Atomic Energy of Canada Limited:  
Environmental Assessment Screening  
For AECL’s proposal to continue  
operation of the Nuclear Research  
Universal (NRU) Reactor beyond its  
Currently scheduled shutdown on  
December 31, 2005  

05-H12.1  
Oral presentation by  
Atomic Energy of Canada Limited  

MR. VAN ADEL: Thank you very much. Good  
morning, Madam Chair, Members of the Commission, and thank  
you for the opportunity to talk to you today about the  
environmental assessment for the operation of the NRU  
beyond 2005.  

For the record, I am Bob Van Adel,  
President and CEO of AECL and I am accompanied here today  
by Dr. David Torgerson on my left, Senior Vice-President,  
Technology and Chief Technology Officer for AECL, and on  
my right, Dr. Paul Fehrenbach, Vice-President of the  
Nuclear Laboratories Business Unit, as well as key members  
of the AECL team have been working on this very important  
project.  

I would like to make a few opening remarks
and then we will ask Dr. Fehrenbach to direct specific
questions on behalf of our team.

In 1996, AECL informed the Atomic Energy
Control Board that the NRU Reactor would not continue
operating beyond 2005. That decision was based on the
assumption that a replacement facility would be operating
by now. That has obviously not happened.

So the NRU continues to be an important
source of medical isotope production and is Canada’s
premier facility for nuclear power research and materials
research. We believe that it is essential to continue
operating NRU to meet these needs until a long-term
solution is developed.

As the world’s largest source of medical
radionuclides, NRU provides more than 34,000 treatments
every day. NRU also produces the majority of the world’s
medical isotopes, including Moly-99 and several longer
lived isotopes such as Cobalt-60, which is used for cancer
therapy. Production of these longer lived isotopes will
continue in the NRU after the dedicated isotope facility
is fully operational.

NRU is the only facility capable of meeting
the R&D needs of Canada’s worldwide CANDU Power Program,
access to world-class domestic research. The reactor
remains essential for the continued sustainability and
growth of AECL as both a Canadian centre of excellence in nuclear R&D and as a commercial vendor of CANDU reactors and reactor services.

NRU is also of significant importance to the Canadian nuclear industry and to the Canadian scientific research community. It is the only source of neutrons for the National Research Council’s Canadian Neutron Beam Centre which hosts independent and collaborative research projects with professors and students from 23 Canadian universities and by scientists from 115 institutions in 19 countries.

NRU is a multipurpose research reactor that continues to deliver enormous benefits to Canadians and people around the world every day.

In contrast, the companies with larger populations where single-purpose reactors are common, NRU is a classic Canadian solution that provides a wide range of capabilities to Canada’s diverse science and technology communities. It is a tribute to the scientists and engineers at that time that the NRU remains a world-class facility nearly 50 years later.

AECL takes pride in operating and maintaining NRU in a safe and an environmentally sound manner.

Since 1996, AECL has invested more than $30
million in physical improvements to the NRU to ensure and improve its safety and to date we have installed seven safety upgrades and five are already in service.

AECL is investing an additional $10 million in the NRU Licence Ability Extension Program and we have completed a comprehensive update of the NRU Safety Report and thoroughly assessed the conditions of the facility to make sure that it is fit to continue to operate, and we have a robust Aging Management Program in which we continuously replace and upgrade equipment as required.

So our proposal is to continue operating NRU in its current configuration until about 2012 and we are in discussions with the Ministry of Natural Resources and the National Research Council about the future of the NRU beyond 2012. Several options are being discussed, including a major refurbishment of the NRU, replacing the NRU with a new multipurpose facility or building several new reactors, each to meet a specific NRU function.

Those discussions will carry on for some time, but we are here today to discuss the Environmental Assessment for Continued Operation of the NRU to about 2012.

While CNSC staff has issued a screening report for the NRU Environmental Assessment, AECL has been continuously monitoring and proactively taking steps to
improve the environmental performance of the NRU and our other facilities at Chalk River.

I am pleased to report that in May of last year we were successful in obtaining ISO 14001 Environmental Management System Certification for the Chalk River Laboratories. This standard calls for a continuous effort to improve environmental performance and we are committed to that effort.

We completed an ecological effects review for the Chalk River site in 2004, which the CNSC staff has accepted, and shared the results with the First Nations citizens groups and other key stakeholders through a series of meetings in January and we have also issued our environmental plan for 2005-06 which identifies the projects we are upgrading to the ISO 14001 standard.

We agree with the conclusion of CNSC staff screening report that continued operation of the NRU will pose minimal risk to the environment.

AECL has worked hard to make information on the environmental assessment and AECL’s request to continue operation of the NRU accessible to our stakeholders. We have provided many opportunities for those stakeholders to make suggestions and voice their concerns including letters and offerings of briefings to federal, provincial, municipal elected officials in
Renfrew and Pontiac Counties, to the Chief and Council of the Algonquin First Nations and to identified citizens groups and through four public information sessions held in our key communities near the facility. All of this information has been posted on our website.

The results of the consultation activities support the CNSC staff’s recommendation that the EA be approved. The Commission has received several letters of support from continued operation of the NRU and we are very appreciative of the support and interest from our community stakeholders.

In conclusion, the continued operation of NRU is vital to Canadians and to thousands of people around the world. We have invested in safety upgrades to the facility and are implementing programs to ensure that NRU continues to operate safely. We intend to demonstrate to the satisfaction of CNSC staff and the Commission that AECL is fully capable of operating NRU safely beyond 2005.

Should the Commission accept the EA, I can confirm that AECL has the resources and the people to operate the facility in a safe and environmentally sound manner.

Thank you. This concludes my remarks.

THE CHAIRPERSON: Thank you very much, Mr. Van Adel.
I would like now to turn to the CNSC staff, as noted in CMDs 05-H12, 05-H12.A, and I would like to turn to Mr. Barclay Howden, the Director General responsible.

Mr. Howden.

05-H12 / 05-H12.A

Oral presentation by

CNSC staff

MR. HOWDEN: Thank you. Good morning, Madam Chair, Members of the Commission. For the record, my name is Barclay Howden. With me today are Mr. Greg Lamarre, Director of the Research Facilities Division, Mr. Claude David, Acting Director and Environmental Assessment Specialist with the Processing Facilities and Technical Support Division, Dr. Patsy Thompson, Director of the Environmental Protection and Audit Division and Mr. Constantine Nache, Project Officer with the Research Facilities Division.

CMD 05-H12 concerns the Environmental Assessment of the continued uninterrupted operation of the National Research Universal, which is NRU, Reactor. Atomic Energy of Canada, AECL, has applied for authorization to continue to operate the NRU Reactor at Chalk River beyond December 31st, 2005.

The authorization of this activity requires
an amendment to AECL’s nuclear research and test establishment operating licence pursuant to section 24 of the Nuclear Safety and Control Act, the NSCA.

In accordance with the requirements of the Canadian Environmental Assessment Act, a screening environmental assessment was conducted resulting in the screening report, which is the subject of today’s presentation.

The presentation will ask for your decision on the recommendations presented in the screening report.

I will now ask Mr. David to present the CMD.

Thank you.

MR. DAVID: Thank you. For the record, my name is Claude David. Good morning Madam President and Members of the Commission.

Today I would like to present to you the screening report for the environmental assessment of AECL’s proposal to continue to operate the NRU Reactor until 2012.

In presenting the screening report I will briefly outline AECL’s proposal. I will also review the environmental assessment process applied to this project, present the project environment interactions identified in the environmental assessment and comment on the need for
implementation of mitigation measures and follow-up considerations and, finally, make recommendations to you with regards to the screening report.

The proposed continued and uninterrupted operation of the NRU is an undertaking in relation to physical work and is defined as a project under paragraph 2(1)(a) of the Canadian Environmental Assessment Act. No changes to the day-to-day operations or to the design of the reactor are being proposed for this project.

The purpose of the proposed life extension of the NRU Reactor until 2012 is to allow AECL to continue its activities in support of nuclear power development, isotope production, fundamental research in neutron physics and other commercial applications.

This slide illustrates some of the steps undertaken by CNSC staff to fulfil the requirements of the Canadian Environmental Assessment Act, all of which are described in more detail in the CMDs.

First I will describe the schedule for this EA. On this topic, I would note that the EA process lasted approximately seven months from the date of determination that an EA was required to today’s hearing. I will also expand on some of the remaining steps listed on this slide in this presentation.

This slide illustrates timelines for the EA
process applied to the NRU project against timelines
applied for typical environmental assessment screenings
conducted by the CNSC.

There are two changes to the EA process
that is typically applied by CNSC staff for the completion
of this assessment. The first change is related to the
preparation of technical studies and of the EA study
report. For the assessment of the NRU the preparation of
studies, including the study report, were not delegated to
AECL pursuant to subsection 17(1) of the CEAA, as is
normally the case for an EA screening completed by the
CNSC.

In the course of regulatory functions CNSC
required the AECL submit a number of reports, including a
site-wide environmental effects review and annual
performance and monitoring reports. These provided
sufficient information for staff to complete an EA
screening report.

The second change to the process is related
to the timing of public consultation on the screening
report. Normally, public consultation is conducted prior
to submission of the screening report to the Commission
Secretariat. For this assessment, public consultation was
conducted after submission of the screening report to the
Secretariat. Stakeholders, including federal expert
departments, were provided with a review period of about four weeks. Dispositioning of the comments received on the screening report are attached to supplementary CMD H12.A and the EA screening report has been revised accordingly as required.

The EA Guidelines approved by a designated officer on March 30th, 2005 identified the scope of the project considered in the assessment. The principal project subject to this assessment is the NRU Reactor. Systems and facilities considered ancillary include the rod bays, experimental facilities, the emergency water supply system, the reactor ventilation system and the main exhaust stack.

Activities associated with day-to-day operation of the NRU Reactor, such as reactor fuelling and de-fuelling and management of waste produced as a result of extending the operating life of the NRU Reactor are also part of the scope of the project.

The scope of assessment includes all factors required for screening EAs under the Canadian Environmental Assessment Act and some of the discretionary factors such as purpose of the project, need for and requirements of a follow-up program and the likely effects of the project on the capacity of renewable resources and non-renewable resources to meet the needs of the present
and those of the future.

Federal departments and interested parties provided input into the development of the EA Guidelines.

As previously mentioned, CNSC staff prepared the EA screening report. This report was attached to CMD 05-H12 and filed with the Commission on April 29th, 2005. The CMD contained a CNSC staff preliminary recommendation that the Commission accept the conclusions of the screening report that the project is not likely to cause significant adverse affects, subject to consideration of any comments received on the EA screening report.

CNSC staff committed to prepare a supplementary CMD. Dispositioning comments received on the report and confirming or modifying CNSC staff’s preliminary recommendation accordingly to the Commission. Federal government departments and the Ontario Ministry of the Environment and other interested parties were invited to comment on the screening report.

The structure of the screening report is intended to serve as a framework for explaining how the assessment factors are systematically considered. The introductory chapters, Chapters 1 to 6, describe the screening process, including the application of the Canadian Environmental Assessment Act and the
determination of scope and scope of project and scope of
assessment.

The project description section of the
report, Chapter 7, identifies the specific works and
activities of the project that have the potential to
interact with the surrounding environment during normal
operations and during malfunctions and accidents. For the
NRU environmental assessment the project description also
identifies mitigation measures that are already in place
to reduce or eliminate potential environmental effects.

Information about the existing environment,
Chapter 8, provides a baseline against which potential
environmental effects of project works and activities can
be assessed. The assessment of effects includes the
identification of potential interactions between the
project and the existing environment, the description of
the resulting changes likely to occur as a result of the
interactions, if any, the technically and economically
feasible mitigation measures that might be applied to each
likely effect, and the determination of the significance
of residual effects remaining after the application of
mitigation measures.

The screening report also provides a
consideration of the effects of this project, together
with those of other projects and activities that have been
or will be carried out and for which the effects are expected to overlap in geographic area and time. This is referred to as the assessment of cumulative effects. It also describes the consultation activities undertaken by the proponent and by CNSC staff. The report includes a preliminary design and implementation plan for follow-up and describes the approach for further developing the follow-up program should the project be approved. And finally, the screening report presents the conclusion reached by CNSC staff and the resulting recommendations.

The NRU Reactor is located on federal lands within the developed area of the Chalk River Laboratories or the CRL site. The CRL site is located in Renfrew County, Ontario on the shore of the Ottawa River, 200 kilometres north-west of Ottawa. Directly across the Ottawa River are the Laurentian Hills in the province of Quebec. Abutting the CRL property to the southeast is the Canadian Forces Base, Petawawa. The village of Chalk River lies to the southwest of the site and the town of Deep River to the northwest.

Baseline conditions are established according to characteristics of the biophysical environment at the site and surrounding areas and the area’s socioeconomic setting. Biophysical characteristics are described in the screening report in terms of
geological features, water quality, hydrology, aquatic environment and terrestrial environment. Socioeconomic characteristics are described in terms of the area’s population and economic base, land use, community infrastructure and cultural and aboriginal interests.

This information provides baseline conditions that form the foundation for the environmental assessment.

At the initial screening all project activities were examined to identify those that could possibly interact with the environment. In all, 86 potential interactions were identified: 84 biophysical interactions and two (2) positive socioeconomic interactions. This information is presented in Chapter 9 of the EA Screening Report.

Each of the 84 interactions was then assessed to determine its potential for a significant measurable effect on the environment. Among the criteria used for this assessment were regulatory standards and guidelines, AECL compliance and monitoring reports submitted to the CNSC, including a site-wide comprehensive ecological risk assessment, and the expertise of CSNC’s specialists.

None of the project environment interactions were determined to result in significant
measurable effects on the environment under normal operating conditions. As a result, no interactions were advanced to a detailed assessment. Therefore, no additional mitigation measures beyond those that have already been implemented are required as a result of this environmental assessment screening. CNSC staff also concluded that no measurable cumulative effects of significance are expected.

The EA Screening Report’s screening also examined the effects of the environment on the project and the effects of accidents and malfunctions, including the effects of nuclear accidents and conventional accidents. CNSC staff concluded that no significant measurable effects are expected from such events.

To conclude, there are no proposed changes to the design or day-to-day operation of the NRU Reactor; only an extension of the operating period. The reactor will continue to be operated in a similar manner. The conclusion that the continued operation of the NRU until 2012 will not cause significant adverse effects on the environment is supported for the most part by observed data. Few assumptions had to be made in the completion of this environmental assessment. This is a mature facility where there is considerable operating experience and an abundance of observed data that was used for the
completion of this environmental assessment.

Public consultation activities were implemented to ensure that the public is provided with the information required to understand the environmental assessment of the project and to provide comment on the findings presented in the screening report. The public consultation activities were shared by CNSC staff and AECL.

