Specialists in inspection, testing and the detailed examination of irradiated fuels and materials form the core of the Shielded Facilities

To complement our surface analysis capabilities, AECL also has remote-handling facilities for post-irradiation examination, analysis, testing of irradiated reactor fuel, reactor components, radioactive materials and equipment. Specialists in inspection, testing, and the detailed examination of irradiated fuels and materials form the core of the shielded facility groups. They are supported by experts in fracture analysis, metallurgical and chemical engineering, analytical chemistry, materials science, and corrosion and wear.

The shielded facilities at Chalk River Laboratories provide a considerable degree of operational flexibility. They include:

• a reactor bay for the receipt and initial processing of materials
• hot cells with remote-handling equipment
• shielded flasks for transfer of highly radioactive materials
• direct sample transfer from hot cells to a shielded Scanning Electron Microscope (SEM)

Specialized hot cells are dedicated to mechanical testing and the examination of irradiated non-fissile materials. Cells are equipped with computer-controlled servohydraulic test frames for tensile, fatigue and other types of fracture testing at elevated temperatures. Others are equipped with cantilever beam fracture mechanics test rigs for delayed hydride crack initiation and velocity tests.

Each of the hot cells in the Shielded Facilities at CRL contain state-of-the-art equipment. This equipment is used for conducting post-irradiation examination (PIE) experiments and testing of radioactive materials. The cells are equipped with heavily shielded walls and windows and mechanical arms so work can be conducted safely.

FOR MORE INFORMATION ON PRESENT AND FUTURE PARTNERSHIP OPPORTUNITIES PLEASE CONTACT:

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The Shielded Facilities at Chalk River Laboratories are integral to AECL’s ongoing success

The licensed nuclear facilities at CRL include 15 cells to perform post-irradiation examination of reactor components and fuel materials. Hot cells are a vital facility to support nuclear power operation, isotope production and the associated R&D programs. The heavily shielded work spaces enable the safe handling and testing of irradiated reactor components and fuels. The Hot Cells are situated in two facilities: the Universal Cells, and the Fuels and Materials Cells (FMC).

The non-destructive visual and dimensional examination of reactor components and fuel takes place in the Universal Cells. Shipments from off-site can be received and unloaded in these cells or NRU bays. In the FMC receiving cells, post-irradiation examination and detailed visual examination of sample preparations are conducted. Also, specialty sample are prepared for X-ray diffraction (XRD), scanning electron microscope (SEM), secondary ion mass spectrometry (SIMS) and metallographic examinations. A suite of blister cells house the optical microscopes. There are also specialty cells for the mechanical property testing of samples, which are available with the use of CNC mill for preparation of the material and a MTS machine for testing.

The major PIE functions performed by AECL are:

- non-destructive visual and dimensional examinations
- machining of specimens from radioactive materials
- metallographic and ceramographic examinations
- fuel burnup dissolution and isotopic analysis
- SEM/EDX/WDX, DSC and FTIR analysis
- gamma spectroscopy
- mechanical testing