

1 **Atomic Energy of Canada Limited:**
2 **Application for the renewal of**
3 **the operating licence for the**
4 **MAPLE reactors at the**
5 **Chalk River Laboratories**

6
7 **05-H20.1B**

8 **Oral presentation by**
9 **Atomic Energy of Canada**
10 **Limited**

11 **MR. VAN ADEL:** Thank you very much, Madam
12 Chair.

13 Good morning, members of the Commission.

14 Thank you for the opportunity to make some
15 introductory remarks associated with our license renewal
16 application for the MAPLE reactors. My remarks apply
17 equally to the licensing renewal application for the new
18 processing facility.

19 For the record, as mentioned, I am Robert
20 Van Adel, CEO of Atomic Energy.

21 I am accompanied here today by Dr. David
22 Torgerson, Senior Vice-President, Chief Technology
23 Officer; Dr. Ken Hedges, Vice-President, Dedicated Isotope
24 Facilities; Mr. Paul Lafrenière, Chalk River Site License
25 holder and General Manager of DIF Operations as well as

1 key members of AECL's team who have been working on this
2 very important project.

3 We are here today to provide the Commission
4 with the additional information that was requested at Day
5 One of the public hearing. This presentation for the
6 MAPLE reactors and the presentation later this morning for
7 the new processing facility provide information on the
8 project work and licensing commitments schedules in
9 support of the application for the two-year license
10 renewals.

11 I want to reiterate to the Commission that
12 AECL is committed to the safe operation of the MAPLE
13 reactors and the new processing facility. The Executive
14 continues to monitor progress on the issues on a weekly
15 basis. We keep our Board of Directors apprised regularly
16 and I confirm their continuing support.

17 I also want to thank all of the
18 stakeholders who have either travelled here today to
19 support our application for license renewal or have
20 submitted written interventions. We are very appreciative
21 of the support and interest from our community
22 stakeholders.

23 Before proceeding with the balance of the
24 presentation, I would like to take a moment to update the
25 Commission on some recent senior management appointments

1 that are key strategic developments within AECL.

2 Mr. Brian McGee is joining AECL as Vice-
3 President of the Nuclear Laboratories Business Unit,
4 effective November 21st, 2005. Mr. McGee is replacing
5 Dr. Fehrenbach who has been appointed Vice-President and
6 Special Advisor on Technology Development.

7 I view this appointment as critical to
8 filling AECL's mandate to support the nuclear platform for
9 the coming nuclear expansion.

10 In this role, Dr. Fehrenbach will remain at
11 Chalk River and will work with Mr. McGee to ensure a
12 smooth transition of leadership at our nuclear
13 laboratories.

14 Mr. McGee will be based in Chalk River and
15 he brings a strong background of nuclear operations from a
16 32-year career with Ontario Power Generation. He also
17 brings a wealth of experience in change management, in
18 particular, his leadership of OPG's integrated improvement
19 program.

20 He will provide experienced leadership to
21 all of AECL's operating facilities. His experience in
22 change management and knowledge of utility best practice,
23 will be put to good use in supporting the implementation
24 of the continuous improvement plans for the Dedicated
25 Isotope Facilities and the NRU.

1 And with that, Madam Chair, I will turn our
2 presentation over to Dr. Hedges.

3 Thank you.

4 **DR. HEDGES:** Good morning.

5 Madam Chair, members of the Commission, for
6 the record, I am Ken Hedges, Vice-President, Dedicated
7 Isotopes Facilities.

8 The Dedicated Isotope Facilities or DIF
9 are the MAPLE 1 and MAPLE 2 reactors, MAPLE 1 Iodine
10 production facility and the new processing facility.

11 I am pleased today to provide
12 clarifications that the Commission Members requested at
13 the Day One of the Public Hearing. Each bullet on the
14 outline shown on this slide addresses one of the requests
15 for clarification at the Day One Public Hearing. I will
16 address each one of these topics in my presentation.

17 Turning to the first item; the first item
18 is Public Information. Since September 2003, we have
19 received and responded to 958 requests for information on
20 AECL's operations at Chalk River. Only one of these
21 requests asked for the status of the MAPLE 1 and 2
22 reactors.

23 AECL's public website has been updated to
24 include more detailed information on MAPLE 1 and MAPLE 2
25 reactors and the new processing facility. The information

1 includes descriptions of the facilities, the environmental
2 performance at Chalk River and worker safety performance.

3 In response to your question at the Day One
4 Public Hearing, I am pleased to describe the Dedicated
5 Isotopes Facilities organization. In my role as Vice-
6 President of DIF, I ensure that DIF organization receives
7 the highest level of commitment from senior management and
8 that issues are being addressed in a timely and systematic
9 way.

10 The DIF Operations General Manager, Paul
11 Fournier, is responsible for ensuring that all activities
12 related to operational readiness and operations are fully
13 in compliance with AECL's nuclear operations and CNSC
14 requirements.

15 Project Engineering Procurement and
16 Commissioning Director, Lawrence Lupton, is responsible
17 for all project engineering, procurement, construction,
18 and commissioning for the Dedicated Isotopes Facilities.

19 The Director of Project Licensing, Victor
20 Snell, is responsible for all project licensing, physics
21 and safety analysis.

22 The DIF Quality Assurance Director, Kuldip
23 Singh, is responsible for defining and monitoring
24 effective implementation of the DIF QA Program.

25 Turning now to operations staffing levels;

1 staffing levels are sufficient for the current operations
2 and commissioning activities. Operational limits and
3 conditions requirements on minimum staff levels are met.
4 Sufficient staff are in training for the production phase.

5 We consider it important to bring MAPLE 1
6 reactor into operation on a routine basis at 2 kilowatts.
7 This will enable the certified operators to exercise their
8 operating routines and maintain their skills. This will
9 also provide an opportunity for on-the-job training of the
10 operators in training.

11 I am pleased to provide an update on the
12 use of industry peers under the DIF continuous improvement
13 plan. Sixteen (16) experienced people from the Canadian
14 Utilities and consultants with Canadian and U.S. power
15 plant experience are currently involved on a part-time
16 basis in the following areas: maintenance and planning,
17 operations, technical support, training and coaching,
18 physics, safety and licensing, human performance, and root
19 cause analysis. We plan to use industry peers in a
20 mentoring and advisory role during the DIF commissioning
21 phase.

22 I am pleased to provide you with an update
23 on the DIF continuous improvement plan. I would also like
24 to note that this plan also applies to the operation of
25 NPF. A similar improvement plan is being implemented on

1 NRU.

2 Recently, there was an industry peer review
3 of NRU operations by a team of experienced staff from four
4 Canadian Utilities. This industry peer review identified
5 areas of improvement for NRU. DIF Operations has reviewed
6 these areas of improvement for the development of the DIF
7 continuous improvement plan. This plan has been provided
8 to CNSC staff.

9 DIF Management has identified a set of
10 initiatives and the implementation strategy. The
11 initiatives are grouped in four main areas: leadership,
12 human performance, processes, equipment performance
13 programs. Implementation of this plan is well advanced.

14 With regard to the question raised on the
15 process water system, PWS, the pinhole leak occurred in
16 MAPLE 2. Inspections of MAPLE 1 piping found considerably
17 less erosion than MAPLE 2. This difference is attributed
18 to the position of the valve and the higher backpressure
19 in MAPLE 1 versus MAPLE 2. To correct this problem, a
20 replacement valve with anticavitation design will be
21 installed in each reactor.

22 In response to your question at the Day One
23 hearing, our CMD provides the MAPLE 1 book schedule
24 showing the target dates for major activities and the
25 associated key milestones.

1 The key milestones for MAPLE 1 are:
2 approval to operate at 2 kilowatts; approval to operate at
3 5 megawatts for PCR testing; approval to operate at 8
4 megawatts for PCR testing; commissioning up to 10
5 megawatts and in-service.

6 The work schedule contains significant
7 uncertainties associated with a positive power coefficient
8 of reactivity and, therefore, the work performed beyond 5
9 megawatts is a schedule risk.

10 The key milestones for MAPLE 2 are
11 completion of commissioning up to 2 kilowatts and
12 completion of commissioning up to 500 kilowatts. We
13 expect to complete the MAPLE 2 commissioning program above
14 500 kilowatts and an in-service will occur after the end
15 of the licence in November 2007.

16 The key milestones for the Iodine
17 production facility are completion of nuclear
18 commissioning and in-service. These are expected to be
19 completed before the end of 2006.

20 This slide shows the licensing issues and
21 the target dates for completion. These target dates are
22 consistent with the work schedule shown on the previous
23 three slides. These licensing issues are discussed in
24 detail in our CMD.

25 With regard to the positive power

1 coefficient of reactivity, both Brookhaven National
2 Laboratory and Idaho National Laboratory have completed
3 their work. You will recall that Brookhaven National
4 Laboratory performed an independent review of AECL's work
5 on the positive power coefficient of reactivity. We
6 recently shared the results of the work with CNSC staff.

7 The Brookhaven review has made the
8 following observations to date:

- 9 1. AECL's analysis was in general
10 thorough and of high quality.
- 11 2. Neutronic models are complete and
12 rigorous, accurately reflecting the
13 as-built reactor both in geometry and
14 in material compositions.
- 15 3. Preliminary results indicate that
16 bowing of targets in the high flux
17 gradients provides a mechanism for the
18 positive power coefficient of
19 reactivity of an appropriate
20 magnitude.

21 I know that this is consistent with AECL's
22 opinion that bowing is the most likely cause of the
23 positive PCR.

24 We also asked Idaho National Laboratory to
25 predict the PCR using independent models and code

1 calculations. We recently shared the results of this work
2 with CNSC staff. Idaho predictions of the PCR agree with
3 our predictions of the PCR. It is negative while the
4 measured value is positive. This good agreement between
5 the predictions supports our view that the discrepancy
6 appears to be related to an unmodeled phenomena such as
7 bowing.

8 We are considering all the findings
9 from the various sources and refining the test plan. It
10 is very important to operate the MAPLE 1 reactor up to 5
11 megawatts to perform the test to re-measure PCR and
12 investigate the potential causes of the positive power
13 coefficient.

14 Finally, in response to the question
15 on document baselines, the DIF operations document
16 baseline has been issued. All the documentation required
17 for safe operation of MAPLE 1 reactor has been placed in
18 the control room.

19 In summary, Madam Chair, Members of the
20 Commission, I believe this presentation has addressed the
21 information requests from the Commission at the Day One of
22 the Public Hearing. We have provided updates on the
23 schedule and the status of the licensing issues in the
24 CMD. We are committed to safe operation of the Dedicated
25 Isotope Facilities.

1 This ends my presentation in support of
2 AECL's application for a two-year licence for the MAPLE
3 reactors.

4 Thank you.

5 **THE CHAIRPERSON:** Thank you, Mr. Van Adel
6 and Dr. Hedges.

7 I would like now to move to the
8 presentation by CNSC staff outlined in CMD Document 05-
9 H20.A and, as such, I would like to turn to Mr. Barclay
10 Howden who is the Director General responsible.

11 Mr. Howden, you have the floor, sir.

12 **05-H20.A**

13 **Oral presentation by**

14 **CNSC staff**

15 **MR. HOWDEN:** Thank you.

16 Madam Chair, Members of the Commission, for
17 the record, my name is Barclay Howden. I am the Director
18 General of the Directorate of Nuclear Cycle and Facilities
19 Regulation.

20 With me today are Mr. Greg Lamarre,
21 Director of the Research Facilities Division; Mr. Bruce
22 Pearson, Project Officer for the MAPLE reactors and the
23 rest of the CNSC licensing team for these facilities.

24 CNSC staff has reviewed the application
25 from AECL to renew the operating licence of the MAPLE

1 reactors at Chalk River Laboratories and has formed a
2 position on the application and put forward
3 recommendations for your consideration.

4 I will now turn the presentation over to
5 Mr. Pearson who will outline these for you.

6 **MR. PEARSON:** Thank you. My name is Bruce
7 Pearson.

8 Atomic Energy of Canada Limited has applied
9 for a renewal of a licence to operate the MAPLE reactors
10 at Chalk River Laboratories.

11 CNSC staff prepared CMD 05-H20 and 05-H20.A
12 which contain recommendations for the Commission on this
13 application. This presentation provides a brief overview
14 of the key issues of this application and CNSC staff's
15 recommendations.

16 Our presentation has four sections.
17 Updates since Hearing Day One, this will cover updates in
18 both the safety areas and outstanding licensing issues,
19 an update on the proposed operating licence, our overall
20 conclusions and our recommendations to the Commission.

21 Updated information on safety areas will
22 cover operating performance, performance assurance
23 including quality assurance and training programs and
24 environmental protection.

25 In CMD 05-H20, CNSC staff noted two failure

1 events which highlighted weaknesses in the operating
2 performance safety area. In order to address these
3 weaknesses, AECL developed and it has now submitted a
4 comprehensive Continuous Improvement Plan for the
5 Dedicated Isotope Facilities.

6 The detailed plan consists of more than 150
7 improvement actions grouped into four focus areas. These
8 focus areas include leadership, human performance,
9 processes and equipment performance programs.

10 To date, AECL has reported substantial
11 progress in completing actions. CNSC staff intends to
12 carry out verification activities over the next few months
13 to confirm the completeness and adequacy of the actions
14 taken to improve performance and to correct and prevent
15 further failure events from occurring in the future.

16 As indicated in CMD 05-H20, CNSC staff
17 carried out an audit of the Dedicated Isotope Facilities'
18 Operations Quality Assurance Program in early June. The
19 changes to this program area since Day One are as follows.

20 The Dedicated Isotope Facilities Operations
21 Quality Assurance Audit Report was sent to AECL on August
22 12th. The audit report contained one directive, nine
23 action notices and three recommendations.

24 AECL provided a prompt response on
25 September 16th. CNSC staff has reviewed the response and

1 concluded that the action will likely address the
2 deficiencies. However, more detailed information is
3 needed to conclusively establish acceptability.

4 As stated in CMD 05-H20, AECL staff sat a
5 certification exam on June 23rd. An update to this
6 program area since day one is as follows.

7 As a result of the exam, three persons
8 received a clear pass; three persons received a
9 conditional pass and are currently undergoing remedial
10 training and three persons will re-write the exam on
11 November 9th.

12 At present, the MAPLE reactors have
13 fourteen certified reactor operators and six certified
14 managers of operation.

15 From its evaluation, CNSC staff has
16 concluded that sufficient certified staff is available to
17 operate the MAPLE 1 reactor.

18 In CMD 05-H20, the ratings given to the
19 Environmental Protection Program and its implementation
20 were inadvertently reversed. This error has now been
21 corrected in CMD 05-H20.A. The Environmental Protection
22 Program should have been rated as "meets requirements" and
23 the implementation of that program should have been rated
24 as "below requirements".

