it would be strange for a  
24 government entity to carry its own licence, its own  
25 insurance if I understand correctly. Anyhow we'll ---

1                   **MR. ELDER:** Okay.

2                   **THE CHAIRMAN:** --- I guess we'll have to  
3 check up on that. Mr. MacDiarmid, do you want to say  
4 something?

5                   **MR. MACDIARMID:** Not really. I've had my  
6 wrong finger on the button. Hugh MacDiarmid for the  
7 record. I could almost imagine that we would carry the  
8 insurance if obliged to, but we would self-insure most  
9 likely if not obliged to.

10                  **THE CHAIRMAN:** Right. Okay. Thank you.  
11 Anybody else? Mr. Tolgyesi.

12                  **MEMBER TOLGYESI:** I just wondering, was the  
13 experience learned, or technologies developed following  
14 the vessel leak, you know, used or implemented elsewhere,  
15 because there was lots of new technologies you were  
16 developing. It was you were supposed somewhere?

17                  **MR. DRUMHILLER:** Hank Drumhiller for the  
18 record.

19                                So the most direct that I know of is that  
20 the inspection tooling we're using today is built off of  
21 the same tooling model, if you would, for the weld  
22 machine. I think that's the most direct use that I know  
23 of.

24                                Now some of the NDE probes I think have  
25 been used, that were developed here, have been used on

1       some other NDE, but I'm not sure the details of that to be  
2       very candid.

3                   **THE CHAIRMAN:**     Yeah.  Can I add something?  
4       I was yesterday at the CNS lunch and award recognition for  
5       many of the work that was done by the MLU team.  And in  
6       fact they single out some of the Canadian know-how that  
7       went into it, which was unique.

8                   And we don't do enough kind of  
9       congratulation from this table here.  I guess it's not our  
10      mandate to say when some amazing new technology was  
11      developed and Canadian known-how, and its reputation is  
12      now well-known and I think it was recognized I guess at  
13      that lunch.

14                  So was recognized the NRU, the staff team  
15      that worked on the regulatory aspect of the return to  
16      service and so did the engineering team of AECL.  So it  
17      was a real -- in fact, love-in for the NLU project here in  
18      spite of all the other challenges that still remain.  
19      So does that answer your question?

20                  **MEMBER TOLGYESI:**  Yes.

21                  **THE CHAIRMAN:**  Anybody else?  Any other  
22      comment?

23                  Well, thank you very much.  We're looking  
24      forward to Day 2.  There's a lot of detail here that we  
25      expect to see further updates and being up to ask is

1 completed. A lot of work started, but has not been  
2 completed. So we're looking forward to a more fulsome  
3 representation in October.

4 Thank you very much Minister of Emergency  
5 Planning.

6 **MR. LEBLANC:** Yeah. I'll just conclude  
7 that by saying that this hearing is to be continued with  
8 Day 2 on October 5th and 6th, 2011 at the Lyons Club hall  
9 in Chalk River. The public is invited to participate  
10 either by oral presentation, or written submission on  
11 hearing Day 2.

12 Persons who wish to intervene on that day  
13 must file submissions by September 6th, 2011. We will be  
14 back at 2:30, Mr. President?

15 **THE CHAIRMAN:** 2:30.

16 **MR. LEBLANC:** For the public hearing on the  
17 application by Canadian Light Source for amendment to  
18 their license. Thank you.

19 (SHORT PAUSE/COURTE PAUSE)

20

21 **Canadian Light**

22 **Source Incorporated:**

23 **Application from Canadian Light**

24 **Source Incorporated for an**

25 **Amendment to its Particle**

1       **Accelerator Operating Licence**

2  
3       **11-H5.1 / 11-H5.1A / 11-15.1B**

4       **Canadian Light Source Incorporated**

5       **CNSC Staff**

6  
7                   **THE CHAIRMAN:**    Okay.  Good afternoon.  And  
8       let's now proceed to the next item of the agenda for today  
9       in its application from Canadian Light Source Inc. for an  
10      amendment to its particle accelerator operating license.  
11      Marc.

12                   **MR. LEBLANC:**  Yes.  This is a one day  
13      public hearing.  The notice of hearing 2011/8/04 was  
14      published on April 7th of this year and a revised notice  
15      was published on May 4th to provide more details on the  
16      nature of the application.

17                   Submissions from Canadian Light Source and  
18      CNSC staff were due on April 8, 2011.  I also know that  
19      supplementary information had been filed by -- well, in  
20      fact one supplementary information has been filed by  
21      Canadian Light Source -- oh, as well as staff since the  
22      first publication of the agenda.

23                   The public was invited to participate  
24      either by oral presentation or written submission.  May  
25      9th was the deadline set.  And the Commissioner received

1 no requests for intervention.

2 June 1st, 2011 was the deadline for filing  
3 of supplementary information. And I've already noted that  
4 supplementary information have been filed by CNSC staff  
5 and Canadian Light Source.

6 **THE CHAIRMAN:** Okay. So let's start by  
7 calling on the presentation from CLS as outlined in CMD  
8 H5.1, 5.1A and 5.1B.

9 And I understand Dr. Hormes, you're making  
10 the presentation, the floor is yours.

11 **MR. HORMES:** For the record Josef Hormes.

12 Bonjour Madame et Monsieur.

13 Good afternoon, Mr. President, members of the Commission,  
14 staff members of the Canadian Nuclear Safety Commission  
15 colleagues.

16 Let me start my presentation by introducing  
17 my colleagues that are here to help me answer difficult  
18 questions.

19 First of all there's Dr. Mark de Jong, the  
20 Director Of Accelerators who will give part of the  
21 presentation.

22 It's Dr. Mo Benmerrouche our Manager for  
23 Health Safety And Environment. It's Dr. Tom Ellis our  
24 Director of Research, and it's Mr. Aziz Ahamd our manager  
25 health safety -- oh, sorry, our manager for quality

1 assurance.

2 Before coming to the Isotope project  
3 presentation that is directly connected to one of the two  
4 amendments that we are asking for and that will be  
5 presented by Dr. Mark de Jong who was in charge of that  
6 project.

7 I would like to highlight in my  
8 presentation three issues. One is the safety culture,  
9 safety record of the Canadian Light Source. Our QA  
10 program that has been established over the last two years  
11 and I would end my presentation with some remarks about  
12 the potential radiation exposure of CLSI nuclear energy  
13 workers.

14 My first statement when I meet people from  
15 the general public is the Canadian Light Source is a safe  
16 facility with a strong safety record.

17 Just as a reminder the Canadian Light  
18 Source is not a nuclear power plant though we are  
19 regulated as a Class 1 nuclear facility by the same  
20 regulation as power plants.

21 We are a safe facility because in our case  
22 it doesn't matter who is switching off the power. If it  
23 is the operator or if it is an earthquake, it doesn't  
24 matter.

25 As soon as the power is switched off we are

1 a safe facility. There is no prompt radiation, there's  
2 nothing left, we don't need any cooling; if we refer to  
3 what happened in Japan.

4 In this case we are a safe facility because  
5 it really doesn't matter who is switching off the power.  
6 It means no requirements for cooling or so when the  
7 machine's not operational.

8 It's also important to mention that we are  
9 an open facility in the sense that we are a user research  
10 facility.

11 The Canadian Light Source was built and is  
12 operated as user facility for researches from a academia  
13 industry and government, and they are the people that  
14 actually using the light source and doing most of the  
15 science at the light source and just a number, we have  
16 more than 1,000 user visits last year, people coming to  
17 the facility.

18 Okay. This slide should highlight our  
19 safety performance. The facility has now been in routine  
20 operation for nearly seven years and during this time we  
21 had zero major injuries as defined by the Canadian OHS  
22 Regulation and we had also zero incidents on radiation  
23 dosimeters exceeding the Canadian Nuclear Safety  
24 Commission and your dose limits for the general public.

25 It's important to emphasize that this zero

1 is not just for our users and visitors, that zero is also  
2 true for all our employees, also for the nuclear energy  
3 workers that are working there.

4 I think it's a remarkable safety  
5 performance and I would like to congratulate Dr.  
6 Benmerrouche and his team for their hard work to implement  
7 that safety program.

8 I strongly believe that this is not just  
9 good luck. It's the consequence of hard work, a well  
10 developed safety culture, and I want to emphasize that  
11 this culture is continuously nurtured by the staff members  
12 of the Canadian Nuclear Safety Commission in their  
13 interaction with our facility.