From February 7th, 2005 to February 23rd, 2005, CNSC staff sought comments from government departments and the public on the EA Guidelines. Comments were received from several federal departments, the Sierra Club and the concerned citizens of Renfrew County. The final EA Guidelines were distributed to federal departments and other stakeholders, including the Algonquins of Pikwàkanagàn -- excuse my pronunciation -- on April 11th, 2005. These comments were dispositioned in CMD 05-H12 submitted to the Commission on April 29th, 2005.

The public was invited to comment on the screening report through a Notice of Hearing which was issued on April 7th, 2005. CNSC staff contacted by telephone certain interested parties prior to April 29th to ensure their participation in the process. CMD 05-H12, along with a copy of a recent Ecological Risk Assessment
Report carried out for the Chalk River Laboratories’ site, was also provided directly to them.

In addition, comments were invited by way of public notice advertisements which were placed in the Renfrew Weekend News, the Ottawa Citizen, the Pembroke Daily Observer, the Journal de Pontiac, the Pontiac Journal, le journal Le Droit and the Windspeaker. CNSC staff attended three of the four public information sessions hosted by AECL in Deep River, Pembroke and in Chapeau in the province of Quebec. These information sessions were held in the latter part of May 2005.

Comments received on the screening report are dispositioned in Appendix 1 of the supplementary CMD, while copies of letters received from elected officials from the Chalk River area are presented in Appendix 2 of the supplementary CMD. The EA Screening Report has been revised as a result of comments received. The revised version of that report is attached as Appendix 3 of the supplementary CMD.

As the responsible authority for the project, the CNSC has an obligation to ensure that the follow-up program is designed and implemented. The objectives of a follow-up program are to verify if the environmental effects of the project are as predicted and to confirm that mitigation measures already implemented
continue to be effective in reducing, controlling or eliminating potentially adverse environmental effects.

The follow-up program for the NRU life extension project is associated with current operations of the NRU Reactor and includes monitoring of chlorine concentration in the NRU Reactor coolant, verifying the screen size on the Chalk River Laboratories’ water intake pipe for conformance with Fisheries Act guidelines, investigating the source of leaks that could potentially be linked to NRU Reactor operations and the phasing out of ozone depleted substances, the halon gas which is used as a fire suppressant for the NRU.

The mechanism for ensuring that the development and implementation of the follow-up program will be the CNSC licensing and compliance program.

CNSC staff and other federal departments have reviewed the environmental assessment documentation. On the basis of this review, CNSC staff concludes that the proposed continued operation of the NRU Reactor until 2012, taking into account mitigation measures already implemented, is not likely to cause significant adverse environmental effects.

CNSC staff recommends that the Commission accept this conclusion and proceed with a course of action consistent with Paragraph 21(a) of the Canadian
Environmental Assessment Act. That course of action would be consideration by the Commission under the Nuclear Safety and Control Act of the application by Atomic Energy of Canada Limited to continue to operate the NRU Reactor.

This concludes my presentation. Thank you.

MR. HOWDEN: Madam Chair, Members of the Commission, that concludes CNSC’s staff presentation. We are available to respond to questions.

THE CHAIRPERSON: Thank you, Mr. Howden.

We will now open the floor for questions to both AECL and to CNSC staff and we will start with Dr. McDill.

MEMBER McDILL: Thank you. In the first round, my questions are quite specific.

With respect to the halon testing, or the halon, it hasn’t been released in 26 years. Is it certain that it will release if required? Is there any testing going on now?

DR. FEHRENBACH: For the record, it is Paul Fehrenbach speaking. I would like to direct that question to Bill Shorter, if I may, the manager of NRU.

MR. SHORTER: Good morning. For the record, my name is Bill Shorter.

I can confirm the halon system is tested every six months by a firm that comes in and tests it for
MEMBER McDILL: That is great. Thank you.

My next question is with respect to the map
with have run off on page 66 of CMD 05-H12. I can quite
easily see that 4.4 is twice 2.2, but are these cubic
meters per hour, minute? What are the units so that I can
get some kind of feel for this, please, maybe as it is in
staff’s document?

(SHORT PAUSE)

MEMBER McDILL: It is Figure 8.3.

MR. HOWDEN: Barclay Howden speaking.

We will have to double check the units and
we will come back to you in a couple of moments.

THE CHAIRPERSON: It does raise a very good
point, though, that Dr. McDill has made before that it is
important for the diagrams to be as fulsome as possible in
this case. So I think this raises an issue that we will
want to look at in a more systemic basis as well.

Dr. McDill.

MEMBER McDILL: My last question is --

perhaps, Madam Chair, you will step on my toes if
necessary. On page 106 in the area of "Accident
Selection", were significant events over the last number
of years looked at and possibly considered in that
accident selection scenario?
MR. LAMARRE: Greg Lamarre for the record.

The two accident scenarios discussed within the Environmental Assessment Screening Report come from the FSAR, the Final Safety Analysis Report for NRU and are bounding.

So in effect, to answer your question, the recent events that have been reported staff feels are still bounded by these two most credible events that are considered within the FSAR.

MEMBER McDILL: Thank you.

THE CHAIRPERSON: Dr. Barnes.

MEMBER BARNES: Yes, there is a lot of information in this document, and I appreciate all the work that staff has done to pull this together. In the end, I think it can be a little challenging reading this and trying to deduce what is really of no significant hazard or value compared to what are the standards and so on, depending on the areas we are looking at. I am going to focus on just a few issues at least to start off with.

One is the issue of the impingement and entrainment dealing with the issue of the screen size on the inlet for the NRU Reactor which entrains about 9,000 fish per year which appears to exceed normal regulations. That is mirrored in the comments made by Fisheries and Oceans Canada.
Two points: If that is against regulations, I wonder why there has not been action taken previous to this. Second, in that section on page 97, it also refers to the chlorination effects twice a week which is done for the controlled biofouling on the pumps. I wonder if those effects are in addition to the 9,000 fish per year. The conclusion reached by staff is that the effects are measurable, obviously, but once again, those magic words come in but not significant.

I am not sure it is not significant to the 9,000 fish but since this is against another federal regulations agency, I wonder why nothing has been done on this and why staff feels this is not too much of an issue?

MR. HOWDEN: I am going to pass that question to -- Barclay Howden speaking. I am going to pass that to Dr. Patsy Thompson. I would like to respond to Dr. McDill’s question.

The flow is the annual mean flow in million cubic meters per year.

MEMBER McDILL: So ten to six cubic meters per year?

MR. HOWDEN: Yes, that is correct.

I will ask Dr. Thompson to respond to Dr. Barnes.

DR. THOMPSON: Patsy Thompson, for the
In terms of why no action was taken previously, the Nuclear Safety and Control Act came into force in 2000, giving the CNSC a mandate to protect the environment, but the mandate and the context of the Act and Regulations focus on the use and release of hazardous substances and nuclear radioactive substances. Entrainment and impingement are sort of physical habitat issues that are not covered by our Act.

In other situations where environmental assessments have been done, because the CNSC is the responsible authority when impacts are noted, this is usually covered in the follow-up program which then becomes a licensing requirement. So that explains why no action was taken by the CNSC in the past.

In terms of the Department of Fisheries and Oceans, they were notified of the issue by consultation from the CNSC consulting them on the content of the screening report.

In terms of the significance of the impact of killing 9,000 fish per year, I will ask Dr. Glenn Bird to respond to that question.

MR. BIRD: For the record, my name is Glenn Bird.

As stated in the report, the killing of
9,000 fish per year or in a higher estimate of the combined NRU and NRX intake systems, the 14,000 fish per year is a measurable effect locally in that these are -- the perch, trout and rainbow smelt are small forage fish and they are very protective, and that the estimated loss of production in the river, the Ottawa River system, is about 63 hectares of production.

In a small system, that would be most significant but because the Ottawa River is a large system, this is only a small fraction of the production within the system and there is a lot of recruitment coming from upstream and downstream. So we are not seeing a major impact on the population.

**MEMBER BARNES:** Is that your reading of the comments made by DFO? Is it still not in contravention of Fisheries and Oceans Regulations?

I appreciate it may not be a requirement under the Act but in terms of the operation of this facility, it still has to meet other regulations, does it not?

**DR. THOMPSON:** Patsy Thompson for the record.

As noted in the screening report and in comments made by the Department of Fisheries and Oceans, this is in contravention to the *Fisheries Act* and measures
are being taken to address the steps that are being taken.

The DFO and AECL have started discussions on the proper screen size to be implemented. The guideline, the DFO has provided the guideline to AECL. AECL will be undertaking a safety review to make sure that putting in screen sizes that would limit the water intake would not cause nuclear safety issues. So this is being handled.

The process that DFO follows is if for safety reasons the proper screen size cannot be implemented, then DFO has the option of issuing essentially a permit that is an exception from following the *Fisheries Act*. Section 32, I believe states that it is illegal to kill fish by means other than fishing. So if a proper screen size can't be put in place to limit fish kill, then DFO can issue a permit to kill fish by means other than fishing.

So those are the options being pursued by DFO and discussions have been initiated with AECL to resolve this issue.

**MEMBER BARNES:** I think ---

**THE CHAIRPERSON:** Sorry, Dr. Barnes, I think it might be appropriate to ask AECL to comment on this.

**MEMBER BARNES:** Could I ask if officials
from Health Canada, DFO and so on are in the room today or not?

THE CHAIRPERSON: I don't believe there are any DFO officials here at this time but, if you agree, then AECL will comment.

DR. FEHRENBACK: Thank you. It is Paul Fehrenbach for the record.

As Dr. Thompson noted, we are working with the Department of Fisheries and Oceans to address this issue. We have conducted an evaluation, as was noted, about the potential effects of fish impingement and the findings indicate as stated that although they are measurable it is not likely significant in a large body of water such as the Ottawa River.

Nevertheless, we are moving forward with the recommended options to detect which one is most acceptable. We are hopeful that the engineering and safety studies that are underway will identify a method of implementing a screen size sufficient to exclude most of these species from impingement and that that will be able to be implemented without safety impacts on the reactor.

MEMBER BARNES: I would like to turn to the issue of the tritium which has been acknowledged as being one of the principal areas of concern, at least as referred to both in the atmospheric release and also in
the groundwater issues.

Turn to the groundwater issues and there are a number of facets here I would just like to touch on. On page 40, there is a general statement about the -- basically the lower third of the page, the last full paragraph, "In January 2003, et cetera, tritium-contaminated groundwater is found near the Power House" and it goes on to discuss the measures taken to try to determine the source of that leak which, as I understand it, is still not known. And it is not quite clear to me because we have seen figures before of groundwater plumes with increased tritium values and in this document at least there are no sort of amounts to my recollection of the actual plumes.

Could I get an update as to -- is that true that we are still not quite sure where that tritium is coming from and could you give us some indication of the size of that specific plume that we are talking about?

**DR. FEHRENBACK:** Yes, thank you. It is Paul Fehrenbach for the record.

I think at the outset we should mention that we have once detected -- once we detected the presence of this plume we did an additional number of bore holes to try and pinpoint the source and further quantify the amount of activity in the plume, and it is worth
noting that it is a very small fraction of the derived release limits from the property.

It is also worth noting that recently, in the latest set of measurements, the activity levels are dropping significantly which leads us to suspect that the source of the plume may well have been one of the active drain lines that has been repaired and replaced near NRU, as opposed to NRU itself, but we continue to investigate and pinpoint the actual source. It will take continued effort to do that.

I emphasize again it is a relatively small leak that is causing this probably and is going to be difficult to detect with a high degree of certainty.

**MEMBER BARNES:** So your last statement is in contradiction to the last statement on page 40. It says the result, "makes it unlikely that drain system leakage could be the source." So this is an update on that.

**DR. FEHRENBACH:** This is an update on that. This is new information that we have just recently received.

**MEMBER BARNES:** And what would be the kind of the area of that plume? Do you actually have enough groundwater control wells to be able to document the extent of that plume?
DR. FEHRENBACK: For the record, it is Paul Fehrenbach.

I would like to ask Ray Lambert to respond more completely to the question.

MR. LAMBERT: For the record, it is Ray Lambert, Atomic Energy of Canada.

Yes, we have done a number of manhole measurements between NRU and basically down water from -- if I could think of it -- from NRU towards the Ottawa River so we have a fairly good map of the shape of the plume between NRU and the Power House, as Dr. Fehrenbach mentioned. However, when it comes up to NRU, finding the actual point of release will take a little bit of -- somewhat more effort.

In terms of area, you can imagine a plume standing down from NRU towards the Power House. Unfortunately, I can't describe a shape very well verbally but we do have it well mapped.

MEMBER BARNES: I was surprised that there were no such maps in this document since that is one of the -- it seems to me -- significant releases. The information given on page 109-110 indicates that all the groundwater values are above the Ontario Drinking Water Quality Standards and correct and therefore that is sort of the point source. Enhanced contamination is flowing
towards the Ottawa River. The conclusions once again are that there are no real measurable effects or no real environmental concerns and that is one that someone might wish to imagine might be a concern; yet, we don't, it seems to me, really have the pertinent data to show the potential for this concern in this document.

THE CHAIRPERSON: Would the staff like to comment specifically, if Dr. Barnes agrees, on what AECL said but also on the issues of the shape and nature of the plume?

MR. HOWDEN: Dr. Patsy Thompson is going to reply to that question.

DR. THOMPSON: Patsy Thompson for the record.

The results -- there is as part of the licensing document a requirement to do a groundwater monitoring program and there are an extensive number of wells in the area around NRU and the Power House. This is reported to the CNSC annually and as part of our compliance verification.

The report, the screening report on page 108 and 109, describes the assessment that staff has made of the significance of the tritium contamination in the groundwater and on the basis of radiation dose to -- potentially living in the soil above the bedrock concluded
that the radiation dose would not be significant and since
the drinking water -- the groundwater is not a drinking
water source then there is no potential exposure for a
member of the public or workers on site.

Having said that, staff, through their
compliance verification program, is tracking the issue of
releases, uncontrollable releases to groundwater from NRU,
and AECL has just updated the information on their effort
in that. So it is being verified and followed up through
our normal compliance activity.

**MEMBER BARNES:** And two other related, more
specific, questions that refer to figures and tables on
figure 8.2, which is the stereographic cross-section of
the CRL site within the centre of the developed area, you
show a number of these wells. Relatively few of these
penetrate into the bedrock, which is fractured granitic
gneiss, and I wonder, do you have -- which is basically at
the level of the water table -- can you convince me that
there is adequate hydro-geological control to show the
potential for migration of such contaminants that we are
talking about within the bedrock?

On Table 8.2 you give porosity, but of
course this is fractured bedrock, so we are dealing with
fracture flow rather than as far as media flow here.
MR. HOWDEN: Barclay Howden speaking.

We can’t reply directly to the bedrock question because we don’t have that information with us, right at the moment.