25 In addition, an upward trend is now

1 expected based on the implementation of the program that
2 has been observed to date.

3 Since the Day One Hearing, the status of
4 prerequisites to be met for approval to change the
5 operating state of the MAPLE 1 reactor has changed.
6 Updates in the following areas will be discussed in the
7 next three overheads: the positive power coefficient,
8 operational readiness and compliance with the guaranteed
9 shutdown state.

10 As indicated in CMD 05-H20, one of the
11 prerequisites for approval to change the operating state
12 of the MAPLE 1 reactor was to provide a safety case to
13 demonstrate adequate trip coverage for the planned
14 operation in light of the positive PCR.

15 Since the Day One Hearing, a revised two-
16 kilowatt safety case that reflects CNSC staff comments was
17 submitted on October 1st and is currently under review by
18 CNSC staff.

19 A second prerequisite for approval to
20 change the operating state of the MAPLE 1 reactor is for
21 AECL to demonstrate that sufficient staff is available and
22 that systems and equipment have been maintained in a state
23 of readiness for the resumption of operation. Since Day
24 One, the following progress has been made with regards to
25 this prerequisite.

1 CNSC staff has conducted two verification
2 inspections to confirm operational readiness. Some
3 deficiencies have been noted and a revised Work Activity
4 Plan is being prepared.

5 CNSC staff intends to conduct additional
6 verification inspections as the restart date nears.

7 The last prerequisite identified in
8 CMD 05-H20 to be met for approval to change the operating
9 state of the MAPLE 1 reactor was to carry out the actions
10 required to address the failure to comply with the
11 guaranteed shutdown state requirements for the MAPLE 1
12 reactor.

13 The progress made in this area since the
14 Day One Hearing is as follows. AECL submitted a revised
15 Operational Limits and Conditions document that has now
16 been approved by CNSC staff and referenced in the proposed
17 licence. All other actions are nearly complete and have
18 been included in AECL's Comprehensive Continuous
19 Improvement Plan.

20 As indicated in CMD 05-H20, AECL had
21 contracted two American laboratories to carry out studies
22 to assist in the determination of the cause of the
23 positive PCR. At that time, it was stated that the
24 results were expected by September 30th. The results of
25 these studies are now available and show that independent

1 predictions for PCR are in good agreement with AECL's own
2 predictions.

3 An independent review of AECL's work has
4 concluded that AECL's analysis was thorough and of high
5 quality and the cause of the positive PCR is likely due to
6 unmodeled phenomena, for example, bowing of targets.

7 The proposed operating licence for the
8 Maple reactors has also been updated since day one. The
9 updates are as follows. Appendix B of the MAPLE reactor
10 licence has been updated to reflect the current approved
11 versions of the MAPLE reactor Operational Limits and
12 Conditions document and the Chalk River Site Emergency
13 Plan.

14 The licence condition for the release of
15 commissioning hold points has been modified to reflect
16 that prerequisites for approval have been defined in CMD
17 05-H20. A new licence condition has been added to
18 strengthen regulatory control through a further hold-point
19 and to reflect that prerequisites to meet the licence
20 conditions have been defined in CMD 05-H20.

21 A licence condition has been added to
22 provide a definitive date for the submission of a
23 Comprehensive Preliminary Decommissioning Plan for the
24 Chalk River site.

1 CNSC staff concludes that an environmental
2 assessment under the *Canadian Environmental Assessment Act*
3 is not required for the proposed licence renewal.

4 AECL is qualified to carry on the licensed
5 activities and AECL has made and, in the opinion of CNSC
6 staff, will continue to make adequate provisions for the
7 protection of the environment, the health and safety of
8 persons and the maintenance of national security and
9 measures required to implement international obligations
10 to which Canada has agreed.

11 CNSC staff recommends that the Commission
12 accepts CNSC staff's assessment that conduct of an
13 environmental assessment of this project under the
14 *Canadian Environmental Assessment Act* is not required;
15 renew the proposed operating licence to operate the MAPLE
16 Reactors for a 24-month period, to November 30th, 2007.

17 In addition -- and because of the
18 uncertainty in project schedules and the number and
19 seriousness of outstanding licensing issues -- CNSC staff
20 also recommends that an interim report be presented to the
21 Commission at/or around the mid-point of the proposed term
22 of the licence.

23 That concludes my presentation. I will now
24 return the floor to Mr. Howden.

25 **MR. HOWDEN:** Thank you.

1 Madam Chair, that concludes our
2 presentation. Staff is prepared to respond to questions.

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

4 Now, the floor is open for questions and I
5 would like to start with Mr. Taylor.

6 **MEMBER TAYLOR:** Thank you, Madam Chair.

7 First of all, I would like to commend AECL
8 for the use of peer review and mentoring processes. That
9 seems to be a sensible thing to do.

10 I have a question for staff about the
11 schedule and approvals.

12 Can you confirm for the record who it is
13 who gives approval for MAPLE 1 for the various steps of 2
14 kilowatts, 5 kilowatts and 10 megawatts?

15 I notice that is the 8-megawatt one that is
16 mentioned in the licence.

17 Who will give those approvals?

18 **MR. HOWDEN:** Mr. Taylor, that would be me,
19 as the Director General.

20 **MEMBER TAYLOR:** Thank you.

21 Look at one of the details of the schedule
22 presented by AECL, the 5-megawatt approval. The third and
23 fourth steps of the schedule show:

24 "CNSC reviews and approves design
25 changes in safety case."

1 and then after that and below that:

2 "AECL implements design change and
3 performs tests at 5 megawatts."

4 I presume, because these things are lumped
5 together, that the tests at 5 megawatts start after the
6 CNSC has approved that specifically, whereas the chart
7 shows that the big lump called "Design Change and Perform
8 Tests" starts halfway through the CNSC approval bit.

9 **MR. HOWDEN:** Barclay Howden speaking. That
10 is correct.

11 **MEMBER TAYLOR:** Thank you.

12 I don't know whether CNSC staff has had
13 time to finalize its review yet, but I would like to hear
14 your views on the safe operation of a reactor with this
15 positive power co-efficient because, clearly, since the
16 theoretical investigations have shown that AECL's analysis
17 has done what is accurate there is still, therefore, some
18 unknown reason.

19 Are you satisfied that the trip coverage
20 and whatever else is being done enables a reactor to be
21 operated safely up to a point where further investigations
22 of a PCR situation can be carried out?

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

24 Yes, Mr. Taylor, I can confirm that staff,
25 first of all, by putting in place those hold points that

1 you see within the CMD and within the licenses will be
2 ensuring in reviewing those safety cases that, one,
3 margins are acceptable to prevent the onset of prompt
4 criticality and, two, margins to critical heat flux will
5 also be accounted for.

6 So it's for those reasons that staff will
7 be looking at each of the individual safety cases,
8 ensuring that those conditions are met before any
9 recommendation to the designated officer is made.

10 **MEMBER TAYLOR:** Thank you.

11 My final question concerns an item in
12 AECL's Supplemental CMD. It is talking about an event
13 where a loss of Class-II power occurred to the MAPLE
14 remote shutdown and monitoring centre due to failures of
15 the batteries in the uninterruptible power supply.

16 Can ACEL explain what the consequences
17 might have been if these batteries had failed while the
18 remote shutdown and monitoring centre was required to be
19 in operation?

20 **DR. HEDGES:** For the record, Ken Hedges.

21 I would like Don Taylor, Facility
22 Authority, to respond to that, please.

23 **MR. TAYLOR:** For the record, Don Taylor.

24 The consequence of that particular failure,
25 had the centre been required to operate, would have been

1 in the event of a Class-IV power failure during that time,
2 a failure to be able to monitor the shutdown reactors.

3 **MEMBER TAYLOR:** Okay.

4 So it wouldn't necessarily have impacted on
5 the actual ability to shutdown?

6 **MR. TAYLOR:** That is correct.

7 **MEMBER TAYLOR:** Thank you.

8 Out of interest, why did the batteries
9 fail?

10 **MR. TAYLOR:** The batteries failed -- just
11 searching my memory bank -- for -- actually, I think to be
12 accurate I would prefer to provide an answer to this
13 question in writing.

14 **MEMBER TAYLOR:** Thank you.

15 **MR. TAYLOR:** Thank you.

16 **DR. HEDGES:** For the record, Ken Hedges.

17 The batteries are being replaced and now a
18 more extensive periodic inspection and maintenance program
19 has been initiated to ensure that this doesn't happen
20 again.

21 **MEMBER TAYLOR:** Thank you.

22 I think that's the purpose of my question.
23 Did they fail because of a maintenance
24 oversight?

1 **THE CHAIRPERSON:** As such, just to verify,
2 Mr. Taylor, do you require then -- some further
3 information then on this or will that be sufficient for
4 you at this time?

5 **MEMBER TAYLOR:** I would be happy for the
6 staff to advise the Commission at some other time perhaps
7 of the answer.

8 Thank you.

9 **THE CHAIRPERSON:** Thank you.

10 Dr. McDill.

11 **MEMBER McDILL:** Thank you.

12 My questions may be a little premature.
13 With respect to the mathematical and physics models, the
14 electronic models, there is a proposal for an integrated
15 analysis scheme and I am assuming this is some sort of
16 fully-coupled model, coupled forward and backwards.

17 Is that correct?

18 **DR. HEDGES:** For the record, Ken Hedges.

19 I would like Albert Lee to respond to this
20 question, please.

21 **MR. LEE:** For the record, Albert Lee.

22 Yes, that's correct. It is a calculation
23 model that would take physics input, thermohydraulics
24 input, put it into a stress analysis calculation; take the
25 outputs of the stress analysis and put it back into the

1 physics and thermohydraulics and iterate until there is a
2 closed solution.

3 **MEMBER McDILL:** The model that currently
4 exists is only -- I will use the term "coupled forward".
5 There is no feedback from the stress analysis.

6 **MR. LEE:** That's correct.

7 At the moment, the model is coupled
8 forward. There are approximations made in the physics
9 calculations to simulate the effect of physical and
10 mechanical changes in the shape of the targets, but it
11 isn't a fully-integrated feedback and feed-forward model.

12 **MEMBER McDILL:** Is bowing -- are the
13 targets well understood in the industry or is this
14 something that is unique to MAPLE?

15 **MR. LEE:** For the record, Albert Lee.

16 Bowing is a phenomenon that is well
17 understood for the CANDU fuel bundles. The temperature
18 regime for the MAPLE targets is such that it was a
19 phenomenon that wasn't anticipated to occur and it isn't
20 occurring for the same physical reasons that it occurs for
21 the CANDU fuel bundles.

22 We are investigating the phenomenon that is
23 occurring in the MAPLE core to determine how bowing is
24 occurring. We don't have all the data yet.

25

1 **MEMBER MCDILL:** Perhaps this is a bit of a
2 -- Madam Chair, you can stop me if it's appropriate. Is
3 the bowing model fully forward and backward coupled for
4 the CANDUs?

5 **DR. HEDGES:** For the record, Ken Hedges.

6 I don't believe we know the answer to that.
7 Victor will attempt now.

8 **MR. SNELL:** Bowing fuel elements, while
9 theoretically possible in CANDU, is not a factor in normal
10 operation. There's a concern for fairly severe accidents
11 where the fuel gets very hot. In those circumstances, the
12 industry has models which can, to a first order, predict
13 that bowing is not a key phenomena. Bowing is not a
14 phenomena at all, in fact, in normal operation.

15 In MAPLE, it's one of the postulated
16 mechanisms for causing a positive PCR. The recommendation
17 that you are referring to, Commissioner, was from
18 Brookhaven, and basically that's a recommendation that
19 says if indeed you determine that bowing is the cause of
20 the positive PCR in MAPLE, then you should consider having
21 a fully integrated model.

22 We do have the ability, as Dr. Lee
23 suggested, to do separate calculations right now where we
24 can calculate physics and thermohydraulics together and do
25 a bowing calculation and feed that back into the physics

1 thermohydraulics calculation.

2 So we do have the tools available to get an
3 estimate of the effect of bowing. Right now, if it turns
4 out that bowing is indeed the cause, then we may give
5 consideration to integrating the toolset so that we can do
6 it without iteration.

7 But the short answer to your question is
8 it's not an issue for CANDU in normal operation, a second-
9 order issue for accidents and, to MAPLE, it's an issue, of
10 course, for normal operation, we believe.

11 **MEMBER McDILL:** Could I ask staff to
12 comment on my questions just asked?

13 **THE CHAIRPERSON:** If you could include in
14 that any issues that you see for this in terms of defence
15 and depth for the MAPLE?

16 **MR. PEARSON:** For the record, Bruce
17 Pearson.

18 There were quite a number of questions
19 asked in a row. So I think Dr. Snell covered the
20 understanding about the coupling of the codes. That's my
21 understanding as well.

22 The target bowing, I think, as indicated in
23 the presentation, that seems to be what is coming out of
24 the studies as the most likely phenomena.

25 If you want to elaborate on some of the

1 other questions that you want staff's opinion on, I can
2 provide a response.

3 **MEMBER McDILL:** My concern is this. Any
4 physical or thermohydraulic or coupled phenomenon that is
5 not well understood concerns me from understanding the
6 physics point of view, and I guess my question to AECL
7 would be if you have the capability to estimate and couple
8 backwards, do you plan to do that?

9 And if you don't -- if the phenomenon is
10 not understood, is there sufficient reactor control to
11 prevent this not fully understood phenomenon from causing
12 problems?

13 **DR. HEDGES:** For the record, Ken Hedges.

14 I would just like to make three short
15 points. Firstly, we are bounding the PCR and would not
16 consider any restart or testing without being fully sure
17 that it was safe.

18 The second thing is that these flux
19 gradients that could be causing the bowing are not part of
20 the long-term normal operation of the reactor. They are
21 related to the initial core where we have depleted uranium
22 fuel next to very highly enriched targets which are
23 causing very large flux gradients.

24 The third point I would like to make is
25 that, while we have modeled it, there is considerable

1 uncertainty in the magnitude of the bowing, and the only
2 real 100 per cent guaranteed way of confirming if it is
3 bowing or not bowing is to undertake the PCR test program
4 at 5 megawatts where we would measure the PCR.

5 We would then remove the targets and
6 replace them with target holders which restrain the
7 elements from bowing, and that would in fact conclusively
8 show that the bowing was or was not, or was part of the
9 discrepancy between the codes and the actual measurement.

10 **MEMBER McDILL:** Staff.

