ONTARIO POWER GENERATION

OPG Proprietary
Commercially Sensitive

June 21, 2013

Memo to file No.: NK38-CORR-38000-0465273

Re: D2O Storage Project 16-31555 Soil Sampling Management

Sampling and Analysis:

Sampling consists of removing a portion of the material being surveyed for separate laboratory analysis and is usually the most sensitive technique for assessing radioactivity levels. Laboratory analysis provides a means of identifying complicated radionuclide mixtures, difficult-to-measure radionuclides, and very low concentrations of residual radioactivity. Sampling is used to provide an estimate of the average radionuclide concentration or level of radioactivity for a specified area or volume of material and may be used to validate the results of in-situ or scanning surveys.

Appropriate sample locations are usually identified in the survey design when the locations are part of a random or systematic grid approach.

Samples will be required at elevated areas identified during a scanning survey to quantify the level of activity present. Sampling and detailed laboratory analysis is typically the most expensive and time consuming method of obtaining survey results

Asphalt:

Asphalt samples have been taken to bring the total number up to the 20 samples as requested by Radiation Protection. The asphalt is currently stored in Campus Site C4 inside the PA. The D_2O Storage project has arranged for additional samples to be taken to Kinectrics for laboratory analysis. Monitor large pieces of material (i.e. concrete, asphalt, etc) with a contamination meter (25% of surface) and GR series meter (100% of surfaces) as material is being loaded into disposal bin.

Soil:

The soil which will be exposed once the asphalt is fully removed will then be accessible. Additional soil samples have been taken to bring the total number up to the 20 samples as requested by Radiation Protection. The D_2O Storage project has arranged for additional samples to be taken to Kinectrics for laboratory analysis.

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Bedrock:

PGL will grab 15 additional samples of bedrock once the excavation starts to bring us up to the minimum 20 samples. Since the bedrock will be remaining on OPG property the bedrock can be shipped and segregated on the Campus Plan Site F1. Although there is no reason to anticipate those samples having any activity based on current results, should activity be present, the project will bring back the affected bedrock.

Risk:

The number of samples determine here is based on the understanding that there is only tritium in the soil. This is a reasonable assumption based on the source of the tritium (IWST spill) and the fact that there has been no identification of other isotopes in the site water samples to date. The determination of the recommended sample size is based on the fact that only tritium will be found in the samples. If, at the time of sampling, further isotopes beyond tritium are found or if the determined variability or shift in the initial sampling is significantly higher, then the number of samples to represent the data units will need to be increased.

Sampling during excavation:

It would be prudent though to collect samples of this material as the job progresses to clearly demonstrate all initial sampling and assumptions hold throughout the process, as this is a large volume of material that is to be relocated at Campus Plant Site F1. It is understood that approximately 2000 truckloads of material are expected to be transferred during this project. Projects and Modifications suggest we sample about 2% of these vehicles or nominally one sample per day during the excavation. These extra samples will not be required to be analyzed and reviewed prior to any vehicle leaving the protected area but needs to be analyzed in a manner that would permit the taking of any mitigating actions should these samples indicate the initial sampling had gaps. This is anticipated to be of the order of an additional 40 samples over the course of the excavation.

In addition to the sampling there is a requirement to have the surface layer scanned with both beta and gamma sensitive monitors to ensure no contamination is present on the surface layer (most likely contaminated layer from beta gamma emitters). Surveys are to be performed in the area around the HWMB just west of the TRF/HWMB. Other areas around this building were shown to be free of contamination but the surface will need to be surveyed at the time of the excavation. This is also recommended in the COG report.

MOE Guidelines:

Both the Senes and COG reports references MOE based guidelines on sample selection based on the volume of the material. There is some inconsistency here based on the recommendations of the NRC guidance vs. the MOE guidance with regards to sampling based on volume or mass. For completeness the guidelines from the MOE tables were used and extrapolated to the proposed 22000 cubic meters of soil and material intended to be transferred on this project. The result of using the MOE guidance would lead us to select about 62 samples. This is in line with the 60 samples recommended based on the MARSIMM tables and the COG report.

Mechanism for Transfer:

N-PROC-RA-0014, Radiological Zoning, Personnel/Material Monitoring and Transfer Permits, provides provision in Section 1.6.6 for the transfer of materials that cannot be released in accordance with N-PROC-RA-0124, Unconditional Transfers of Materials from Radiological Zones. Such material shall be released under N-FORM-10243, Conditional Transfer Permit. The conditions to be applied would include, as understood from the project team, that the material will be controlled from further release from OPG control pending further processing and sampling for final release and monitored to ensure such material does not cross contaminate other grounds or materials while at its proposed holding area.

Table 1: Waste Type and Disposal Options

Waste Soil	Disposal Option
H3 <0.02 µCi/kg and GG<MDA/NORM	Can dispose outside of PA either on or offsite
H3 < 0.108 µCi/kg	Can be disposed outside of PA but onsite (i.e. Campus Plan Site F1) removed from PA under a conditional transfer permit.
Wastewater	**Disposal Option**
IF H3 < 0.108 µCi/kg and GG < MDA/NORM and no PHC	Soil infiltration or to yard drainage
IF H3 < 0.108 µCi/kg and GG < MDA/NORM and evidence of PHC OR IF H3 between 0.108 and 2 µCi/kg and GG < MDA/NORM regardless of PHC impacts	Disposal via Detox to Clean Harbours- final disposal via incineration
IF H3 > 2 µCi/kg and GG > MDA/NORM regardless of PHC	Consult and typically solidify ship to Nuclear Waste Management Division

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