MEMBER BARNES: One might assume that, as that figure 8.2 shows, that there is a good deal of sand, silty fine sand and medium fine sand, which most of the wells penetrate that hydro-geologically most of the contaminants might flow through the glacial sand deposits.

On Table 8.2, which is on page 71, you give values, again, of porosity for the sand -- that is the last item in Table 8.2 -- and the porosity given there is 35 to 45 per cent. Is that a real value? Are you going to tell me that there is 45 per cent porosity in these sands?

(SHORT PAUSE)

DR. THOMPSON: Patsy Thompson, for the record.

The information in table 8.2 is based on reports provided to the CNSC by AECL that have been reviewed by our geoscience specialist. So the information appears to be sound.

In terms of the issue of porosity and the fractured bedrock, the information we have is that groundwater flows towards the Ottawa River at a rate of
between 10 and 100 metres per year and that is the basis for the assessment that is being used in this report.

**MEMBER BARNES:** Yes, but that is mainly within the quaternity sands, as opposed to bedrock, right, or is that in total?

**MR. BIRD:** Those flow rates are for within the upper layer of the rock itself that has been reported by AECL.

**MEMBER BARNES:** In the fractured basin?

**MR. BIRD:** In the fractured rocks.

**MEMBER BARNES:** Okay.

**THE CHAIRPERSON:** Dr. Barnes, if you agree, we will ask AECL if they have any comments on that.

**MEMBER BARNES:** Right. And I might also ask AECL if they want to comment on the 45 per cent porosity reported in these sands.

**DR. FEHRENBACH:** Thank you. It is Paul Fehrenbach, for the record.

Unfortunately, we don’t have our geoscience experts with us and so we cannot really add further to the clarification of your question, Commissioner.

I would note that the information that is being quoted in the Screening Report comes from a report we had commissioned by Raven Beck Environmental Limited who did this assessment for us.
MEMBER BARNES: I saw the reference to it at the bottom of the page, but at 45 per cent you can see that there is -- you know, you have to ask what kind of sand these particular spheres of sand -- and to get 45 per cent is rather exceptional. If you were in the oil industry to get 45 per cent you would be leaping up and down, right, because it is almost impossible to get that. It also means, if you get 45 per cent, that you have got a lot of potential for rapid migration of fluids through it. That is what I am trying to get at with the tritium plumes and so on, for which we have no maps.

DR. FEHRENBACK: Yes, Commissioner, I would note that the hydraulic conductivity is reported separately, as a separately measured number, as well.

MEMBER BARNES: I wonder if I could -- just maybe one other final question, Madam Chair, and that is the airborne emissions. This is reported on Table 8.9. This is from the Power House. And the value for basically the last five years, ‘98 to ‘93 for CO2 is 31,000 tonnes, give or take, and there are also values of NOx and SOx SO2 in there, which again are substantially above the thresholds, which I realize is a threshold, given in Table 8.10 on the lower part of page 75.

So I wonder if staff -- I appreciate that
this is, in a sense, a point source in a location and it may not contravene our own Act -- but nevertheless we are looking at the environmental issues of this particular nuclear facility. And elsewhere in the report, page 91, it is pointed out that this represents -- for the CO2 levels -- .0067 per cent of the national total. It still seems to me this is a substantial amount of emissions from this one plant.

Again, the conclusion is that it is essentially insignificant and not a concern. Is that really what we should be examining here, or should we be asking whether this value -- whether AECL, in the spirit of cleaner air, in fact, shouldn’t be looking at technologies to try to reduce this level?

So for this kind of plant, is that level of emissions, particularly those three values, or particularly for CO2, is that what we should be expecting?

**DR. THOMPSON:** Patsy Thompson, for the record.

The Screening Report essentially looks at past emissions and predicted future emissions, to be able to make a conclusion on the potential environmental effects of the continued operation of the NRU reactor.

The information has been reviewed by Environment Canada and the conclusion is supported by CNSC.
staff, as well as by Environment Canada staff.

In terms of the thresholds for the criteria air contaminants, those are reporting thresholds for Environment Canada to be able to have an inventory of releases nationally.

In terms of whether this is acceptable from an operating point of view, this is more an issue that we would look at under our compliance program. And through our audits of the AECL Environmental Management System, for example, we would look at pollution prevention initiatives and Environment Canada gets reports and is involved in some compliance verification activities with CNSC staff.

So this can be pursued through our normal licensing and compliance program. But, for the purposes of the assessment, under CEAA to be able to make a conclusion, we had to look at current emissions and we base the assessment essentially on the continued operation to make sure that we were conservative in our assessment.

MEMBER BARNES: I understand that, but in certain cases where there is a feeling that the emission levels are too high, that is the point of the Follow-up Program, and I didn’t notice this being one of the activities being directed within the Follow-up Program.

I am just asking, really, whether this is a
value that should be of concern?

DR. THOMPSON: Patsy Thompson, for the record.

The information we have and the reviews that have been done by Environment Canada do not give us any information to say that this is a concern and should be pursued aggressively. So we are satisfied that the operation is in compliance with our requirements, but also other requirements.

The Follow-Up Program is intended to deal with issues of, for example, non-conformance or where there is a need to verify the predictions that have been made in terms of environmental impacts.

In this case, the environmental significance of those releases are low and not significant and it wasn't deemed necessary to put it in the Follow-Up Program.

THE CHAIRPERSON: Dr. Dosman.

MEMBER DOSMAN: Thank you, Madam Chair. I have several questions, one for AECL and several for staff.

I wonder if I might, Mr. Van Adel, ask you, on the issue of the length of life of the NRU in the 1990s -- 1996 was predicted the NRU would be phased out by this time. And just judging from the tone of your comments, I
wonder if you might share some of your long-range thinking?

Do I now take it that it’s quite possible that the NRU might be refurbished? You indicated 2012 but possibly for the indefinite future with successful refurbishment?

MR. VAN ADEL: Thank you. Bob Van Adel, for the record.

We have been continuously in dialogue with the Government of Canada, various departments in the government and with the NRC and other users of the facility.

On the question of the longevity of the NRU and what we might do to replace the NRU by way of meeting the requirements for a long-term research facility or another research facility and to cover the other functions once the primary isotope production activity is transferred to the DIF.

About four and a half years ago, five years ago, when the Government of Canada examined the issue, there was some momentum around replacing the NRU with a new research reactor, a brand new facility, but the cost of that was judged to be very large and also, there was some issue in the government’s mind about the long-term future of the nuclear industry and whether the power
industry was going to continue to grow and therefore place
demands on a future facility or whether it was going to,
in fact, slowly be phased out.

As well, there were questions about what
might be the real requirement for a replacement reactor
and what might it look like.

And so AECL, when the government decided to
delay that decision for some time, AECL embarked on
examining alternatives because we realized at some point
that the NRU reactor will reach a point at which it is
desirable not to carry on.

And so there are a number of proposals that
have been looked at and one of them is the possible
refurbishment of the NRU reactor; that is, a complete
makeover of the reactor, which off the top of my head I
recall the cost of that would be something in the order of
$200 million, to suggest that that is not just a trivial
sort of -- we are not fixing a few pieces of equipment.
That would be a full refurb of the reactor and that would
extend its life for 30-35 years, according to the
assessments.

And many of our counterparts around the
world have taken that approach and there are many examples
which I could cite here, reactors of 1960s genre, research
reactors having been completely refurbished in a similar
manner.

But we are also examining the possibility of a brand new facility and that has many variations. It could be a facility that meets some of the needs of the scientific R&D community or meets all of the needs that everyone might have, including some international dimension.

So as a corporate priority -- and I will talk about these later -- but as a corporate priority, we have this year said and notified the government that we are accelerating the examination of those issues and that we want to engage with the government, starting in the fall, in a dialogue about specifically which of those options might be the most attractive so that we are planning to replace the reactor at a reasonable point in time as opposed to simply allowing ourselves to get into a situation where we are under time pressure and other constraints.

So I believe that if we are successful in our endeavours, you will see that become part of the agenda at the government decision making level and there will be potentially Cabinet level discussions leading to an acceptance of a recommendation for what to do in the medium to long term.

So we are addressing it today and continue
to do so, but we have increased the emphasis on bringing this to people’s attention so that we don’t end up with a so-called neutron gap in terms of the R&D community and the other uses.

**MEMBER DOSMAN:** Thank you.

Madam Chair, if I might ask some specific questions relating to worker health?

And I note that perhaps for AECL that there are some 82 workers, at least in 2003, judging by Table 8.5, that are operating the NRU on a regular basis and their average whole-body dose equivalent was 7.5 milliSieverts. And I am just wondering; that is an average dose and I wonder if AECL or staff, or perhaps both, might comment on what the range was and whether there were any workers that were approaching 50 milliSieverts for the year or 100 milliSieverts over a five-year period?

**DR. FEHRENBACH:** Paul Fehrenbach, for the record.

I would like to direct that question to Ray Lambert, the Director of Health and Environmental Programs.

**MR. LAMBERT:** Thank you. For the record, Ray Lambert, AECL.

The maximum dose at Chalk River in 2004 was
15.8 milliSieverts below our -- the average doses typically range, with the majority of people, somewhere below 10 milliSieverts, typically around 5. I don’t have a report that gives specifically NRU. I am reading from our Chalk River Annual Report.

**MEMBER DOSMAN:** All right. And, Madam Chair, if I might, that is the point that I would like to make, that I see data for the average across Chalk River, but it was specifically for employees and operators at the NRU facility that I was wondering about maximum doses. We have got the average, but it would be nice to have the range.

**MR. LAMBERT:** Ray Lambert again with Atomic Energy of Canada.

The maximum dose I recited is from NRU. The individual received it while working in NRU. The range of exposures in NRU are shown at Table 8.5. Sorry, the average is shown in 8.5. The range, if I recollect, will be somewhere between 1 milliSievert to about 10-11 milliSieverts. As I said, maximum of 15, average of 7.5, but that is by memory I am reciting.

**DR. FEHRENBACK:** I would note, Commissioner, that the numbers show a decrease over time and that that is one of our metrics that we follow closely
and put a lot of stock in is monitoring and reducing doses
to both workers and to the public.

**MEMBER DOSMAN:** Thank you.

I am wondering, Madam Chair, if I might ask
staff to comment?

**MR. HOWDEN:** Barclay Howden speaking.

Our radiation protection specialist is
Caroline Purvis, who is here. I will ask her to comment
on our view of the doses as well as the control of doses
within the NRU Reactor. Thank you.

**MS. PURVIS:** For the record, I am Caroline
Purvis, Radiation Safety Specialist.

Yes, we concur with the reported doses as
Mr. Ray Lambert stated. AECL has instituted a
comprehensive ALARA Program in the past year, and so the
control of doses has certainly increased for special jobs.

So yes, we would concur that the doses are
showing a small downward trend and we are satisfied with
the control of doses to workers in NRU.

**MEMBER DOSMAN:** Thank you, Madam Chair.

I wonder if I might go on to Table 8.7?

Perhaps staff, since staff has assembled this table,
Summary and Comparison of Employees Safety Performance at
CRL site. And there’s two issues. One is the “Severity
of Injuries” row is blank and I was just wondering if that
was inadvertent or if staff could provide any further
information on that seeming lack of information?

MR. HOWDEN: Barclay Howden speaking.
The “Severity of Injuries” is actually
listed below that line for Chalk River site and in the
U.S. NSC. So the line with “Severity of Injuries” is just
like a heading.

MEMBER DOSMAN: Thank you. I can see now
what you have done.

The number of 17 in 2002, is that a large
number and were any of these life-threatening, or what was
the severity of the injuries?

MR. HOWDEN: Barclay Howden speaking.

That information was provided to AECL, Dr. Dosman, so I would like to suggest that they respond to
that question.

MEMBER DOSMAN: AECL, may I ask you to
respond, please?

DR. FEHLENBACH: Paul Fehrenbach for the
record.

I would like to direct that detailed
questions to Ray Lambert, please.

MR. LAMBERT: For the record, Ray Lambert,
AECL.

Most of the accidents occurring at Chalk
River are your typical slip-falls, pulling back strains. Severity represents the number of days lost as a result of either going to a physician or resting up in bed.

I don’t have a record in front of me. I can’t, off the top of my head, think of any serious injury that occurred but I’m going by memory.

DR. FEHRENBACK: Again, just for clarification, I would like to point out that that is another one of the metrics that we follow very closely. And while the data here goes up to 2002, we are experiencing now again a downward trend in both the frequency and severity of lost-time injuries on the site with a more aggressive Occupational Health and Safety Program that we have introduced.

MEMBER DOSMAN: Thank you for that information, Mr. Fehrenbach.

I might just ask staff, on the table next to page 112 of CMD 12.A, I wonder, would staff be willing to help interpret this table for me? The writing is quite small and there are no headings on the table, and not withstanding my new glasses, I am having a little difficulty handling this table.

MR. HOWDEN: Barclay Howden speaking.

Claude David will respond to your question.

MR. DAVID: For the record, my name is
Claude David.

This is what we call the Interaction Table. The top row lists the environmental components that were examined. The side row to your -- or the side column on the left-hand side of the table lists the various installations and activities that actually form part of the scope of project. So each of the items you see on the left-hand side column were examined with respect to each of the environmental components that are listed in the top row.

Now, the numbers actually identify the actual interactions. In the presentation it was mentioned that 86 interactions were identified for the purposes of this assessment, and we could have used dots to identify those interactions but we decided to use numbers so we could better track the further assessment of those interactions and relate those to those numbers on this Table.

THE CHAIRPERSON: Do you have a further question, Dr. Dosman?

MEMBER DOSMAN: Yes.

So is this table, if you like, a summary that prepares us for Table 9.1; is that the idea?

MR. DAVID: Yes, that is correct. Each of those interactions should appear in Table 9.1.
MEMBER DOSMAN: Thank you.

I have one other question for staff. It’s a fairly minor detail question that refers to Table 8.8. I note that for arsenic the number of 3.55 plus or minus 14 in 1998 is exactly the same number as 3.55 plus or minus 14 listed for the five-year average, and while that could occur by chance, I am just wondering if there is any possibility of an error in that table?

MR. HOWDEN: Could I clarify your question, Dr. Dosman? Are you talking about the Argon-41 on the top? Okay. Thank you.

(SHORT PAUSE)

THE CHAIRPERSON: If you would like to have time, staff, to do that, if Dr. Dosman agrees, we could come back with a clarification of that so that we are not spending time looking at it.

MEMBER DOSMAN: Most certainly.

DR. THOMPSON: Patsy Thompson, for the record.

On Table 8.8, the first row refers to Argon-41. Essentially the five-year average 3.55 time stamp to the 14 is coincidentally the same as the 1998 number. So it is a coincidence but the number is factual.

MEMBER DOSMAN: Thank you.

THE CHAIRPERSON: Mr. Taylor.
MEMBER TAYLOR: Thank you, Madam Chair.

