

Port Granby 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 Granby Project (PGP) for the period 2017 January 1 to 2017 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 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.

- PGP-related activities for enabling infrastructure:
 - The new Port Granby Waste Water Treatment Plant (PG WWTP) was the only facility discharging effluent from the PG Waste Management Facility (PG WMF) during 2017 as the old Water Treatment Building (WTB) was shut down in 2016 and subsequently decommissioned. There were no exceedances compared to effluent discharge limits outlined in the Waste Nuclear Substance Licence (WNSL) or its design objectives throughout the year. A total of 172,974 m³ of treated water was discharged from the PG WWTP to Lake Ontario during 2017.
 - Improvements were made to the operation of the facility. Improvements included remote control and automation of Pumping Station 1 (PS-1) from the Equalization (EQ) Pond to the PG WWTP, upgrading data input and trending capabilities on Supervisory Control and Data Acquisition, improving ventilation in the dewatering room, improvements to the lime and soda ash dosing systems and improvements to the clarifier.
 - CNL established action levels for the PG WWTP in 2017 which were accepted by CNSC staff.

- Completed repair to municipal roads along the haul route when project-related damage was noted.
- Continued to monitor the condition of the asphalt surface of Concession Road 1 for deterioration caused by construction traffic and repaired as necessary.
- Finalized the bi-annual Road Condition Assessment for the Primary Haul Route consisting of Newtonville Road from Highway 401 to Concession Road 1, and Concession Road 1 from Newtonville to Elliott Road and provided to the Municipality of Clarington in 2017 June.
- PGP-related activities for PG LTWMF construction and PG WMF remediation:
 - There was approximately 293,980 tonnes of excavated waste transported from the PG WMF to Cell 1 of the PG LTWMF during 2017 calendar year.
 - Installation of the sheet-piling and foundation work at the West Gorge pond to support future remediation was completed.
 - Installation of dewatering wells in the PG WMF East Gorge Reservoir was completed in 2017 August.
 - Construction of two temporary water storage tanks PG LTWMF site to improve the flexibility and contingency for management of contaminated water and stormwater was completed. These storage tanks provide an additional on-site water storage capacity of approximately 12,000 m³.
 - Construction of the duct bank for the two leachate pumping stations was completed.
 - Remediation and excavation activities, and transfer of waste to the PG LTWMF took place during the reporting period, with the exception of suspension periods noted below.
 - The collection and treatment of water continued throughout the year, including during periods where waste excavation and transportation were suspended.
 - A specialized subcontractor excavated the Trench 6 area near the southeast corner of the PG WMF, using hydro-vac equipment to locate and excavate six known buried gas cylinders.
 - Clearing and chipping of trees at the PG WMF was completed in 2017 March, ahead of the 2017 bird nesting season.
 - Removal of clean fill placed in Cell 2 of the engineered Mound in 2016 was removed in 2017 May (waste previously placed in Cell 1 was moved to Cell 2 to provide freeze protection of the clay liner; completed on 2017 December 22).
 - Excavation of the PG WMF legacy sedimentation and treatment ponds was completed, and the old WTB was demolished and remediated.
 - Granular materials continued to be hauled to and stockpiled at the north end of the site.