14 As I already mentioned we are requesting to  
15 have our Class 1B operation license amended by two issues:  
16 One, to incorporate a new QA manual, and the second point  
17 is to modify the 250 MeV access control interlock system  
18 which would allow us to use an area of the old  
19 Saskatchewan accelerator left for medical isotope  
20 production and medical isotope project that will be  
21 introduced by Dr. de Jong later on.

22 This slide and the next two ones  
23 highlighting the QA program that we implemented and that  
24 was strengthened significantly by hiring Aziz Ahamd as a  
25 full-time QA manager for the CLS.

1           In close collaboration with all directors  
2           and managers Aziz developed a new QA manual. The previous  
3           manual, we had always a QA manual, but the previous manual  
4           was optimized for the construction and the commissioning  
5           phase of the light source. It's a slightly different way  
6           of handling the machine.

7           Now we are in our second phase and that is  
8           what I call "user operation". And therefore we had to  
9           change and modify a few things in that QA manual. And in  
10          addition to that QA manual there were also other issues of  
11          the QA program.

12          For example we implemented a management  
13          review process. We implemented a taproot investigation  
14          tool for investigating events. We improved and  
15          reorganized our internal audit program, and we implemented  
16          and improved nonconformance process, and especially the  
17          follow-up process for non-conformances.

18          Based on the new QA manual several  
19          documents describing high level safety relevant processes  
20          has also been rewritten. These processes are: document  
21          control, training, work management and configuration  
22          management and non-conformance management.

23          I suppose it's really important to  
24          emphasize that most of these revisions were carried out in  
25          extremely close collaboration with Canadian Nuclear Safety

1 Commission staff.

2 I think it's important to mention that our  
3 QA activities over the last two years were also influenced  
4 by a reportable event what we call the Potential Radiation  
5 Exposure of CLSI Nuclear Energy Workers.

6 This incident was called by a very unusual  
7 steering of our electron beam in a part of our system the  
8 limit to boost the transfer line.  
9 However also in this event the radiation exposure of the  
10 workers involved was below the detection limit of  
11 dosimeters.

12 Based on our own taproot investigation it  
13 was actually the first taproot investigation carried out  
14 by CLSI staff in collaboration with TRIUMF (inaudible).  
15 Based on that taproot and based on the recommendation from  
16 CNSC staff we established several measures to mitigate  
17 risk also for the future.

18 For example we improved the local  
19 shielding. We established an independent verification  
20 process for the corresponding Dipole wiring, and we  
21 improved significantly our visual and audible radiation  
22 alarms and response system.

23 I would like now to hand over to Mark de  
24 Jong to tell about the medical isotope project.

25 **DR. DEJONG:** Thank you, Josef. Okay.

1 Now I'll talk about the second part of the CLS amendment  
2 request. The modification of the CLS access control and  
3 interlock system to permit access to release Room 13 also  
4 known as the Experiment Area 2 or EA2 at CLS from a  
5 lockup.

6 This slide shows a portion of the sub-  
7 basement of the Canadian Light Source facility. The  
8 electron beams come from the -- the electron beam line is  
9 shown in red going first coming in from the left and then  
10 going down to the bottom. This is part of the 250 MEV  
11 electron Linac transfer line to transfer electrons from  
12 the linear accelerator to the booster.

13 The Zone 3 which is shown shaded has been a  
14 part of the -- is a present part of the lock up system  
15 when we operate the electron Linac.

16 It was an old experimental area from the  
17 previous facility. It's currently designated as a  
18 radiological storage area and no access permitted during  
19 operation of the 250 MeV Linac.

20 The next slide shows the plant new  
21 configuration where Zone 3 of the lockup has been reduced  
22 to a short corridor and a new access gate has been  
23 installed. Additional concrete and lead shielding will be  
24 installed to reduce the possible radiation exposures to  
25 persons in the EA2 area while the 250 MeV electron Linac

1 is operating.

2 This shielding will also block off access  
3 from the EA2 to the electron beam switchyard that's in  
4 Room 3 which is where the current electron beam lines are.

5 Access to the EA2 area will now be through  
6 a service area room located above the electron switchyard  
7 and down a spiral staircase just shown in the drawing  
8 there.

9 After these changes, EA2 will be designated  
10 as a radiological controlled area and access can be  
11 independent of the operation of the 250 MeV Linac.

12 Nevertheless, there will continue to be  
13 restricted access similar to other such areas within CLS.

14 With these changes, we then plan to use the  
15 EA2 area for the medical isotope project that I will now  
16 describe.

17 The CLS medical isotope project is one of  
18 four such projects funded by Natural Resource Canada's  
19 non-reactor-based isotope supply programs. All four  
20 projects are developed in accelerator-based techniques for  
21 the production of either Molybdenum-99 or Technetium-99m.

22 In our project, the Canadian Light Source  
23 is the project lead with collaborators from the National  
24 Research Council, the University of Ottawa Heart  
25 Institute, the University Health Network, which is

1 associated with the University of Toronto, and NorthStar  
2 Medical Isotopes, an American company that has developed  
3 an isotope separation unit optimized for the separation of  
4 Technetium-99 from low specific activity solution of  
5 Molybdenum-99.

6 Our project will examine the use of high-  
7 power electron linear accelerators for the production of  
8 Molybdenum-99 by a photo neutron reaction on Molybdenum-  
9 100.

10 In this reaction a high energy,  
11 approximately 15 MEV photon, knocks one neutron out of  
12 Molybdenum-100 to form Molybdenum-99. The high-energy  
13 photons are produced by Bremsstrahlung radiation when  
14 high-energy electrons hit a target.

15 The scope of the CLS isotope project  
16 includes the procurement, installation and commissioning  
17 of a 35 MeV electron Linac with a beam power up to 40  
18 kilowatts. This is essentially a little bit over  
19 1 milliamp average current for those that are more  
20 familiar with currents for accelerators.

21 We will also be designing a converter  
22 target, which is the target used by the electron -- the  
23 target the electrons will hit to produce the  
24 Bremsstrahlung radiation and a separate holder for  
25 Molybdenum targets.

1           The project's goals include designing these  
2 components to handle the electron being powered greater  
3 than 20 kilowatts. Some modest development of remote  
4 handling of the Molybdenum targets will also be necessary.

5           In parallel, we are also using the NRC 35  
6 MeV electron Linac to validate the production yield  
7 computations as well as some of the Molybdenum target  
8 processing requirements.

9           The processing includes dissolving the  
10 Molybdenum targets, separation of the Technetium from the  
11 Molybdenum solution and recovering and reforming new  
12 Molybdenum targets from the solution.

13           This slide shows a tentative layout of the  
14 planned isotope production facility in EA2. The smaller  
15 region shown on the left is where the 35 MeV electron  
16 Linac and target assembly will be located.

17           A new shielding wall will be installed to  
18 separate the isotope Linac from a new nuclear substance  
19 laboratory with two hot cells to be installed on the  
20 larger region on the right.

21           In addition, a new emergency exit to the  
22 surface will be required to meet building code  
23 requirements.

24           The next slide gives the overall strategy  
25 for installation of the isotope production facility.

1 First, the present lockup system needs to be modified to  
2 release EA2 from the lockup and add additional shielding  
3 to protect against beam losses from the 250 MeV Linac.  
4 This requires an amendment to the present CLS Class I  
5 licence.

6 Then, following the standard CSNC licensing  
7 process and criteria for Class II facilities, we will  
8 construct the isotope production facility with CLS holding  
9 a separate Class II licence for this facility.

10 The EA2 will be split into two areas, one  
11 forming a bunker containing the 35 MeV isotope Linac and  
12 the other area renovated to become a containment level  
13 nuclear substance laboratory.

14 The isotope facility will meet the Class II  
15 requirements for a research and development facility.

16 I'll now hand the presentation back to  
17 Josef.

18 Thank you.

19 **MR. HORMES:** Thank you very much, Mark.

20 We come to our summary conclusion. We  
21 believe that our application in support of the amendment  
22 of our Class IB operating licence is complete and has  
23 addressed all comments and questions raised by the  
24 Canadian Nuclear Safety Commission staff.

25 We would like a revision of the Quality

1 Manual for the Class 1B nuclear facility. That's  
2 administrative in nature. And we would like the  
3 modification of the 250 MeV Linac ACIS and release of the  
4 AE2 area for use by the medical isotope project that has  
5 been assessed for radiological hazards.

