



# Information to Support Two-Year Licence Renewal Application for MAPLE Reactors

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# Introduction

- AECL has a capable, competent organization in place to operate the MAPLE reactors
- AECL is committed to a continuous improvement program which supports safe, high quality operation, and draws on the lessons learned by others in the industry
- AECL is committed to meet all regulatory criteria on health, safety, security, the environment, and Canada's international obligations
- AECL is committed to resolving technical issues, completing nuclear commissioning and producing medical isotopes during the next licence period



# Dedicated Isotope Facilities (DIF)





# Presentation Outline

- Senior Management Oversight
- Safe and High Quality Operation
- MAPLE Reactors Performance
- Operating Plan for Next Licence Period
- Positive Power Coefficient of Reactivity
- Summary



# Senior Management Oversight

- DIF organization formed under AECL Vice President
- AECL Executive reporting and involvement strengthened
- DIF Operations has lead responsibility for safe operation of the MAPLE reactors
- Project team supports completion of commissioning and progress to In-Service
- Dedicated task team oversees effort to resolve positive Power Coefficient of Reactivity (PCR)
- Enhanced quality and safety culture



# Safe and High Quality Operation

- **Implementing comprehensive improvement plan**
  - Guided by industry peers
  - Implemented new performance measurement system
- **Improved operating performance**
- **Improved public information activities**
- **AECL/CNSC communications**
- **Regular communications with all AECL staff**
  - Focused on Corporate priorities for safe and reliable operation



# Safe and High Quality Operation (cont'd)

## Implementing Comprehensive Improvement Plan

- Clear roles and responsibilities
  - Conduct of Operations expectations
- Continuous performance evaluation
  - Operations Score Card
- Human Performance Improvement program
  - 6 Managers, Operations and 11 Reactor Operators certified
- Equipment Performance program
  - MAPLE Reactors Operational Limits and Conditions Rev. 9 approved by the CNSC staff



# Safe and High Quality Operation (cont'd)

## Improved Operating Performance

- AECL has acted strongly to implement lessons learned from unplanned events (SOR 1 Failure, Departure from GSS for MAPLE, and other site events):
  - Corrective Actions identified with input from industry peers
  - Implementing comprehensive improvement plan
  - Improving event reporting and Root Cause Analysis
    - Obtaining advice and input from utilities
    - Implemented Event Reporting to CANDU utility standard





# Safe and High Quality Operation (cont'd)

## Improved Public Information Activities

- Public disclosure – more responsive
  - Approximately 900 requests managed since Sept. 2003
- Public engagement – increased interactions with public
  - Community briefings, special events, projects, and website
- Environmental reporting – information more readily available
  - Ecological Effects Review available on website and provided at community briefings with environmentally-focused organizations



# Safe and High Quality Operation (cont'd)

## AECL/CNSC Communications

- New AECL Chief Regulatory Officer in place
- Regular meetings with the CNSC staff at both management and executive levels
- All AECL commitments to the CNSC tracked and monitored against project milestones
  - AECL regularly updates CNSC staff on commitment status



# MAPLE Reactors Performance

- Worker dose exposures well below regulatory limits
- Radioactivity releases to the environment well below facility Action Levels and Derived Release Limits
- Perfect fire safety performance
- One lost-time injury (2003)



# MAPLE Reactors Performance (cont'd)

## Program Evaluations

- Specific programs for MAPLE operation:
  - Operating performance
  - Performance assurance
  - Commissioning
- Fully integrated with the Chalk River site programs:
  - Emergency preparedness
  - Environmental protection
  - Radiation protection
  - Nuclear security, safeguards and non-proliferation



# Operating Plan for Next Licence Period

- **MAPLE 1 Reactor:**
  - Operate to 2 kW to establish routine operations
  - Operate to ~ 5 MW to perform PCR related tests
  - Operate to 8 MW to test PCR mitigation features
  - Produce irradiated isotope targets for NPF commissioning
  - Complete commissioning above 8 MW
  - Progress to In-Service
  
- **MAPLE 1 Iodine Production Facility:**
  - Complete Phase A and Phase B Commissioning
  - Progress to In-Service
  
- **MAPLE 2 Reactor:**
  - Complete Phase B Commissioning up to 500 kW



# Positive Power Coefficient of Reactivity

- Task team is overseeing execution of a multi-pronged plan:
  - Assessment by AECL of possible causes of positive PCR and design options study (completed)
  - Prediction of the PCR using independent models and code calculations by US National Laboratory (target: Sept. 30, 2005)
  - Independent review of AECL work on the PCR by US National Laboratory (target: Sept. 30, 2005)
  - High power operating tests in MAPLE 1 reactor
  - Implement measures to resolve the positive PCR issue



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- AECL is applying for a two-year licence







# Key Terms

- DIF – Dedicated Isotope Facilities
- GSS – Guaranteed Shutdown State
- MMIR – MDS Nordion Medical Isotopes Reactor
- NPF – New Processing Facility
- PCR – Power Coefficient of Reactivity
- SOR – Shut Off Rod