- The Remediation Verification Standard Operating Procedure was conducted in the Phase 5 area at the northwest and northeast corners of the PG WMF. Pending laboratory confirmation that clean-up criteria has been met, this area will be backfilled with clean material.
- An unanticipated gas cylinder was discovered in 2017 October by the contractor excavator operator working inside Phase 3 of the PG WMF. An investigation by the contractor and subcontractors followed, which resulted in the contractor implementing a newly planned methodology. This method accounts for potential future encounters with pressurized cylinders containing unknown gases during excavation activities and includes:
 - A two-stage operation with Level B Personal Protective Equipment (PPE), including supplied air and a respirator crew stockpiling excavated material, which is then loaded by a crew in Level D PPE and transferred to the PG LTWMF cells.
 - Heavy equipment, including bulldozers and excavators, are now equipped with a one-inch thick Plexiglas blast shield.
 - Revisions to all contractor safety-related plans including Addendum 5 of the Site Health and Safety Plan and the Waste Excavation and Transport Plan.
 - Personnel were trained on the new methodology, additional levels of PPE and equipment shielding, all of which was implemented prior to resuming waste movement activities following the discovery of the cylinder. At the end of the 2017 calendar year, approximately 293,980 tonnes of waste material (approximately 53% of all waste to be moved based on current estimates) was confirmed transferred into the PG LTWMF cells.
- An emergency preparedness exercise was held 2017 March 22 simulating the emergency extrication of an injured worker from a controlled area, to test the contractor's emergency response plan. Clarington first responders, including fire and paramedic services, assisted in the planning of the exercise and performed the simulated rescue. A debrief session was held with all participants following the drill and a report was prepared and submitted to the CNSC.
- Storm and ground water accumulation within the excavation areas at the PG WMF continued to be monitored and transferred to the PG WWTP from the EQ pond.
- Developed water management and contingency operating procedure and a stormwater management plan. Relevant personnel were provided training on implementing these plans.
- Erosion control and dust suppression at the PG WMF and PG LTWMF sites continued.
- 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.
- 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 PG WMF in accordance with the parameters of the CNSC licence and approved CNL WMF operational and maintenance procedures.
- 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.
- Twenty three compliance oversights were conducted by CNL for the PGP. No negative trends were observed. Recommendations for improvement raised from compliance oversight activities were dispositioned or rectified. Additional to the compliance oversights, there were daily site walk downs and monthly safety site walk downs which were effective in resolving issues immediately.
- There were no lost time injuries in 2017.
- EA follow-up and operational monitoring continued in 2017 with no areas of concern.
 - Groundwater Monitoring
 - Operational groundwater well sampling was not conducted in 2017. The operational groundwater wells were decommissioned with exception of one, which is included as part of the Biophysical Effects Management Program in 2016 as they were located within or adjacent to the PG WMF excavation areas.
 - Bluff Seepage Monitoring
 - In 2017, seepage samples were collected quarterly from three locations along the Lake Ontario bluffs between the east and west gorges in the areas where active erosion is being monitored. In 2017, samples were not collected in the spring due to unsafe conditions along the Lake Ontario shoreline as a result of historically high water levels. Elevated concentrations of fluoride, arsenic, uranium and nitrates were noted in the seepage water. The elevated concentrations are in line with historic trends for bluff seepage monitoring. However, seepage flow volumes are very small throughout most of the year. As a result, the total contaminant plume to Lake Ontario remains very small. The seepage water quality is expected to improve as the project evolves.

- Water Collection and Treatment System
 - During the reporting period, none of the effluent discharge limits for the PG WMF were exceeded. No toxicity failures occurred during the reporting period.
- Geotechnical Monitoring Program
 - Geotechnical inspections were performed by the contractor and CNL in 2017. This consisted of ongoing inspections and monitoring activities (including regular visual observations), per each organization's respective plans and procedures. Since waste movement began on 2016 November 1, the contractor produced monthly slope stability reports, as per the specification requirements.
- PGP Environmental Assessment Monitoring consists of atmospheric, geology and groundwater and aquatic monitoring. Below is a brief summary of environmental monitoring for 2017.
 - Atmospheric Monitoring
 - Five filters exceeded the Overriding Limit of 120 $\mu\text{g}/\text{m}^3$ from 2017 January and March. The exceedances represent approximately 1% of total samples. The contractor performed appropriate dust mitigation practices.
 - Independent Dust Monitoring
 - During the 2017 reporting period, independent dust monitoring continuously occurred during the work hours and results were reported on a 15-minute interval. Throughout the year, there were six instances when the 15-minute average exceeded the Action Level (AL) of 120 $\mu\text{g}/\text{m}^3$ at the work site perimeter. The six exceedances of the AL all took place in the first quarter of 2017, January to March. It should be noted that on the days of AL exceedances, there were no exceedances of the overriding limit from the high-volume air samplers located at the perimeter of the controlled area.
 - Noise Monitoring
 - Continuous sound level data was collected at a total of nine locations in Port Granby during the 2017 monitoring period on a quarterly basis. Several special campaigns were also conducted along the transportation route to monitor the effects of increased truck traffic to the site. Overall, noise monitoring data is consistent with the EA predictions.
 - Geology and Groundwater Monitoring
 - Groundwater samples were collected and analysed for contaminants on a quarterly basis in 2017 in conjunction with the measurement of groundwater static levels. On the site of the current PG WMF, the groundwater quality is expected to improve significantly once waste removal is completed. On the site of the PG LTWMF, perimeter monitoring