6 The CLS safety report has been revised and  
7 accepted by the CNSC staff.

8 Last but not least, some concluding remarks  
9 about our interaction with Canadian Nuclear Safety  
10 Commission staff.

11 I think that the collaboration with CNSC  
12 staff is intense and constructive, and it is guided -- and  
13 that's the most important point -- by openness and trust,  
14 and I'm very grateful for that.

15 However, I mentioned already a year ago or  
16 so in my mid-term presentation to the Commission there's  
17 always room for improvement. And I still see a little bit  
18 of danger that we might be, I call it, over-regulated.

19 I think the focus of CNSC should be safety-  
20 related issues. I'm well aware of the problems because we  
21 are regulated by the same rules and regulations than  
22 nuclear power plants. And it's sometimes not obvious to  
23 see what the impact on safety is by some of the  
24 regulations that are required.

25 My typical example is that connection

1           between security and safety. It's a little bit difficult  
2           in our case because we have hardly any radioactive  
3           material, and when the facility is switched off, we have  
4           no problem with radiation.

5                           It means the question is what is a security  
6           issue? Stealing my laptop, for example.

7                           But let's not stop with that negative  
8           remark. What is really important is the collaboration,  
9           transparent collaboration between CNSC staff and CLSI, and  
10          I'm convinced that this constructive interaction and the  
11          continued support of CNSC staff was, in the past, perhaps  
12          the most crucial building block for the Canadian Light  
13          Source and it will be a crucial building block also in the  
14          future for the safe operation of the old Light Source and  
15          also the new medical isotope project.

16                           Thank you very much for your attention.

17                           **THE CHAIRMAN:**    Thank you.

18                           Before opening the floor for questioning,  
19          I'd like to hear now from CNSC. Monsieur Régimbald, the  
20          floor is yours.

21

22          **11-H5**

23          **Oral presentation by**

24          **CNSC staff**

25

1                   **M. RÉGIMBALD:** Bonjour, monsieur le  
2                   président, membres de la Commission. Mon nom est André  
3                   Régimbald. Je suis le directeur général de la Direction  
4                   de la réglementation des substances nucléaires.

5                   Je suis en compagnie de madame Kavita  
6                   Murthy, qui est la directrice de la Division des  
7                   installations de catégorie II et des accélérateurs, et de  
8                   madame Jacinthe Plante, agent principal de projet dans la  
9                   même division.

10                  Also with us today are Ms. Kuen Sia and Mr.  
11                  Lawrence Colligan who are both management system  
12                  specialists, and Dr. Felicity Harrison from the human and  
13                  organizational factor. She's a -- I'm sorry -- she's a  
14                  human and organizational factors specialist who are from  
15                  the Directorate of Safety Management.

16                  Also, Mr. Michael Beaudet, Director of the  
17                  Nuclear Security Division, Mr. Raphael Duguay, conseiller  
18                  en sécurité également de la Division de la sécurité  
19                  nucléaire.

20                  Je cède maintenant la parole à Madame  
21                  Murthy qui va commencer la présentation.

22                  **MS. MURTHY:** Good afternoon, Mr. Chair,  
23                  members of the Commission. For the record, my name is  
24                  Kavita Murthy. Dr. Jacinthe Plante will walk you through  
25                  the details of the request today. In the interests of

1 time, we have omitted a lot of the information that has  
2 already been presented by the licensee.

3 This presentation consists of three  
4 different parts. We'll begin with the short introduction  
5 of the licensee. Next, we will provide you with  
6 information about the medical isotope projects and  
7 finally, we will discuss the two licence amendment  
8 requests that are in front of you today.

9 For the record, CLS stands for Canadian  
10 Light Source, the Class 1B nuclear facility. CLSI stands  
11 for Canadian Light Source Incorporated, the operator of  
12 the facility.

13 In our spoken presentation, CNSC staff will  
14 use the acronym CLS to refer to both the facility and the  
15 operator.

16 CNSC staff have assessed the CLS  
17 application and concluded that the application meets CNSC  
18 expectations; therefore, CNSC staff will provide a  
19 positive recommendation of the two amendment requests to  
20 the Commission today.

21 Dr. Plante will now continue with the  
22 presentation.

23 **DR. PLANTE:** Bonjour, monsieur le  
24 président, membres de la Commission. Let me introduce you  
25 to the CLS facility.

1 CLS is a particle accelerator which  
2 accelerates electron close to the speed of light to  
3 produce synchrotron radiation. The facility comprises a  
4 linear accelerator represented by number 1 on the top of  
5 the figure.

6 This accelerator brings the electrons to an  
7 energy of 250 mega electron volts. When the electrons  
8 reach that energy, they are transferring to the booster  
9 accelerator, represented by number 2.

10 The electrons are then accelerated to 2.9  
11 giga electron volts. At this point, they are transferred  
12 into the storage ring, represented by number 3.

13 Electrons circulating in the ring emit  
14 synchrotron radiation tangentially to the storage ring.  
15 Synchrotron radiation is directed into beamlines which are  
16 used to conduct experiments. Number 4 on the figure is an  
17 example of a beamline.

18 CLS is a Class 1 particle accelerator since  
19 the electron beam energy is above 50 meV. It's received  
20 its first CNSC licence in 2000 for construction followed  
21 by a CNSC operating licence in 2004. The licence was  
22 renewed in 2006 and will be expiring in May 2012.

23 The current licence has been amended three  
24 times by the Commission in 2008, 2009 and 2010.

25 This picture is a top view of the

1 experiential hall which contains the storage ring and the  
2 booster ring. The hall dimensions are equivalent to two  
3 football fields.

4 During operation, the greatest radiation  
5 hazard at CLS is prompt radiation. It is called prompt  
6 radiation because it's only present when the beam is on.  
7 In other words, when the accelerator is turned off, the  
8 radiation is also turned off. Protection from prompt  
9 radiation is achieved with thick shielding and safety  
10 interlocks. In the event of a natural disaster such as an  
11 earthquake, the accelerator will shut off.

12 Following the earthquake in Japan in March,  
13 upon CNSC request, CLS reviewed its safety case and  
14 concluded that it still valid and new additional measures  
15 are required.

16 CNSC staff are satisfied with CLS'  
17 conclusion. CNSC staff are also satisfied that  
18 radiological hazards at CLS are adequately controlled.

19 The principal radiological hazards at  
20 shutdown are some activated component inside the  
21 shielding. The radiation are variable levels and short-  
22 lived. Local shielding as shown in the picture by the red  
23 arrow is sufficient to adequately protect against these  
24 hazards. There is no need to cool down or contain the  
25 activated components.



1 under this program. The funding will end in March 2012.  
2 This past February, CNSC and CLS signed an administrative  
3 regulatory protocol. This protocol establishes milestones  
4 and service standards for licensing activity related to  
5 the medical isotope project.

6 Technetium 99 is the radio isotope daughter  
7 of Molybdenum 99. CLS proposes to produce Molybdenum 99  
8 by irradiating a 95 per cent enriched Molybdenum 100  
9 target with a gamma beam generated using a 35 mEv electron  
10 accelerator. The Molybdenum 99 decays into Technetium 99  
11 with a half-life of 2.75 days.

12 CLS proposes to install the medical isotope  
13 project within existing Class 1B facility in the area  
14 known as Experimental Area 2 or EA2. This area is  
15 adjacent to the existing 250 MeV linear accelerator which  
16 is represented by the yellow section on the left of the  
17 slide.

18 In the blue area to the right of the slide,  
19 the hot cells to process the medical isotope will be  
20 built. The hot cells will also be in EA2.

21 The entire project is defined as a Class 2  
22 nuclear facility. It includes a 35 mEv accelerator which  
23 is defined as a Class 2 prescribed equipment. Further,  
24 less than one peta Becquerel of Molybdenum 99 will be  
25 processed annually at this facility. CMD-08M10 authorizes

1 designated officers to issue Class 2 nuclear facility  
2 licences.

3 CLS will apply for a Class 2 nuclear  
4 facility licence for the medical isotope project.

5 The picture at the top of this slide shows  
6 an example of a Class 2 nuclear facility. A cyclotron  
7 used to produce Positron Emission Tomography or PET  
8 isotopes. Similarly, cyclotrons are also used to produce  
9 Technetium 99.

10 The Accelerators in Class 2 Facility  
11 Division regulates around 300 Class 2 nuclear facilities.  
12 All Class 2 licences are issued by designated officers.