My first question relates to a detail of the scope of the project. Could staff please clarify for me that Figure 5.1 represents graphically the scope of the project? Paragraph 5 of the report is entitled the “Scope of the Project”.

MR. HOWDEN: Mr. David will reply.

MR. DAVID: For the record, my name is Claude David.

The scope of project, if we are going to use this Figure 5.1 -- the scope of the project assessed for this environmental assessment included all of the installations within the NRU building, and that includes the area for back-up power. It also includes the NRU Reactor and the experimental facilities, and there is a bay-water area. It also included the roof vents that are located on the roof of the NRU building.

The scope of the project also included the assessment of Tank 1, which has now been replaced by a new holding tank facility. That was included as part of the scope of the project.

Also part of the scope of the project was the Switchyard/Powerhouse. This facility provides the power to allow the NRU Reactor to operate.

Also included in the scope of the project,
bottom left-hand corner, is the Fuel Fabrication Facility. The two facilities themselves, which my understanding is where we manufacture the fuel that goes into the NRU facility, and perhaps AECL could expand on that a bit more.

Also included in the scope of the project is the waste management areas in terms of the wastes that are generated from the operation of the NRU facility. Different types of waste are routed to various waste management areas, and I’m referring to solid waste in this case.

Also included as part of the scope of the project was the active liquids that are routed to the waste treatment centre via Tank 1 or the new — now the new ---

**MEMBER TAYLOR:** Sorry. Maybe I can interrupt you, just to save time. At the bottom of that, underneath the drawing of the NRU building, is the MOLY-99 production and the FISST tank. Are those included in the scope of the project?

**MR. DAVID:** The MOLY-99 and FISST tank were not included as part of the scope of this project.

**MEMBER TAYLOR:** Thank you. That is why, because I noticed in one of the answers you said that operation of the MOLY-99 production wasn’t part of the
scope of the project and I couldn’t quite understand it because I had assumed that all these things were part of that. Okay. Thank you.

The only other comment I have is in the main description of the project, in Chapter 7, for example, in 7.7, “Plant Life Management Program”, the staff described the plant life management program in a paragraph: It is currently implemented to ensure that all structures, et cetera, et cetera, meet the requirements for continued operation.

I am sure that the objective of the program, but is it a reasonable description of the program given the various incidents that have occurred in the last year or so?

**MR. LAMARRE:** Greg Lamarre, for the record.

Just for clarity sake, the plant life management program is being considered under the future license ability extension, a licensing decision that will come to the Commission this fall and next year. The statements in there, as the Commission member has noted, are perhaps not totally accurate in that the plant life management program isn't at this point fully implemented. We will be reporting back on that in greater detail in October and then in 2006 as to the measures put in place by AECL in support of their license ability extension
program.

What they currently have, as AECL staff previously mentioned, is an aging management program that looks at obsolescence and degradation and repairing those systems and components as they come up for renewal and replacement. To go with that will be AECL currently putting in place a comprehensive plant life management program and periodic inspection program that, as I said, we will be able to comment on further at the next set of hearings if a positive decision is taken by the Commission members on the Environmental Assessment Screening Report.

MEMBER TAYLOR: Okay, thank you.

THE CHAIRPERSON: Mr. Graham.

MEMBER GRAHAM: Thank you. Some of my questions have been or asked, but as a follow up I have three lines of questions.

As a follow up to Dr. Barnes, with regard to questions with regard to the fish kill, my specific question would be you gave a specific amount, 9,088. This is to AECL. So I would presume that they were counted so you could get that number. That is not just a -- they were actually counted as they were.

To see that many fish killed, was there not some sort of concern that you were in contravention of the DFO regulations and so on before this screening came
about?

DR. FEHRENBACK: For the record, it is Paul Fehrenbach.

I would like to ask Ray Lambert to respond to that question, please.

MR. LAMBERT: Ray Lambert, for the record.

The study undertaken to determine the impact on the fish at NRU included consultation with DFO and sharing our report with DFO at the time. There was no indications in our communications with DFO or feedback that would lead us to believe we were in any non-compliance with regs.

The study was undertaken in 2002. Further, in our discussions with DFO at this time, though there are guidelines that we are applying against -- we are applying guidelines recommended or put forward by DFO to determine what is required in terms of screening or trying to keep fish out of the water intake, but there still is a part in the regulations that accepts -- that recognizes that DFO can give an exemption for the intake.

So I believe it was perhaps understood back in 2002 that we likely felt we were within that clause. So there was no feedback at the time with DFO that told us we were in non-convention and they had no concerns with the report when we presented it to them in 2002.
DR. FEHRENBACK: Just for further clarification if I could, Commissioner, the study that we are talking about where the documented data came from was the result of a count. It was done as part of the environmental effects review which was undertaken in 2002 and that these are relatively small fish, the bulk of them that we are talking about. So the numbers can be quite --

MEMBER GRAHAM: I realize that but I guess my question is the 9,088 fish were over what period of time?

MR. LAMBERT: One year.

MEMBER GRAHAM: One year? Was any application ever made to DFO for an exemption?

DR. FEHRENBACK: Paul Fehrenbach, for the record.

Those discussions are underway, as was discussed earlier, with respect to the -- if possible, we will introduce screen measures to further exclude small fish from impingement and if not, if that is not possible, then we will continue the discussions with respect to an exemption.

MEMBER GRAHAM: I guess the only reason my line of questioning is this way is that this dates back to 2002, I believe, and that study was -- was that 9,088 done
in 2002 or 2003 or was it just done recently?

**DR. FEHRENBACK:** Paul Fehrenbach, for the record.

I would like to ask Ray Lambert to provide that clarification.

**MR. LAMBERT:** The report on the fish study was released in 2002. There has been no other fish study done at NRU. We are currently doing another fish study on the water intake on our NRX -- what we call our water intake for NRX which is the waters, including water for our MAPLEs.

**MEMBER GRAHAM:** As a follow-up, and I am not going to belabour any longer, but my concern is that you were aware of this in 2002. We are in 2005 and we are still studying -- and it is still being studied. The time lapse it takes to have things, to have problems resolved is of concern.

My question would be to CSNC staff. Do you concur that it takes a long time to have something resolved, especially an issue like this?

**DR. THOMPSON:** Patsy Thompson, for the record.

In terms of the issue that needs to be resolved, the issue is now part of the follow-up program to the environmental assessment and DFO has indicated that
their expectation is that this be resolved for the fall.
So the timelines now are quite short.

In terms of what has happened in the past, it is difficult to say whether this is a reasonable or unreasonable timeline. In terms of staff’s review of the environmental effects review documents, the documents were submitted to us over an extended period of time and staff commented on this issue that this is something that needed to be followed up by AECL and it is being done now. But the environmental effects review -- the review of this document by staff was finalized, I believe, in the fall and we have -- AECL has addressed our comments and are implementing the items that needed to be followed up.

MEMBER GRAHAM: I am still concerned that it takes nearly three years to resolve a problem of screen size and so on.

Anyway, my other question with regard ---

THE CHAIRPERSON: Sorry, Mr. Graham, I wonder if I can do a supplementary on that ---

MEMBER GRAHAM: Sure, sure, go ahead.

THE CHAIRPERSON: --- as I think you have raised an interesting point.

My sense is the line of questioning that a number of Commission members have taken on this is it is really not the role of an environmental assessment to pick
up long-term issues on a facility. It is to say that if we continue operating it, what will be based on our present information, what are the future projections which would, you know, seem to me quite different than -- it is quite different than what we would consider an important issue.

This facility is located on water. It is located on a river. It would seem to us, and I think we are somewhat aware, as some of the Commission members have said, is that there have been a number of issues that we have had to follow up with and talked about Environment Canada and now we are talking about Fisheries.

I think that it does raise legitimately in the mind of the Commission the issues of the connection between the Environmental Effects Study, environmental oversight per se, the involvement of other federal bodies and ensuring on the part of both -- the primary responsibility resting with the licensee but also a coordination responsibility on the staff that we are taking enough of a holistic systematic look at these facilities to ensure that if we didn’t have this EA that it would be going on.

So my sense is from your comment, Dr. Thompson, that this -- and please correct me if I am wrong -- is that this was identified in the Environmental
Effects Study that was done by AECL, if I am correct; that it was analyzed and even if we hadn’t had this EA, that would have been raised to the proponent and to DFO and been handled.

That is the concern, I think. Would this have been detected in what we think is a pretty self-evident issue, which is the impact on fish in the Ottawa River which is right next door to the facility. So that is, I think, the question, Dr. Thompson.

DR. THOMPSON: Patsy Thompson, for the record.

In terms of the review done by staff, the issue was identified. We have, I would say, a well-oiled working relationship with Environment Canada in terms of dealing with issues that are of common interest.

In terms of working with the Department of Fisheries and Oceans, the relationship isn’t as well developed. We have been working with the Department of Fisheries and Oceans on similar issues for nuclear power plants in Ontario and getting staff from DFO to respond to communication from the CNSC in a timely manner has not always been easy. This situation has been resolved and we believe that what has happened over the last few months has given us a better understanding of the process that DFO follows and whose door we should be knocking on.
So moving forward, the relationship with DFO is one that has improved and I think will continue to improve. So we should not see such delays in responding or dealing with issues in the future.

THE CHAIRPERSON: I suppose what I understand broadly, and also in the specific instance, I mean, this is the responsibility of DFO. It is the Fisheries Act. It is not our Act. We do have a responsibility for coordination, a responsibility of oversight of facilities, but I guess what I am hearing here is we are not just talking to CNSC staff and we are not just talking to the proponent but we are talking to DFO about their responsibilities and their accountabilities as well for oversight in this particular facility. I think that is important as well.

Back to Mr. Graham. Sorry, Mr. Graham.

MEMBER GRAHAM: Well, that is quite all right because what I wondered the other day when I was reading this was whether if we hadn’t had the screening, would some of these things have been caught or not or is it -- or fleshed out or is this just part of the ongoing and it got written up in this as part of ongoing work that was being done, or is it relevant only to an EA screening.

Along that same line, and I don’t want to get into a licensing question, but I do want to ask a
question with regard to staffing, training and especially unplanned events.

The reportable events, there was a mention in your presentation, in AECL’s presentation, that the unplanned events and the study of root cause, detailed root cause investigations.

Just for clarification or more or less satisfaction of mind, all of your unplanned events, has there been a root cause followed up and -- first of all, AECL and then the CNSC staff -- are you satisfied that a root cause analysis has been successfully completed on all those unplanned events?

**THE CHAIRPERSON:** And I think the connection to the EA is that we are really looking at the future planning, particularly the effect on environmental areas.

**DR. FEHRENBACK:** For the record, it is Paul Fehrenbach speaking.

Our event investigation method is in place. We do root cause analyses on every event and we track the follow-up.

However, I must say that the robustness of our process is not what we would like it to be at this time. It has been noted as an area for improvement and we are working hard to improve it.
I am prepared, if you are interested, to discuss some of the various things we are doing to improve the process but it will address both the backlog of actions that we have for the lower levels, significance items as a result of root cause investigations and the timeliness of completion of those.

MEMBER GRAHAM: I think those can be dealt with at the time of licensing if that proceeds to that, but I guess what I wanted to know is you are not satisfied and you are working on trying to improve it? I guess that is your basic answer and I wonder if CNSC staff would like to answer or comment also?

MR. HOWDEN: Thank you. Barclay Howden speaking.

I am going to ask Greg Lamarre to give you some comments, but as an introductory note, for the purposes of the EA, the two events that are described, we are satisfied that they are boundings such that the effects can be used for the environmental assessment. But clearly, the ongoing evaluations of the events in day-to-day operation are important because they may shed new information on these bounding events. At this moment we are still satisfied the bounding events are indeed the bounding events.

But I will now ask Greg Lamarre to comment
on our day-to-day view of the assessment of the events or investigation of the events.

**MR. LAMARRE:** Greg Lamarre, for the record.

I will be brief because I am sure these discussions will come up this afternoon.

Essentially, we concur with Dr. Fehrenbach’s comments that we see deficiencies in AECL’s -- what they call their OPEX program, their Operational Experience Program that drives the root cause analysis, the identification of deficiencies and the corrective actions that then fall out.

We have got concerns that AECL is not consistently hitting the root causes such that the corrective actions that are then identified truly get to those underlying systemic-type issues and factors that they need to prevent reoccurrence.

So essentially, in summary, we do have concerns. There are some actions in place. There has been a meeting in which staff and AECL discussed issues and staff clearly laid out where they see the deficiencies being in AECL’s OPEX Program and AECL is to provide some follow-up to that meeting as to how they are going to correct some of those deficiencies in their OPEX Program. But once again, I think we can get into more specifics this afternoon, if you would like, unless you would like a
little bit more detail, Mr. Graham?

**MEMBER GRAHAM:** Well, that will be handled at another time.

My other question was with regard to the discharge, and it was on page 32 of the report, 7.5.4 and I read there that "Chlorine is injected twice weekly into the NRU pump well to control slime and algae formation".

The amounts of chlorine that are injected -- and also I presume that then is discharged into the Ottawa River because -- if I follow the reading of that, and my question is, has there been an analysis done as to the amount of chlorine that is being discharged, the percentage or the control of how much is being discharged into that pipeline and the effects it would have on the Ottawa River?

That question would be first of all to AECL.

**DR. FEHRENBACH:** Paul Fehrenbach, for the record.

Yes, there is an analysis done and I will pass the question to Ray Lambert for further clarification.

**MR. LAMBERT:** For the record, Ray Lambert, Atomic Energy of Canada Limited.

As you mentioned, chlorine is used in the
NRU water. The output from the NRU water goes into our process sewer and the process sewer is analyzed for total residual oxidant, which would include chlorine. However, I understand there is also a residual report in our annual reports on electrical monitoring and compared to standards.

The standards also follow up a recommendation coming of the EA for some additional chlorine monitoring of the Ottawa River to verify our understanding of what we are releasing and I believe we are going to follow through on that.

**MEMBER GRAHAM:** Yes, well that was why I was asking the question. I wonder if anybody else from AECL would like to comment on what your future plans are with regards to chlorine monitoring.

**DR. FEHRENBACK:** For the record, Paul Fehrenbach. I would like Paul Lafrenière to add further clarification.

**MR. LAFRENIÈRE:** Paul Lafrenière, for the record.

Yes, two years ago we were involved with an extensive study in the residual chlorine levels in the water treatment plant. We brought in consultants who analyzed our system and provided us with recommendations on the optimization of the Chlorine Residual Program.
That has since been done and we have received an endorsement on our practices there.

As far as the future is concerned, we are currently involved with studies in a waste treatment plant area. So this specific aspect would also be brought into that area. Studies will be available I believe in the -- probably over the calendar year.

MEMBER GRAHAM: Would CNSC staff like to comment on concurrence or requirements?

DR. THOMPSON: Patsy Thompson, for the record.