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

12 I'm going to pass the floor to Greg Lamarre
13 in just one moment, but I think you have touched on the
14 critical issue that CNSC staff is facing with regards to
15 trying to understand a phenomenon that is not yet fully
16 understood while trying to assess safety cases to allow
17 operation to test the reactor.

18 So I will let Mr. Lamarre speak further.

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

20 Just to follow on from what Mr. Howden
21 said, staff's position and our concern is obviously with
22 an unknown phenomena and target bowing as the one that's
23 the subject of the current conversation. But there are
24 other possible candidates as well that have been
25 communicated to us by AECL.

1 The fact of the matter is that we're just
2 one step into the process of understanding what's causing
3 the positive PCR, and in AECL's mind, as Dr. Hedges has
4 alluded to, ultimately they are going to have to carry out
5 some physical experimental work in order to properly
6 rationalize what the phenomenon or phenomena are that are
7 causing the PCR.

8 Staff will always be looking at whether or
9 not the safety case that they are presenting to us is in
10 fact conservative and whether or not the bounds on PCR are
11 conservative, for example, to ensure that once again
12 issues of prompt criticality and fuel failure are fully
13 addressed and that those margins are at least what was
14 accepted in the original safety analysis report.

15 **MEMBER McDILL:** Thank you.

16 **THE CHAIRPERSON:** Dr. Barnes.

17 **MEMBER BARNES:** Let me follow up a little
18 further on these issues which I think I agree are central.

19 Again, I applaud the efforts of AECL to get
20 the external reviews, and you referred to the two studies
21 from Brookhaven and Idaho National Labs, which I think
22 obviously are sort of central to some of our discussions.

23 But I wonder, since you quoted at least a
24 few lines out of these, why we have not got any material
25 from these reports? Why is there no executive summary, et

1 cetera, et cetera, in the documents today?

2 **MR. VAN ADEL:** I would like to ask Albert
3 Lee to respond to that, please.

4 **DR. LEE:** For the record, Albert Lee.
5 The report from Brookhaven National
6 Laboratory has just completed the review and comments
7 cycle within Brookhaven National Laboratory and they are
8 expecting to issue the report to us by October 31st.

9 The report from the Idaho National
10 Laboratory is just completing the internal verification
11 and review and comments cycle within the Idaho National
12 Laboratory, and they also expect to issue the final report
13 to us by October 31st.

14 At this point in time, the two reports are
15 complete and they shared the results of the reports with
16 AECL and with the CNSC staff at presentations that were
17 made in the last week of September.

18 We are not able to provide the text of the
19 reports until we receive the final signed versions from
20 the two laboratories.

21 **MEMBER BARNES:** Okay.

22 But I still would note the wording in staff
23 CMD 05-H20.A, bottom of page 5, that the cause of a
24 positive PCR is likely due to some phenomenon that is not
25 currently modeled in the computer codes. So we have to

1 take it then at this stage that the phenomenon itself is
2 not understood.

3 So in that case, I follow up with the
4 response from AECL and perhaps staff and ask for
5 clarification in the schedule within the five-megawatt
6 approval and eight-megawatt approval parts. That's on
7 Figure 1, page 17.

8 In the 5-megawatt approval, the bottom line
9 or bar on there indicates AECL implements design change to
10 perform PCR tests at 5 megawatts over a period of some
11 months in 2006.

12 And then to go to 8-megawatt approval, AECL
13 submits design changes, et cetera, even before those
14 5-megawatt tests are done. AECL completes all CNSC
15 licensing and prerequisites for 8 megawatts and so on,
16 again before the 5-megawatt tests are complete. CNSC
17 reviews, et cetera, before the 5-megawatt tests are
18 complete.

19 Is this realistic or am I missing something
20 here? It seems to me that the PCR has been accepted as a
21 very critical part. Clearly, the answers to that are not
22 going to get finished until the testing of 5 megawatts
23 have been done and yet AECL apparently is completing
24 design changes and getting them approved by CNSC staff
25 before the 5-megawatt testing is complete.

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

2 In terms of what that means there, those
3 design changes would be to allow the 5-megawatt test to go
4 forward, not as a result of some future fundamental design
5 change.

6 It's more focussed on being able to do the
7 test which would be -- I'll allow these folks to elaborate
8 on that. So it's more focussed on that particular test.

9 I'd just like to add a bit of additional
10 information on the peer review. As you know now, AECL has
11 not received the formal reports yet. But from the CNSC
12 staff's perspective, I just want to let you know that our
13 staff did travel to both of these labs to meet with these
14 people so that we could have a good understanding of the
15 work that was being done and so that, when the tests came
16 in, that we had that and we could have confidence that the
17 work being done was good and we have been briefed on the
18 high level conclusions.

19 In terms of returning to the 5-megawatt
20 safety case, again, those design changes would be design
21 changes that would be needed for the safety case itself.

22 There is no presumption that we would
23 accept the design changes or the safety case at this point
24 in time until we see what has been done because they have
25 to meet the requirements that Mr. Lamarre has outlined.

1 **MEMBER BARNES:** Before Mr. Lamarre
2 continues, just so that I'm not -- surely you need to get
3 through the 5-megawatt testing of that before you can
4 significantly go to the 8-megawatt approval stage, don't
5 you?

6 So much of the 8-megawatt approval is
7 essentially on those bars being done before the 5-megawatt
8 testing is being completed. That's my point.

9 **MR. LAMARRE:** Greg Lamarre for the record.
10 Just to answer your last question,
11 Dr. Barnes, yes, there is a great deal of parallel work
12 that's going on there. It's an iterative, staged approach
13 that's being proposed here.

14 So what we can categorically say is the
15 extent of design changes that will be required at each of
16 those power levels or, as Mr. Howden has said, whether or
17 not they're going to meet staff's expectations, there are
18 two things that staff is looking for. Obviously,
19 fundamentally, a safety case that provides staff with
20 assurances that that plant can be operated safely within
21 those power ranges and also some sort of assurance that
22 what is being proposed goes to the fundamental nature of
23 moving the commissioning forward, understanding the PCR
24 and that.

25 So essentially, what we're looking for from

1 AECL is the safety case and also in parallel with that is
2 some sort of a test plan that goes to the core of either
3 carrying out tests to understand the PCR or carrying out
4 other fundamental experimental work with the goal of
5 moving commissioning forward long term.

6 **MEMBER BARNES:** Well, I understand that is
7 -- I guess it comes back to how realistic these schedules
8 are, whether there are just -- someone in a sense put them
9 together and they are loose configurations.

10 There was some wording that these were --
11 there were a number of "uncertainties" here. I guess
12 there has to be some realism in putting these bars in and
13 it seems to me that in 8-megawatt approval, you have
14 completed your review and approval of the design changes
15 and safety case for 8 megawatts. This is what this
16 diagram says to me.

17 You have completed that before the AECL has
18 completed its design changes and performed the PRC test at
19 5 megawatts. I am not quite sure how you can do that.

20 I can see a certain parallelism going on
21 but the bottom line in the 5-megawatt approval is not
22 complete by the time you have done your review which is
23 the third line in the 8-megawatt approval.

24 **THE CHAIRPERSON:** I guess I would just like
25 to add before you answer because one of my questions, you

1 know, is sort of a corollary of Dr. Barnes.

2 This really is the project management plan
3 of AECL and I think that what the Commission would want to
4 know that in the project management plan of the staff that
5 some of these issues have been addressed so that there is
6 -- what you discussed as this conservative safety oriented
7 approach of the staff is sort of really incorporated in
8 the project management plan so that we have assurances as
9 the Commission that these elements are there before this
10 process goes forward, if that's clear.

11 So I think the main question is Dr. Barnes'
12 but I think there is a corollary here about what is the
13 planning -- the plan of the staff to ensure that some of
14 these points are considered sufficiently.

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

16 To answer your question, Madam Chair, yes,
17 certainly staff's plans include, incorporate and consider
18 the licensee's project management approach and I guess
19 your fundamental question is whether or not we deem this a
20 reasonable plan in terms of whether it's achievable,
21 whether or not staff has the resources within our project
22 management envelope to be able to action our
23 responsibilities under this plan and that is clearly
24 "yes".

25 There are numerous uncertainties with this

1 plan. I think AECL made that abundantly clear,
2 specifically beyond 5 megawatts. So when we look at
3 planning, we want to ensure first and foremost that the
4 short-term objectives are certainly achievable. Medium
5 and longer term objectives, we have to look at those
6 through a lens that incorporates those uncertainties that
7 are still to come.

8 To get back to Dr. Barnes' question about
9 parallel activities, perhaps it's one that the licensee
10 might want to comment on but I know, for instance, right
11 now, we still have the 2-kilowatt case in front of us but
12 I know that the licensee is already working on their
13 5-megawatt case.

14 So the fact that they are going ahead with
15 work doesn't presuppose any decision that staff might
16 make, most certainly, but I think it's probably in the
17 licensee's best interest and appropriate for them to
18 comment on, for them to be looking down the road and
19 starting to put pen to paper and start to develop plans
20 and cases for commissioning milestones further than just
21 the very near term ones.

22 But perhaps, once again, that might be more
23 appropriate for AECL to comment on. Thank you.

24 **DR. HEDGES:** For the record, Ken Hedges.

25 I agree with what the staff have just

1 described. There are a number of processes going on and
2 maybe I'll just explain how the processes work. The first
3 thing we did or do is to prepare a safety case for a
4 specific power level. If there are some difficulties in
5 meeting the agreed redundancy and margins for that safety
6 case, we then propose to do a design change.

7 For example, at 2 kilowatts, we lower the
8 trip set point significantly. We then get approval from
9 the staff for that design change to lower that. We then,
10 probably in parallel, submit the safety case for the staff
11 to approve and then we are in parallel implementing the
12 design changes.

13 Then once the staff have approved the
14 safety case, we would then start the reactor up.

15 So there's a number of iterations going on
16 and we are doing the same thing at the moment for 5
17 megawatts. We're looking at -- we have analyzed the
18 5-megawatt case and we are looking at what modifications
19 as a result of the power coefficient are needed for 5
20 megawatts, bearing in mind that we have to conservatively
21 bound the power coefficient because of the uncertainty in
22 the phenomena that are causing it. Therefore, that's
23 driving us into making changes on things like trip set
24 points so that we are safe. We can't implement those
25 changes until we have got approval from the CNSC.

1 And, in parallel, we'd like to implement
2 those changes while they are reviewing the safety
3 submission. Meanwhile, the reactor is still in GSS.

4 **MEMBER BARNES:** I have two different
5 questions, one to AECL.

6 It's interesting your organizational chart
7 and it's a small point. It's just figure 4, page 37 of
8 your submission.

9 I wonder why the box, one of those at the
10 bottom called Manager, DIF Commissioning was reporting up
11 to the Director of MMIR Project Engineering, Procurement
12 and Commissioning as opposed to General Manager, DIF
13 Operations.

14 I understand from the wording there that a
15 lot of the work will be involved in at MMIR. It wasn't
16 clear with the title of DIF Commissioning where that
17 reporting structure is best served.

18 **DR. HEDGES:** For the record, Ken Hedges.

19 The work up to the point where the
20 commissioning is complete and the system is turned over to
21 Operations is considered to be a project activity. And
22 Operations are the recipients of these systems which are
23 turned over by the project.

24 And so the Director of Engineering,
25 Procurement and Commissioning is a project-like person,

1 and what the Operations people do, they look at the
2 results of the engineering and the construction and the
3 commissioning and they assess whether that system is
4 suitable for operation. And if it is, they accept it for
5 operation or they accept it for operation with some
6 remaining work to be done.

7 So that's really -- Operations are there as
8 the long-term owners of the facility and they have to
9 accept what they're getting from the project.

10 **MEMBER BARNES:** And wouldn't the role of
11 DIF commissioning be a long-term activity?

12 **DR. HEDGES:** The long-term activities are
13 in the Operations box.

14 Commissioning will finish and then the
15 plant will be turned over to Operations and the only piece
16 that will remain is the General Manager, DIF Operations.
17 The remainder of the boxes which are project boxes will
18 disappear when the facility is finished.

19 **MEMBER BARNES:** Okay.

20 My last question to staff. It's just a
21 wording of your conclusions on page 9, section 5
22 conclusions at page 9 of the staff CMD 05-H20.A.

23 "Staff concludes that the overall
24 performance of AECL MAPLE Reactors
25 during the current licence period

1 meets requirements and performance
2 will continue to meet requirements
3 during the term of the proposed
4 licence."

5 Given the difficulties that have been
6 experienced in MAPLE reactors and given the "C" rankings
7 that you had on a number of occasions, and given the
8 uncertainties of things that we are discussing today, do
9 you think that statement that you have there is really a
10 fair representation of -- do you think there should be a
11 little bit -- a few qualifiers put there?

12 I'm saying this because these tend to be
13 sort of summary statements that often appear in staff
14 documents but, to me, they don't really express as a
15 conclusion some of the uncertainty that we're dealing with
16 in this particular case.

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

18 I recall you asking this question before,
19 Dr. Barnes, and we agree with you. We should probably
20 summarize this most in terms of risk as opposed to the
21 meeting of the requirements, because our recommendations
22 are made on this facility not posing unreasonable risk to
23 health safety, the environment.

24 So I would say that we will reconsider this
25 standpat statement and try to make it more reflective in

1 the future.

2 Thank you.

3 **THE CHAIRPERSON:** Dr. Dosman.

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

5 There's been considerable discussion both
6 at the last session and today on the issue of the positive
7 power coefficient of reactivity and I'm just wondering --
8 the idea of so-called bowing that has been introduced
9 today and I'm just wondering if the licensee might be
10 willing to describe in layman's terms for us just what
11 this bowing is and what the implications of this bowing
12 are for safety, as you propose to ramp-up from 2 kilowatts
13 to 5 megawatts.

14 **DR. HEDGES:** For the record, Ken Hedges.

15 I would like to ask Albert Lee to respond
16 to that, please.

17 **MR. LEE:** For the record, Albert Lee.

18 The bowing phenomenon that we're
19 investigating involves a large flux -- thermal neutron
20 flux gradient that one side of the molybdenum-99 targets
21 sees and this causes the targets to deflect in the
22 direction of the highest thermal neutron flux, thereby
23 increasing the reactivity and increasing the fission rate
24 on that one side as opposed to the other side.

25 So it is a -- it's expected to be a

1 mechanical deflection of the target. We're looking at
2 mechanical deflections that would be on the order of .6
3 millimetres to 1 millimetre at full power.

4 **MEMBER DOSMAN:** The implications for
5 safety, for a safe operation of this phenomenon, do you
6 have any comments on that issue?