13 In conclusion, CLS medical isotope project  
14 is similar to facility already regulated by CNSC under  
15 designated officer authority. Understanding that this  
16 area is of high interest to the Commission and the public,  
17 we have presented this project for your information only.

18 This concludes the first part of the  
19 presentation.

20 We will now move on the first of two  
21 amendment requests. This request is to revise the safety  
22 report listed on the licence to allow occupancy in the  
23 Experimental Area 2 or EA2, during the operation of the  
24 250 MeV linear accelerator.

25 The Experimental Area 2 or EA2, on the

1 right of the slide where the medical isotope project will  
2 be installed is adjacent to the 250 MeV linear  
3 accelerator. At present, area EA2 is an exclusion area  
4 during operation of the 250 MeV accelerator. In other  
5 words, no one is allowed in the area when the accelerator  
6 is operating.

7 In order to allow access to area EA2 two  
8 major modification to the area are proposed. I will  
9 discuss a proposed modification in the next slides.

10 The first modification is to add shielding  
11 to reduce doses to an acceptable level in area EA2. CLS  
12 submitted details of the shielding and dose estimate to  
13 work in this area.

14 CNSC staff have performed independent  
15 analytical shielding calculation to verify if doses are  
16 acceptable during operation of the 250 MeV linear  
17 accelerator.

18 In our calculation we use two occasions,  
19 which are the source of the greatest radiation hazards  
20 shown by the green and orange circle on the figure. CNSC  
21 staff have evaluated the following two scenarios: first,  
22 the worst case scenario where all the electrons beam is  
23 lost at one single point.

24 And second, for normal operation where  
25 there will be some losses of electron. For normal

1 operation we have used five percent of beam power loss.  
2 There is note of CNSC staff calculation are presented in  
3 this slide. For the worst case a complete loss of  
4 electrons beam, the dose rate in area EA2 would be 15  
5 microsievert per hour. It should be noted that this type  
6 of event is rare and lasts only a few minutes. If CLS  
7 staff were exposed in such an event the dose received  
8 would be negligible.

9 For normal losses during operation the dose  
10 rate in EA2 was .75 microsievert per hour. This would  
11 present 1.5 millisievert per year for a full occupancy of  
12 2,000 hours per year, which is much higher than the  
13 expected occupancy of this area.

14 In reality the occupancy of the area would  
15 be less than four months during construction and will  
16 result a dose -- in a dose less than .5 millisievert.

17 In conclusion, the proposed additional  
18 shielding would reduce the dose to CLS staff to an  
19 acceptable level.

20 The second modification to area EA2 is a  
21 change to the access control system. At present there are  
22 three entrances to area EA2 indicated by P1, P2 and P3.  
23 Of these only two will remain functional. P1 will be  
24 completely blocked with concrete. P2 will be controlled  
25 by the access control interlock system. Entrance P3 will

1 remain the only safe access to area EA2 during operation  
2 of the 250 MeV accelerator.

3 Effectively with the additional shielding  
4 in place area EA2 will no longer be an exclusion area and  
5 can be safely removed from the lockup zone. CNSC staff  
6 have reviewed the lockup process in the lockup zone and  
7 the proposed changes are acceptable.

8 The second amendment request is the  
9 revision of the quality assurance manual listed on the  
10 current operating license. CLS revised its quality  
11 assurance, or QA manual listed in its license. The  
12 proposed revision corrects deficiencies identified during  
13 a CNSC audit in 2008, and following an investigation of an  
14 event in 2009.

15 CNSC staff identifies some deficiencies in  
16 QA processes and in the implementation of the program. Of  
17 the item listed on this slide Configuration Management  
18 Control and Independent Verification processes were  
19 identified as weaknesses contributing to the event in  
20 2009.

21 Please note that this is the same event  
22 that was referred to in CLS presentation as potential  
23 radiation exposure to CLS nuclear energy workers. CNSC  
24 referred to it as the Dipole Incident for reason which  
25 will be obvious as briefly outlined in the next slides.

1 In October 2009 CLS reported that due to a polarity error  
2 on the dipole magnet a 250 MeV electron beam was  
3 misdirected towards the shielding wall. In the figure the  
4 orange circle represent the dipole. The green arrow  
5 represent the normal direction of the beam and the red  
6 arrow represents the direction of the misdirected beam.  
7 At the time of the incident on the other side of the wall  
8 three CLS workesr were present. Following this incident  
9 the radiation badges for the workers were red. No dose  
10 was received by any of the worker present in the area  
11 during the event.

12 Following a review of the investigation  
13 report submitted by CLS and after an inspection that  
14 followed, CNSC staff identified several deficiencies that  
15 contributed to the event. CNSC required CLS to implement  
16 a number of corrective action, which are as follows:  
17 Revision of the QA manual, improvement of visible and  
18 audible alarm. The picture on the slide show the improved  
19 radiation alarm installed at CLS facility this year. The  
20 radiation alarm now include a set of three lights and a  
21 loud speaker as seen on the top of the figure.

22 CNSC staff also requested retraining of  
23 staff on how to respond to alarm and to assess if similar  
24 event could occur at any other locations.

25 The diagram in the photograph show the area of the Dipole

1 Incident. CLS safely reproduced the Dipole Incident in  
2 2010. And has installed additional shielding in areas  
3 that show high radiation dose rate. This additional  
4 shielding is shown in yellow in the photograph taken by  
5 CNSC staff during an inspection in April of this year.  
6 CLS did not find any other location that could be affected  
7 with high radiation field.

8 This slide summarizes CNSC staff oversight  
9 of the QA program. Another program in 2008 highlighted  
10 deficiency in the QA program which were corrected in June,  
11 2009. In October, 2009 the Dipole Incident event show  
12 further deficiency in the QA program. Since then CNSC  
13 staff inspection follow up on the implementation of  
14 corrective actions.

15 In March 2011 CLS applied to amend its QA  
16 manual. CNSC staff has reviewed the revised manual and  
17 found it acceptable. Before renewal in 2012 CNSC will  
18 perform a QA audit to verify the implementation of the  
19 program.

20 To summarize the medical isotope project is  
21 presented to the Commission for information only. No  
22 decision is requested. CLS has requested two amendment to  
23 its license. The first amendment is regarding the  
24 revision of the safety report to all our staff to occupy  
25 area EA2. To prepare the area for the medical isotope

1 project.

2 And the second amendment is regarding the  
3 revision of the quality assurance manual. CNSC staff  
4 reviewed CLS application and concluded that the  
5 application meets CNSC expectation and that the licensee  
6 is qualified to carry on the activity and will make  
7 adequate provision toward the protection of the  
8 environment, the health and safety of person.

9 For this application CNSC staff recommend  
10 that the Commission amend the license by updating Appendix  
11 A to include the latest revision of CLS safety report and  
12 that the Commission amend the license by updating Appendix  
13 B to include the latest revision of CLS quality assurance  
14 manual.

15 Thank you for your attention. CNSC staff  
16 is available for questions.

17 **THE CHAIRMAN:** Thank you. So let's jump  
18 into the question period and we'll start with Mr.  
19 Tolgyesi.

20 **MEMBER TOLGYESI:** Merci, Mr. Président.  
21 Could you precise this Dipole Incident event which  
22 happened, which is in your slide 22, the one you compared  
23 to your slide 3. What happened? Where's the location?

24 It's to staff.

25 **DR. PLANTE:** The incident, this is compared

1 to slide number 3 if I can.

2 **MEMBER TOLGYESI:** You have a full circle  
3 there from linear accelerator to booster and storage ring  
4 and beam lines.

5 **DR. PLANTE:** It's in between of the  
6 entrance of the linear accelerator to the booster and I  
7 can put it on the slide if you bring me to the slide.  
8 That will have happened here. Can you see that arrow?  
9 It's right here.

10 **MR. REGIMBALD:** It is right, Andre  
11 Regimbald for the record, it's right at the entrance from  
12 where the linear accelerator injects electrons into the  
13 booster as shown in the little -- can you point Jacinthe  
14 again the arrow? Can you see that Mr. Tolgyesi?

15 **MEMBER TOLGYESI:** Yes.

16 **THE CHAIRMAN:** So what's the doomsday  
17 scenario here if somebody was right in the middle -- I  
18 mean nobody got any dosage, et cetera, but what could have  
19 happened if somebody was in the line of sight?

20 **MR. HORMES:** Josef Hormes for the record.  
21 There is shielding and that shielding was  
22 also tested during the commission of the whole system  
23 there.