Chlorinated waste water is a toxic substance under Schedule 1 of CEPA and it is for that reason that it is being not only monitored but there is also an expectation that the use of chlorine be looked at in terms of optimization of the amount of chlorine that is being used.

It is recognized that chlorine needs to be used to control biofouling but we expect AECL not only to monitor the concentrations of chlorine going out but also to do work to ensure that they have optimized the use of chlorine. It is currently identified in the Follow-Up Program to the environmental assessment.

MEMBER GRAHAM: Thank you. I had some other questions but I will pass until -- okay.
The other question I had was with regard to
the power and I read somewhere, and I haven't found it
just yet right here now, that some of the lines, power
lines and so on to the pumps and so on, travel submerged
and so on, underwater and so on. I am not sure where I
have read it at the time but I had made notes to that.
And I guess testing of the lines and testing of auxiliary
power and so on, what is -- how is that done and is it
done in a safety manner? Electricity travels very well in
water, sometimes if there is a bad connection and so on.

My questions are, how often do you check
all of your -- for safety measures, all of your submerged
pumps and all of your electrical appliances -- not
appliances but the equipment that is below water, that is
submerged?

**DR. FEHRENBACK:** Paul Fehrenbach, for the
record.

In general, it is our practice not to have
electrical conduits submerged in water. We certainly have
a lot of buried services on the site that go through
conduits, closed conduits from what are typically
described as manholes or large concrete bunkers with
connections. So in terms of testing on those lines, you
periodically go in and have access to the various
junctions to ensure that the conduits remain fit for
service and the lines are not interfered with.

Further clarification on your question, if there are any pumps and submerged cables, I will refer to Paul Lafrenière or Bill Shorter, please, for further clarification.

**MEMBER GRAHAM:** No, that can be left because I will have to find it again without getting into detail.

There was one other question I had, though, with regard to -- and this had come up through some of my notes from previous meetings -- with regard to storage tanks, the new storage tank and there is the old one that is being discontinued and I am trying to think of the number and I can't get it.

But my concern is when you decommission the storage tank that was leaking and so on, is it -- decommissioning, is that removed or how is that dealt with or it is just left there and left until a later date for decommissioning?

**DR. FEHRENBACK:** Paul Fehrenbach, for the record.

The first thing that is done, of course, is that the tank is drained and is put into a safe shutdown state. There is a formal process of doing that before it can be turned formally over to decommissioning. Once it
is in a safe shutdown state, such that the liquids are
removed from it and it is then safe to begin other work,
the decommissioning program puts a plan together to decide
how to further proceed.

Ultimately, the tank will be deconstructed
and removed from its location and the site, returned
either to another use, to brownfield condition or to
greenfield condition, depending on what the future
requirements for that particular piece of real estate are.
But the tank will not be left in its current condition
indefinitely.

THE CHAIRPERSON: My question is to CNSC
staff with regards to the table that you put forward as
the EA schedule and the typical CNSC EA versus the EA
process that was used for the NRU.

My questions are the following. Are you
convinced that this still meets the requirements of the
Canadian Environmental Assessment Act and what -- there is
going to be a follow-up on one of the interventions, one
of the following CMDs, I believe, on the issue of
transparency in a specific sense, but when you designed
the NRU EA process and implemented it, are you -- what
were the parameters that you followed in terms of ensuring
that this met what would be called a CNSC typical EA in
spirit if not exactly in timeliness?
So those are my questions to staff.

MR. HOWDEN: Mr. David will reply to it first on whether it meets the requirements of the CEA Act, and secondly, we do have a policy for consultation and why we feel that we are satisfied that we have met our own policy.

MR. DAVID: Claude David, for the record.

The issue of transparency involves the way the screening report was prepared and for this particular screening the studies were not delegated by the CNSC to AECL for reasons that were previously explained.

There was a certain level of cooperation or consultation between CNSC staff and AECL for the preparation of the project description. The facility itself is very much the heart of the whole Chalk River Laboratory site and specialists and project officers prepared the project description through reading many, many volumes of documents, synthesizing, reducing that information and then further reducing that information, to come up with a project description that was both reasonably short ---

THE CHAIRPERSON: Sorry, Mr. David, I think I just want to go back to specifics.

I think if the Commission wants to have questions with regards to the project description, that is
fine. I think, as Mr. Howden said, my questions were really quite specific in terms of the analysis by staff of those two questions.

So maybe, Mr. Howden, you could comment?

MR. HOWDEN: Yes. Barclay Howden speaking.

With regard to the requirements of the Canadian Environmental Assessment Act, this Act does not require consultation on a screening level report.

However, the policy of the CNSC has been to consult on screening levels. So we do meet the requirement of the CEA Act.

In terms of our policy, we normally have a consultation period on the guidelines and the screening report.

In this case what we did was we put the draft guidelines out. There was an opportunity to comment, which is our normal process.

We put out a preliminary screening report with an opportunity to comment, which is our normal process.

We put out a draft screening report after the preliminary screening report was reviewed, which included the disposition of the comments by stakeholders, including members of the public.

The difference was, is that that period of
time from that point to the hearing was quite short. It
was a one-week period, as normally there is about a 30-day
period. However, in doing this we were satisfied that
there was adequate consultation done because we did engage
people and they did comment.

Two, we went out to -- specifically
contacted each known stakeholder in advance and actually
supplied the information to them directly. So we were
targeting them to make sure that they did not get missed.

Third thing, we did put advertisements in
all the local papers to try to make sure anyone that we
had not been able to target would have an opportunity.
And we did capture one person that we had not targeted who
did come in. That was Mr. Hendry.

Finally, AECL, during the preparation of
the screening report which is being done by us, did hold
public consultation activities. There were four. We
attended three, such that we could be satisfied that there
was sufficient time for -- there was sufficient
opportunity for people to get involved. As well, these
consultations were done in more than one place, so that
there was a geographical spread.

We were in Quebec, Deep River, Pembroke --
I am not sure where the fourth place was. So with all
that combined, we felt that the consultation was adequate
and that there was sufficient transparency so that people
would have the opportunity to comment.

In terms of transparency, as Mr. David has
said, in order for us to get this environmental assessment
factually correct for you, it was necessary to liaise with
AECL to make sure that we had the facts. The assessment,
though, was done by CNSC staff. So the independence was
introduced there.

I will just conclude with that and respond
to any follow-ups.

THE CHAIRPERSON: The consultation that was
done by AECL in Quebec, did the CNSC staff attend that
consultation?

MR. HOWDEN: Yes, we did. Mr. David went
to Chapeau and we can provide further comments on that, if
you wish.

THE CHAIRPERSON: Yes, I would like a
little bit more detail with regard -- and perhaps -- it
was AECL who did the consultation; they may wish to
comment, if I am correct, in that they ran the
consultation in Chapeau.

Particularly, from my past experience,
there is a number of small communities there and I just
wondered if the mayors of all of those small communities
had been contacted and if they attended, or if there was
sort of a municipal input, as well as actual citizens of
those areas who attended that -- I am talking specifically
about Chapeau here.

DR. FEHRENBACH: For the record, this is
Paul Fehrenbach.

I would like to ask Ms. Donna Roach, our
Manager of Community Relations, to respond to the
specifics of the Chapeau meeting.

MS. ROACH: Good morning. For the record,
my name is Donna Roach. I am the Manager of Community
Relations.

Yes, all of the communities in Pontiac
County were invited to attend. We advertised in the local
papers and we also sent invitations about the -- sorry --
we sent letters describing the project to all of the
mayors in the communities, inviting them to have a
briefing if they so requested. We actually moved the
location to Chapeau from previous locations because that
came from the communities themselves, saying, “We think
that you would get more people coming to your sessions if
you were in Chapeau.” And we had a very good turnout
there.

In addition to that, we also received late
yesterday -- and I believe that this has been received by
CNSC staff as well -- the Mayor of Chapeau, Ile-aux-
allumettes, Densyl Spence, is also our community contact
with all of the elected officials. And they presented a
resolution in favour of the EA approval.

**THE CHAIRPERSON:** Thank you.

We are going to take a 10-minute break and
we will be back. Thank you.

--- Upon recessing at 10:30 a.m.

--- Upon resuming at 10:42 a.m.

**THE CHAIRPERSON:** If you could take your
seats, ladies and gentlemen, we are ready to commence.

We will now go to round two questioning. I
will ask Dr. Barnes if he would like to start.

**MEMBER BARNES:** Maybe two or three comments
first, based on the line of questioning of others.

And again to staff, you were asked to look
at the scope and define it, but maybe for my interest,
from Figure 5.1 why was the Moly-99 production not
included, which I think was the spirit of Mr. Taylor’s
question but not really answered?

**MR. DAVID:** For the record, my name is
Claude David.

The Moly-99 production facility was not
included because it is not required for the NRU Reactor to
operate.

**MEMBER BARNES:** Okay. Then I’ll make a
comment on the -- if you allow me, Madam Chair -- on the fish.

    Just an observation, because obviously the inlet is required to allow the NRU to exist, to operate, and it seemed to me that the line of questioning was going slightly askew there. It seems to me that it really is AECL’s responsibility, not the lines of questions that I think went to staff who were trying to document this, or the fact that DFO may not have been aware of it. It seems to me that AECL is operating a facility. It’s taking in water. It’s emitting water, which has a thermal pulse to it. Both of those activities impinge on the biological aspects of the Ottawa River and it’s the responsibility of the licensee to make sure that there is no undue effects on the life within the regulations, both of our Act as well as those of other bodies, in this case obviously Fisheries and Oceans Canada.

    We deal with these fish issues, I think, on most nuclear power plants that come up. So it’s no surprise to AECL. So I was a bit surprised that AECL appeared to be looking for exemption as opposed to fixing the problem, which was to address the screens.

    I know you are going to look at the screens and that’s part of the Follow-up Program, but it did seem to me that the responsibility lay with AECL to be aware of
Fisheries and Oceans Canada rules and regulations.

**DR. FEHRENBACK:** If I may just respond to that. I realize it wasn’t quite a question, but nonetheless you raised some interesting observations.

First of all, I would like to point out that when we became first aware of the magnitude of the fish impingement as a result of our Ecological Effects Review, which was done by a consultant for us, the conclusion of that review by the consultant was that it was not a significant impact. So it did not seem to us, at that time in 2002, to be an issue that warranted urgent attention.

More recently, in fact quite recently, within the last six months, we have become aware that Department of Fisheries and Oceans has a guideline; not a regulation in this case but a guideline, which we intend to honour now that we are aware of it, and we are in discussion with the Department of Fisheries and Oceans as to how that might be achieved.

We would prefer to be able to put in place a situation like a screen which stops the issue, and that is the focus of the engineering assessment. It is not just a study to look at the situation. We are actually doing an engineering assessment, getting down into the specifics of the mesh size, how the screen would be
emplaced without impairing the operation of the reactor. So it is more than a study. It is a serious engineering assessment and that would be our preferred solution and the one which we would intend to implement as a follow-on to this Environmental Assessment Report.

I would also like to, without minimizing the issue at all, put it into a little bit of perspective for us. The 9,000 fish a year of the type that we are noticing represents a small ice cream container a day or less, and it’s about 25 or two dozen minnows a day, which is about what the average fisherman goes through an average afternoon fishing in the Ottawa River.

So when you compare that with the magnitude of the benefits of operating NRU and the 34,000 people a day that receive direct health benefits from the radioisotopes, it didn’t seem to us in that balance also to be an urgent issue.

Nonetheless, I don’t want to minimize the fact that there are Department of Fisheries and Oceans Guidelines which we are now aware of and which we intend to honour.

MEMBER BARNES: Thanks. I think you raise the issue which we face in trying to read these documents and I’m sure are a challenge for the staff in just how much information is needed for this process, because there
is no indication of size of fish, right, and so on and so on. So I’ll leave the fish alone.

But I’ll make another comment, if I may, and that is just again one of Mr. Taylor’s points, I think, was the Plant Life Management Program. If we are looking at a major plant and this is a screen review for environmental assessment for a plant that might, for example, only have seven years life left, that’s one thing, but if it’s -- I’ll take Mr. Van Adel’s speculation that it might go on for another 30 years -- then I think we are here looking at issues here that really should be looked at in a much longer term for a particular activity, a freeze-frame at the moment and so on.

But I was surprised at how little information was given on 7.7 on page 34 under Plant Life Management Program.

Let me turn just to a few more questions of ---

DR. FEHRENBACK: Could we respond just to clarify?

MEMBER BARNES: Of course.

DR. FEHRENBACK: The comments by Mr. Van Adel were referring to the question about the longer-term future, and this is happening in parallel with what we are here discussing today.
Today we are focussed on the environmental impact of operating NRU for a period between now and about 2012; not the longer term future. And in that regard we do have now an Aging Management Program, if you prefer to call it that, which is fairly robust, and we can describe that in more detail if you like.

But if we come back for the longer term operation or refurbishment of NRU, that is a different situation and there will be a much more significant refurbishment. There will be an analysis of that. It will be a very significantly different situation. But even for the interim we are putting in place a more robust Life Management Program to ensure -- the basic purpose of this is to ensure that every system in NRU is fit for purpose and remains fit for purpose over the operating lifetime that we envisage between now and 2012.

MEMBER BARNES: I just want to conclude with three quick, short questions.

On page 80 on Table 8.15 you list the Ottawa River water quality for annual average radionuclide concentrations between 1998 and 2003 from the various sites down the river, and they are essentially the same listings of Tritium gross, beta-gross alpha or total Strontium and Cesium-137, but in the middle of the diagram for the CRL downstream, Cesium-137 is not listed. I
wonder why that would be?

That’s the third one up from the bottom.

Your 28 kilometres downstream, 18 kilometres working up, and then the CRL downstream. And in contrast to all the other categories Cesium-137 as well as total Strontium is missing, but I was more interested in the Cesium value. Is there a reason?

MR. HOWDEN: Barclay Howden responding.

I think that is an oversight on our part and it should have been in there. I’m not sure if we have the information available to provide to you but we did assess the information.

MEMBER BARNES: Do you recall in the assessment whether there were any surprises or any anomalous values, and values of significance here?

DR. THOMPSON: Patsy Thompson, for the record.

The data is from the AECL Annual Reports, and those reports are reviewed for compliance by staff and we have not, over the past years, noted increasing trends that would be of concern, and my expectation, although we don’t have the data this morning, is that there is no inconsistency in terms of the trends at Pointe au Baptême, which is the station that is missing the Cesium data.

MEMBER BARNES: Okay. If I could turn to
page 92 and running onto 93, these are the non-radiological -- the normal operation surface water and sediments under non-radiological and it refers to -- I am just reading at the top of page 93 and it is also commented on, if I recall, in Environment Canada’s response:

“It is not possible to evaluate whether cadmium and selenium levels exceed the CCME guideline values for drinking water and protection of aquatic life since analytical detection limits used by AECL-CRL are greater than CCME guideline values.”

