# Opening Remarks
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**Slide 2 – Outline of Presentation**

Thank you Mr. Chairman. Bill Pilkington for the record.
I will begin by outlining my presentation material for today. During the course of my presentation, I will:

- Provide an update on the current status of the NRU Outage;
- Review in general the causal factors contributing to the outage;
- Provide information on condition assessment of the reactor vessel;
- Provide an update on the progress to date on inspection and repair activities;
- Provide insights to the parallel facility maintenance activities under the Extended Activities Program, and
- In conclusion, I will briefly discuss Communications activities and present an outline of the outage schedule.

**Slide 3 – General Status & Background**

Since our last appearance before the commission, AECL has made progress on many outage related activities.

The reactor is now defuelled and drained of heavy water. This action in turn has eliminated the elevated Tritium releases to below the Action Level. I will provide specific “Tritium Emissions in Air” data later in this presentation.

Inspections of the interior of the aluminum vessel continue to progress, as we are currently in our third phase of Non Destructive Examination (NDE). This series of inspections includes scanning vertical strips of the vessel wall. I will note that our ongoing inspection activities are being conducted in parallel with our outage critical path activities related to repair.

Based on evidence collected to date, AECL is considering applying a weld build-up technique over a broad area or band at the inside base of the reactor vessel wall, which will address all nine of the sites of concern that have been identified to date. In view of the number and locations of the repair sites, the band of weld build-up application may be a more efficient way to proceed in repairing the reactor vessel.

AECL continues to pursue a second mechanical repair technique, in order to address the potential for locations not conducive to weld repair. Both techniques are being advanced simultaneously to provide assurance that the appropriate repair technique is available when needed.

Guidance on the duration of the shutdown continues to be founded on the best evidence available, including the most up-to-date analysis of the inspection data, progress on repair strategies, and critical path requirements for restart after a shutdown with the fuel removed from the reactor. At this time, the application of the band weld

build-up technique, and the number of repair sites, indicates the NRU will return to service during the first calendar quarter of 2010. Further guidance on a return to service date will be provided when more information becomes available.

**Slide 4 – Location of the Leak**

This slide was presented at our last update to the commission. As a reminder, the leak site is located in the vessel wall at the bottom of the vessel, nine meters from the nearest access point at the top of the reactor and access to the internals of the reactor vessel is through openings only 12 cm in diameter.

**Slide 5 – Location of the Leak**

On this slide, you can see the exact location of the leak site, indicated by the red arrow. We use this weld as part of a reference on future slides.

Heavy water that leaked from the reactor was collected to drums, and is being stored. Actions taken by AECL to drain the vessel have stopped the leak. In its ongoing communications on the outage, AECL has reported to the CNSC and public, that a small portion of the leakage evaporated, and resulted in a monitored airborne tritium release through the NRU reactor ventilation system.

**Slide 6 – Tritium Emissions in Air**

This slide shows the weekly air-borne tritium emissions from the NRU ventilation system, from before the leak occurred to recent measurements.
You will note for the period preceding the May 15 leak that emissions were well below the Action Level, and more recently the emissions have returned to these low values.

During the reporting period around May 15, the action level for Tritium Emissions in Air was exceeded. AECL reported this exceedence to the CNSC and advised local stakeholders of it through voluntary public disclosure.

You will note on the graph a decrease in emissions, associated with the lowering of the vessel level (June), then an increase over late June early July – this rise in emissions is attributed to an inspection and disturbance of the leak site resulting in an increase in the leak rate.

The emissions returned to below the action level with the draining of the vessel.

**Slide 7 – Causal Factors Technical**

A draft technical report on the assessment of the vessel corrosion mechanism has been prepared by AECL's corrosion experts and has been submitted for third party review.

The assessment is based on:

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- Review of scientific and technical literature
- Operating experience, including experience with the original vessel
- Historical corrosion monitoring (coupons inserted into the annulus)
- Historic chemical analysis records of water draining from the annulus
- Characterization of artifacts removed from the annulus during this outage

The assessment concluded that nitric acid produced by the presence of air and water in the annulus space under radiation conditions caused the corrosion found on the vessel wall.

