

Port Hope Project 2017 Annual Compliance Report Summary

The purpose of this report is to submit to the Canadian Nuclear Safety Commission (CNSC) the annual compliance report for the Port Hope Project (PHP) for the period 2017 January 1 to 2017 December 31. This report is a requirement of Section 2.3 of the *Port Hope Long-Term Low-Level Radioactive Waste Management Waste Nuclear Substance Licence* and Section 3.2.3 (e) of the *Port Hope Licence Conditions Handbook*. The *Port Hope Long-Term Low-Level Radioactive Waste Management Waste Nuclear Substance Licence* was revised and issued on 2017 November 29.

The Port Hope Area Initiative (PHAI) is a community-based project to develop and implement a safe, local, long-term management solution for historic low-level radioactive waste (LLRW) in the Port Hope area. The PHAI is defined by *An Agreement for the Cleanup and Long-Term Safe Management of Low-Level Radioactive Waste Situated in The Town of Port Hope, The Township of Hope and the Municipality of Clarington* (the "Legal Agreement"), which took effect on 2001 March 29, between the Government of Canada and the municipalities of Port Hope and Clarington for the management of the LLRW within each of the communities. Canadian Nuclear Laboratories (CNL) is responsible for the direction and execution of the PHAI in compliance with the Legal Agreement, licences and Environmental Assessment (EA) decisions. CNL has overall responsibility for managing the PHAI on behalf of Atomic Energy of Canada Limited, a federal Crown corporation.

The overall performance highlights for 2017 activities are outlined below.

- PHP-related activities:
 - The new Port Hope Waste Water Treatment Plant (PH WWTP) transitioned into operation in 2017 January and active commissioning of the residuals management process was completed in 2017 December. The residual management process performed as designed and produced solids of adequate quality to pass commissioning. In addition to the solids stream, the return line for evaporator condensate was also tested and verified to be in conformance with the Licence Conditions Handbook design objectives. Regular operation is expected to occur starting in 2018 April.
 - Early Work (EW) 1 construction activities were completed in 2017. The work included removal and rework of the clay placed in Cell 1 as winter frost protection and construction of Cell 1 including a toe-drain trench and Geosynthetic Drainage Layer for groundwater seepage.
 - Port Hope Long Term Waste Management Facility (PH LTWMF) contract was award in 2017 May, and mobilization activities occurred in 2017 fall. Winterization activities occurred as of 2017 December, which included 1 m cover

material to protect the liner. The scope of the work included installation of the supporting infrastructure such as weigh scales to enable receipt of on-site waste, infrastructure to enable receipt of off-site waste, initiation of the Water Treatment Collection Pond expansion, and excavation and transfer of on-site non-LLRW to the PH LTWMF which began 2017 December 1.

- Fieldwork for Campaign 1 was completed in 2017. Historic LLRW was identified on 44 of 450 properties, which will require remediation.
 - Radon investigations and fieldwork for Campaign 2 was completed; final delineation and reporting in progress.
 - Property Radiological Survey for Campaign 3 continued in 2017 and initial characterization fieldwork was completed in 2017 September.
 - Radon monitoring for Campaign 4 concluded in 2017 and fieldwork for Campaign 4 began in 2017 fall.
 - Radon investigations (radon monitor placement) for Campaign 5, in progress: characterization fieldwork and radon reporting scheduled to begin in 2018 summer.
 - Road Allowances contract 1, which had finished earlier in the year, was extended in 2017 November to investigate additional sites adjacent to contaminated residential sites and is ongoing into 2018. Road Allowances contract 2 commenced in 2017 July and is ongoing into 2018. The first Remediation Design contract was completed in 2017. Three remediation design contracts were awarded in 2017. Remediate historic LLRW and restoration of properties is planned to start in 2018.
 - The Phase 2 project activities related to municipal roads included conducting road assessments and completing road upgrades, where required.
- All licensed activities continued to be carried out safely and securely.
 - CNL completed all required reporting as outlined in the Licence Conditions Handbook under Section 3.2.3.
 - There was one failure of component process systems (drainage ditch). This was the unplanned release of untreated water to the environment as a result of an extreme rainfall event on June 23 and was reported to CNSC as per reporting requirements outlined in the Licence Conditions Handbook.
 - CNL hosted an information session followed by a tour of the PH LTWMF and major remediation sites in Port Hope with representatives from Environment and Climate Change Canada on 2017 August 31.
 - The annual ISO 9001 Audit for 2017 took place in 2018 February. The results of this ISO 9001:2015 Audit is still pending.
 - Three compliance program self-assessments were conducted for 2017.