24 It means we are not sure if the workers  
25 were not in the line of sight of the electron beam, but

1 the shielding was obviously sufficient because there was  
2 no reading on the dosimeters in this case.

3 There is shielding of course what you have  
4 seen in the drawings. There was accidental shielding  
5 because there is a huge magnet sitting in between but  
6 there's also a wall that's an intentional shielding that  
7 was actually also calculated during the commission of the  
8 linear to booster transfer system. The reaction of our  
9 people was not what we would expect.

10 Well I'm looking for slide number 7 about  
11 doses, maximum dosage to workers. It's quite obvious that  
12 you are well below the public dose limit of millisievert  
13 for here.

14 But still it's quite increased compared to  
15 previous year's performance as well it was less than .2.  
16 Now you're at about a .5 or .6. This increase is due to  
17 what?

18 **MR. BENMERROUCHE:** Mo Benmerrouche for the  
19 record. The increase in that dose was actually me in  
20 fault in those measurement to produce the dipole event.

21 So I received that dose because I was doing  
22 measurement to produce the dipole event, and that dose is  
23 for myself as an nuclear energy worker, this is just for  
24 myself, .5 millisieverts I received.

25 But in general nuclear energy worker and

1 users and staff do not exceed levels about .2  
2 millisieverts. So that's why just for that specific time  
3 when we did radiation measurement to produce a dipole  
4 event.

5 **MR. HORMES:** Josef Hormes for the record.

6 That slide might be misleading. It's one  
7 exposure, it's not averaging over 1,000 users. And that  
8 one person received .5, is Dr. Benmerrouche in this case.

9 That is the highest dose that was recorded  
10 for anyone working at the CLS. And that means the highest  
11 dose in 2009 was, .01 and the highest dose recorded in  
12 2010 was .5 because it was Dr. Benmerrouche repeating the  
13 dipole wiring event and doing a lot of measurements to  
14 verify that the shielding and everything was adequate.

15 **MEMBER TOLGYESI:** So he was testing on  
16 himself. You have any consequences, no?

17 **DR. BENMERROUCHE:** Still alive.

18 **MEMBER TOLGYESI:** And then I have one last  
19 question, it's a little bit more technical. When you go  
20 to the slide 11 of staff. What I understand that -- slide  
21 11. That the photon beam produced by 25 MeV linear  
22 accelerator will hit the (inaudible) located in a target  
23 area I suppose. And there will be some hot cells which  
24 will be used to dissolve the moly targets to produce moly  
25 99 and eventually Tc-99 moly.

1                   Now this moly targets, moly target is  
2 consist of what, it's a solid, it's a liquid, it's a  
3 vapor, it's what?

4                   **DR. DEJONG:** For the record Mark de Jong,  
5 Canadian Light Source. The targets are planned to be  
6 molybdenum metal discs 1 millimeter thick, 15 millimeters  
7 in diameter and there'll be a stack of them and the photon  
8 beam will be passing through them.

9                   And then the processing afterwards will be  
10 just processing the small discs that are essentially about  
11 the size of a quarter.

12                  **MEMBER TOLGYESI:** Okay. Now this moly  
13 targets will be processed in hot cells?

14                  **DR. DEJONG:** Correct.

15                  **MEMBER TOLGYESI:** Okay. So how will you  
16 move them because it's a shielding all around, how will  
17 you move these targets from where they are, where they are  
18 produced to the cells and ensure that, you know, what's  
19 the safety?

20                  **DR. DEJONG:** The details we're still  
21 working on. To make things nice and simple we are  
22 basically going to look at dropping those discs into a lead  
23 pig and basically then carry them around and put them into  
24 the hot cells and carry on doing the processing in the hot  
25 cells.

1                   **MEMBER TOLGYESI:** Okay. So they will be in  
2 a led pig.

3                   **DR. DEJONG:** Yeah.

4                   **MEMBER TOLGYESI:** It's no danger, no  
5 exposure for those who will manipulate them?

6                   **DR. DEJONG:** That's correct.

7                   **MEMBER TOLGYESI:** That's it Mr. President,  
8 merci.

9                   **THE CHAIRMAN:** Thank you. Who's next?  
10 Dr. McDill.

11                   **MEMBER MCDILL:** Thank you. First question  
12 to staff, is the oversight appropriate and suitable and  
13 matching to all other facilities, Class 1B facilities of  
14 this type? I mean, is this facility over-regulated  
15 compared to other facilities of the same type?

16                   **MS. MURTHY:** Kavita Murthy for the record.  
17 To the extent that the hazards posed by this facility are  
18 comparable to other Class 2 nuclear facilities, we believe  
19 that CLS can be effectively regulated as a Class 2 nuclear  
20 facility.

21                   However given that the definitions that are  
22 in our regulations place them in the Class 1 realm if they  
23 are, they have to follow the process associated with that.

24                   **MEMBER MCDILL:** And what is the most I  
25 guess onerous aspect of that for them? They can tell me

1 themselves, but from staff's perspective.

2 **MR. REGIMBALD:** Well Andre Regimbald here.  
3 The process for licensing is a bit more administrative,  
4 that there are more administrative processes. For example  
5 in coming to the Commission, compared to being the  
6 designated officer who would consider an application or a  
7 licensing decision.

8 However I would like to point out it's very  
9 important that the rigor in the technical assessment is  
10 the same whether the license is issued by an officer or  
11 whether it's presented to the Commission for a decision.

12 **MEMBER MCDILL:** Is there a fiscal burden  
13 associated? Fiscal or financial burden associated with  
14 this?

15 **MS. MURTHY:** CLS is exempt as a research  
16 facility at the present time, so short answer's no.

17 **THE CHAIRMAN:** But I know that university  
18 Professor (inaudible) is not being charged there but he's  
19 presumably some cost associated with this, right? To  
20 them.

21 **MR. REGIMBALD:** Yes, absolutely. The  
22 licensee has to come to the meeting here in Ottawa, but  
23 they are exempt from the CNSC Cost Recovery Regulations.

24 **THE CHAIRMAN:** Just to follow-up, so these  
25 are our regulations, right? So if you believe that they

1 are misclassified by our regulation. What does it take to  
2 change it?

3 **MR. REGIMBALD:** Well, I suppose that CLS  
4 could present a request for us to consider an exemption by  
5 the Commission under the Act, on the regulations from the  
6 Class I regulations and have them classified as a Class II  
7 nuclear facility. And in the long-run we would introduce  
8 proposed changes to the Class I regulations to remove the  
9 designation and put that in the Class II nuclear facility  
10 regulations.

11 **THE CHAIRMAN:** Mr. Jammal.

12 **MR. JAMMAL:** Thank you, Mr. President. For  
13 the record, Ramzi Jammal. There are a couple things, to  
14 Dr. McDill's very valid question.

15 When we were amending the Class II  
16 regulations way back then I want to go on the record and  
17 state, we told CLS, actually, we asked them and we were  
18 amending the regulation for them to fit into the Class II  
19 regulation. At the time CLS did not want to be in a Class  
20 II and they wanted to -- wished to remain as a Class I,  
21 that's one aspect.

22 The other aspect the President asked  
23 question is what does it take to make the change to  
24 regulations. Of course through the process and we will be  
25 working on different classes with respect to the Class I

1 regulation and the (inaudible). But we are, since we are  
2 before the Commission then the approval process with  
3 respect to this Class I facility, and all LSU colleagues  
4 can correct me if I'm offline here, that the delegation of  
5 authority can be granted to the DO, designated officer, so  
6 that the approval process can be done at the DO level and  
7 reported back to the Commission on the approval process.

8 But in conclusion when we amended the Class  
9 II regulations the intent was to include CLS, add CLS on  
10 their own motion, which we have documented exchanges with  
11 them; they wanted to stay as a Class I facility.

12 **THE CHAIRMAN:** CLS, why?

13 **MR. HORMES:** Yes, Josef Hormes. It was  
14 long before I came to Canada. It is for me history. And  
15 there were good reasons at that time to consider at least  
16 staying in Class I and (inaudible).

17 **DR. DEJONG:** I guess I have to claim  
18 responsibility for that decision.

19 The reason for the decision came when we  
20 had actually finally got our operating license as a Class  
21 I facility. And then there was the request to come as a  
22 Class II, but the classification as Class II was as an  
23 electron synchrotron solely for the purpose of generating  
24 synchrotron radiation.

