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Approach for Site Characterization of Historic Waste Management Areas at Chalk River Laboratories

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Abstract: Canadian Nuclear Laboratories (CNL), formerly Atomic Energy of Canada Limited (AECL), has been investigating and verifying the waste inventory in the Chalk River Laboratories (CRL) Waste Management Areas (WMAs). CNL carries out characterization and assessment of the WMAs to identify health, safety, and environmental liabilities and ensure compliance with regulations. Characterization results are used to model risks and future site conditions to determine where remediation activities, both in the interim and for final release of the site, are necessary. The characterization results also serve as input to developing the overall management strategy or decommissioning approach for the WMAs.

The waste inventory of the historic WMAs is known primarily from historical records, which may be inaccurate or incomplete. CNL has been working to recover as much information as practical on CRL legacy waste and record it in an electronic database. Verification of the waste records is made through field investigations. The characterization work also supports ongoing revision to the site wide Environmental Risk Assessment (ERA) by providing information on the source terms and soil conditions within the non-operating WMAs.

CNL has adopted a phased approach to characterization, using progressively more invasive techniques in each subsequent phase. Characterization is broken down into three steps (1) Historical Site Assessment, (2) Non-Intrusive Characterization and (3) Intrusive Characterization.

Methods

The first step in characterizing any contaminated area is to conduct a Historical Site Assessment (HSA). The purpose of an HSA is to compile all historical information regarding the site's use, the physical setting, any previous characterization work and develop a preliminary conceptual site model for the area. Non-intrusive field characterization work is directed at defining the physical and environmental conditions at the site without compromising the physical boundaries of waste structures (i.e., radiation surveys, geophysical surveying, soil coring and sampling, groundwater sampling and excavations). This fieldwork can include excavation of the targeted waste structure to collect information on the geometry and condition, but the scope would exclude penetration of the waste container(s) and sampling of the source material. Intrusive characterization involves entry (intrusion) into the physical boundaries of the waste structure. This fieldwork is aimed at confirming quantitatively the characteristics of the wastes, assessing the extent of soil contamination, identifying more precisely the potential hazards to workers and the environment, and enabling the subsequent development of safe procedures for waste recovery, waste conditioning (if needed) and waste dispositioning.

Case Study –Waste Management Area A (Active Liquid Waste Tank)

WMA A was the first location used for radioactive waste management in Canada and was in service from 1946 to 1957. It contains unlined sand trenches and approximately 15 discrete waste burial structures. It was also used for direct dispersal of radioactive liquids. Up until the late 1970s WMA A was also used for temporary, surface storage of used equipment. In 1981 the surface was cleared and graded and WMA A was closed to any new additions of waste.

Preliminary characterization activities (non-intrusive) were undertaken at WMA A in the 1990s and early 2000s including geophysical surveys and excavations to locate and evaluate the condition of several waste structures of interest. At that time, CNL had identified two waste structures within WMA A that contained liquid. There were also another 15 historic structures in WMA B that contained liquids. Investigations of the structures containing liquids were advanced ahead of other waste burials. The Active Liquid Waste Tanks (ALWTs) in WMA A were two of these structures and the sequence of characterization activities for ALWT 2 is outlined below.

In parallel to the advancement of ALWTs characterization and assessment, the overall characterization of WMA A has progressed. Radiological surveys were completed in 2012 and the comprehensive HSA was completed in 2013. In 2014 and 2015, the remaining discrete waste structures within WMA A were investigated. This non-intrusive characterization included excavation, soil sampling and in-situ gamma spectroscopy to

examine the construction of waste packages and reduce uncertainty regarding the inventory. The results of the non-intrusive characterization will provide input to ensure the interim safety of WMA A prior to final remediation and will provide a basis for developing the remedial action plan.

References

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Remediation Process for Areas Affected by Past Activities and Accidents, Safety Series No. WS-G-3.1, IAEA, Vienna (2007).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Characterization of Radioactively Contaminated Sites for Remediation Purposes, IAEA-TECDOC-1017, IAEA, Vienna (1998).

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Overcoming Barriers in the Implementation of Environmental Remediation Programmes, Nuclear Energy Series No. NW-T-3.4, IAEA, Vienna (2013).

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