7 **MR. LEE:** Well, with respect to the
8 implications on safe operation, we're looking at
9 implementing design changes that would restrain the
10 targets from bowing to prevent them from physically
11 deflecting, and we're examining the impact on critical
12 heat flux to ensure that our margin to critical heat flux
13 under all operating conditions and postulated accident
14 conditions remain within the acceptance criteria.

15 **MEMBER DOSMAN:** Is it necessary to, if you
16 like, ramp-up to 5 megawatts to get the information that
17 you require to make both diagnostics -- I guess you still
18 are diagnosing, if I might use that term -- to a degree
19 and then to apply the necessary treatments, if I might use
20 that phenomenon?

21 I mean, is it necessary to ramp-up to the 5
22 megawatts to be able to get the kind of information you
23 need to correct the issue?

24 **MR. LEE:** For the record, Albert Lee.

25 Yes, we believe it is necessary to operate

1 up to 5 megawatts in order to have a definitive indication
2 of the phenomenon and also to have a definitive measure
3 that measures that we take to correct for the phenomenon
4 will be effective.

5 The positive power coefficient is a
6 phenomenon that's been measured to be directly
7 proportional to the change in power between two operating
8 states.

9 So for example, if one is operating up to 2
10 kilowatts, the size of the phenomenon would be about a
11 thousand times smaller than if one were to operate up to 2
12 megawatts. In order to see the phenomenon we need to be
13 able to see a change in reactivity in the reactor between
14 a high-power state and a low-power state.

15 **MR. DOSMAN:** Madam Chair, I'm just
16 wondering if I might persist with one or two follow-up
17 questions?

18 And are you confident that the reactor can
19 go up to 5 kilowatts safely in the context of this
20 phenomenon?

21 **MR. LEE:** I'm confident that the safety
22 case that we have submitted to the CNSC for operation up
23 to 2 kilowatts has a very large conservatism built into
24 it to ensure that we have large margins to prompt
25 criticality and large margins to critical heat flux.

1 We're currently developing the safety case
2 to operate up to 5 megawatts to conduct a series of
3 planned tests to re-measure the positive power coefficient
4 of reactivity and to conduct several tests to confirm
5 whether or not bowing of the targets in the presence of a
6 large thermal flux gradient is a contributor to the
7 positive power coefficient reactivity.

8 For those tests, we will not proceed until
9 we have a safety case that we are convinced has sufficient
10 margin to prompt criticality and sufficient margin to
11 critical heat flux, to ensure that we meet all the
12 acceptance criteria for operation under all operating
13 states.

14 **MEMBER DOSMAN:** I realize there has been
15 some discussion on this issue and is staff fully confident
16 that the 5 megawatt status can be achieved without any
17 undue risk to the operators, the environment, or any other
18 aspect?

19 **MR. LAMARRE:** Greg Lamarre, for the record.
20 We certainly can't presuppose the
21 acceptability of the yet to be submitted safety case for 5
22 megawatts, but what staff can confirm is that they will
23 not make a recommendation for approval to the designated
24 officer unless those margins to prompt criticality and
25 critical heat flux are assured and ultimately health,

1 safety, and the environment is protected. That is most
2 certainly our commitment.

3 **MEMBER DOSMAN:** Thank you.

4 Madam Chair, I just have one or two
5 questions on the issue of the operating performance,
6 performance assurance, and environmental protection.

7 And I note that all of these have been, in
8 terms of performance, have been in the "C" categories, and
9 I just wondered if the licensee might -- and I realize
10 that the assessment of staff has been that all of these
11 areas are improving and I'm just wondering if the
12 licensees would like to make any comments on efforts that
13 the licensee is making to ensure that all three of these
14 will move to the, if you like, to the more acceptable
15 category, and in particular to make any comments on the
16 issue of the "C" category on environmental protection?

17 **DR. HEDGES:** For the record, Ken Hedges.

18 The comprehensive and continuous
19 improvement plan that we have proposed is intended to
20 address the deficiencies of "C" level ratings that we were
21 given in the operating performance and performance
22 assurance.

23 We have made, I believe -- and I think the
24 staff commented positively on this -- we believe we made
25 significant progress in raising the bar to a standard that

1 will meet our requirements and the CNSC's requirements in
2 all of these areas.

3 We have human performance programs and
4 checks and balances in place now that weren't there when
5 we have the events such as the GSS which led to the
6 reading on operating performance.

7 But maybe I'll just turn this over to Paul
8 Lafrenière who can give you a little more detail on the
9 Continuous Improvement Plan.

10 **MR. LaFRENIERE:** Paul Lafrenière, for the
11 record.

12 The Continuous Improvement Plan is based on
13 four tenents. These are the leadership, including the
14 roles and responsibilities, improved human performance,
15 approved processes and the development and improvement of
16 equipment performance programs. So I will provide a short
17 update on some of these points.

18 If we look at the leadership, we have
19 implemented a clear set of management objectives as well
20 as facility planning, and this is providing concrete
21 results and direction to all the staff.

22 On the human performance, we have
23 implemented -- using our industry peers and as a result of
24 all the assessments that have been done, we have
25 implemented a program of training of all our staff. At

1 this point in time, we have completed over 40 observation
2 and coaching sessions inside the DIF facilities.

3 On the process side, we have developed our
4 System Health Monitoring Program and our Maintenance
5 Programs and they are well on there way to being completed
6 by the end of this calendar year.

7 As far as processes are concerned, we have
8 put a lot of effort into ensuring our facility operations
9 focus is there in terms of the overall scheduling and
10 planning and integration with the project schedules. The
11 daily production meetings and the daily project meetings
12 are fully integrated in ensuring that that focus is there.

13 I think we can say confidently that we are
14 now finding our own problems and they are being resolved
15 before we move forward.

16 Thank you.

17 **MEMBER DOSMAN:** Madam Chair, if I might,
18 and particularly on the issue of environmental protection,
19 I wonder if the licensee would be willing to make comments
20 on progress in that direction?

21 **DR. HEDGES:** For the record, Ken Hedges.

22 I would like Paul Fehrenbach to comment on
23 the site program on environmental protection.

24 **DR. FEHRENBACH:** Thank you. For the
25 record, Paul Fehrenbach.

1 I think, as noted, Commissioner, in the
2 AECL Supplemental CMD, the "C" ranking that you referred
3 to on the program for environmental protection was really
4 based on the 2002 audit that was undertaken by the CNSC
5 staff.

6 All of the actions which came out of the
7 analysis of that audit, except one which is on schedule
8 for completion, have now been completed, and those actions
9 included the MAPLE and NPF facilities.

10 So for example, all of the staff from MAPLE
11 reactors and the NPF facility have now taken the
12 environmental protection training, and the environmental
13 and operational control aspect assessments have been
14 undertaken for those facilities as well, as one example.

15 There is a number of other examples as well
16 of specific things that have been done to improve the
17 environmental performance at the site, including the
18 formation and operation of our environmental panel, which
19 issues an annual environmental plan for the site, and
20 actions are taken and monitored against that plan.

21 And as noted, I think, by the staff and
22 their comments this morning, they have noted that the
23 improvement on the implementation of our environmental
24 plan is improving and we expect that as a result of a
25 subsequent more detailed inspection by the CNSC that will

1 be confirmed.

2 **MEMBER DOSMAN:** Madam Chair, thank you.

3 I'm just wondering if staff have any
4 comments on the comments, so to speak?

5 I should be more clear. I wonder if staff
6 would be willing to comment on their confidence that the
7 licensee will be able to continue the upward trend in
8 these categories and achieve acceptable ratings?

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

10 Thank you, Dr. Dosman, for your question.

11 Yes, I can certainly confirm and concur
12 with the majority of the comments made by the licensee.

13 What we are seeing is an improving trend
14 through, as Dr. Hedges alluded to and Mr. Lafrenière, the
15 Continuous Improvement Program, and it is for those
16 reasons and the reasons outlined in greater detail in
17 05-H-20.A that we are seeing and crediting the licensee
18 with the improving trend.

19 What will be done, what we will be
20 following up through various verification activities, as
21 we have also outlined in the CMD, after this hearing, to
22 ensure that those areas of priority, performance
23 assurance, operational performance and environmental
24 protection, which is essentially a site-wide program,
25 continue to be addressed by the licensee.

1 are finding their issues and they are correcting their
2 issues. So that's very positive.

3 **MEMBER DOSMAN:** Thank you.

4 **THE CHAIRPERSON:** Thank you, Mr. Graham,
5 for being so patient. Mr. Graham.

6 **MEMBER GRAHAM:** Thank you, Madam Chair.

7 I am always astonished at the stark
8 contrast between Day One and Day Two when AECL comes
9 before us. Over my tenure as a Commissioner, there always
10 seems to be such great improvements between Day One and
11 Day Two.

12 My first question probably should be to
13 CNSC staff.

14 In Day One, there was considerable
15 documentation and discussion with regard to a lot of
16 issues, issues like:

17 "AECL has been unable to determine why
18 their design safety analysis computer
19 codes and models do not predict the
20 measured..."

21 and goes on:

22 "AECL is unable to carry out reliable
23 simulations of power coefficient..."

24 and:

25 "AECL is unable to demonstrate shut-

1 down system efficiencies in accordance
2 with actions..."

3 and it goes on and on.

4 I have made some other notes:

5 "AECL still has to comply with CNSC's
6 commitment of root cause analysis for
7 the events..."

8 and my question to CNSC staff is: Are you satisfied that
9 in the two-month period between Day One and Day Two -- and
10 I know there is a larger timeframe than that, because you
11 prepare before the exact date of Day One -- that you have
12 seen enough improvement and there has been enough
13 improvement that we can safely go ahead with this
14 licensing as you are requesting and as is before us?

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

16 Yes, I can confirm that the trends that we
17 are indicating in our CMD are accurate.

18 Just to put a bit of context to that,
19 between, as you said, the 30 or so days prior to the Day
20 One and the time that we are in front of you today, we
21 have been provided with the Continuous Comprehensive
22 Improvement Program by AECL on DIF.

23 The intermediate time has allowed us at
24 least to perform a preliminary review on that plan and to
25 come to a preliminary conclusion that it is encompassing,

1 it is very detailed and goes beyond the issues that, as an
2 example, we have previously raised to the Commission in
3 the SDRs. That is positive and that certainly indicates
4 improvement.

5 During the time between the Day One and Day
6 Two, the issues raised by Dr. Fehrenbach in terms of
7 closing out the outstanding audit findings from 2002 on
8 the environmental protection side have come in and staff
9 is satisfied that an improving trend in that area is also
10 merited.

11 So, yes, I can confirm that the improving
12 trend is real and staff supports that.

13 **MEMBER GRAHAM:** Thank you.

14 On another issue then -- and this is to
15 AECL -- in Day One your comment was -- or there was a
16 comment with regard to

17 "AECL acknowledges that there is one
18 safety significant design requirement
19 that is not covered by testing. This
20 submission only came to light as a
21 result of CNSC staff's assessment and
22 AECL contends that this new
23 requirement is being imposed on the
24 Commission completion assurance in
25 requiring the safety functional

1 performance..."

2 and it goes on and on, that AECL contends that only the
3 original acceptance criteria and expected results set out
4 should be -- go forward.

5 You comment with regard to -- are you in
6 agreement now that the requirement that was put on by CNSC
7 with regard to this is acceptable?

8 **THE CHAIRPERSON:** Mr. Graham -- are you
9 able to find that, Dr. Hedges, or perhaps Mr. Graham could
10 give a specific location.

11 **MEMBER GRAHAM:** Day One -- it was in CNSC
12 staff's CMD on page 17 -- CNSC staff presentation -- the
13 second and third paragraph down. I made notes of it during
14 Day One, to come forward on Day Two, whether there is now
15 an agreement that the requirements of the CNSC are
16 acceptable to AECL.

17 **DR. HEDGES:** I believe you are referring to
18 the Commissioning demonstration of design intent?

19 **MEMBER GRAHAM:** Yes.

20 **DR. HEDGES:** We have developed and proposed
21 an alternate way of resolving this issue and we presented
22 that to the staff, and our impression was that although we
23 have not had a formal response to that, that they were --
24 that that had resolved the issue. We have come up with an
25 alternative approach and we are implementing that

1 alternative approach to show that commissioning has
2 demonstrated design intent.

3 **MEMBER GRAHAM:** Can I get a comment from
4 CNSC staff? Are you in agreement or concurrence on this
5 issue?

6 **MR. PEARSON:** Bruce Pearson for the record.
7 Yes, we are in agreement with what
8 Dr. Hedges just stated.

9 **MEMBER GRAHAM:** Thank you.
10 Another question I have, Madam Chair, is
11 with regard to the recommendation CNSC staff made this
12 morning or in the CMD document H20.A.

13 In the recommendation 2 you talk about a
14 24-month licence renewal and in the overview or overheads
15 that you presented to us this morning, you also mentioned
16 a mid-term which was not in the H20, or I do not see it
17 there, anyway.

18 Are you recommending both, and that is what
19 you want to go ahead with, both the renewal of the licence
20 and a mid-term?

21 **MR. HOWDEN:** Barclay Howden speaking.
22 Yes, that is correct.

23 **MEMBER GRAHAM:** From the time of writing
24 this document, 20.A, until now, what fostered the concern
25 that there should be a mid-term?

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

2 I believe it was an oversight. The
3 intention all along was to have a mid-term, because we
4 knew that this project, as it goes forward, has lots of
5 changes and undulations and we felt it appropriate to
6 commit to coming back to the Commission in a year's time,
7 if they should issue the licence.

8 **MEMBER GRAHAM:** So, in other words, by --
9 with regard to Maple 1 reactor, by November of next year,
10 November 2006, CNSC's review and approval of design change
11 and safety cases with regard to -- at the eight megawatt
12 approval -- that is where we should be and you will be
13 able to give us an overview for the 2 kilowatt, five
14 megawatt and eight megawatt, right up to that stage?

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

16 The answer to that is "yes". But, again,
17 there are uncertainties with the project and the project
18 may not be as far along.

19 But based on the schedule and the agreement
20 between Mr. Lamarre's staff and AECL to manage the
21 resources, that is the intention at the moment, but
22 bearing in mind there are uncertainties.

23 **MEMBER GRAHAM:** On page 3 of your
24 submission this morning, 2.2.1, with regard to quality
25 assurance, you talked about identifying deficiencies --

1 "Until these identified deficiencies are corrected" -- how
2 serious are these deficiencies and do you feel that they
3 were moving along sufficiently to give assurance that the
4 Quality Assurance Program is satisfactory to issue a
5 licence?

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

7 I am going to ask Mr. Wong, our Quality
8 Assurance -- Quality Management specialist -- to reply to
9 that.

10 Thank you.

11 **MR. WONG:** For the record, my name is Paul
12 Wong, Quality Assurance Specialist.