Environment Canada suggests and I think you have adopted this in the follow-up is that you will modify the analytical techniques there to allow you to better measure cadmium and selenium levels, but it raises the question in my mind when you are doing these values, why are you using analyses that in fact are not providing you with this information?

So maybe it is a question to staff; why has -- well, it could be to AECL first and then to staff. AECL, why are you using techniques that do not allow you to detect these, and to staff, why is this happening?

THE CHAIRPERSON: So we will start with
AECL, please.

**DR. FEHRENBACK:** For the record, Paul Fehrenbach speaking.

I will take that question under advisement for the moment. I don’t have an answer immediately available.

**MEMBER BARNES:** Okay. It is also referred to in EC-9 of the Disposition of Comments from Environment Canada.

**THE CHAIRPERSON:** Perhaps we could move to staff then, Dr. Barnes?

**MEMBER BARNES:** Yes.

**THE CHAIRPERSON:** Is there any comments from the staff?

**MEMBER BARNES:** The conclusion was that therefore, EC recommends that the proponent lower the detection limits for those cadmium and selenium for future monitoring.

**DR. THOMPSON:** Patsy Thompson, for the record.

This is an issue that staff dealt with under our Compliance Program. In reviewing the environmental effects review documents from AECL, we requested that this issue be addressed in future monitoring.
MEMBER BARNES: May I just -- forgive me. Out of interest, it comes back to the cooling water intake. I am looking at page 96, the second paragraph. I will read it:

“Cooling water for the NRU is taken from 24 metres below the river surface.”

Going on:

“The water temperature of the intake ranges from a low of 1 degree C in January to a high of 20 degrees C in September.”

Are you really taking in 20 degrees C from 24 metres in the Ottawa River?

DR. FEHRENBACK: For the record, Paul Fehrenbach.

I would like to ask Bill Shorter, the Manager of the NRU, to respond to that question, please.

MR. SHORTER: For the record, this is Bill Shorter.

I can confirm that our inlet water temperatures approach 20 degrees in September.

MEMBER BARNES: Good. It wasn’t that when I swam there.

I wonder if I could just ask one more
question and that is at Table 9.3, which I'm going to have to start with finding where it is. It is on page 130 and these are the "Hazard quotients for significant exposures to hazardous substances in the Ottawa River" and you will see there under the "Offshore zone process sewer" under the column "Max", both of those are in bold and underneath, it says "Bold values indicate both benchmark and background exposure levels are exceeded".

Would AECL like to indicate really what these values mean and the significance of that exceedance in all those components?

For example, in Table 9.4, most of the -- if you look at the last few words, "Therefore, all HQs are less than 1", but in 9.3, most of them are substantially above 1, right up to 6.3.

**DR. FEHRENBACK:** For the record, Paul Fehrenbach.

I would like to ask Ray Lambert to respond to that, please.

**MR. LAMBERT:** Thank you. Ray Lambert, Atomic Energy of Canada, for the record.

This observation that -- where we have a few incidents where chemical doses were depicted to exceed benchmarks was identified in the Ecological Effects Review and a recommendation was put forward which we are
following through on to do baseline further studies to
determine the effect of the stress on the biota present.

So far, there is no indication. In fact, our data indicates that there has been no impact on the
population of species but we are following through on the recommendation of the Ecological Effects Review for
further study.

The benchmark values I believe were -- as I mentioned, came out of our -- I believe they are the ones that came out of our Ecological Effects Review which are based on internationally accepted values for the particular species identified. Exceeding a benchmark is an indication that we should do more follow-up work which we are doing.

**MEMBER BARNES:** I wonder if staff, Dr. Thompson, might interpret those numbers for me in terms of the magic word “significance” particularly on the animals listed there.

**DR. THOMPSON:** Patsy Thompson, for the record.

The conclusions from the assessment essentially indicate that the risk quotients that are bolded are above 1 and would be an indication that an effect is expected. In terms of the significance, because the spatial extent of the potential effects is very
limited, it was concluded not to be significant. If you
would like more detail, I would ask Glenn Bird to provide
more details if you would like.

**MEMBER BARNES:** I guess what I am getting
at is that in Table 9.1, which lists the potential
interactions of continuous operation of the NRU Reactor on
the environment, there was a remark about consistency with
every aspect looked at ended with “No Significant
Measurable Effect”, right, without -- for all of them.
And yet, when I look at Table 9.3, that doesn't seem to
speak in those words but it comes back to (a) measurable
and (b) significant, and since these words are never
really defined in here, I was trying to look for some more
clear statement at this meeting.

**MR. BIRD:** Glenn Bird, for the record.

In Table 9.3, the numbers in bold, as Patsy
pointed to you, are the risk quotients or hazard quotients
greater than 1. Those hazard quotients are simply the
measured concentration of the contaminants in the sediment
divided by the benchmark. The benchmarks are Canadian
Council of Ministers of the Environment 1999 data for
sediment guidelines. A value of greater than 1 doesn't
mean there is an effect. It just shows there is a
potential for them.

In the column to the right, you can see the
hazard quotients for background. Many of the background quotients are greater than 1 and 2. I would also like to point out at this time for benthic invertebrates, the two copper values, 13 and 12, should actually be 1.3 and 1.2 and that the benthos benchmark values that were used are given at Table 4.2. So it is dividing the concentration measured in the sediments by those benchmarks which were not derived from toxicity tests.

**MEMBER BARNES:** Let me try this once more and it’s probably because I don’t necessarily fully understand this. You are telling me on the one hand there is no significant measurable effect in Table 9.1, which includes the things we are discussing here under this Table 9.3, at least for hazardous substances in the Ottawa River. And in every case there, every case under the HQ for the background, it is above 1, all right? So as the footnote indicates, the background is -- exposure levels have been exceeded and then under the “Max”, the bolded numbers, they are all, many of them, significantly above it, right up to 6.3.

I am trying to find out what is the real significance of those numbers for those animals, vertebrates and invertebrates that are listed there?

**DR. THOMPSON:** Patsy Thompson, for the record.
Just in terms of clarification of the measurable effect in comparison to a significant measurable effect, a measurable effect would be one where if the operation of the NRU in this case and ancillary facilities would result in changes in water or sediment quality that are measurable. This would be a measurable effect.

Then, the next step is to say, well, there is a measurable effect. Is this effect significant? That is where we have used the hazard quotients to try to understand the significance, the potential significance of that measurable effect.

For the hazard quotients that you are referring to, they are based on sediment quality guidelines as Glenn Bird just mentioned. The guidelines are based on a probability of effect. They are usually conservative and because they are also very spatially limited, although the hazard quotient is above one (1), the spatial significance -- the spatially limited impact makes it not significant. It is measurable but it is not significant.

**MEMBER BARNES:** Surely, that is your interpretation, which of course it is, but here we are looking at the process that is feeding the exit water out into the Ottawa River. There is a zone. You would say it
is limited but, nevertheless, I think -- I forget the
number now, but it is certainly a few hectares in which
when the sediments have been analyzed have increased
values of various substances; right? Here we are looking
at the values both for the background and the hazard
quotient for a number of organisms that live within that
area. So I would challenge that we are not necessarily
looking at a very tiny area. We are looking at an area
where this material flows out. I would rather see that
admitted rather than in Table 9.1 continually indicating
that there is no measurable significant effect. It seems
to me what you have shown here is that there is an effect
that is both measurable and it is significant within the
area of concentration from the process sewer.

The issue is, is it so significant that
AECL needs to do something about it? Maybe that is what
you mean by significance. Then I would ask is it possible
to do something about it? But those questions aren’t
addressed, I think.

DR. THOMPSON: Patsy Thompson, for the
record.

Maybe two elements, to answer your
question. The first is the staff’s determination of
significance is based on guidance provided by the Canadian
Environmental Assessment Agency in terms of interpreting
significance in relation to the *Canadian Environmental Assessment Act*. There the interpretation is in terms of are there likely to be significant impacts at the population level? This is done essentially by looking at the spatial extent, the likelihood and the temporal -- the period during which the impact may last.

So this is the basis on which staff has made its conclusion of significance. In terms of the spatial extent and the likely significance of this for populations of organisms the conclusion is not significant.

You also should know that in Table 9.3 the bolded hazard quotients are for the maximum concentrations, not for the mean which there again limits the spatial extent.

The second element to the issue is the hazard quotients that are bolded are very similar to those that are noted in background areas in the Ottawa River where impacts on Benthic Invertebrates are not seen. So although there is a measurable impact from the releases of chemicals from the process sewer they are not out of line with what is seen in background locations in the Ottawa River.

A third element is the conclusion that staff has reached in terms of significance of sediment
contamination in that area affected by the process sewer is the fact that sediment samples were taken and bio essays, toxicity bio essays were conducted on those sediments in the lab. The results of those bio essays show that the sediment is not toxic to Benthic Invertebrates.

So those are the lines of evidence we have used to draw the conclusion.

**THE CHAIRPERSON:** Are there further follow-up questions? Dr. Dosman, do you have any follow up?

**MEMBER DOSMAN:** Madam Chair, just briefly, I am just trying to fully understand Table 8.7 regarding the lost time injuries. Table 8.7 on staff document -- perhaps staff would like to comment initially -- refers to overall performance at the CRL site and I wonder whether there is any information at the NRU facility for lost time injuries?

**THE CHAIRPERSON:** Perhaps that would be appropriately handled by AECL since this is their data and then we can go to CNSC staff?

**MEMBER DOSMAN:** Well, thank you, Madam Chair. That is perfectly fine.

**DR. FEHRENBACK:** We don’t have the details of data with us, but I would ask Bill Shorter to do the best he can in providing the distinction between the Chalk
River site data and NRU staff data.

MR. SHORTER: For the record, this is Bill Shorter.

Yes, the lost time injuries are tracked by facility. They are reported in our annual safety report that comes to staff. From my memory, unfortunately today our typical values would be in the neighbourhood of two to three lost time injuries per year, typically in the terms of a strain-type injury. No significant injuries in my recent memory, with respect to the facility, and that would include all the people that work in the facilities, not just the operating crew but the maintainers, the tradesmen and the support staff.

DR. FEHRENbach: Just for clarification, what Bill just quoted is the number of lost time injuries per year. What is in this table is a number of lost time injuries, I believe, for 200,000 hours, which is the standard norm, industry norm for reporting it. So Bill’s two to three would be much less than the 1.8 shown in the table here.

MEMBER DOSMAN: Right. Well, thank you, Mr. Fehrenbach. I appreciate that clarification.

In addition, I would just like to ask AECL the comparison to U.S. National Safety Council’s statistics, correct me if I am wrong, do you know if those
are comparing to workers of similar type or is that the broad range of U.S. workers which would include quite dangerous occupations like construction, farming and so on?

**DR. FEHRENBACH:** Paul Fehrenbach, for the record.

I am not familiar with the makeup of what is being compared here. Usually, we compare our statistics to Canadian utility data, which was more akin to the kind of work we are doing and also to the chemical industry which is also similar to a large fraction of the work we do at the Chalk River site.

In general, we tend to trend below the chemical industry in terms of frequency of lost time accidents. The data for the power reactor industry in Canada is a little more varied. We are above some, below some. Also, the direct comparison is a little tricky sometimes because of the different definitions we tend to use from one facility to another.

**MEMBER DOSMAN:** I am just trying to interpret the data.

**THE CHAIRPERSON:** Well, perhaps, Dr. Dosman, though I think we have got to put this in the perspective of the EA. I think, if you see the definition of the EA it is talking about the issue of projected
accidents for the continuations of facility. So perhaps it is not so much -- if I could just frame it in the case of in order for us to make a determination on the EA what is the information that is given to us and is there any lack of clarity in terms of a forecast as to whether this facility could be continued? Perhaps that would be helpful for you, and perhaps CNSC staff wish to comment?

MEMBER DOSMAN: Thank you for framing the question in that manner, Madam Chair.

MR. HOWDEN: Thank you. Barclay Howden speaking.

In terms of these types of events, we look at the individual events as they might impact on the safe operation of the facility, as Madam Keen has said, to be able to determine whether our bounding accidents are still bounding. We are satisfied that the information we have is that the bounding accidents are there.

Just in terms of other issues, the lost time injuries are dealt with by Human Resources Development Canada and we liaise with them on the regulatory issues which would be discussed under a licensing hearing with you. But we are satisfied that this is not impacting the environment.

MEMBER DOSMAN: Thank you, Mr. Howden.

THE CHAIRPERSON: Dr. McDill.
MEMBER McDILL: Thank you. All the way back to where I started this morning with the units for surface run-off.

If I could ask staff and the AECL with respect to Figures 8.3, which is the surface run-off, water run-off and drainage figure, Figure 8.6, which is the monitoring figure, and Table 8.1, which is the summary of the drainage basin areas. I will give you a second to pull it all together.

So it is Table 8.1, Figure 8.3 and Figure 8.6. Everybody has got their post-it notes?

Once you gave me the units, I was able to start putting this together. I was able to find the arrow for Perch Lake, sort of bottom right-hand corner of 8.3. I think that is the 1.8 times 10 to 6. I was able to find Maskinonge Lake. Balmer Bay is way up at the top but there is no surface water star on 8.6 and I am not sure if there should be, but I think that is up there.

But Pumphouse Creek I have not been able to find and I am wondering if someone could tell me where it is because the surface run-off is the largest of all the numbers.

THE CHAIRPERSON: Perhaps that is an appropriate question for AECL.

DR. FEHRENBACK: Yes, it is an appropriate
question for AECL but I am afraid we don't have someone right here who knows exactly where Pumphouse Creek is.

MEMBER McDILL: Okay.

Toussaint Lake and the Ottawa River --

Toussaint Lake I found. The Ottawa River number 1.9, I guess, is up at the top. There is a 1.9 up at the top pointing directly to the Ottawa River. So I am assuming that is where that 1.9 is.

My question is -- not my question, my statement is, as we go into the interveners' questions this afternoon, I think it would helpful if we knew in terms of 8.6, Figure 8.6, in very rough terms following up to Dr. Barnes' question, the tritium plumes are where on this map in general terms? Obviously, there is a bunch down by CRL but maybe you could be just a little bit ---

THE CHAIRPERSON: I think it would be appropriate if they answered now, if AECL answered now.

DR. FEHRENBACH: In Figure 8.6, the tritium air is shown in the green boxes, but in general, the plume we were discussing this morning is also associated with the area of the little green boxes sort of in the middle of the little red area labelled "CRL".

MEMBER McDILL: Thank you. So all of the monitoring wells are down in that circle. I guess it is --
DR. FEHRENBACH: Well, the ones that we were discussing this morning. There are three other plumes that we are treating which are out in the waste management areas.

MEMBER McDILL: Okay. That is way out on the left?

DR. FEHRENBACH: That is right.