will be used at the site perimeter locations to confirm the effectiveness of the containment system. Groundwater levels were measured quarterly in 2017. A slight increase in average water levels in 2017 can be observed in most wells relative the 2016 data. This is likely due to the increased amount of rainfall observed in 2017 relative to 2016.

- Soil sample results indicated that only total boron has consistently exceeded the clean-up criteria for the Contaminants of Potential Concern (COPCs) at all locations. However, it should be noted that the value is not increasing, indicating that the condition was pre-existing and that the project is not contributing to these elevated levels. All other values are below the clean-up criteria for the COPCs and are comparable to previous years.
- o Aquatic Monitoring
 - Results from sediment sampling indicated elevated uranium, nickel, cobalt and vanadium in some of the samples relative to 2016 data. Arsenic exceeded the Provincial Sediment Quality Guidelines and the Canadian Council of Ministers of the Environment Sediment Quality Guidelines. Sediment samples collected on 2017 July showed higher levels of metals than those collected in the fall sampling campaign. The historically high rainfall observed in the spring of 2017 may have contributed to these elevated levels. It is expected to improve once remediation of the Port Granby site is complete.
 - The surface water flowing in the Port Granby Creek watershed was sampled on a quarterly basis at two locations. Water quality in the sample locations of the stream have remained stable over the last few years, notably with respect to metals and radionuclides. In 2017, elevated detection limits were observed for cadmium, selenium and silver in some of the quarterly samples. Port Granby Creek was also monitored for one storm event in 2017. The contaminant concentrations were observed to peak as Total Suspended Solids (TSS) increased. Concentrations of phosphorus and iron were observed to exceed the Provincial Water Quality Objectives (PWQOs) and/or Canadian Water Quality Guidelines (CWQGs) as TSS increased. The rural nature of the site and the associated farming activities would likely contribute to the higher than normal phosphorus levels observed during the storm event monitoring. Concentrations were subsequently reduced as TSS levels declined. Cadmium, selenium, and silver elevated in some of the samples collected during the storm event.
 - Lake Ontario water quality at the diffuser is not affected by the current PG WMF operations, and this is also evident from results of the mixing zone samples.

- The results of the drainage water sampling campaigns were compared against the PWQO and the CWQG. Exceedances have been observed in previous years for these compounds in drainage water (prior to emplacement of the waste at the PG LTWMF), and as such are not likely related to the operation of the facility. The rural nature of the site and the associated farming activities would likely contribute to the higher than normal phosphorus levels in the pond. It should be noted that elevated detection limits (i.e., above or at the applicable regulatory criteria) were observed for cadmium, chromium, selenium, and silver in some of the samples collected in 2017.
- In 2017 October, an emergency tabletop drill was completed to test the Environmental Emergency Plan (E2 Plan) for Chemical Releases at PG WWTP. The drill included walking through a pre-determined scenario involving one of the chemicals stored on site.
- In 2017, there was one emergency event that directly or indirectly affected the PGP. This was the unplanned release of untreated water to the environment as a result of an extreme rainfall event on 2017 June 23.
- There were no security events that effected the PGP.
- From 2017 January to 2017 December, there were no radioactive material transport shipments associated with the PGP.
- Public consultation/stakeholder engagement remains high and effective. 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.