13 With respect to the seriousness of these
14 deficiencies, I would not say that they are significant.
15 It is a general management process, sort of weaknesses, if
16 you want to put it that way.

17 For example, there are some deficiencies in
18 the field change controls, changes in the field,
19 deficiencies especially in the non-conformance processes
20 which we have seen recurring over the years.

21 There are no deficiencies that place an
22 immediate safety on the operation of the reactor.

23 As far as their proposed actions,
24 resolutions to these deficiencies, most of them are
25 definitely going in the right direction, as we stated in

1 our CMD.

2 There are only a few exceptions, and very
3 few exceptions, and those exceptions are generally to do
4 with the extent of the proposed measures. There just
5 needs to be a little bit more depth and broadened scope.

6 In conclusion, we are happy with the
7 proposed resolutions.

8 **MEMBER GRAHAM:** A question to AECL is you
9 said that you -- in the document it says that you will be
10 responding with further information by the end of October.
11 Is that still on schedule with regard to that?

12 **DR. HEDGES:** I would like Paul Lafrenière
13 to respond to -- sorry, Kuldip Singh to respond to the
14 question on the QA audit.

15 I think we have actually responded to the
16 CNSC, and I think that was mentioned in the staff
17 presentation that we had responded to the audit, but we
18 can give you a little more detail.

19 Mr. Singh.

20 **MR. SINGH:** Kuldip Singh for the record.

21 Yes, we do confirm that the response to the
22 2005 audit has been sent.

23 We had recently received CNSC data towards
24 the end of August regarding some outstanding issues from
25 the 2003 audit. CNSC has accepted our responses to almost

1 75 per cent of the responses that we provided and the rest
2 of the responses will be sent to CNSC this week.

3 **MEMBER GRAHAM:** Thank you.

4 Just one further question though to CNSC
5 staff. The peer review that was being done on the outside
6 assistance or outside review that has been done to AECL,
7 has CNSC staff been involved on an ongoing basis in that
8 peer review and been consulted or are you -- are you part
9 of that, I guess I should put it that way?

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

11 No, staff is not part of that peer review.
12 We haven't been brought into the process, but AECL, the
13 licensee, has been keeping us apprised of the progress and
14 the findings and, ultimately, the continuous improvement
15 program that has come out of that has been provided to
16 staff and has been discussed at our periodic meetings.

17 **MEMBER GRAHAM:** But in other words, you
18 don't have any independent discussions with those parties?

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

20 That's correct. We do not have any
21 discussions with the independent peer review group.

22 **MEMBER GRAHAM:** Just one further question I
23 have with regard to the training program.

24 There was a list of an additional eight new
25 reactor operators, one manager, and the results of that

1 training program and so on. The three, three and then so
2 and so, is that more or less the norm in testing and so on
3 with regard to licensing and testing of staff -- of
4 training of staff? I'm talking about the three passes,
5 the three ---

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

7 From staff's view, it's reasonable given
8 that these individuals are new certifications.

9 These aren't re-certifications but people
10 that are being trained and new in the positions, and I
11 think that that pass/fail success rate is reasonable.

12 **MEMBER GRAHAM:** Is the make-up now of
13 trained staff, licensed staff and so on, sufficient to
14 proceed to starting of MAPLE 1 and 2?

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

16 Yes, I can confirm that MAPLE 1 has the
17 requisite number of certified and trained staff to safely
18 operate that facility.

19 **THE CHAIRPERSON:** Thank you.

20 My first question is for the licensee. On
21 the staff overheads, specifically number 13 -- no -- yes,
22 number 13, the staff gave the Commission an update on some
23 issues with regards to a licence condition, new condition
24 and modified condition.

25 For the record, could the licensee confirm

1 that they are accepting of those changes, or do you have
2 any comments with regards to that?

3 **DR. HEDGES:** You're referring to the
4 licence conditions. We have no objections.

5 **THE CHAIRPERSON:** I would like -- just for
6 an example, on your overheads, page 7, you gave the plans
7 for improvements in a number of areas, and just to give
8 the Commission a flavour rather than into great detail of
9 any one of these, I would just like to know, for example,
10 could you give us some information on the plan for
11 deployment of the root cause analysis work that resulted
12 from the use of industry peers, just to give us an example
13 of how this would be instituted?

14 **DR. HEDGES:** For the record, Ken Hedges.
15 Paul Lafrenière will describe the root
16 cause initiative.

17 **MR. LAFRENIERE:** Paul Lafrenière for the
18 record.

19 AECL has recognized that there was a
20 weakness in the root cause analysis area. Starting in
21 February of this year, plans were put in place to get to
22 the bottom of the issues and resolve them.

23 So what has been done, basically, industry
24 peers were brought in. We have done a complete review of
25 the Corrective Action Program and the root cause analysis

1 area. They are related. The report was put together and
2 those recommendations are being acted upon and they are
3 part of the continuous improvement plan for the site, NRU
4 and DIF.

5 Specifically, what has been done is
6 training has been put in. The program has been revamped
7 on root cause analysis. Training has been put in place
8 and is continuing, and we are putting a lot of our young
9 staff, professional staff, through these areas.

10 Changes to the process include not only in
11 the area of staffing in the OPEX area, operating
12 experience area, but they also included changes to the
13 process such as we have introduced a peer or a discovery
14 process prior to presentation to management of the root
15 cause analysis results.

16 At these meetings, all of the lead
17 investigators for the site attend, and what this does is
18 we use the advantage of counselling from industry peers,
19 recognized experts in the root cause analysis area at
20 several stations, to come in and provide assurance that we
21 are upgrading the overall level.

22 So one of the main issues in the past was
23 we were not getting to the underlying causes. We were not
24 probing enough. That is being changed, and I think in the
25 recent root causes analyses that have been submitted by

1 AECL, I think we can see a change in the positive area.

2 I should also point out that AECL has
3 commissioned, and had performed, a common cause analysis
4 by recognized industry peers. Again, who have done this in
5 many power plants around the world. They have come in and
6 taken roughly 20 of our events in the DIF facilities and
7 they have looked at the underlying causes behind them.

8 AECL has received the recommendations and
9 is acting upon them, and they are an integral part of our
10 continuous improvement plan.

11 **THE CHAIRPERSON:** I just have a couple of
12 comments which the licensee and the staff may want to
13 probe with me.

14 My sense for the licensee is that a lot of
15 the questions of the Commission is -- a number of the
16 questions of the Commission Members really revolve about
17 understanding the Continuous Improvement Program that you
18 have put forward and understanding this, but remaining, I
19 think, concerned that it will be implemented in the long
20 run, that it isn't really -- that it isn't a short-term
21 commitment.

22 I don't think there is much that can be
23 said now. I mean, the proof will be in the pudding, I
24 think, of this, but I think since this deeply affects not
25 just MAPLE but so many of these are intrinsic and

1 these kinds of change programs really require processes
2 and commitments that go beyond the current, you know,
3 management and even employee group. And we have been, in
4 parallel to this, focusing on an overall corporate culture
5 change program, which is designed to effectively achieve
6 sustainability in these kinds of improvements across the
7 board.

8 That overall Cultural Change Program, which
9 is really designed to change the way we do our business
10 every day in every aspect of the company, that's been
11 underway for a bit of time now, but it is being led by
12 myself and the Executive Committee.

13 Also, the Board of Directors is engaged
14 through one of their committees who are overseeing that
15 Cultural Change Program. And its thrust is to ensure that
16 the momentum around these things becomes part of the
17 fabric of our organization and it transcends my time in
18 the organization, and that of other key people.

19 As we look at the group of management in
20 our company, and its age and the retirement period over
21 the next five years and so on, we are also linking to
22 succession planning and the choice of people from outside
23 that we bring into the organization.

24 And you have heard me this morning mention
25 a few key appointments where we are bringing people into

1 the organization who can bring this kind of experience not
2 only in cultural change but in sustainability of that
3 cultural change into the organization.

4 So we are hoping for enough continuity in
5 the top management and in our management ranks in general
6 to drive this forward, but it is a major corporate
7 objective; it is one of the six major objectives that are
8 established by the company against which we are all
9 measured and evaluated and it goes right up to the Board
10 of Directors or contained in our corporate plan and so,
11 ultimately, go to the shareholder.

12 So I think we are addressing this. It is a
13 long process. Most people talk about these changes as
14 taking a number of years, but I think we have been into it
15 for a number of years across the company.

16 AECL is a large and diverse organization as
17 you well know, and we have had pockets of excellence, if
18 you will, where things have really taken off. Other parts
19 of the organization have lagged a little bit, and I think
20 the thrust now is aimed to bring everyone up to the same
21 speed at the same time and have the organization proceed
22 forward in an organized change program.

23 So we can report on that on a regular basis
24 over and above these things, which are fundamental to it,
25 but they are not just pockets of activity that are

1 happening around, say, the MAPLE Reactors or around some
2 other activity at Chalk River. It is sustainable and
3 ongoing across the whole company.

4 **THE CHAIRPERSON:** I say this just to
5 connect my two questions, I suppose, is that really the
6 issues that would come before us would be areas where
7 there was an SDR that required sort of a response in terms
8 of the root cause analysis, which in some cases may be
9 appropriate and in some cases may not, you know, depending
10 on the type of areas. So you know, as I said, the proof
11 of the pudding.

12 My question to staff is -- Mr. Lamarre
13 answered my question, which was probably -- I probably
14 should not have tacked it onto Dr. Barnes' question -- so
15 I didn't probe it too much. But I wasn't actually
16 concerned, Mr. Lamarre, about the following of their
17 project management plan.

18 I think if I can think about a second theme
19 that I am hearing from the questions is the issue about
20 the Commission requiring assurances from the staff that as
21 well as watching carefully what they do in their project
22 management plan -- and I think that you have given a
23 number of comments with regards to seeking to assure the
24 Commission of vigilance in terms of the watchdog approach,
25 if I could give you that -- but I think what the

1 Commission would expect would be that the staff would
2 have, as well as this very optimistic and somewhat
3 parallel project management plan, which is reasonable for
4 the licensee that the staff have a sense from their own
5 point of view, looking at it from a risk point of view.

6 The important areas in your project
7 management plan, not in theirs, in your project management
8 plan, where some of the critical decisions -- I wouldn't
9 go as far as say go, no go, but critical overview types of
10 decisions need to be made by the Commission staff on the
11 safety.

12 So that was just to give you a sense of
13 what my question was about. It wasn't whether you have
14 sufficient staff to watch what they are doing, it is
15 whether there is a separate plan in your mind about the
16 issues that we are relying on you to look at in terms of
17 the overview as you go through these points, particularly
18 as we see some of these scientific, as certain areas
19 develop and especially with phenomena that everyone agrees
20 are new and unexplored.

21 So I think there is some opportunity to
22 give the Commission assurances that there is that kind of
23 mindset.

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

25 Yes, to answer your question very

1 succinctly, Madam Chair, we certainly are in the mindset
2 of ensuring that we are clearly focused on what are the
3 key licensing strategies criteria that we have to address
4 in order to assure safe operations of this facility today,
5 tomorrow, during the period of the proposed license.

6 I'd point to the CMD that was delivered to
7 the Commission last summer, 04-M28, as well as the Day One
8 CMD-05-H20, as evidence of the fact that staff has clearly
9 laid out what the licensing plan or strategy is from our
10 perspective, and I think what you see in there are all of
11 the key prerequisites.

12 Those are prerequisites that have been
13 derived, presented to you by staff from our perspective in
14 order for the licensee to move off of the step that they
15 are on now beyond that step.

16 We have got key criteria, decision-making
17 points, as you said, Madam Chair, that need to be
18 addressed to our satisfaction such that we can make a
19 recommendation, for example, up to the designated officer
20 for his approval on certain key licensing strategies.

21 So we have certainly thought about that
22 from a project management perspective as you have coined,
23 and we are looking at what criteria are key, at what phase
24 of the licensing strategy to continue to give us
25 confidence of safe operation and the protection of HSC.

1 So I can certainly concur and I hope I have
2 satisfied any questions that you had that staff is
3 certainly looking at this strategically from a project
4 management perspective.

5 **THE CHAIRPERSON:** Thank you.

6 I guess my last question at this point is
7 with regards to communication. This project has suffered
8 over the years, almost five years, since I have been
9 President, of comments with regard to communications and
10 clarity of communications on this point. We certainly
11 have seen before the Commission where we have asked you to
12 bring back to clarify that people are communicating and
13 that there is an understanding between licensee and staff
14 on this.

15 So I would just like to ask, first, the
16 licensee and the staff to comment with regards to the
17 quality and clarity of the communications on this
18 particular project which I think has suffered over the
19 years -- licensee first.

20 **DR. HEDGES:** For the record, Ken Hedges. I
21 would just like to make two points.

22 I think there is an opportunity to improve
23 communication and confidence building. I strongly endorse
24 the assignment of CNSC staff to the site where they will
25 be able to observe on a daily basis the behaviours of the

1 staff and the behaviours of management so that we can
2 build that confidence that things are going in the correct
3 direction.

4 The second point I would make is that I
5 have adopted a policy of as soon as any information is
6 available I have made it available to the staff.

7 So, for example, when we had our first
8 High-Level Briefing from Brookhaven in Idaho, I not only
9 invited ourselves, MDS Nordion, but also staff to come and
10 see that.

11 We didn't get any preview of that, we
12 talked to them about what they were going to say but, in
13 general, we have just been as open as we can and to try to
14 see if we could bring ourselves and the staff to a common
15 understanding of these complex issues.

16 Thank you.

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

18 I would say that from our perspective, the
19 communication has improved immensely and is staying good,
20 partly because we have put a lot of discipline on
21 ourselves at the project level, with Mr. Pearson at the
22 management level, with Mr. Lamarre at the executive level,
23 with me meeting with Dr. Hedges on a regular basis.

24 We do concur that a site office that we
25 will be establishing over the next few months will give us

1 day-to-day insights that we don't have right now and I
2 think that will be very positive. But I think my
3 perspective is the lines of communication are open and
4 they are being used and I find that things have improved
5 immensely.

6 There is much -- a few surprises, and I
7 think that was what was occurring before, is people were
8 taking positions and they were getting entrenched and not
9 communicating until the entrenched positions are there,
10 whereas now issues are being discussed much earlier to get
11 them out and get people thinking about it.

12 So from my perspective I am satisfied with
13 the way communication is presently.

14 **THE CHAIRPERSON:** Thank you.

15 I will just check if there is round two
16 questions.

17 Mr. Taylor?

18 **MEMBER TAYLOR:** Just one. Yes, a question
19 just to follow-up on that communication issue.