**Slide 8 – Causal Factors Organizational**

Although it did not have direct nuclear safety consequences, AECL recognizes this is a very serious event. In addition to investigating the technical cause of the corrosion, AECL has also carried out a root cause analysis of organizational factors leading up to this outage. Due to the nature of this event, this analysis necessarily covers a period of many years. The causal factors identified by this analysis do not account for the evolution of the organization over this extended period, and as a result have limited value in determining appropriate corrective actions. We have engaged a third-party expert in safety culture, knowledgeable of the Chalk River Organization to help AECL determine the more fundamental and persistent underlying causes of this event. This will help us to develop an effective corrective action plan so that similar events may be avoided and organizational effectiveness is improved.

While this additional work is underway, AECL is taking more immediate action to address findings from the root cause analysis. The condition assessment of the NRU vessel is being reviewed and will be revised, and all other condition assessments for NRU systems are being re-evaluated as a part of the integrated safety review we have in progress. We have also brought in external experience from the nuclear industry to assist us in the planning and execution of the current outage.

I would also point out that in December of 2008, prior to this event, we received funding for the Isotope Supply Reliability Program or ISRP to improve the reliability of NRU and the other facilities required for isotope production and to prepare for NRU licence renewal in 2011. In January of this year we were granted trial membership in WANO, the World Association of Nuclear Operators for NRU. With the resources of the ISRP, and the support of WANO and it's members, we have the opportunity to achieve world class standards of performance in all of our work processes and practices.

**Slide 9 – Inspection**

AECL continues to improve its understanding of the vessel's condition with ongoing vessel inspections.

The first set of inspections used a tool we refer to as our Mark I to determine the broad extent of corrosion on the NRU vessel and to identify sites that may require repair.

An improved NDE tool, the Mark II was developed to provide more comprehensive access to the full circumference of bottom of the vessel. This recent set of scans has generated a large amount of data from those areas previously inaccessible by the Mark I tool. The data is currently being analysed.

On going inspections will continue to support our condition assessment, fitness for service case and vessel repair strategy.

**Slide 10 – Repair**

Building upon the information provided by the inspection activities, vendors have been progressing on the development of repair tooling. Weld build-up has been selected as the preferred repair technology, with a mechanical seal providing a second option if repair sites are identified where weld repair is not appropriate for any reason.

Testing of the repair process and special tools will be carried out on the full height mock-up now constructed in the former NRX facility at Chalk River Laboratories. The

mock-up is also used to train staff who will inspect and repair the reactor. This will maximize work efficiency and minimize radiation exposure. The mock-up is currently being used to test the specialized tools designed to perform vessel cleaning and the removal of material samples for analysis.

**Slide 11 – Extended Activities Project**

At our last appearance before the commission, there was interest expressed in NRU maintenance activities beyond the scope of the leak repair and how these activities are being coordinated with critical path repair activities.

An Extended Activities Project (EAP) has been established to complete activities that increase the safety and reliability of the facility, without compromising the schedule for safely returning NRU to service. Of particular interest are activities that require an extended shutdown or the NRU vessel to be drained.
EAP scope of work includes:

- Equipment refurbishments
- Inspections identified in the Plant Life Management program
- "Walkdowns" supporting design work
- Preparations for **2010 scheduled maintenance outage**
- Work in support of **2011 licence renewal**

It is important that I point out at this time that EAP work will not impact repair critical path activities.

**Slide 12 – Communications**

Outage communications tailored to a variety of stakeholders have been extensive and include:

- Daily protocol communications to government departments
- Daily informal interaction with CNSC Site Staff
- Weekly status updates to our local stakeholders and the public
- CEO weekly status updates to government officials
- Teleconference updates with community leaders and the health community

- A dedicated web site www.NRUCanada.ca launched in July to provide a single point of contact on the NRU outage for all stakeholders. We are currently averaging about 2000 visits per week

**Slide 13 – Schedule**

This slide identifies the critical path and major activities leading up to the NRU return to service. It is a simplified version of the much larger outage schedule, and provides an overview of the outage activities including major milestones and deliverables.

The colour green indicates completed activities to date; black indicates activities yet to be completed; and red indicates activities that lie on the critical path yet to be completed.

**Slide 14 – Conclusions**

In conclusion, we continue to make good progress on returning NRU to service. In doing so,

- AECL will not compromise on safety

- Returning NRU to safe reliable operation to support medical isotope production is our primary objective, and

- Evidence to date indicates that the NRU reactor vessel can be successfully repaired, and will be returned to service in Q1 of 2010

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