MEMBER McDILL: Maybe sometime I will find out where Pumphouse Creek is. I was just trying to put it all in context to this map so I knew where everything was. Thank you.

THE CHAIRPERSON: Mr. Graham, do you have a question? And then I'll ask Mr. Taylor after that.

MEMBER GRAHAM: I just have one more question with regard to Table 8.15, Ottawa River water quality for annual average.

There is a large jump below just downstream from the CRL downstream in tritium from an average of 4, 4.29 to 3.16. That is the five-year average I am looking at and my question to CNSC staff is, even with that high jump and because the remarks on the very next page are that it can be up to size 7,000 becquerels per litre, that it is safe for drinking water.

Is that large increase significant enough for concern to health in the Ottawa River for drinking
water, because I presume the Ottawa River does produce
drinking water downstream for various communities?

**DR. THOMPSON:** Patsy Thompson, for the
record.

The concentration of 316 becquerels per
litre, the five-year average that you refer to, is not
unexpected from the operation of the CRL site and it is
not a concern for human health. It is well below the
drinking water guideline as you mentioned and well below
levels that would be a concern for human health or for the
non-human biota.

There are monitoring activities going in
drinking water sources downstream of Chalk River and the
levels of tritium have always been well below drinking
water guidelines.

**MEMBER GRAHAM:** And can one presume that
the further down river you go, 18 kilometres to 28
kilometres as it reduces is because of dispersement and so
on?

My other question is the source of the
tritium and there are various places. There is the plume
and so on, that it may be coming from the plume as it
 progresses. Can CNSC confirm to me that the monitoring,
that there are significant -- are there enough monitoring
wells to monitor the flow of the plume toward the Ottawa
River that we are satisfied that we have enough monitoring areas?

**DR. THOMPSON:** Patsy Thompson, for the record.

The measurements of tritium downstream of Chalk River essentially originate from the process sewer, the plumes that we were discussing earlier this morning, as well as Perch Creek. Those are the three main sources, with the process sewer and Perch Creek being the most important.

There are enough monitoring wells to monitor the actual groundwater plumes and there is sufficient monitoring in the river to track any trends for tritium and provide us information which we could take action if needed.

**THE CHAIRPERSON:** Thank you.

That ends then the first round of questions. We are going to now move to the interventions. Before we start, I would note that we've already read the more detailed written submissions from the intervenors and these more detailed written submissions will also be dully considered.

We have allocated approximately 10 minutes for the oral presentations. I'd like to now move to the oral presentation by Concerned Citizens of Renfrew
Country. This is outlined in CMD 05-H12.2 and we have Mr. Hendrickson with us again.

Welcome, Mr. Hendrickson, and the floor is yours, sir.

05-H12.2

Oral presentation by

Concerned Citizens of Renfrew County

MR. HENDRICKSON: Thank you, Madam Chair and Commissioners for an opportunity to present. My name is Ole Hendrickson and I am representing Concerned Citizens of Renfrew County today.

I just wanted to start out -- there has been some discussion already on the significant development report that will be considered later regarding the radiated fuel rod left without cooling for nearly two minutes and if that illustrates some possible gaps in the safety culture and management oversight.

Those kinds of events probably influence the likelihood of future significant environmental effects from operating the NRU Reactor more than probably anything I am going to talk to you about in the next 10 minutes and I am sure that you share our group's concerns about those types of events.

I'll try to go quickly through some of my main points. I'll talk briefly about this truncated
process in preparing the screening report and some of the concerns we have about that; on the issue of the need for quantitative data on particularly waste associated with the seven-year duration of the project and management of particularly high-level waste; and finally, a few remarks on gaps in the -- what we see as gaps in the Environmental Monitoring Program.

So in our view, the screening report did not really address the seven-year timeframe of continued operation until 2012. And this brought up some process concerns about how CNSC staff and AECL may have interacted in the preparation of the report and whether AECL might have actually been pressuring CNSC staff to more or less extend the scope of this project beyond the time, the seven-year timeframe, in noting some of the comments that the period of operation might even extend until 2050.

And there were some comments in the -- when I looked at the dispositioning of comments from different people it almost seemed that AECL might have had and advanced look at some of the sections of the actual screening report rather than the guidelines per se.

So we do seem to have a situation where CNSC shared early versions of the screening report with AECL and AECL was saying, "Well maybe we can change the screening report so that it might apply for more than the
seven-year period.” And that triggered some concern in our group and we just thought that there was a need to clarify the timelines and process of some of that interaction between CNSC staff and AECL on this screening report and whether that actually occurred in advance of the finalization of the guidelines.

So, you know, we feel that all -- that we, as intervenors, should have as much time as possible to look at this. We also note that, looking at the dispositioning of Health Canada’s comments, they suggested that maybe the extension of licensing period might be less than seven years and they were raising concerns about aging management and what we have talked about in terms of plant -- the lifetime of the plant.

So I realize that that sort of issue will be addressed in future, during the licensing hearings, but those are concerns that we also share.

Then in terms of some of the cumulative effects of this, in conjunction with other operations, when we looked at the guidelines, we stated that we had a special concern associated with the extended operation of the NRU and its continuing use for medical isotope production and the delays in full commissioning of the MAPLE reactors, which are adding pressure to keep using the NRU for Moly-99 and we felt that there should be some
kind of analysis of how medical isotope production might interact with some of the other activities of the NRU.

We note that Health Canada also said they would appreciate knowing the status of the MAPLE reactors that are meant to replace the aging NRU -- at least for medical isotope. And we just think that there is a big difference between operating a 50-year old reactor on a daily basis for medical isotope production, or operating it for -- largely for research purposes or maybe also for Cobalt 60 -- when there is more opportunity to shut the reactor down for maintenance, and we are concerned about higher accident risks with the ongoing daily operation for medical isotope production and felt that those kinds of risk scenarios might have been addressed in the screening report.

Another third of issue around cumulative effects has to do with section 9.6.4, which concluded that cumulative effects from the project in combination with ongoing and future CRL operations and projects are not expected to occur and that the annual emissions will show "no measurable change".

Well, we felt that basing that conclusion solely on annual emissions ignores the fact that there is a cumulative effect of the addition intermediate and high-level waste that will be generated as a result of
operating the NRU for an additional seven years.

And one table which particularly puzzled us was Table 7.2, which indicated that more than 80 per cent of the high-level waste generated at CRL during the 1999 to 2003 period came from sources other than the NRU Reactor, if we are interpreting that table correctly.

And since we are not aware of any other major operating reactors at CRL, we were wondering, “Well, what is the source of all these high level wastes,” if they are truly coming from non-NRU sources. And if some of these might be external to CRL, then the variations in those external sources in combination with what is generated by the NRU could have a significant bearing on cumulative effects.

And we noted that the EA Guidelines did call for inventories of nuclear substances and other hazardous materials and the sources and quantities of waste predicted to be generated by the project and also on-site processes for handling those wastes, which becomes relevant, I guess, later today, when you talk about the significant development in terms of managing some of the irradiated fuel rods coming out, the reactor.

And we just could not find those kinds of inventories and quantities in the screening report and it just really observes that over the next seven years there
will be further waste generated and they will need to be
disposed of in the waste management areas. And, at the
present rate of waste generation, there is sufficient
space in Waste Management Area B tile holes to accommodate
these additional waste.

Yet, we recall -- and I am sure most are
aware -- that some of the tile holes at Waste Management
Area B are leaking, or at least admitting water, if not
leaking. And placing more waste in those tile holes seems
to be a problematic aspect of future operations. We are
quite aware that there is a proposed new facility which is
currently being assessed under the Environmental
Assessment Act, namely the construction operation of a
fuel packaging and storage project, which would take some
or perhaps all of the tile hole waste out and put them in
a more secure state. And yet the screening report did not
describe that particular project in any detail. But it
seemed that project would be fairly important in assessing
the ability of AECL to manage the cumulative effects
associated with the waste that would be generated during
the continued operations of the reactor.

We felt that the report should provide
information about particularly that fuel packaging and
storage project so that that would help assess the overall
impacts of prolonging the operations.
Now, then when we turn to mitigation and follow-up, in section 7.2 of the report, we found a couple of fairly problematic statements, and I will just quote these.

One says:

“No measurable effects...”

-- and that is not even “significant measurable effects,” but the statement is:

“No measurable effects are expected to occur as a result of the continued operation of the NRU reactor...”

And there has been a fair bit of discussion around that because -- and the other one was:

“As a result of the assessment of this project it is determined that no additional mitigation measures are required above and beyond the environmental protection programs which have already been implemented.”

And we do find those problematic in terms of the first statement. I mean, it clearly contradicts -- when you say “there are no measurable effects,” the data in the screening report show that there are isotope releases via the process sewer. We have been talking about them. There is Argon-41 and C-14 coming from the
reactor stack. There are wastes being generated and stored in waste management areas. There are releases of heavy metals and persistent organic compounds as well. And all these things are measurable and -- or should be measured, in fact.

And the second statement that:

“As a result of the assessment it is determined that no addition mitigation measures are required above and beyond current environmental protection programs.”

Well, we do not feel that the screening report itself really assessed the current environmental protection programs at CRL. Our understanding is that is basically done as part of the licensing hearing.

So that kind of determination does not seem to flow from the scope of the work that was done in the screening report. And so we are not sure that a conclusion that “no mitigation measures are required above and beyond existing environmental protection programs” is appropriate and can be supported by the evidence provided in the screening report.

When we look at the kinds of issues identified for the Follow-Up Program, and this has all been discussed quite a bit already this morning, there is
the size of the screen or the existence of a screen at the
cooling water intake and the fish impingement issues, the
source of the leaks that are potentially linked to the NRU
Reactor operations we have heard that may be those now
that -- that the thought is those may have been associated
with the old active drain system which has been removed,
and thanks to the Commissioners for delving into that.
And three issues that might require additional monitoring,
having to do with some of the heavy metals, I guess, that
might be released or might not be released because the
detection limits are actually higher than some of the
concentrations that might be of concern, that the studies
-- to be better define that the plume associated with the
process sewer in the sediments that are contaminated and
the release of chlorine which is, I guess, added to the
pipes to clean them out periodically.

Now, this is a fairly diverse set of issues
that could be addressed in the Follow-Up Program and it
does lead us to wonder, you know, what if we really did
have a thorough review of the Environmental Protection
Program? Because this issues such as fish entrainment and
leaks from the NRU Reactor, possibly problematic heavy
metal and chlorine discharges, the unknown extent of the
plume from the process sewer are all, in our view,
potentially significant environmental effects. And while
it is important they have been identified in the screening report, we do think that there might be a need for a more sort of comprehensive Follow-Up Program.

For example, just on the fish issue, we were looking at some of the dispositioning of comments from Environment Canada which noted that the most recent fish population studies were done in 1980 and Environment Canada recommended that AECL conduct a new fish survey as part of the Follow-Up Program.

The CNSC staff response was that a new fish survey is not required as the project does not have an adverse effect on fish, and they went on to say releases from the NRU have no effect on fish.

Well, the discussion we have had today shows that just can’t be supported. There are impacts on fish clearly from impingement in the water intake and potential impacts also from the contaminants that are being released from the process sewer in other sources of release of radionuclides and other substances.

Our group has been, for some time, critical of some of the gaps in AECL’s monitoring program and we would like to see credible, long-term data sets; for example, Cesium-137 levels in fish, and we have often mentioned the Strontium-90 levels in freshwater mussels.

We feel that monitoring really is the
single most important mitigation measure that can be
included in a follow-up program. It’s the only real way
you can validate environmental protection regimes, and we
note that emission levels are largely based on human doses
and not on effects on biota.

So we were hoping that given our historic
lack of success in getting what we think is a satisfactory
resolution of some of these environmental monitoring
issues through the licensing process, that maybe this
environmental assessment process and the follow-up
associated with it might be a good mechanism for designing
and implementing perhaps a more comprehensive
environmental monitoring program for CRL.

And really, as people have said today, the
NRU is the heart of CRL operations and if a review of gaps
in the monitoring program and development of a
comprehensive monitoring program are not initiated as a
follow-up environmental assessment measure here, we feel
that yet another opportunity will have been missed to fill
what we find are some significant gaps in the
environmental protection regime.

Thank you.

THE CHAIRPERSON: Thank you very much.

Are there questions from Commission members
with regards to this intervention?
Dr. Dosman.

MEMBER DOSMAN: Madam Chair, I would just like to ask if AECL would be willing to respond to the statement on page -- what would be page 7. It’s the second-last page:

“Our group has long been critical of the gaps and absence of transparency in AECL’s Environmental Monitoring Program.”

I’m just wondering if AECL would be willing to comment?

DR. FEHRENBACH: For the record, it’s Paul Fehrenbach speaking.

Let me discuss the transparency issue first. I don’t think there is an issue, actually. We have something like 30,000 monitoring results a year from locations which extend upriver and downriver of our site, as well as significant monitoring points on the site. This information is assessed and collected annually into summary reports with some fair level of detail in them, and those reports are made publicly available. In fact, they are on our website, and if I am not mistaken, copies have been sent to Mr. Hendrickson and the Concerned Citizens of Renfrew County.

So in terms of transparency, I really can’t
agree that there is an issue. Everything that we have is made public in terms of our monitoring program and it’s quite extensive.

We are always willing to discuss the question of sufficiency. We believe we have -- we don’t have any significant gaps in our program. We have it independently validated and verified as well. A professor from the University of Laval annually comes and does independent checks and measures and compared his results against our monitoring results, and we make public that comparison as well.

I’m a little bit at a loss with respect to allegations of major gaps in the program.

And I would like to say with respect to the sediment studies near the process sewer that a couple of the major findings there are worth noting. One is that with respect to heavy metals that have concentrated on the river bottom and are detectable in that location, a coring analysis and historic look at the times at which these materials were laid down shows that the vast majority of the heavy metals in Ottawa River sediments come from mining activities well upstream of the Chalk River area, up in the regions of Tamiscamingue and Northern Ontario and Northern Quebec and that with respect to some of the radionuclides that are found concentrated there and the
relatively low concentrations that were discussed earlier this morning, the historic sedimentation rates there have also significantly decreased since the NRX Reactor was shut down. So the NRU is having a relatively minor ongoing impact in terms of additional sediments in the river bottom.

**MEMBER DOSMAN:** Madam Chairman, if I might ask CNSC staff if you might be willing to comment specifically on the intervenor’s comments on Cesium-137 levels in fish or Strontium-90 levels in freshwater mussels in the context of long-term monitoring?

**DR. THOMPSON:** Patsy Thompson, for the record.

The Environmental Monitoring Program that AECL has in place to meet the licence requirements of the CNSC have been designed based on emissions to the environment, the pathways, the means by which the contaminants release from the site, find their way into the environment and may expose people or non-human species.

The program AECL has in place is a regulatory compliance program and, as such, meets the requirements of the CNSC.