20 I noticed AECL say that they had not
21 received formal agreement, that their approach to
22 commissioning assurance had been accepted by the CNSC, the
23 CNSC staff said it was acceptable. Does staff propose to
24 write formally on the topic?

25 **MR. PEARSON:** Bruce Pearson, for the

1 record.

2 Yes, we intend to write formally on the
3 record that the methodology that is being employed for
4 commissioning demonstration of design intent is
5 acceptable.

6 **THE CHAIRPERSON:** Dr. McDill.

7 **MEMBER MCDILL:** Thank you. This is a
8 follow-up to my earlier question.

9 With respect to validation of the codes in
10 your sections -- AECL section 7.1.5 -- clearly, with the
11 lack of ability to predict the Positive Power Coefficient
12 of Reactivity, there must be some concern as well with the
13 use of Cathena to complete the code validation in the -- I
14 guess for the parameters or for the ranges that are
15 applicable to MAPLE.

16 I was wondering if you would comment, then,
17 on how you plan to deal with that issue as you go through
18 the other -- I guess there are sort of eight or nine
19 bullets there with respect to measure flow through the
20 diodes et cetera down to xenon reactivity?

21 **DR. HEDGES:** For the record, Ken Hedges.
22 Albert Lee will respond to that.

23 **MR. LEE:** With respect to many of the other
24 phenomena that have been measured in the commissioning
25 tests up to 8 megawatts in the MAPLE 1 Reactor, we have

1 completed validation exercises where we have compared
2 predictions using Cathena to the thermohydraulics
3 phenomena that were measured and, in general, the
4 agreement is very good between the thermohydraulics
5 predictions using Cathena and the measured trends from the
6 commissioning tests.

7 In many instances, we find that our safety
8 analysis assumptions were demonstrated to be conservative
9 and, when we applied best estimate analysis, that it is
10 using the same codes that we come in very good agreement
11 with the measured phenomena; the one notable exception, of
12 course, being the Positive Power Coefficient of
13 Reactivity.

14 **MEMBER McDILL:** Two more very brief
15 questions.

16 In the first round, you commented that the
17 flexion of the target was -- I think you said 0.6 to 1
18 millimetre at full power. In terms of a mathematical
19 definition, is this a large deformation or small
20 deformation or perhaps the question is ---

21 **MR. LEE:** With respect to the physical
22 dimensions of the target, the overall length of these
23 targets are half a metre, roughly, and the outside
24 diameter of the targets are 15 millimetres. It's an
25 annular target so the inside diameter is about $13\frac{1}{2}$

1 millimetres.

2 So one millimetre sideways deflexion is
3 actually a fairly large bowing. It is several times the
4 amount of bowing that one would normally expect to have
5 occur from physical manufacturing processes.

6 **MEMBER MCDILL:** And if you restrain that
7 target as a potential cure, is there any risk of large
8 thermal stresses developing, particularly the Tensile, I
9 guess, would be your concern, or is it too early to
10 predict that?

11 **MR. LEE:** For the record, Albert Lee.

12 The methods that are being examined for
13 restraining the target would still allow the target to
14 expand thermally in the axial direction along the length.

15 So we are investigating modifications to
16 the methods for holding the assembly of targets in the
17 core such that we don't impose additional compressive
18 loads or restrain thermal expansion along the length. We
19 are simply looking at measures that would prevent a
20 deflexion in the radial direction.

21 **MEMBER MCDILL:** Thank you. Thank you,
22 Madam Chair.

23 **THE CHAIRPERSON:** Any further questions?

24 Well, thank you very much. This ends round
25 one. We will return with the intervenors. Thank you very

1 much for your patience.

2 We will take a 10-minute break and we will
3 be back for the intervenors' section. Thank you.

4 --- Upon recessing at 10:35 a.m.

5 --- Upon resuming at 10:45 a.m.

6 **THE CHAIRPERSON:** We are now going to
7 move to the interventions part of the hearing today.

8 Before we start, I would just like to
9 mention to the intervenors that we have had -- especially
10 the ones who are new intervenors here -- is that all the
11 Commission members have had an opportunity to read your
12 fulsome presentation fully and your presentations will be
13 taken into account, the written as well as your oral
14 today. So we have allocated pretty well about 10 minutes
15 for each of you, but certainly that will be followed by
16 questions if appropriate from the Commission Members.

17 We also would like to note that, as I
18 mentioned this morning, we are having three hearings today
19 on AECL matters and, in some cases, some intervenors have
20 filed the same intervention for all three. We can take
21 these into account for each of the three hearings for the
22 MAPLE, for the New Processing Facility and for the NRU
23 extension.

24 So that if you -- I will be asking you at
25 the end if you would like that presentation that you are

1 making now to be taken into account at the other two
2 hearings or if you wish to make them separately. It is
3 your right to choose either of those as you see fit. In
4 either case, they will be taken into account at that
5 point.

6 So with that preamble, then, I would like
7 to move to the first intervention which is the oral
8 presentation by the Council on Radionuclides and
9 Radiopharmaceuticals, Inc. This is CMD05-H20.2 and 05-
10 H20.2A.

11 I am pleased to welcome the Chairman of the
12 Council with us today and, sir, the floor is yours.

13
14 **05-H20.2 / 05-H20.2A**

15 **Oral Presentation by**
16 **the Council on Radionuclides**
17 **and Radiopharmaceuticals, Inc.**

18
19 **MR. SAGER:** Thank you, Madam Chair. Good
20 morning to the Chair and to the Commissioners.

21 My name is Dave Sager and I represent CORAR
22 the Council on Radionuclides and Radiopharmaceuticals.
23 And what I hope to do today is to convince the Commission
24 of the importance of the MAPLE reactors to the practice of
25 nuclear medicine in North America.

1 A little bit about CORAR. CORAR is a North
2 America trade association and it is made up of
3 manufacturers involved in supplying products for nuclear
4 medicine. And, in fact, all the major manufacturers in
5 North America are members of CORAR.

6 Radiopharmaceuticals play -- nuclear
7 medicine plays an important role in medicine and you can
8 break down nuclear medicine into diagnostic nuclear
9 medicine and therapeutic nuclear medicine and you can see
10 in the presentation that we are touching on all the
11 primary front lines of medicine today.

12 I am going to focus just on one, coronary
13 artery disease.

14 Myocardial perfusion imaging is a procedure
15 that has grown by about 20 per cent for the last 5 years
16 and it is important for physicians to be able to predict
17 myocardial infarction for patients that have had previous
18 myocardial infarctions and for patients that have never
19 had one.

20 So this is a growing procedure and it is
21 kind of the -- it is the basis for a lot of the growth in
22 nuclear medicine today.

23 You can see the growth chart. Now, there
24 are different sources for numbers. If you talk to the
25 Society of Nuclear Medicine today, you will see that they

1 would say that right now there is approximately 20 million
2 procedures done in North America. This data source,
3 considered to be highly accurate, shows 17 million.

4 But, however you look at it, you can see
5 that the procedures are growing at a very rapid rate and
6 this is because of the involvement of nuclear medicine in
7 cardiology, in oncology, and other specialities.

8 Right now, AECL and MDS Nordion supply 40
9 per cent of the world's moly 99. Now, I mentioned
10 myocardial perfusion imaging. That procedure is dependent
11 upon moly 99. AECL/MDS Nordion also supply I-131, used
12 for diagnostic thyroid uptake studies and treatment of
13 Graves' Disease and they also supply iodine 125, used for
14 Brachytherapy Seeds for implantation for prostate cancer.

15 So, as you can see, nuclear medicine and
16 the products from AECL and MDS Nordion are important in
17 the practice of nuclear medicine.

18 The practice is growing in other ways as
19 well.

20 We have a new class of radiopharmaceuticals
21 that are using monoclonal antibody to target specific
22 cancers and attach radionuclides to the monoclonal antibody
23 that takes it right to the cancer and creates a desired
24 effect, killing the cancer cells.

25 We have seen two introduced Speczor (ph)

1 and Zevalin and we anticipate seeing more in the
2 marketplace in the years to come.

3 So, if you take a look at the reactors that
4 are commercially producing material today, the NRU reactor
5 has been the principal supplier for -- one of the
6 principal suppliers for North America; as I said,
7 supplying roughly 40 per cent of the world's moly.

8 It is critical, as the aging NRU reactor
9 looks to be decommissioned that the MAPLE reactor come on
10 board and, therefore, we encourage the MAPLE reactors --
11 you to continue to licence the MAPLE reactors so that they
12 can continue to supply the radioisotopes necessary for
13 nuclear medicine studies.

14 In summary, I think I have shown that
15 nuclear medicine in North American is growing and
16 important for the delivery of health care today. MDS
17 Nordion and AECL have done a great job in supplying the
18 needs of the medical community. They have been a reliable
19 supplier of moly over the years and the other reactors
20 around the world are not going to be able to keep up with
21 the demand for moly and other radioisotopes.

22 Therefore, we need to have the MAPLE
23 reactors brought on line and to continue to supply the
24 world, and particularly North America, with radioisotopes.

25 That concludes my presentation, Madam

1 Chair.

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

3 Are there any questions or comments from
4 the Commission Members with regard to this presentation?
5 Dr. Dosman?

6 **MEMBER DOSMAN:** Madam Chair, I just wonder
7 if I might ask: Given the almost exponential increase
8 that you show in the nuclear medicine field, does your
9 organization have a handle on the degree to which the
10 technicians and the public are protected from undesirable
11 effects during this rapid growth?

12 **MR. SAGER:** Are you referring to the
13 technicians in the radiopharmacies or the people
14 delivering the dose to the patient?

15 **MEMBER DOSMAN:** Well, I guess both, but
16 actually I was thinking of the people delivering the dose
17 on site.

18 But, of course, you raised another issue as
19 well.

20 **MR. SAGER:** Yes, we are very involved with
21 the -- particularly the Nuclear Regulatory Commission and
22 those in the U.S. that monitor the safety at all stages of
23 nuclear medicine, from the nuclear pharmacies to the
24 technicians that deliver the dose to the patient.

25 **MEMBER DOSMAN:** Could you give some

1 description of the level of confidence in the
2 effectiveness of the procedures used to protect the
3 technical people and, indeed, the patients, the public?

4 **MR. SAGER:** Well, you are venturing outside
5 of my area of expertise, but I will say that I know that
6 everybody involved wears monitoring equipment. The
7 monitoring equipment is evaluated and I am fairly
8 confident -- I am confident that the safety levels are
9 high for the practice of nuclear medicine?

10 **MEMBER DOSMAN:** Thank you.

11 **THE CHAIRPERSON:** I just think perhaps --
12 so there would not be a misunderstanding -- I understand
13 your comment was with regards to the decommissioning of
14 the NRU.

15 And, unless I am mistaken -- and AECL will
16 correct me -- I believe that there is actually going to be
17 a move made to extend the life of the NRU.

18 I just thought that perhaps AECL might want
19 to clarify that for the record.

20 **DR. HEDGES:** For the record, Ken Hedges.

21 The MAPLE reactors are there to follow on
22 from NRU. The MAPLE reactors will be in service according
23 to those schedules we presented.

24 In the meantime, it is essential that NRU
25 continue to produce those isotopes.

1 The concept of two MAPLE reactors and a
2 more advanced processing facility which deals with the
3 waste in a more modern way and a more effective way, I
4 think are the benefits of the dedicated isotope
5 facilities.

6 But we strongly support the need for NRU to
7 provide them in the interim.

8 **THE CHAIRPERSON:** That is just for
9 clarification for the record.

10 Well, thank you very much, sir, and thank
11 you for coming before us today.

12 I would then like to move to the next
13 presentation. It is an oral presentation by
14 Messrs. Cole, Merit, Pyatt and Brown, as outlined in CMD
15 05-H23, 05-H23A, and my understanding is Mr. Brown will do
16 the presentation, sir.

17 Welcome to the Commission and the floor is
18 yours.

19 **05-H20.3 / 05-H20.3A**

20 **Oral presentation by**

21 **Maurice D. Cole, Kenneth Merrett**

22 **Al Pyatt and Cliff Brown**

23

24 **MR. BROWN:** Well, Madam Chair and Members
25 of the Commission, I am Cliff Brown and my associate,

1 Maurice Cole, planned to be here today to share this
2 presentation with me, but he cannot be here because of
3 illness, so I will be doing the entire presentation.

4 We represent a group of four members of
5 the public living in the Town of Deep River.

6 Three of us were former employees of Chalk
7 River and the fourth was a schoolteacher who has spent his
8 life educating many of our young folk, some of whom are
9 now working at CRL and a larger group who always seemed to
10 go on to make a contribution to society and Canada, the
11 U.S.A. and many other parts of the world.

12 We thank you for the opportunity to
13 personally express our support for the licence extensions
14 or renewals of three reactors in an isotope processing
15 facility.

16 As you have all had opportunity to read our
17 submission, I shall direct our comments of support for the
18 isotope of radiation and processing facilities on a much
19 more personal level. Two of us benefit from one of the
20 products, Technitium-99 through a yearly bone scan. It
21 gives us knowledge that our treatment for prostate cancer
22 is working or perhaps gives us an early warning that it
23 has become metastatic and spread to the bones.

24 A third member of our group benefits from
25 the use of a tracer to identify where plaque is nearly

1 blocking a blood vessel.

2 Perhaps at this time I should explain why I
3 am so enthusiastic about the development or growth of
4 medical isotope production.

5 I come from a family which is reputed to
6 have a defective gene. Whether it's true or not, that's
7 the comments. It makes us more susceptible to cancer.

8 In 1951 my grandfather died of prostate
9 cancer and melanoma. In the mid-seventies my father died
10 of prostate cancer and shortly after my brother died of
11 lung cancer from second-hand smoke.

12 Needless to say, over the 40 years
13 beginning in 1950, the evolution of diagnostic and
14 treatment technology in our health system has been
15 dramatic. For my grandfather who lived in remote central
16 Ontario, diagnosis often occurred after death. For my
17 father and brother, diagnosis had improved but often too
18 late to effect an adequate treatment.

19 By 1990, when my prostate cancer was
20 detected, it was early enough to allow successful
21 treatment initially with a very radical method.

22 Today, on initial diagnosis radical surgery
23 is rarely practised, being replaced with a session of
24 hormone block to weaken the cancer growth weight and then
25 followed with an external beam radiation using an

1 accelerator-base source or, more recently, by brachia
2 therapy using radioactive seeds.

3 For me, advanced treatment and
4 radiopharmaceuticals has given me a life expectancy well
5 beyond the 10-year target that my urologist cited to me in
6 1990 when I was detected with cancer.