25 So that a variety of other experiments, say

1 if we wanted to do an experiment even with the 250 MeV  
2 (inaudible) into a fixed target would be require us to be  
3 Class I again.

4 Also there were a variety of fairly  
5 detailed specifications on the character of the safety and  
6 lockup systems that were very prescriptive in the Class  
7 II. We had ones that we felt were completely equivalent  
8 and acceptable to the Commission, but they did not in  
9 detail comply with the Class II requirements and we would  
10 have to go back and reengineer it to meet the Class II  
11 requirements.

12 We felt with those changes that had no  
13 value and the possible future limitations on some  
14 potential experiments that may come in the future on a  
15 research facility given that we were already a Class I  
16 facility we chose to remain one.

17 **THE CHAIRMAN:** Well, we heard that there's  
18 flexibility here. I think there's room to negotiate in  
19 the future if so you wish. Dr. McDill.

20 **DR. MCDILL:** I have a couple more  
21 questions, but why didn't you do this by teleconference  
22 for example? Why did all of you come?

23 **MR. HORMES:** Josef Hormes. We like the  
24 direct interaction and coming to a real city.

25 **DR. MCDILL:** Fair enough. We like to see

1       you too.

2                   My next question is with respect to the --  
3       trying to recreate the incident. Did you present the  
4       experiment you wanted to run to staff, or were you  
5       required to before you deliberately exposed yourself even  
6       as a new (phonetic)?

7                   **MR. BENMERROUCHE:** Mo Benmerrouche for the  
8       record. We did discuss the test that we wanted to do to  
9       reproduce the dipole event with a CNSC project officer.  
10      And the reason we wanted to do, redo or try to understand  
11      what happened because most people thought that the event  
12      was due to the reverse polarity of the dipole downstream.  
13      I think if we can put

14                   **UNIDENTIFIED SPEAKER:** Slide 23.

15                   **MR. BENMERROUCHE:** Slide 20 --

16                   **UNIDENTIFIED SPEAKER:** Or slide 3.

17                   **DR. MCDILL:** You can put slide 24 on CNSC  
18      staff.

19                   **UNIDENTIFIED SPEAKER:** Slide 23. Try slide  
20      22 I think, right? You want this one?

21                   **MR. BENMERROUCHE:** So the one before that.

22                   **UNIDENTIFIED SPEAKER:** Yeah. It's slide  
23      22.

24                   **MR. BENMERROUCHE:** Yeah. The -- when we  
25      had that event -- yeah. So you can see from the diagram

1       there are two dipole.  There's the B1300.02 and the  
2       B1300.03.  When we had the event most people thought that  
3       it was due to the reverse polarity in the dipole B1300.03.

4               When you look at that configuration we did  
5       think that could have led to the high dose.  The reason  
6       for that is if the beam is directed like in that red arrow  
7       it's well-shielded in the beam direction by that -- see,  
8       there's the booster dipole DP, it's a lot of steel there  
9       in the direction of the beam.  And we did think that was  
10      the issue with the elevated radiation level that we  
11      measured.  That's one point.

12              When we had the event we had the radiation  
13      alarm.  We had the area radiation monitors, just between  
14      wall two and wall one, just in that crack there.  And the  
15      levels measured by the radiation monitors were a little  
16      over 15 microSv per hour.  And given the shield that is in  
17      place we thought that it cannot be possible, but it is due  
18      to the reverse polarity in that dipole.

19              So we wanted to understand what's going on.  
20      And when we talked to the accelerator physicist and we  
21      tried to understand what was going on at that time.  And  
22      at that time typically for the accelerator physicist they  
23      want to get the beam from B1300.02 to the green arrow on  
24      the other side of B1300.03.

25              And when you do that there's a fair amount

1 of missteering between B1300.02 and B1300.03.

2 **MEMBER McDILL:** Miss --

3 **MR. BENMERROUCHE:** Missteering the beam.

4 **MEMBER McDILL:** Missteering.

5 **MR. BENMERROUCHE:** Yeah. And what happened  
6 is, because that dipole was in the reverse polarity they  
7 could not see the beam beyond B1300.03. So because of  
8 that they tried to missteer the beam so they can see  
9 whether they can have the beam on the other side of  
10 B1300.03.

11 Typically in most situation when you set up  
12 that line the missteering is very small. You don't have  
13 to do a lot of missteering before you can see the beam on  
14 the other side of B1300.03.

15 But because they could not see the beam  
16 because of the reverse polarity because the beam was not  
17 making it into the, you know, its nominal path, so they  
18 had to do some extreme missteering. When I say extreme  
19 we're talking about you know, slightly like 95 percent or  
20 so of the nominal path.

21 So by looking at the whole thing we said we  
22 need to try to reproduce the event by doing that  
23 missteering and see if we can reproduce that event.  
24 That's why we discussed with the CNSC staff about the  
25 whole issue. And then doing that testing we also -- we

1 used the proper precaution to make sure that you know,  
2 there's nobody in that area except nuclear energy workers  
3 and the radiation staff.

4 And what happened is the elevated radiation  
5 level is not actually at beam height. The radiation --  
6 the high radiation level was actually above beam height.

7 **MR. BENMERROUCHE:** The higher radiation  
8 that was actually above beam height. It was a little  
9 over, what, 1.7 meters or so.

10 So we wanted to do that just to have a  
11 better understanding of what's going on with that  
12 situation so we can evaluate the losses and also design  
13 the proper shielding for that area.

14 So that was the main reason, if we didn't  
15 do those radiation measurements, it's going to be really  
16 hard for us to properly design the shielding like we show  
17 in the other slides and reduce the dose rates.

18 And also, I just emphasize that the dose  
19 rates were above beam height. So even if people were  
20 there, the likelihood of them being exposed to those  
21 radiation level is very small because the radiation levels  
22 were above, you know, beam height.

23 Does that answer your question? I know  
24 it's a lot of details.

25 **THE CHAIRMAN:** Okay, forgive me, but I

1 didn't get the punch line.

2 So what happened? So you did the test ---

3 **MR. BENMERROUCHE:** And then ---

4 **THE CHAIRMAN:** --- it's the miss-steering  
5 that's causing this?

6 **MR. BENMERROUCHE:** All right, we've figured  
7 out what happened.

8 **THE CHAIRMAN:** What happened?

9 **MR. BENMERROUCHE:** Miss-steering.

10 **THE CHAIRMAN:** So it's miss-steering and  
11 then it went off?

12 **MR. BENMERROUCHE:** Yes, the miss-steering  
13 was happening between B1300-02 to a B1300-03. Right?

14 **THE CHAIRMAN:** And, therefore, then, where  
15 did the beam go to then?

16 **MR. BENMERROUCHE:** So what happened is,  
17 when you miss-steer the beam, the beam will hit the big  
18 pipe at a very small angle and, when you do that, you  
19 shower, you produce a lot of radiation. Most of the  
20 radiation is well-shielded at beam height because of the  
21 shielding and -- that we have in place.

22 **THE CHAIRMAN:** Okay.

23 **MR. BENMERROUCHE:** But, above, you will see  
24 slightly elevated radiation levels.

25 That also allow us to have a better

1 understanding of what we need for shielding. And to  
2 really come up with the proper design of the shielding,  
3 there is many ways how to do that too and, then, we  
4 discuss that with the engineers and the best solutions  
5 that you come up with is to have a local shielding around  
6 the pipe.

7 So even if you have mistake, even at larger  
8 angles, it will still be captured by the local shielding.

9 **MR. HORMES:** Josef Hormes, for the record.

10 The alternatives would have been to rely on  
11 simulations; and we did that. We also simulated the  
12 event.

13 On the other side, we discussed it with the  
14 Canadian Nuclear Safety Commission staff: simulation is  
15 one side, but the real measurements are the truth.

16 And, therefore, with all those  
17 measurements, it would not have been really possible to  
18 determine also those showers that were above 1.70 metre or  
19 so. It would not be possible. I mean, the  
20 measurements were a crucial element for designing the  
21 proper shielding that will prevent in the future any of  
22 those events.

23 **THE CHAIRMAN:** Dr. McDill?

24 **MEMBER MCDILL:** I have no problem with  
25 running experiments, what I have a problem with is

1 unnecessarily exposing -- even a new -- to this and that's  
2 why I asked -- and I am going to go back to the staff in a  
3 minute -- if this was approved.

