Remote Handling and Waste Containment Approach for Standpipe and Bunker Legacy Waste Retrieval at Whiteshell Laboratories

Matthew Cole – Veolia Nuclear Solutions
Torje Osen – Merrick & Company
Project Overview

- Decommissioning of CNL’s Whiteshell Facility
- Waste in Bunkers and Standpipes
- Remotely Retrieve, Characterize, Condition, and Repackage
- Material Handling, Cell Design, Shielding, Containment and Remote Handling
Material Handling

LL Waste

IL Waste

FM Waste

Bunker to SCU Waste Transfer

Standpipe to SCU Waste Transfer

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Once emptied, the interior of the standpipe is sprayed with a fixative spray and the temporary shield cover is installed.
Cell Design, Shielding and Containment

- External Mounted Lights and Cameras
- External Mounted Drives
- Commercial Utility Feed-thru’s
- Cell Material Pass-thru
- In-Cell Manipulators
- Fully Contained Waste Transfer
- Fully Contained Cell Operations
- In-Cell Manipulator Maintenance Bays
- Portable and Modular Concrete Shield Blocks
- Steel Shielding for Cell Access
Cell Design, Shielding and Containment

- Full Manipulator Tool Suite
- Cell Material Movement on Tray Conveyors
- Cell operations organized and ventilation flows in direction of increase in contamination
- Double Door Waste Load-in/out Ports
- High Pressure Water, Vacuum Cleaner, and Disposable Tray Liner for Decontamination
Remote Handling

- The Whiteshell Project Uses Various Levels of Remote Handling including:
  - Remote Excavators (REA)
  - Heavy Duty Hydraulic Manipulators (SWARM)
  - Sensitive Force Feedback In-Cell Manipulators (Dexter)
- Due to the Variety of Waste and Operations the System Must be Very Flexible
  - *All Systems Include a Variety of Tools*
Remote Handling – Remote Excavator Arm

- The REAs are Commercial Excavators Arms that are Mounted to Gantries and Operated Remotely
- Use Commercial Tools with Quick-Change Tool Connections
- Used for Heavy Duty Work:
  - Rubblizing Concrete
  - Digging Gravel
  - Large Size Reduction
The SWARM is a long reach hydraulic manipulator used primarily for waste retrieval. It is based on a commercial crane with significant modification. It also uses a set of tools with a commercial tool change. It is used in the Standpipe and Bunker Retrieval work.
Remote Handling - Dexter

- The Dexter is a proprietary tactile manipulator system
- It replicates the normal operations of a two-armed worker
- It allows workers to perform very delicate and precise operations
- It is used for:
  - Sorting and Segregation
  - Small Package Opening
  - Small Tool Handling
Questions?

Matthew Cole
Veolia Nuclear Solutions
matthew.cole@veolia.com
&
Torje Osen
Merrick & Company
torje.osen@merrick.com