7 I believe that the role of
8 radiopharmaceuticals in health system practice will
9 increase and I think our previous presentation made a good
10 indication of that and confirms my belief.

11 Canada should and must take a lead both in
12 production and also in the development of new applications
13 and technologies. More countries will be able to devote
14 more money to healthcare and with that, the need for
15 radiopharmaceuticals will grow. So we as a nation that is
16 considered to be part of the developed world should be
17 ready and non-hesitant to put our money where our skills
18 and knowledge can really take us.

19 I shall now direct a few remarks in support
20 of the licence extension for NRU Reactor and following
21 that for a much longer period. While we have really
22 talked about isotope production already, but one comment
23 remains. I understand that production of longer-lived
24 isotopes will continue in NRU once production is
25 transferred to the MAPLE machines.

1 began in 1985 had a huge impact on research and
2 development at CRL. Many programs ceased; their
3 facilities given away and their personnel dispersed to all
4 parts of the world. However, the neutron-scattering
5 facilities and their management was transferred to the
6 National Research Council, re-emerging as the Canadian
7 Neutron Beam Centre.

8 Today, young researchers from Canadian as
9 well as world universities can carryout their research
10 work using these facilities very often without a facility
11 charge.

12 With the availability of neutron beams from
13 NRU or its potential successor, the proposed Canadian
14 Neutron Facility, Canada will have a specialized skills
15 and knowledge resource that is very essential for meeting
16 the demands of a growing knowledge-based economy.

17 But equally exciting to me is the
18 availability of special neutron-scattering facilities to
19 Canadian industry to solve special materials problems, to
20 prove material performance for new product designs and to
21 perform a wide variety of measurements on many different
22 materials at a very wide range of temperatures and
23 pressures. This work is done by NRC staff. It is kept
24 fully proprietary and does not require expert knowledge by
25 client staff and it is done at a cost that is within the

1 pocketbook available to Canadian industries.

2 When one examines even briefly the wide
3 range of resources provided by the NRU Reactor in its
4 specialized facilities, we recognize that it has been and
5 continues to be a tool for Canadian economic growth. It
6 becomes easy for every one of us to see that this reactor
7 must continue to operate and, in doing so, to serve
8 Canada.

9 Thank you for listening.

10 **THE CHAIRPERSON:** Thank you, Mr. Brown.

11 Are there any questions from the Commission
12 members to Mr. Brown?

13 Well, thank you very much, sir. Would you
14 please indicate whether you would be doing a separate
15 presentation then at the other two hearings or not, sir?

16 **MR. BROWN:** Well, I think I have included
17 my comments for the entire group in this particular
18 presentation, so I think I won't bore you any further, so
19 to speak.

20 **THE CHAIRPERSON:** You certainly don't bore
21 us, sir. Thank you very much.

22 We will then now move to the next
23 presentation which is the oral presentation by MDS Nordion
24 as outlined by CMD documents of 05-H20.4 and 05-H20.4A.

25 I am pleased to welcome the President of

1 MDS Nordion, Mr. Steven West and the Vice-President of
2 Technology, Mr. Grant Malkoske.

3 Sirs, the floor is yours.

4 **05-H20-4 / 05-H20.4A**

5 **Oral presentation by**

6 **MDS Nordion**

7 **MR. WEST:** Thank you, Madam Chair. Good
8 morning.

9 Good morning, members of the Commission.

10 I am Steve West, President of MDS Nordion
11 and on my right is Grant Malkoske, Vice-President of
12 Technology at MDS Nordion.

13 MDS Nordion is a key stakeholder in these
14 projects with AECL and is a strong partner with AECL in
15 the supply of radioisotopes for the international medical
16 community.

17 MDS Nordion is appearing before the
18 Commission to fully support the Application by Atomic
19 Energy Canada for the renewal of operating licences for
20 the MAPLE reactors and the New Processing Facility.

21 We would also request that our intervention
22 be recorded in support of the operating license extension
23 to NRU.

24 Mr. Malkoske will do our presentation.

25 **MR. MALKOSKE:** Thank you, Madam Chair, and

1 members of the Commission.

2 So just following on Mr. West's comments,
3 what we would like to demonstrate is our support for the
4 licensing work of AECL in preparing, and the Canadian
5 Nuclear Safety Commission in reviewing and approving the
6 applications, all the while ensuring the safety of the
7 public, workers and the environment, and also with a
8 commitment to the ongoing quality of the operation of the
9 facilities as they are producing medical isotopes.

10 We also would like to emphasize the
11 importance for a timely NRU licence extension now, given
12 the role that has been discussed around Canada, being a
13 premier supplier and assuring the global medical isotopes
14 supply.

15 And lastly, of course, we would like to
16 comment on the importance of the MAPLE facilities as a
17 future producer of medical isotopes, a producer that will
18 service the international nuclear medicine community.

19 We have come before the Commission
20 previously on a variety of issues to portray the important
21 role of Canada through MDS Nordion and AECL in supplying
22 the world with medical isotopes.

23 Certainly, it is the view of MDS Nordion
24 and our customers that Canada's supply is essential to the
25 provision of healthcare for patients who are beneficiaries

1 of medical isotopes globally.

2 Today, the NRU Reactor plays a vital role
3 in producing medical isotopes for MDS Nordion. In the
4 future, the baton will be passed to the MAPLE facilities to
5 fulfil this important role.

6 Once the radioisotopes have been produced
7 at the Chalk River Laboratories, at MDS Nordion, we
8 further process these products and ship them worldwide to
9 our customers, the radiopharmaceutical manufacturing
10 companies. It is these customers who, in turn, undertake
11 further processing of the material and distribute the
12 final radiopharmaceutical products to many thousands of
13 hospitals and clinics for patient care.

14 For physicians and patients, moly-99 is the
15 world's most important medical isotope. Eight (8) of 10
16 nuclear medicine diagnostic procedures depend upon this
17 isotope. It has particular significance in diagnosing
18 cancer and heart conditions.

19 Other isotopes produced in the NRU Reactor
20 are iodine-131 used for a variety of treatment
21 applications including fibroid cancer therapy and
22 diagnostic imaging, iodine-125 used for treating prostate
23 cancer and xenon-133 used for lung ventilation studies.

24 Furthermore, the NRU Reactor is the world's
25 primary producer of high specific activity cobalt-60. It

1 is cobalt-60 that is produced at NRU which is used for
2 cancer and teletherapy applications and equipment supplied
3 by MDS Nordion to more than 60 countries worldwide.

4 MDS Nordion's distribution to top export
5 destinations reveals an interesting picture. This chart
6 shows that many countries depend significantly on the
7 export of Canadian-sourced isotopes.

8 For example, we supply some 17 per cent of
9 the isotopes needed by Europe, some 50 per cent of the
10 isotopes by the United States, to South America some 80
11 per cent of the medical isotopes and in Japan, 85 per
12 cent.

13 So this helps to illustrate, certainly, the
14 importance of NRU today and the future importance of the
15 MAPLE reactors.

16 Allow me to make the following points that
17 provide an interesting perspective on what we do. So
18 while there may be many individual products or commodities
19 where Canada leads the world, the following information
20 affirms the point that Canada is a global leader in the
21 production of medical isotopes.

22 In fact, we see here that Canada is the
23 first supplier, the premier supplier of medical isotopes
24 around the world, the largest exporter, in fact. And we
25 see some of the applications; automotive, for example, we

1 are the third largest exporter; the fourth largest
2 exporter of agricultural products and the sixth largest
3 producer of oil and gas.

4 So if you look at it from this perspective,
5 it helps us to truly appreciate how important this
6 partnership is between Atomic Energy of Canada Limited and
7 MDS Nordion in meeting the needs of the nuclear medicine
8 community.

9 So then, as a country we want to pay
10 particular attention to our trade prospects as they relate
11 to these other products, but also especially as they
12 relate to healthcare products.

13 The NRU Reactor is important today. It is
14 a primary supplier of medical isotopes. There are some
15 100 applications of medical isotope scans used in today's
16 medicine. More than 25,000 patient procedures are
17 performed daily worldwide using medical isotopes supplied
18 by MDS Nordion with over 9 million procedures performed
19 annually.

20 Everyday more than 45,000 cancer treatments
21 are performed using cobalt-60 produced in the NRU Reactor,
22 and, as I said previously, overall some 60 countries
23 globally rely on Canada for a substantial portion of their
24 reactor-produced isotope needs.

25 Moreover, our isotope supply and isotope

1 technology continues to be the foundation for MDS Nordion
2 and our customers to find new ways to diagnose and to
3 treat disease.

4 Radioisotope technology is being applied to
5 develop new ways to target and treat cancer. It is now
6 possible to deliver the radiation right to the cellular
7 level within the body.

8 Known as radio immunotherapy, monoclonal
9 antibodies are used to carry the radioisotopes to the
10 cancer cell where radiation destroys the individual cell
11 and largely spares healthy cells. This treatment is
12 offering new hope for conditions like non-Hodgkin's
13 lymphoma.

14 In fact, Health Canada has recently
15 approved the drug Bexar for use in Canada, and MDS Nordion
16 is a supplier of the medical isotope iodine-131 being used
17 in this product.

18 So Canadian enterprise has become an
19 essential partner for biotechnology companies to develop
20 their leading edge treatments by radio wavelength
21 molecules.

22 Medical isotope innovation continue to
23 unfold. Molecular imaging is leading toward new ways to
24 develop drugs. Molecular imaging is a term used for an
25 immerging set of drug development tools that are based on

1 nuclear technologies and are anticipated to help bring new
2 drugs to market faster, more economically, and with a
3 greater probability of success.

4 For example, at the developmental stage
5 molecular imaging allows researchers to track the bio-
6 distribution of a drug in animals and, therefore, to
7 better translate the results into humans.

8 Molecular imaging could also be used at the
9 clinical and commercial stages of drug development to
10 identify which patients could benefit from a particular
11 drug before they take it and then monitor how well it
12 performs. This can be used for diagnosing or treating
13 heart disease, cancer and neurological disorders.

14 MSD Nordion and Canada are positioning
15 themselves as leaders in this area because of our
16 expertise in radiation technology and our access to
17 radioisotopes supplies.

18 If today, for whatever reason, the NRU
19 Reactor was not available for isotope production, the
20 demand for these medical products would experience a
21 shortfall in supply.

22 In fact, all other producers in the world,
23 collectively, cannot fill the gap that would be created by
24 the unavailability from NRU.

25 We do maintain supply agreements to backup

1 short-term isotope requirements from the handful of other
2 countries that produce reactor isotopes. But if NRU is
3 unable to supply isotopes for an extended period beyond a
4 routine maintenance shutdown, there is not enough global
5 capacity to supply the world's demand for reactor produced
6 medical isotopes.

7 NRU, which has played a key role in
8 supplying medical isotopes to date, has been in operation
9 for some 48 years now. So replacing this aging reactor
10 continues to be a priority for MDS Nordion in order to
11 assure the global nuclear medicine community that Canada
12 can continue to be a dependable supplier of medical
13 isotopes for the world.

14 For radiopharmaceutical companies, who are
15 MDS Nordion's customers, to nuclear medicine physicians,
16 to patients who benefit from this technology, the health
17 care system depends on Canada to supply medical isotopes
18 reliably and routinely.

19 Which brings us to MAPLE. To ensure a
20 reliable continuous supply of medical isotopes we have
21 made the decision to build two MAPLE reactors and a New
22 Processing Facility. MAPLE 1 and MAPLE 2 will provide a
23 mutual backup capability. So while the commissioning
24 process proceeds to get the MAPLE facilities into
25 commercial production the continued supply from NRU

1 certainly is essential.

2 The nuclear medicine community is vitally
3 interested in a timely completion of the MAPLE facilities
4 and in the safe and dependable commencement of commercial
5 production of isotopes from them. The presentation by
6 CORAR helped to demonstrate that today.

7 To provide the assurance to the healthcare
8 community that Canada will maintain its reputation and
9 capability as a reliable supplier of isotopes, it is
10 important to proceed with the safe and timely completion
11 of the MAPLE project with full adherence to an effective
12 Quality Assurance Program.

13 So then in summary, we are confident of
14 AECL's ability to ensure the safety of the workers and the
15 public as they proceed with licensing, to deliver an
16 effective Quality Management Program, and to ensure the
17 ongoing reliability of the operations and protection of
18 the environment, and an essential requirement going
19 forward, of course, is to ensure that all the requisite
20 regulatory requirements are being achieved.

21 So in conclusion, then, we support the
22 request that AECL has made to renew the operating licence
23 for the MAPLE Reactors and the NPF for this two-year
24 period, and also to extend the NRU Reactor operating
25 licence to July 31st, 2006.

1 Thank you.

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

3 I believe, Mr. West, you said that this
4 would be the presentation for all three; is that correct?
5 Thank you, sir.

6 Are there any questions or comments from
7 MDS Nordion? Yes, Dr. Barnes.

8 **MEMBER BARNES:** Let me just interrupt your
9 statement.

10 For all the last three intervenors -- I
11 mean, I don't think there is any doubt that the Commission
12 recognizes the importance for Canada and this particular
13 facility to produce and allow a production of medical
14 isotopes. I just want to make sure that is clear.
15 Obviously, our responsibility here is to look at the safe
16 development of the MAPLE reactors.

17 So I would, if it is not an improper
18 question to Nordion, I notice in your last slide that
19 you're confident of AECL's ability and you have four
20 bullets, but you don't actually assure confidence in the
21 ability to construct the MAPLE reactors. I wonder, having
22 seen the material presented and also the new schedule and
23 the new management that AECL has put in place, do you have
24 reasonable confidence that the MAPLE reactors will be put
25 in place in the timeframe that you now think is

1 reasonable?

2 **THE CHAIRPERSON:** And you may wish to
3 answer this or you may not wish to answer it. It's your
4 choice.

5 **MR. WEST:** I think we do have confidence
6 definitely in AECL and their ability to find a solution.

7 Clearly, there are still some uncertainties
8 and we are concerned about those, as is the nuclear
9 medicine community worldwide, but I think from our
10 perspective where we stand today that AECL has the "A"
11 team on the project and we stand right behind them.

12 **MEMBER BARNES:** If I could ask another one?

13 Having seen some of the statistics on the
14 growth of demand for medical isotopes, when you appeared
15 to us right at the beginning for the MAPLE reactors the
16 second reactor was simply a backup for the first one.

17 Given the growth, at what point do you see
18 the second reactor being needed essentially to supply the
19 demand for isotopes?

20 **MR. MALKOSKY:** Grant Malkosky.

21 I think as we see the MAPLE 1 Reactor come
22 onboard we would expect that certainly within the 10 to 20
23 year timeframe there should be sufficient capacity in the
24 MAPLE 1 Reactor to produce the world's medical isotopes,
25 certainly the demand from MDS Nordion.