- A wide range of mandatory and other job-specific training activities were carried out in 2017 to ensure that all personnel have the level of training related to radiation safety, occupational safety and health, environmental protection and chemical safety, appropriate for their duties.
- CNL managed operations at the Welcome Waste Management Facility (WWMF) in accordance with the parameters of the CNSC licence.
- Radiation Protection doses for workers remain As Low As Reasonably Achievable and doses for public remain low.
- Radiation exposures for workers and public were below all regulatory dose limits.
- Fifty five compliance oversights were conducted by CNL for the PHP. No negative trends were observed. Recommendations for improvement raised from compliance oversight activities were dispositioned or rectified.
- There were no lost time injuries in 2017.
- EA follow-up and operational monitoring continued in 2017 with no areas of concern.
 - Groundwater Monitoring
 - Eleven on-site PH LTWMF observation wells were sampled in 2017 spring and fall. The arsenic and uranium concentration are higher in two observation wells and these results are consistent with historical data. All other parameters were below Contaminants of Potential Concern (COPC) criteria.
 - Water Collection and Treatment System
 - During the reporting period, none of the effluent discharge limits for the WWMF were exceeded and no toxicity failures occurred.
 - Off-Site Sampling
 - Water samples were taken on a monthly basis from an off-site stream within the same watershed as the facility. Results were generally found to be below the Provincial Water Quality objectives and Canada Water Quality Guidelines, with the exception exceedances for Copper, Lead and Uranium.
 - Domestic Wells
 - CNL voluntarily sampled domestic wells on 13 residential properties near the WWMF. The analyses for all domestic wells showed that the Ontario Drinking Water Quality Standards for the analyzed parameters were met. All residents have been notified in writing about their well monitoring results. No further action required.
- Port Hope Project Environmental Assessment Monitoring consists of atmospheric, geology and groundwater and aquatic monitoring. Below is a brief summary of each environmental monitoring for 2017.

- Atmospheric Monitoring
 - Air quality monitoring was conducted from 2017 April 4 to 2017 November 3 for EW1 construction activities at the PH LTWMF Site. Monitoring continued in 2017 November 3 with the continuation of construction activities associated with the PH LTWMF ponds expansion project. A winter shutdown of the site took place from 2016 December 6 to 2017 April 4. The monitoring results were comparable to previous years, indicating that construction activities have not affected air quality outside of the CNL-controlled area.
- Independent Dust Monitoring
 - During the EW1 construction, there were 64 confirmed exceedances of the action level and of which 25 took place from 2017 May 17 to 2017 May 18. The contractor used water as a dust suppressant and minimized dust generating activities. The Contractor worked to continuously improve and optimize dust mitigation practices, and the number of exceedances of the overriding limits was subsequently reduced throughout the remainder of the year.
- Noise Monitoring
 - Based on the results of three main monitoring campaigns and additional monitoring conducted around PH LTWMF, the noise impact associated with EW1 and PH LTWMF construction were below the predicted range. CNL did not receive any noise complaints with respect to EW1 and PH LTWMF project activities.
- Geology and Groundwater Monitoring
 - Groundwater samples were collected and analysed for contaminants twice in 2017 at 20 monitoring wells located within the PH LTWMF. Exceedances are the result of the effects of the legacy waste management facility, which does not have an engineered liner or cover system in place. Monitoring will continue through the phases of the project, and improvements to groundwater quality are expected to be occurring through natural attenuation. The average water levels in monitoring wells were comparable to previous years. There were slight increase in water levels and this is coincident with the increased precipitation over 2017.
 - Soil monitoring results indicated that there were no exceedances of COPCs in 2017 with the exception of arsenic at PH LTWMF. This location is an area known to be slightly contaminated with arsenic due to surface water runoff. As such, the elevated concentrations are not thought to be caused by wind-blown dust deposition from construction activities of the PH LTWMF, but rather by migration through surface water. There are no

immediate environmental concerns, and the area will be remediated as part of the PHAI cleanup.

- Aquatic Monitoring

- The water quality in all locations of the Brand Creek watershed were generally consistent with the monitoring data over the past seven years suggesting that construction of the PH LTWMF is not having an adverse effect on Brand Creek water quality. One storm event was sampled hourly in 2017. The contaminant concentrations were observed to peak as Total Suspended Solids (TSS) increased. Overall, the contaminant concentration were subsequently reduced as TSS declined. Concentrations of COPCs associated with the PHAI are predicted to improve in surface water once the project is completed.
- The Lake Ontario water quality results at the diffuser were generally consistent with the monitoring data for the past few years, suggesting that LTWMF Operations are not having an adverse effect on water quality.
- The leachate from the PH LTWMF mound (called drainage water) collected in the treatment ponds was sampled twice in 2017, in June and November. The water quality has remained stable over the past few years. Changes in drainage water quality and volume are expected to occur after remediation work commences.

- In 2017, the waste management Safety Control Area was not applicable to the PHP.
- There were no security events that effected the PHP.
- In 2017, the safeguards and non-proliferation Safety Control Area was not applicable to the PHP. Safeguarded materials are planned in 2018, and will be reported in the 2018 Annual Compliance Report.
- From 2017 January to 2017 December, there was no radioactive material transport shipments associated with the PHP.
- CNL maintained effective relationships with the local community and First Nations through its many outreach and stakeholder relations activities, in accordance with the PHAI Public Information Program.