The Transformation to Canadian Nuclear Laboratories and the Vision for its Shielded Facilities

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Company History

Nat’l Research Council of Canada
British-Canadian lab in Montreal for HW moderated design.

1942

CRL
National Research Council builds nuclear research labs in Chalk River, Ont

1944

ZEEP
First controlled nuclear chain reaction outside the United States

1945
Company History

NRX
Research reactor generated highest neutron flux in the world

1947

Co-60
First radiation treatment in Canada from Co-60 produced at CRL.

1951

NRU
World’s most powerful research reactor and first online refueling

1957
Company History

NPD
Canada’s first power generating reactor proves the CANDU concept

1962

WR-1
World’s first organic-cooled research reactor starts up in Whiteshell Labs

1964

Pickering
Produced more electricity than any nuclear power station in the world

1971
Company History

TASCC
Superconducting cyclotron produces first beam at Chalk River Labs.

1985

Eddy Current Probes
Continues world-leading probe development with X-probe

2000s

Thorium
Development and demonstration of thorium fuel for use in CANDUs

2009
Company History

Hydrogen
Construction begins on Canada’s new world class hydrogen isotopes laboratory complex.

2013

NRU
Announcement of the decision to cease operation of the NRU reactor in 2018.

2015

Canadian Nuclear Laboratories
Laboratoires Nucléaires Canadiens

2015
Chalk River Laboratories, ON
Whiteshell Laboratories, MB
Douglas Point, ON
NPD, ON
Gentilly 1, Que.
Port Hope / Granby, ON
LaPrade, Que.
Centre for Nuclear Energy Research, NB
• ~ 9000 acres in size
• ~200 acres lab complex
• 17 nuclear facilities
• 70 major buildings
• 3100 employees
• ~1600 engineering, scientific, and technical staff
• ~500 PhD’s and Master’s
• ~300 licensed skilled trades
• Engineers
• Administrative and Business professionals
Restructuring of AECL

- 2006 - Government made the decision to restructure the organization to reduce risks and costs to Canadian taxpayers:
  - **Phase I:** Divestiture of the CANDU Reactor Division – Completed in 2011
Restructuring of AECL

- **Phase II**: Restructuring of nuclear laboratories – Completed in September 2015
Nuclear Decommissioning Demolition Firm

EPC Contractor in Canada

Program Management Firm

World-Leader in Collaborative, Cost Effective S&T

National Nuclear Laboratory Operation

Commercial Nuclear Waste Firm

CNEA Canadian National Energy Alliance
Vision: CNL is a world-class, right sized and sustainable national nuclear laboratory delivering science and technology.
Vision 2026
Vision 2026
Vision 2026
Advanced Nuclear Materials Research Centre

- CNL is proposing to carry out a project to design, license, construct and commission a new Class I nuclear facility;
- Provide state of the art facility for enabling modern, cutting edge and relevant R&D activities in nuclear fuels and materials;
- Consolidate capabilities and segregate from legacy liabilities;
- Improve safety, efficiency and cost effectiveness;
- Provide flexible, modular shielded facilities and laboratory space for federal & CANDU and other commercial markets;
CNL’s Shielded Facilities

- Post Irradiation Examination;
- Flask receipt, loading, unloading and shipment;
- Liquid waste pre-treatment;
- Radioactive specimen storage.
CNL’s Fuel Development Laboratories

- Recycled Fuel Fabrication Laboratory (RFFL);
- Fuel and fuel bundle characterization;
- Fuel and advanced fuel manufacturing;
CNL’s Metallographic & Surface Science Laboratories

- Chemistry and Corrosion Labs;
- Model Development Lab;
- Mechanical and Micro-Mechanical Testing Labs;
- Metallurgical preparation and examination Labs.
CNL’s Storage Bay

- Storage of radioactive fuel and materials;
- Flask loading and unloading;
- Visual inspection and characterization.
CNL’s Decontamination Facilities

• Respirator Lab;
• Component and equipment decontamination;
• Flask and hot cell liner decontamination.
ANMRC Project Status

• Scope of Work being written for AAR and Conceptual;
• Business Case in early draft, sent to AECL for initial comment;
• Draft Client Requirements Document created;
• Programming and scoping in conjunction with overall 10 year plan;
• Draft Licensing Plan created;
• Draft WBS and schedule created;
• Early budgetary estimate created;
Short Term Impact and Bridging

Current Facilities

• Original mandate to ensure operability until 2017;
• Mandate changed in 2012 for safe operation till 2030;
• Mandate changed again with restructuring to 2022;
• Budget reduced to roughly $17M for refurbishment.
Short Term Impact and Bridging

Current Facilities

• Currently working through terms and conditions of a contract with an engineering consultant for SFRP;
• Goal is to perform assessments of systems, structures and components and make recommendations to achieve safe operation until 2022;
• Seven Priority Areas of Concern: Electrical, ventilation, cell windows, mat’l & equip handling, cell doors, cell ports, & ALWS.
• Gap analysis on new business opportunities;
• Equipment Development;
SFRP Progress Update

Isolation Room Material Handling Crane
SFRP Progress Update
Isolation Room Material Handling Crane
SFRP Progress Update

Fumehood Upgrade

Universal Cell 2 Fumehood

Universal Cell 3 Fumehood
SFRP Progress Update

Fumehood Upgrade

Universal Cell 2 Fumehood

Universal Cell 3 Fumehood
SFRP Progress Update

Stereomicroscope
SFRP Progress Update

Stereomicroscope
SFRP Progress Update

Stereomicroscope
SFRP Progress Update

UC-3 Crane Repair
SFRP Progress Update

UC-3 Crane Repair
SFRP Progress Update

UC-3 Crane Repair
SFRP Progress Update

UC-3 Crane Repair
SFRP Progress Update

UC-2 Crane Replacement
SFRP Progress Update

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SFRP Progress Update

UC-2 Crane Replacement
SFRP Progress Update

UC-2 Crane Replacement
SFRP Progress Update
Rear Door Repair & Back-up Door Closer
SFRP Progress Update
Rear Door Repair & Back-up Door Closer
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Rear Door Repair & Back-up Door Closer
SFRP Progress Update

Ventilation Upgrades
SFRP Progress Update

Ventilation Upgrades

Diagram showing details of ventilation system with annotations indicating dimensions and specifications.
SFRP Progress Update

Gamma Spectrometer (Transfer out of FMC-2)
SFRP Progress Update

Gamma Spectrometer (Transfer out of FMC-2)
SFRP Progress Update

Gamma Spectrometer (Transfer out of FMC-2)
SFRP Progress Update

Gamma Spectrometer (Transfer out of FMC-2)
SFRP Progress Update

FCV-2000 (Transfer out of FMC-2)
SFRP Progress Update

FCV-2000 (Transfer out of FMC-2)
SFRP Progress Update

Burn-up and Helium Leak Test (Transfer out of FMC-2)
Thanks you for listening.

Questions?