

Port Hope Project 2016 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 2016 January 1 to 2016 December 31. This report is issued in compliance with 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 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 2016 activities are outlined below.

- Port Hope Project-related activities:
 - The new WWTP progressed through construction, inactive commissioning and partial active commissioning of the water handling side of the facility in 2016. CNL completed Start Up activities for Zone 2 and Factory Acceptance Tests (FATs) were completed on the evaporators. During the year and as previously reported, issues were experienced with the VFD on the evaporators. CNL engaged a third party electrical consultant to conduct an independent investigation. The report received from the consultant recommended the VFDs be relocated to the mezzanine floor for better thermal management. VFD relocation is expected to be complete 2017 April. CNL also worked to prepare Zone 2 for inactive commissioning.
 - Early Works 3a (EW3a) construction activities were completed in 2016 March and the contractor demobilized from site in spring of 2016. Early Works 1 commenced with mobilization of the contractor in 2016 May. The EW1 project involved the construction of Cell 1. The scope of the work included preparing the laydown area, beginning installation of temporary haul roads, pre-construction surveys, installation of perimeter fencing, mass excavation of footprint of Cell 1,

beginning installation of clay baseline in Cell 1, winterization activities including protection of placed clay and shut down for winter.

- Fieldwork for Campaign 2 (approximately 800 properties) was completed by the end of 2016. Delineation was still ongoing at the end of 2016 with over 300 properties identified as having LLRW. Fieldwork for Campaign 3 of the Property Radiological Survey began in 2016 August. Exterior gamma scans had been completed at approximately 777 properties and borehole drilling/soil sampling had been completed at approximately 85 properties. Interior gamma surveys had just begun. Fieldwork for Campaign 4 (approximately 940 properties) had begun in 2016 August which included the placement of radon monitors. The radon monitors are scheduled for pick up in spring 2017.
- Survey and delineation work continued throughout 2016 at road allowances where final reporting is anticipated to be completed by 201 May.
- All licensed activities continued to be carried out safely and securely.
- There were no failures of equipment, component process systems or inappropriate procedure of human action.
- CNL completed all required reporting as outlined in the *Licence Conditions Handbook* under Section 3.2.3.
- The annual ISO 9001 Audit took place in 2016 October and resulted in no findings and identified no further opportunities for improvement. Four compliance program self-assessments were conducted for 2016 and one self-assessment is in progress.
- No processing of wastes at the Welcome WMF occurred during the reporting period.
- CNL managed operations at the Welcome WMF in accordance with the parameters of the CNSC licence.
- Radiation exposures were below all regulatory dose limits.
- Forty compliance oversights were conducted for the Port Hope Project. No negative trends were observed. Recommendations for improvement raised from compliance oversight activities were dispositioned or rectified prior to the next oversight inspection.
- There were no lost time injuries.
- EA follow-up and operational monitoring continued in 2016 with no areas of concern.
 - Operational Monitoring
 - Groundwater Monitoring
 - Ten on-site observation wells were sampled in 2016 June and 2016 November. Arsenic concentration level remains high in Observation Well 2-75 as compared to other wells, which is 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 are well below COPC criteria.
- Domestic Wells
 - CNL voluntarily sampled domestic wells on 6 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 environment's monitoring for 2016.
 - Atmospheric Monitoring
 - Air quality monitoring was conducted from 2016 January 4 to 2016 March 31 during EW3a construction activities. Air quality monitoring recommenced on 2016 May 2 at the start of EW 1 construction activities until 2016 December 6 when the contractor demobilized for winter shut-down. 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 EW3a project, there was 1 occurrence when the 15-minute average exceeded the action level. During the EW1 construction, there were 64 confirmed exceedances of the action level. The summer of 2016 was challenging in terms of dust management given that the region experienced very dry and hot weather conditions. The contractor used water as a dust suppressant and minimized dust generating activities. The Prime Contractor worked to continuously improve and optimize dust mitigation practices, and the number of exceedances was subsequently reduced throughout the remainder of the year.
 - Noise Monitoring
 - Based on the results of two main monitoring campaigns and additional monitoring conducted, the noise impact associated with EW3a/EW1 construction were below the predicted range. CNL did not receive any noise complaints with respect to EW3a/EW1 project activities.
 - Geology and Groundwater Monitoring

- Groundwater samples were collected and analysed for contaminants twice in 2016 at 20 monitoring wells located within the WWMF. Exceedances are the result of the effects of the current 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 with the exception of one monitoring well, which showed an average water level drop of 3.7 m from 2015. The Port Hope Screening Report predicted that the water table will lower by 10 m. Fluctuations in the water levels have been observed at this well in previous years. Monitoring will continue in future years to confirm if this is a result of natural fluctuations or the lowering of the water table.
 - Soil monitoring results indicated that there were no exceedances of COPCs in 2015.
 - Aquatic Monitoring
 - The water quality in all locations of the Brand Creek watershed were generally consistent with the monitoring data over the past few years suggesting that construction of the LTWMF is not having an adverse effect on Brand Creek water quality. One storm event was sampled hourly in 2016. 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 PHAI Operations are not having an adverse effect on water quality.
 - The leachate from the WWMF mound (called drainage water) collected in the treatment ponds was sampled twice in 2016, in June and December. The water quality has remained stable over the past few years.
- In 2016, there were no emergency events that directly or indirectly affected the Port Hope Project.
- The waste management Safety Control Area is not applicable to the Port Hope Project.
- There were no security events that effected the Port Hope Project.
- The safeguards and non-proliferation Safety Control Area is not applicable to the Port Hope Project.
- From 2016 January to 2016 December, there were no radioactive material transport shipments associated with the Port Hope Project.

- 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.