1 What the capability of MAPLE 2 will provide
2 for us is an option to go forward should that growth
3 really materialize. We would have to then at that point
4 in time certainly take a broader look at infrastructure.

5 So for example, if the demand is really
6 there does the New Processing Facility have the capacity
7 to process the additional targets that will come out of
8 the reactors and keep up with that demand?

9 There would have to be a process capability
10 review, frankly, and a determination made whether there is
11 sufficient capacity in the existing facilities.

12 **MEMBER BARNES:** But you would expect that
13 would be beyond the year 2012?

14 **MR. MALKOSKY:** Yes.

15 **THE CHAIRPERSON:** Dr. Dosman.

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

17 For MDS Nordion I would just like to -- you
18 do say this in your last bullet, but I would just like to
19 pose the question at any rate.

20 Do you see that AECL is taking all the
21 steps that are necessary, from the point of view of
22 safety, of the workers and the public from the point that
23 the material leaves AECL as transported and arrives so
24 that all measures are being taken both for workers there,
25 for transportation, and at your site?

1 **MR. WEST:** We are fully confident in AECL's
2 safety record and their ability to deliver to us isotopes
3 in a safe manner.

4 **MEMBER DOSMAN:** Thank you.

5 **THE CHAIRPERSON:** Thank you very much,
6 gentlemen, for joining us today.

7 We would now like then to move to the next
8 submission, which is an oral presentation by the Canadian
9 Nuclear Workers' Council, as outlined in CMD-05-H20.5, and
10 we are very pleased again to welcome the president of the
11 council with us today with some representatives of the
12 union.

13 So sir, the floor is yours.

14 **05-H20.5**

15 **Oral presentation by the**
16 **Canadian Nuclear Workers' Council**

17 **MR. SHIER:** Thank you, and good morning,
18 Madam President and Members of the Commission.

19 As indicated, my name is David Shier. I am
20 the President of the Canadian Nuclear Workers' Council.
21 Today with me I have several representatives of our unions
22 and our council from the actual Chalk River site.

23 To my right is Gord Tap. Gord is with the
24 Chalk River Technician and Technologists Union. Beside
25 Gord is Mike Roy. Mike is with the Allied Trades Council.

1 The Allied Trades Council represents several unions in the
2 trades sector at Chalk River. Mike is actually a member
3 of the IBEW, International Brotherhood of Electrical
4 Workers. Beside Mike is Bill Richmond. Bill is a member
5 of the Chalk River Professional Employees Group. So they
6 do -- there is a lot of knowledge from the workplace with
7 me today.

8 At Chalk River there is a lot of unions.
9 I'm not going to go through our brief. I'm just going to
10 highlight some of the points there.

11 Of the 2000 employees at Chalk River there
12 is -- about 83 per cent of these workers are members of
13 unions. There is a large number of unions, in total about
14 15. Several of them are covered under the Allied Council.
15 But this, I think, can be an assurance that with the
16 number of unions there and representatives, any safety
17 issues would definitely be brought forward.

18 So we are here today in support of the re-
19 licences of the MAPLE reactors, the New Processing
20 Facility, and also support the extension of the NRU.

21 I think it is worthwhile pointing out that
22 on the second page of our submission the Joint Health and
23 Safety Committee at Chalk River has representatives from
24 all the unions on that committee, and we say it's part of
25 their work and success that they continue to reduce the

1 average radiation exposure. It has come down over the
2 years, and the safety record has improved or it has stayed
3 within industry averages. This is very important work
4 that some of these committees have been involved with.

5 In regards to the specifics of the
6 individual licences, the NRU, there was a little concern
7 there which we had highlighted in our submission regarding
8 staff leaving. It's only natural in areas when they know
9 something is going down that staff tend to start to look
10 for other positions.

11 There's been a lot of dialogue with the
12 unions and some discussions and they have worked day.
13 There's been new hires and that concern the unions had has
14 been addressed and there is a path forward in that
15 particular area.

16 The MAPLE reactors as we indicate, a little
17 disappointment. They have them fully commissioned but the
18 members who work in this facility assure us that in their
19 opinion, they are very safe to operate and the same with
20 the New Processing Facility.

21 So in conclusion, as we indicated, we are
22 in support and we assure the Commission and the public
23 that if there were any safety issues that these would
24 definitely be brought forward by the unions in the area,
25 area at the site and also remember that the people who

1 work there are members of the community and are naturally
2 very concerned with the environment and such.

3 And again, it should reassure you that they
4 would make sure things are brought up and they feel that
5 the site is very safe to continue operation.

6 Thank you.

7 **THE CHAIRPERSON:** Dr. Dosman has a
8 question.

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

10 I would like to ask Mr. Shier -- we've
11 heard a great deal this morning about operating
12 performance and performance assurance, about training and
13 also about safety culture. And of course, as you are
14 aware, operating performance and so on involves everyone
15 and are you confident that the workers on the site are
16 being fully cooperative and fully embracing the efforts of
17 AECL in achieving improved records in these two
18 categories?

19 **MR. SHIER:** I will make a comment and I'll
20 ask the others in the group to comment as well.

21 I'm familiar with the operator group up
22 there and the information I get from them that they are
23 satisfied with the safety. My actual role -- to turn hats
24 for a minute from the union I work for, that the operators
25 are one of our units and any safety concerns they have

1 they would direct them through me.

2 So I can say from the operators there that
3 there is no significant health and safety problem and as
4 far as the MAPLE goes in discussion with the MAPLE
5 operators, they are getting their training and, as I said,
6 they're anxious to get going with the project.

7 I'll ask the others if they want to make
8 any comment on that.

9 The others basically support that it would
10 be the same across the other unions.

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

12 Thank you for your reply but my question
13 really, sir, was much more specific in recognizing that
14 operation performance safety culture is really a
15 multipartite responsibility.

16 Are you confident that the workers on the
17 sites are fully or enthusiastically embracing the efforts
18 that we heard this morning of AECL to improve their
19 rating, to improve performance in these areas?

20 **MR. TAP:** My name is Gordon Tap. I'm
21 Secretary of the Chalk River Technicians and Technologists
22 Union and an employee of AECL for 24 years.

23 Our technicians are involved in almost all
24 safety aspects at the Chalk River site, right from basic
25 inspections of the buildings on a monthly or bi-monthly

1 basis, right up to the site Safety and Health Committee.
2 So we're always aware of the new initiatives that are
3 coming down from above, especially with respect to culture
4 change.

5 It's been made very clear to us and in our
6 own interest to embrace the cultural change that AECL has
7 put forward especially in safety culture.

8 Safety culture has been made quite -- we've
9 been made quite aware of it right from our webpage. Every
10 morning when we log into our computers it comes up.
11 There's quite often something about safety culture and
12 culture change at AECL, right down to the grassroots level
13 when our Branch Manager gives us updates from the EWBC. I
14 believe that's the acronym. I'm not quite sure.

15 So no, we are always quite aware of that
16 change and we are seeing results of it and we're embracing
17 it. We have to. It's our jobs. It's our community.
18 It's our environment and it's in our own best interest.

19 **MEMBER DOSMAN:** Thank you.

20 **MR. TAP:** You're welcome.

21 **THE CHAIRPERSON:** Other questions?

22 Well, again, thank you very much Mr. Shier
23 and the representatives for joining us here today.

24 Can I conclude that this would be the
25 presentation for all three hearings?

1 **MR. SHIER:** Yes, you can.

2 **THE CHAIRPERSON:** Thank you very much, sir.

3 We are now going to move to the next oral
4 presentation which is an oral presentation by phone, by
5 teleconference, by the Corporation of the Town of Deep
6 River.

7 **05-H20.6**

8 **Oral presentation by the**
9 **Corporation of the**
10 **Town of Deep River**

11 **THE CHAIRPERSON:** I understand Her Worship
12 Mayor Aikens is with us today. Am I correct, Mayor?

13 **HER WORSHIP MAYOR AIKENS:** Yes, I am here.

14 **THE CHAIRPERSON:** The floor is yours,
15 madam.

16 **HER WORSHIP MAYOR AIKENS:** Thank you very
17 much.

18 The Corporation of the Town of Deep River
19 supports the application by Atomic Energy of Canada for
20 the extension of the operation of the NRU reactor and for
21 the licence renewals for the MAPLE reactor and the New
22 Processing Facility.

23 Chalk River Laboratories, including NRU,
24 MAPLE and NPF, are located within the municipal boundaries
25 of the Corporation of the Town of Deep River but I would

1 like to also note at this point that you have letters of
2 support from the County of Renfrew and our closest
3 neighbours, the Town of Laurentian Hills.

4 AECL is a crucial part of the social
5 economic fabric of our community. The Town of Deep River
6 and the County of Renfrew have been home to Chalk River
7 Laboratories for 60 years and their contribution locally,
8 provincially, nationally and internationally is something
9 we are very proud of.

10 As it relates specifically to MAPLE, Canada
11 is a world leader in the production and supply of
12 radioisotopes for medical applications and you have heard
13 much more detailed presentations on that already this
14 morning. More than half of the world's medical isotopes
15 are currently being produced at AECL. So the extension
16 for NRU is critical to this while MAPLE is coming online.

17 The MAPLE reactor will provide, when it is
18 ready, medical isotope production for the world in a way
19 that we are very proud in the Corporation of the Town of
20 Deep River to be associated with.

21 Nuclear medical practices provide a
22 reliable and non-intrusive way to diagnose and treat
23 various types of diseases. Radioisotopes play an
24 essential role in nuclear medicine. Radioactive tracing,
25 nuclear magnetic resonance and also radioisotopes for

1 palliative and curative cancer treatments are again
2 techniques that were developed in association with AECL
3 and are currently being supportive with MDS Nordion and
4 are very important to our status as a community and we are
5 very proud to be able to be part of that.

6 I want to draw the attention also to NRU.
7 One of my other responsibilities at the County of Renfrew
8 is to be in charge of economic development and planning
9 and over the last 18 months, I have had the opportunity to
10 visit NRU twice, once with a group of economic developers
11 from Eastern Ontario and once with the warden and my
12 counterpart from the Mayor from the Town of Laurentian
13 Hills.

14 We were very impressed in both of those
15 visits with the high quality of the workers, with the high
16 quality of the safety and with the commitments from AECL
17 to make sure that NRU runs in a safe manner to benefit not
18 only the work that they are doing producing the medical
19 isotopes but we were very interested as well in the work
20 that they are doing with the National Research Council to
21 provide support to other industries in Canada for testing
22 that can only be done in that type of facility.

23 AECL has always been a strong corporate
24 citizen in our area. We have never had any reason to
25 doubt or to be concerned about their commitment to safety

1 and their commitment to our communities.

2 They are good corporate citizens and they
3 are working very hard to make sure that they not only
4 strengthen their relationships with their neighbouring
5 communities but reach out to us on a regular basis to make
6 sure that we receive information in a timely and accurate
7 manner on anything in their business operations that would
8 impact us in the local communities.

9 I also wanted to bring out the point that
10 this is very important for us obviously for the jobs and
11 the income but more importantly than that, AECL has always
12 been receptive to any kind of questions that we had. They
13 have been a very good protector of the environment. This
14 has been a very, very good place for us and for me
15 personally to raise my children over the past 23 years.

16 We made a conscious decision to come from
17 the Greater Toronto Area for the lifestyle that could be
18 provided and we have no qualms at all, both as a mom and
19 as a health care provider -- I am the administrator of the
20 long-term care facility in Deep River. I have no qualms
21 at all about their commitment to making sure that everyone
22 in the area of Renfrew County has a safe working
23 environment.

24 And further to that, their commitment to
25 everyone in North America for being able to produce those

1 isotopes and help to have medical radioactive materials
2 available to help in the diagnosis and treatment of
3 ongoing diseases is very important.

4 Again, we just want to take this
5 opportunity to support AECL in their licence extensions,
6 to reassure the Commission that we are not concerned in
7 any way about how they are maintaining those businesses
8 and how they plan to move forward, and that we look
9 forward to working in partnership with AECL in the years
10 to come.

11 And I'd be happy to answer any questions.

12 **THE CHAIRPERSON:** Thank you very much, Your
13 Worship. Are there any questions for the mayor?

14 There are no questions, Ma'am. Thank you
15 very much for joining us today. Can I assume that this
16 will be the presentation for all three?

17 **HER WORSHIP MAYOR AIKENS:** Yes, it will.

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

19 We will then now move to the written
20 submissions.

21 **05-H20.7**

22 **Written submission from the**
23 **Canadian Forces Base/Area**
24 **Support Unit Petawawa**

25 **THE CHAIRPERSON:** The first written

1 submission is from the Canadian Forces Base/Area Support
2 Unit Petawawa, CMD 05-H20.7.

3 Are there any questions or comments from
4 Commission members with regard to this written submission?

5 **05-H20.8**

6 **Written submission from the**
7 **Corporation of the Town of**
8 **Laurentian Hills**

9 **THE CHAIRPERSON:** Seeing none, we move on
10 to the next which is the written submission from the
11 Corporation of the Town of Laurentian Hills, CMD 05-H20.8.

12 Are there any questions or comments from
13 Commission members with regard to this written submission?

14 **05-H20.9**

15 **Written submission from**
16 **Cheryl Gallant, M.P.,**
17 **Renfrew - Nipissing - Pembroke**

18 **THE CHAIRPERSON:** Seeing none, I move to
19 the next submission which is a written submission by
20 Cheryl Gallant, M.P. for Renfrew-Nipissing-Pembroke, CMD
21 05-H20.9.

22 Are there any questions or comments with
23 regard to this submission from Commission members?

24 **05-H20.10**

25 **Written submission from the**

1 **County of Renfrew**

2 **THE CHAIRPERSON:** Seeing then none, I move
3 to the next submission, which is a written submission from
4 the County of Renfrew outlined in CMD document 05-H20.10.

5 Are there any questions or comments from
6 Commission members with regard to this submission?

7 That then concludes the written
8 submissions.

9 **MR. LEBLANC:** This completes the record for
10 the public hearing on the matter of the application by
11 Atomic Energy of Canada Limited for the renewal of its
12 operating license for the MAPLE reactors at the Chalk
13 River Laboratories.

14 The Commission will deliberate and will
15 publish its decision in due course. It will be posted on
16 the CNSC Website and will be distributed to participants.

17 **THE CHAIRPERSON:** We will now take a very
18 short break, two or three minutes just to reorganize our
19 papers and to start with the next hearing.

20 Thank you very much.

21 --- Upon recessing at 11:38 a.m.

22 --- Upon resuming at 11:43 a.m.