We have audited the program implementation in the past. We review the data annually and are
satisfied that what is currently being done by AECL meets
the requirements.

The CNSC staff presented, I believe it is
in 2003, the risk-based process that staff uses to
indicate what level of monitoring is expected from
licensees. This is currently being formalized in a
regulatory guidance to support a standard being produced
by the CNSC. Our understanding currently is that AECL’s
Monitoring Program would meet the requirements of the
standard and the guidelines that will be issued shortly.

The issue of monitoring for fish or mussel
for Strontium and Cesium-137 has been raised in the past
and was the basis that the Ontario Ministry of the
Environment used to approach Environment Canada in terms
of conducting an investigation for potential violation of
the *Fisheries Act*.

All the work that Environment Canada
Investigation Group did on releases from the Chalk River
site indicated that although there were measurable
releases from the site and measurable values in mussel and
fish for example, that this did not constitute a violation
of the *Fisheries Act*, and the work we have done and the
Environmental Effects Review that AECL has done, indicates
that although there are measurable levels these will not
pose a risk to biota.

So on that basis requiring or requesting that AECL conduct this monitoring would not provide a lot of additional value in terms of potential controls on the operation of the site.

There are also, I guess, disadvantages or problems with using mussels as a regular ongoing monitoring tool. It is a tool that is being used for some national programs, for example, in terms of long-term tracking of environmental quality. But in terms of using it as a tool for specific industries, it works well under some water concentrations or water levels and not as well in others. So it has got limitations as well that would need to be considered.

But from a compliance point of view, it is staff’s opinion that the current program that Chalk River has in place meets our requirements and it will continue to be audited to make sure that it continues to meet our requirements.

MEMBER BARNES: Thank you.

THE CHAIRPERSON: Are there any further questions for this intervenor?

Mr. Henrickson, one of the questions I have is whether there has been a meeting between any members of your group and AECL with regards to this ongoing
Monitoring Program? Has that happened and has CNSC staff attended that meeting?

MR. HENRICKSON: No, Madam Chair. We haven’t specifically met with either the licensee or CNSC staff on the Monitoring Program issue.

THE CHAIRPERSON: I say that because I am aware that your group has met with CNSC staff on another topic and another licensee, and I just wanted to check with regards to this. As you say, it is a long-term licensee in that area, and that is just a question that I had.

Are there any further questions?

Thank you very much, sir, for coming today.

I would like to then move to the next oral presentation, which will be by teleconference. So I am just checking to make sure that this is CMD 05-H12.7, 05-H12.7A.

Mr. William Hendry is with us, I believe, sir, and I believe this is your first time before the Commission. So welcome, sir.

05-H12.7 / 05-H12.7A

Written Submission from William Hendry

MR. HENDRY: Thank you. Can you hear me loud and clear?

THE CHAIRPERSON: I certainly can, sir.
MR. HENDRY: I understand the Commission is made up of two ladies and four men?

THE CHAIRPERSON: Yes, that is right, sir.

MR. HENDRY: What a good looking and handsome group you are.

Too much butter?

THE CHAIRPERSON: Did you have an intervention, sir?

MR. HENDRY: A little humour there. I didn’t hear any laughing though.

THE CHAIRPERSON: We are a very serious group, sir ---

MR. HENDRY: Okay.

THE CHAIRPERSON: --- for your intervention.

MR. HENDRY: Okay. If you look at the report in front of you they’ve made a reference there to “Chapleau”, readings in Chapleau. Well, Chapleau is a town in Ontario about 400 miles northwest of Chalk River. What we’re actually talking about here is Chapeau, Quebec, C-H-A-P-E-A-U.

THE CHAIRPERSON: That is correct, sir.

MR. HENDRY: Now, I received some information just yesterday which for me raised more questions than answers. They indicated that, in fact,
there is radioactive material escaping into the air from the operations of the NRU Reactor.

So these questions I was hoping to get some answers yesterday from either AECL or CNSC people but nobody was available. I assume they were all sequestered in Ottawa in preparation for today’s meeting. So I will get to these people and I will ask these questions, and today I’m going to tell you what my questions are going to be for them, and if I’m not happy with the answers or upset by them I will pass along my comments to you through Secretary Marc Leblanc.

Now, what I wanted to know is, with regard to air monitoring, is the monitoring conducted on a 24/7 basis or is it just sporadic? And what are the acceptable limits of these fall-outs and what are the actual local measurements? And will the addition of two more reactors triple the amounts of the fall-out and what would the cumulative effect be?

Basically that’s what I have for you folks and you may have a question for me.

THE CHAIRPERSON: Well, sir, we certainly are interested in your questions and your ongoing contact with the CNSC staff is totally appropriate. But because you raise these questions why don’t we try to see if we can get some answers.
Would AECL like to comment to begin with, please?

DR. FEHRENBACK: Could we clarify which questions we are being asked?

MR. HENDRY: All right. I can give you my first question, if you like.

The monitoring, the air monitoring, is it an annual thing, a semi-annual thing, or is it conducted on a 24/7 basis?

DR. FEHRENBACK: I will ask our environmental expert Ray Lambert to respond to that.

MR. LAMBERT: Thank you. For the record, Ray Lambert, AECL.

In response to your question, the monitoring off-site is predominantly 24/7 and it consists of different types of monitors. We have TLDs, air monitors, ---

MR. HENDRY: I can’t hear you.

MR. LAMBERT: I’m sorry. I will speak into the mic.

The quick answer to your question is that we monitor airborne activity around our site, in the vicinity of our site, down to Chapeau, Demers Centre, for example, using equipment that is monitoring 24/7. In particular in Demers Centre, and excuse me if I’m
pronouncing it wrong, in Chichester we have TLDs, for example, monitoring disposition of radionuclides on a 24/7 basis.

**THE CHAIRPERSON:** Did you hear the answer, sir?

**MR. HENDRY:** Yes, I did.

And my next question would be what are the acceptable limits? I mean, give me a number from one to 10. What are the acceptable limits of these fallouts and what are your actual readings in comparison to them?

**DR. FEHRENBACK:** Paul Fehrenbach, for the record.

There is quite a large number of numbers to quote here and I don’t think really that gets to the sense of your question. It depends on individual radionuclides and total activities, whether it’s air, water, et cetera.

But let me say in response to your question that the annual release limits are set based on what the CNSC declares as acceptable doses to the public based on advice from the International Commission on Radiation Protection, and those are then turned into what would be an acceptable release from the site to stay below those numbers. Typically, our releases are running in the area of one per cent or less of these, what we call, derived release limits. So we are well below the acceptable
levels which are set essentially by the CNSC.

MR. HENDRY: Okay. And my next question is what will the addition of two more reactors do to these limits?

DR. FEHRENBACH: The limits will not change.

MR. HENDRY: Well, I mean the actual fallout.

DR. FEHRENBACH: We don't believe the releases will change significantly from the addition of two modern and I assume you are referring here to the MAPLE isotope production reactors?

MR. HENDRY: Correct.

DR. FEHRENBACH: Yes. No, in fact, we expect the releases to reduce when we transfer the isotope production to the MAPLE isotope facilities.

MR. HENDRY: Okay. Finally, what would the cumulative effect be from this fallout over a long period of time, over 10 years or 20 years or 30 years? Have there been any medical studies done along that line?

DR. FEHRENBACH: Yes, there have been studies. I would like to refer again that question -- this is Paul Fehrenbach, for the record. I would like to refer that question to Ray Lambert.

MR. LAMBERT: Ray Lambert, for the record.
As Dr. Fehrenbach mentioned, there has been studies of the radiological impact both on humans and non-humans and these are ongoing studies and there are also our Environmental Monitoring Program aspects where we go and sample vegetation, soil, water, vegetables, fruits, milk to determine whether there is accumulation of nuclides into the levels so that we can compare them against these benchmarks.

**MR. HENDRY:** Please, talk up, sir. I can hardly hear you.

**MR. LAMBERT:** I am sorry.

**MR. HENDRY:** And I am concerned with the air monitoring at this point.

**MR. LAMBERT:** The air monitoring, the accumulation that you would be referring to then would be rated nuclide de-positioning from the air into the environment, into the water and vegetables and milk. So part of our monitoring program is we actually take samples of the environment, of vegetables and milk, et cetera, to determine if there is any accumulation of nuclides and we compare them against the models that are used to calculate our releases and compare against deregulatory release limits. We also use them to compare against benchmarks in international studies as to what are acceptable levels of activities in the environment.
MR. HENDRY: But what my concern is, is the intake of air by people. We have such a high rate of cancer along here, we have whole streets in the city of Chapeau where cancer is prevalent in every house, from children to old people and it is the air intake that they are breathing. This is what I am concerned about and this is the kind of a study I want to know if a cumulative effect over years of exposure to this material could be contributing to this cancer we are having.

DR. FEHRENBACH: Yes. The last study that was done with respect to that shows there was no measurable effect on cancer rates from the emissions from not only from Chalk River but around any nuclear power plant. The data in Renfrew County with cancer rates, we are advised by the County Health Unit, is more a result of local lifestyle conditions, smoking, diet, exercise, et cetera. We are not aware of any recent studies that would contradict that.

MR. HENDRY: When was the last study done, do you know?

DR. FEHRENBACH: I don’t have the date of that study currently. I’ll see if we can find it. One moment.

(SHORT PAUSE)

DR. FEHRENBACH: To the best of our
knowledge, the last such study was done in the 1980s.

**MR. HENDRY:** Well, ladies and gentlemen of the Commission, I intend to delve into this in a little bit more detail with the people at AECL when they make themselves available to me. And as I said earlier, if I am unhappy with the results I am getting, I will certainly make a report to you through the Secretary, Marc Leblanc, and I thank you for your time today.

**THE CHAIRPERSON:** Before you leave, sir, I would like to have the CNSC staff as sort of the independent oversight for AECL to just comment if there is anything they would like to say with regards to your specific questions as to any variations in terms of their information to the information that was given to you by AECL. Those are your independent experts looking at this. So I will ask Mr. Howden to do that.

**MR. HOWDEN:** Thank you, Madam Chair.

Barclay Howden, for the record.

I am going to ask Dr. Patsy Thompson to comment on the concerns of Mr. Hendry with regard to the long-term cumulative effects of the deposition of airborne contaminants into the area of Chapeau.

**THE CHAIRPERSON:** And I would like you specifically to comment if there is any variation from your point of view as to the frequency of monitoring, et
cetera, that was commented on by AECL. If you have any variations for Mr. Hendry, that would be important too.

Dr. Thompson, please?

**DR. THOMPSON:** Patsy Thompson, for the record.

In terms of the question in terms of will the operation of two new reactors add to the current emissions, the answer is yes, it will add to the current emissions, but not significantly. So the expectation is the current radiation doses that members of the public get from exposure to emissions from Chalk River will not -- will increase but very slightly and will remain well, well below levels that are the regulatory limit and levels known to cause potential health effects.

The expectation is that there will be no variation in accumulation of radionuclides over time. We have a fairly long history of monitoring in the area and we have not seen in the very areas that are being monitored close to Chapeau and Chichester increased accumulation over time and we expect that this will not change.

**THE CHAIRPERSON:** Do you have any comments with regards to the other information that was given by AECL in terms of frequency, the monitoring devices, the monitoring frequency, the nature and frequency of any
other historical health studies or anything that you would like to add?

**DR. THOMPSON:** In terms of the frequency of the monitoring -- Patsy Thompson, for the record, my apologies. Because the nature of the types of radionuclides that will be released is not going to change with the -- when the MAPLE reactors come online, we don’t expect that there will be required changes to the monitoring program in terms of frequency and location. In terms of the health studies, it is our understanding from the staff’s epidemiologist that the current information indicates that there is not an increased incidence in cancer in the area.

**THE CHAIRPERSON:** Sir, what we will ensure is that the Secretary gives you the information in terms of contact information with the CNSC staff and AECL has also already agreed to supply you with any information. Certainly it is your right as a citizen to have transparency in terms of the information that is available on any licensed property that is under license to the CNSC. So it is my assumption and my direction to the staff that they will give you the information that you seek.

And if you wish to intervene before the Commission in any of the hearings that we have, it is
certainly your right and the Secretary will put you on the mailing list for those information releases. So I hope that addresses a bit of the questions that you have today and certainly it is your right to ask further questions in the future.

MR. HENDRY: Well, I appreciate that and maybe just in closing, I will make an observation here that medical tests done 25 years ago, I think with the state of the art today, those tests may prove to be a lot different than the ones they got 25 years ago and I think that is something we are going to have to look into.

THE CHAIRPERSON: Thank you very much, sir. Are there any other questions from any other Commission Members?

Well, thank you very much for your intervention. Thank you very much.

We will now then move on to the next submission. It is a written submission from the Corporation of the Town of Laurentian Hills, CMD 05-H12.3.

Written submission from the Corporation of the Town of Laurentian Hills

THE CHAIRPERSON: Are there any questions or comments from Commission members with regards to this CMD?
Seeing none, I will move on then to the next written submission. It is a written submission from the County of Renfrew, outlining CMD 05-H12.4.

**05-H12.4**

Written submission from the County of Renfrew

**THE CHAIRPERSON:** Are there any questions or comments from Commission members with regards to this CMD?

Seeing none, I will now move to the next written submission. It is a written submission from the Corporation of the Town of Deep River CMD 05-H12.5.

**05-H12.5**

Written submission by Corporation of the Town of Deep River

**THE CHAIRPERSON:** Are there any questions or comments with regards to this submission?

Seeing none, I will move to the next submission which is a written submission by Cheryl Gallant, M.P. CMD 05-H12.6.

**05-H12.6**

Written submission by Cheryl Gallant, M.P., Renfrew - Nipissing - Pembroke

**THE CHAIRPERSON:** Are there any questions or comments from Commission members with regards to this
Thank you very much, then. This completes the record for today’s hearing.

With respect to the matter I propose that the Commission confer with regard to the information we have considered today and we will be determining if further information is needed or if the Commission is ready to proceed with the decision and we will advise accordingly.

Yes, Dr. Fehrenbach.

**DR. FEHRENBACK:** One point of clarification I could add just before you close, Madam Chair, was the question from Dr. McDill about Pumphouse Creek. If you get out Figure 8.3 I can clarify the situation. We have one of these situations where a creek goes by two different names. On this figure it is known as “Black Duck Creek” and it is in the lower centre of the figure. It drains Black Duck Lake which is in the extreme lower-left corner into a lake somewhere just off the map on the right centre bottom.

**THE CHAIRPERSON:** Thank you very much.

Because of that I will have to start at the beginning.

With respect to this matter, I propose that the Commission confer with regard to the information that
was considered today and then determine if further information is needed or if the Commission is ready to proceed with the decision, and we will advise accordingly.

We will now take a break and we will be back at 5 after 1:00. Thank you very much.

--- Upon recessing at 12:04 p.m.