4 I don't know, for example, why you didn't  
5 put a whole pile of dosimeters hanging on polymer dummies  
6 from the ceiling to the floor and the entire length of the  
7 wall.

8 So maybe you can ask and, then, staff, I  
9 know, wants to answer something.

10 **MR. BENMERROUCHE:** Mo Benmerrouche, for the  
11 record.

12 I still believe that the exposure was not -  
13 - we still practice a lot to make sure that we minimize  
14 the exposure to the staff, but ---

15 **MEMBER McDILL:** Forgive me, but as low as  
16 reasonably -- is not deliberately exposing yourself,  
17 that's not ---

18 **MR. BENMERROUCHE:** No, but what we've done  
19 is we tried to characterized the losses but, once we  
20 established that, we actually use dosimeters on the wall  
21 to actually record the radiation levels that we indicate  
22 in our reports.

23 So it was just to get an idea of what's  
24 going on. But, once we established that we actually  
25 deploy dosimeters and we expose those dosimeters for

1           whatever period of time to get adequate levels of  
2           radiations -- and that's what we've done actually, we've  
3           exposed shielding on various experiments for the  
4           situations.

5                       **MS. MURTHY:** Just a point of clarification:  
6           The area that Dr. Benmerrouche is talking about is in a  
7           shielded area. It isn't -- he was never in direct line of  
8           the full beam. It is beyond a shielding wall.

9                       Had he been in the beam, he would not be  
10          here today.

11                      Number two, they did perform simulations  
12          before asking him or before undertaking the actual  
13          measurements.

14                      **MEMBER McDILL:** So when we go to Section 5,  
15          page 2 of 6 and you are talking about:

16                               "... upon completion of shielding  
17                               installation, radiation  
18                               measurements will be performed to  
19                               validate the shielding design.  
20                               Additional shielding will be  
21                               added as required ..."

22                      This is going to be more of the same?

23                      **MR. RÉGIMBALD:** I'm sorry, Dr. McDill,  
24          could you please repeat again your reference?

25                      **MEMBER McDILL:** It's a supplementary

1 report, section 5, Safety Report, page 2 of 6.

2 This is to go to the next stage. Are we  
3 going to have more testing of this kind?

4 **MS. MURTHY:** I believe the evaluation is  
5 complete and I believe that no other areas have shown the  
6 start of elevated dose levels; but I will let Dr. Plante  
7 answer.

8 **DR. PLANTE:** Jacinthe Plante, for the  
9 record.

10 We were on an inspection in April 2011. We  
11 have seen shielding in place, we received the result and  
12 the result are confirming a reduce of dose rates behind  
13 the shielding wall.

14 So we are satisfied with the dose and the  
15 shielding in place and there are no other additional areas  
16 where they found high exposure.

17 **MEMBER McDILL:** And the simulations don't  
18 show any other areas as well?

19 **DR. PLANTE:** Correct.

20 **MEMBER McDILL:** And will the simulations be  
21 -- has the simulation software been refined to pick up  
22 this kind of change that wasn't picked up the first time?

23 Maybe CLS should answer that one.

24 **MR. BENMERROUCHE:** Mo Benmerrouche, for the  
25 record.

1                   When we talk about the simulation, it's a  
2 Monte Carlo simulation. It's a code and -- I don't know  
3 if any ---

4                   **MEMBER McDILL:** Yes, "Monte Carlo" says it  
5 all. Thank you.

6                   **MR. BENMERROUCHE:** Okay.

7                   **THE CHAIRMAN:** Monsieur Jammal?

8                   **MR. JAMMAL:** Thank you, Mr. President.

9                   Dr. McDill, you're asking very good  
10 questions and let's not -- I have known Dr. Benmerrouche  
11 for a while, let's not make him the hero that's he's been  
12 exposing himself to radiation.

13                   There is a simulation that takes place  
14 based on Monte Carlo on determining the shielding aspect.  
15 The testing that he has done is a normal testing that we  
16 do during commissioning.

17                   So you do the modeling, you establish the  
18 shielding design ascertains dose and, at times, when you  
19 are evaluating if there is a void in your shield, you're  
20 taking measurements.

21                   You're correct, usually, you start with the  
22 model itself, determine the efficiency of the shielding  
23 and, then, you go into the physical layout itself and you  
24 take other measurements or you put dummies or you put TLDs  
25 on the wall.

1                   So before -- for me not reviewing, but the  
2 practice and the policy of the CNSC would never allow an  
3 individual to expose themselves, let it be voluntarily or  
4 not, without ascertaining the dose and potential worst  
5 case scenario.

6                   And in that case, when we looked into the  
7 CMD, when I was dealing with the CMD, I asked the same  
8 questions. The dose was based -- the potential dose, was  
9 based on Monte Carlo simulation, adequacies of the  
10 shielding and, then, he was allowed to go on to the air to  
11 do the measurements.

12                   **MEMBER MCDILL:** So it was approved ahead of  
13 time, which was my first question.

14                   **MR. JAMMAL:** Correct.

15                   **MEMBER MCDILL:** Thank you. Thanks, Mr.  
16 Chair.

17                   **THE CHAIRMAN:** Thank you.  
18 Monsieur Harvey?

19                   **MEMBER HARVEY:** Merci, monsieur le  
20 president.

21                   Just to follow, what was the reason, the  
22 main reason, to report the incident?

23                   Would the incident have been reported to  
24 CNSC if there hadn't been people there?

25                   **MR. RÉGIMBALD:** André Régimbald, here.

1                   Yes, that's correct, Mr. Harvey, because in  
2 this instance there was no dose incurred by anyone or the  
3 dose was very low.

4                   So because the people were standing behind  
5 that shielded area and no one was inside and they are not  
6 allowed to go inside the area.

7                   But if the dose had exceeded an action  
8 level or a limit specified in the regulation, yes of  
9 course, we would have reported the incident to the  
10 Commission.

11                   **MEMBER HARVEY:** What I mean is the  
12 reporting from the -- not from the Commission but from the  
13 licensee.

14                   I mean, if there hasn't been people there,  
15 could the incident occur and no obligation to report to  
16 the CNSC staff.

17                   **MR. RÉGIMBALD:** No, the incident would have  
18 been required by the regulations to be reported by CLS to  
19 the Commission as per the regulation.

20                   **MEMBER HARVEY:** Okay.

21                   How was it detected? Is this something  
22 that you detect instantly when that occurs?

23                   How long could last such incident? And,  
24 have you ever to your knowledge such incident did occur in  
25 the past?

1                   **DR. DEJONG:** For the record Mark de Jong,  
2                   Director Of Accelerators. I'll give you a little  
3                   background on that one. We had been coming out of an  
4                   outage where we had been commissioning new power supplies  
5                   for those magnets which was the end of not being  
6                   commissioned and the error on the wiring occurred when  
7                   retrofitting went back to the old power supply.

8                   At the time we were trying to set up the  
9                   beam going all the way through. So I think if we go to  
10                  that diagram shown on slide 24, the normal set up  
11                  procedure is to run the beam straight through along the  
12                  bottom, there's a screen there to monitor it, and then the  
13                  operator switches it into the bend to take a look.

14                 The next position there you can see the  
15                 beam would be after the second dipole which happened to be  
16                 reversed. The operator was just trying to understand why  
17                 he could see beam at the first position and couldn't see  
18                 beam at the second position and steered it back and forth  
19                 trying to see whether it was just some misadjustment on  
20                 the first dipole.

21                 When he was doing that the first time on  
22                 the larger slide I guess it's 22. You see where it says  
23                 RF, that's a radio frequency cavity there. The RF system  
24                 was required for the booster to operator, but RF system  
25                 tripped off.

1           The control for that RF system is just on  
2 the other side of the shielding wall so two of the people  
3 went over there to restart the RF system.

4           They no sooner got it restarted while the  
5 first operator was going and it tripped off a second time.

6           We've inferred afterwards that it was when  
7 he was steering the beam back and forth at some time the  
8 beam briefly went through that RF system, caused an arc in  
9 it and that's why it tripped off.

10          It's also why some of the other technicians  
11 who were just on the other side of the wall, while they  
12 were there they saw the radiation monitor going off  
13 indicating over 50 microsieveverts per hour.

14          And they got out -- first they called the  
15 operator and said turn it off, the beam, and then got out  
16 there and reported it to the HSC saying that radiation  
17 monitor had gone off.

18          So that was the scenario through the -- by  
19 the time the second incident the operator had already  
20 concluded there was something wrong with those magnets  
21 down there and immediately went down to investigate and  
22 found that the dipole polarity was reversed.

