



International Canada

Client
Ontario Power Generation (OPG)

Location
Tiverton, Ontario, Canada

RWOS1 Tile Hole Removal Project Bruce Power Site

CH2M HILL removed 23 Tile Holes (THs) containing intermediate level radioactive waste at the Bruce Nuclear Power Site for Ontario Power Generation Inc. (OPG). The THs were encapsulated and removed from the ground during a pilot Phase 1 (1 TH) and Phase 2 (22 THs). Significant features of the project included:

- A revised removal procedure developed for Phase 2 was implemented safely and successfully, with the remaining 22 THs removed (two and a half months ahead of schedule)
- CH2M HILL and its subcontractors delivered over 9,000 work hours with no reportable incidents made to the Canadian Nuclear Safety Commission, Ministry of Labour and Ministry of the Environment
- First nuclear waste project outsourced to the private sector by OPG; significant savings for OPG: contingency budget for Phase 2 was unused due to successful methodology and project completion (well ahead of schedule)

Project Background

During the mid-1970s, intermediate level radioactive waste, mainly in the form of ion exchange (IX) columns and filters from the Douglas Point Nuclear Reactor were stored in 23 in-ground THs at the Radioactive Waste Operations Site #1 (RWOS1) at the Bruce Power Site.

Use of RWOS1 by OPG was discontinued in 1976 and water quality in the groundwater system had been monitored since then. The presence of elevated tritium concentrations in groundwater prompted several investigations. These have inferred one or more of the THs as the source. OPG retained CH2M HILL to remove the THs to prevent further leakage and to consolidate these wastes at RWOS2. To minimize the spread of contamination and worker dose, it was decided to encapsulate the THs in steel and concrete prior to removal.

CH2M HILL provided project management, design and prime contractor services for the TH Removal Project. In addition, CH2M HILL and its subcontractors were responsible for preparing plans and implementing the following programs: radiation protection, conventional health and safety, quality assurance, and environmental protection.

Client and Regulatory Satisfaction

Execution of all facets of the project by CH2M HILL met or exceeded OPG's expectations. Removal of the THs has eliminated the risk of ongoing groundwater contamination and reduced OPG's liabilities. The RWOS1 TH Removal Project was the first nuclear waste project outsourced by OPG to the private sector. Despite the inherent risks for OPG, CH2M HILL's ability to deliver challenging nuclear waste projects resulted in OPG earning the trust and praise of the CNSC.



Innovative Methodology

- A nested casing approach that had many advantages, including eliminating the need for large-scale excavations and minimizing worker dose
- A hydraulic casing oscillator to insert the outer casing 4 m into the ground
- A vacuum system to remove soil around the TH
- Shielding and downhole video camera to minimize worker dose

Public and Worker Protection

The project work was conducted under the ALARA protocol. Measurements of radiation at the fence line of the facility was reported by OPG to CNSC and all measurements during the project were below the standard set by the CNSC. The predicted collective radiation dose budget was 1,300 mrem for the site workers. Application of the innovative methodology and the ALARA protocol resulted in a significantly lower measured total collective worker dose of 180 mrem.