23          So the inference of the group at the time  
24 was that they got the radiation through the wall because  
25 of the reverse dipole. It was the subsequent reproduction

1 of the event we realized that just by steering you could  
2 actually see that if the beam is not bent by the full  
3 amount but a little bit less you have a direct path going  
4 right into that wall causing a much larger shower. And  
5 that shower was going above the existing shielding that  
6 was in there.

7 So I think it highlighted for us, you know,  
8 several little problems on the operation. One is, in  
9 general the operators had known that there was a shielding  
10 against the inside of that concrete wall had assumed that  
11 it was sufficient so they didn't worry too much about any  
12 missteering of the beam when they were working there.  
13 So I highlighted that those assumptions were not correct  
14 and so I think that's where we had the whole investigation  
15 and said, okay we need more shielding around there and  
16 started responding to it.

17 But I think it was -- it created enough  
18 concern that we reported to Health and Safety, we left it  
19 up to Health and Safety to decide whether that was a  
20 reportable incident.

21 **MEMBER HARVEY:** Merci.

22 **THE CHAIRMAN:** Merci. Thank you. Mr.  
23 Barriault?

24 **MEMBER BARRIAULT:** Merci, Monsieur le  
25 Président. I guess just a few business case questions

1 if you want to on medical isotopes. Have you crunched out  
2 the figures whether you'll be cost effective of producing  
3 radioisotopes for medical purposes compared to the NRU  
4 costs?

5 **DR. DEJONG:** I guess I have two parts to my  
6 response. One is to try to determine what NRU costs are.  
7 That's the byproduct of the reactor.

8 In our analysis we'd be -- based on the  
9 measurements that we've actually done at the NRC on terms  
10 of the yield, the 40 kilowatt machine that we're building  
11 would provide approximately 100 curies per week which  
12 would be enough for Province of Manitoba, Saskatchewan and  
13 still have probably about 30, 40 curies left over.  
14 That two 100 kilowatt electron accelerators with this  
15 capability would have sufficient capabilities of supplying  
16 molybdenum 99 for the country.

17 When we try to go through all of the costs  
18 we believe you would actually make money at \$400 per curie  
19 for the moly 99.

20 Now whether it really makes sense as a  
21 private business it's still to be determined, but we  
22 certainly believe it could be quite competitive.

23 **MEMBER BARRIAULT:** So you'll be able to  
24 supply, you assume you'll be able to supply Saskatchewan,  
25 Manitoba I would imagine the east side Alberta, also?

1                   **DR. DEJONG:** That's potential. For now  
2 we're talking about just, you know, this is a  
3 demonstration to see that we can get the yield. There  
4 will be certainly much more certification and regulatory  
5 approvals required from both the CNSC as well as Health  
6 Canada before we went on any sort of production.

7                   **MEMBER BARRIAULT:** Thank you. Thank you,  
8 Mr. Chairman.

9                   **THE CHAIRMAN:** I like to follow-up on this.  
10 So what is it that you actually have to deliver by 2012?  
11 You know, and are you going to be ready? 2012 is around  
12 the corner, are you going to do all this between now and  
13 then?

14                   And is the chemistry and the hot cells and  
15 everything, you know, you don't have to do all this, it's  
16 not new discovery. You know the chemistry, you know the  
17 protocol, you know all the thing that needs to be done to  
18 actually produce this and you got to supply for molybdenum  
19 100, all of the above.

20                   **DR. DEJONG:** We certainly got a very  
21 challenging timeline for trying to achieve something  
22 because all of the expenditures for this project must be  
23 completed by March 2012.

24                   So it's a race to get things committed and  
25 spent and that results in scoping sometimes a little

1 elastic.

2 We are most intently focused on being able  
3 to demonstrate that we can at least run 20 kilowatts into  
4 the target and demonstrate the yield of something like  
5 about 20 curies per day.

6 If we can demonstrate 20 curies per day and  
7 some molybdenum metal, I think that'd be a lot more  
8 interest and we'll look for funding to carry on during the  
9 processing afterwards.

10 We're going to take a look at trying to put  
11 in as much of that processing infrastructure as we can,  
12 feasibly within the project time, but it would be tight.  
13 I think when we compare -- we certainly know that the  
14 Health Sciences Center in Winnipeg has a separation  
15 technique for low specific activity molybdenum 99,  
16 activity from low molybdenum 99.

17 They have the capability of processing  
18 radiated molybdenum metal for extraction of the  
19 technetium. So we're also taking a look at some possible  
20 collaborations with them.

21 I think a lot of the elements are in place,  
22 we'll take a look at what we have time to actually do and  
23 then start taking a look at whatever we need to supplement  
24 afterwards.

25 **THE CHAIRMAN:** I met yesterday at the CNS a

1 very interested party in the proof of concept and  
2 commission, it's your minister, Minister Norris who  
3 suggested that we be nice to you here today.

4 The point is that everybody is looking for  
5 the commercial proof of concept here. Are you keeping  
6 track of the other three experiments?

7 **DR. DEJONG:** We're certainly in,  
8 effectively in close communication with the other three  
9 components. Most closely but the Manitoba proponents that  
10 are also looking at the similar electron process.  
11 I've also worked closely with the TRIUMF people for just a  
12 lot of basic advice on hot cells and a lot of the handling  
13 and some of the issues.

14 The University of Saskatchewan is also  
15 pursuing a PET cyclotron and by that having close  
16 collaboration with the University of Alberta which is one  
17 of the fourth participants.

18 So it's a fairly small community and we're  
19 trying to stay in close collaboration and communication  
20 with everyone.

21 **THE CHAIRMAN:** The bottom line is you guys  
22 are convinced at least by 2016 there will be an  
23 alternative to the NRU?

24 **DR. DEJONG:** Certainly, yes.

25 **THE CHAIRMAN:** Anybody else, Mr. Harvey?

1                   **MEMBER HARVEY:** Small question. In page 4  
2 of your document about the target assembly which has  
3 coating for the targets will become somewhat more direct  
4 over your radiations. But with the careful selection of  
5 materials the assembly should useable for many radiations  
6 but would happen after that?

7                   Careful on selection of material, DSN black  
8 should be usable for many irradiations but what happened  
9 after that? What, this will be irradiated that would be  
10 wasted, nuclear waste after that, I suppose and you will  
11 have to manage that.

12                   **DR. DEJONG:** That's correct, the current  
13 design for the converter target would be for one  
14 millimetre thick, tantalum falls approximately a  
15 centimetre, a couple centimetres in diameter.

16                   We know of similar designs that it was used  
17 in Oakridge for production of neutrons for many years that  
18 was run up to about 40 or 50 kilowatts average power for  
19 years, so we expect that converter target to last a long  
20 time, but it will certainly get active.

21                   The choice of tantalum over tungsten, which  
22 was the alternative, is to try to come up with, reduce the  
23 residual activity as much as possible or have materials  
24 that will decay reasonably fast and try to reduce the  
25 radiation level.

1                   But it's still, you know, a few cubic  
2 centimetres of all material at this time.

3                   **MEMBER HARVEY:** Merci.

4                   **THE CHAIRMAN:** Just one last quick question  
5 to staff. If post-March the government wants to allow  
6 commercial facility to become operational, what licensing,  
7 what further licensing process is required?

8                   **MS. MURTHY:** As a Class 2 nuclear facility,  
9 they would become medical, an isotope production facility.  
10 So they would have an isotope production accelerator; they  
11 would be designed as a Class 2 nuclear facility with the  
12 processing integrated into the Class 2 nuclear facility  
13 licence as long as the activity did not exceed the limit  
14 that would make it a class one processing facility.

15                   So it would be good to handle it as a Class  
16 2 nuclear facility.

17                   **THE CHAIRMAN:** So it would be a separate  
18 unit within the CLS, let's say?

19                   **MS. MURTHY:** Depending on -- yes, it would  
20 be a separately issued licence and separately maintained.

21                   **THE CHAIRMAN:** And they have to come in  
22 with the new application to us? Is that ---

23                   **MS. MURTHY:** Yes, yes.

24                   **THE CHAIRMAN:** To a deal?

25                   **MS. MURTHY:** That's right.

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**THE CHAIRMAN:** Right. Okay.

Well thank you very much. Good luck to  
you.

Okay. We'll reconvene at 4:05.

--- Upon recessing at 3:57 p.m.