UNDERTAKING J14.6

Undertaking

For the table that starts on page 5 of LOW's compendium (K14-1), which displays OPG NK38-REP-07730-10022 R000 (Darlington Nuclear Refurbishment and Continued Operation Environmental Assessment Follow Up Program) Page 8 Table 1.4-1, to look through each program element in the follow-up program elements table and state;

a) exactly what the expected cost for each program element will be during the test period specifically
b) whether the program element will be completed during the test period (2014 2015)
c) what the expected commencement and completion dates

(Provide the following for each program element of Table 1 shown at pg 5 of the compendium: expected commencement date, expected completion date, budget amount for test period.)

(cross reference LOW#001)

Response

The total cost of the elements of the Darlington Refurbishment EA Follow-up Monitoring program as defined in Table 1.4.1 of report NK38-REP-07730-10022 R000 (Darlington Nuclear Refurbishment and Continued Operation Environmental Assessment Follow Up Program) is included in the attachment together with the annual cost for the test period specified (2014 – 2015). There are no defined commencement and completion dates at this point as OPG is still developing the detailed study methodology and schedule which requires approval from the CNSC. However the work will be completed consistent with the three phases of the project; prior to refurbishment, during refurbishment and post refurbishment.

Program Element Reference Number	Applicable Environmental Component	Description of Follow-up Program Element	Expected Time and Duration	Cost (Test Period 2014)	Cost (Test Period 2015)
1	Surface Water	Review the DNGS effluent monitoring program relative to that of applicable CSA standards and subsequent confirmation through applicable ERA results to verify EA predictions related to liquid effluents. At a minimum, this shall include: • Broad spectrum characterization of effluents (parameters beyond those currently contained in license/permits). • Screening of the parameters for inclusion in the site's operational ecological risk assessment (ERA). • Review of the adequacy of existing effluent and environmental monitoring programs based on the site's ERA	Coordinate with OPG's review of new standards against current programs. **Completed during the Refurbishment and Continued Operation phases**	$60K	$30K

Program Element Reference Number	Applicable Environmental Component	Description of Follow-up Program Element	Expected Time and Duration	Cost (Test Period 2014)	Cost (Test Period 2015)
2	Surface Water	Conduct a Stormwater Control Study for areas subject to refurbishment activities within the Protected Area during the Refurbishment of the first unit for two representative storm events (spring and summer storm) to confirm that the Project has not adversely affected storm water quality. Analyze the stormwater based on historical findings, including, but not limited to, Municipal/Industrial Strategy for Abatement (MISA) parameters such as total phosphorus, aluminum, iron, oil and grease, ammonia and ammonium and biological oxygen demand	One season of monitoring during the **Refurbishment phase**. Determine need for additional monitoring based on results.	$0	$0

Program Element Reference Number	Applicable Environmental Component	Description of Follow-up Program Element	Expected Time and Duration	Cost (Test Period 2014)	Cost (Test Period 2015)
3	Aquatic Habitat/Biota	Monitor data on cooling water discharge temperature and plume characteristics and interpret in relation to fish habitat and susceptibility of VEC species. Compare temperature criteria and other assessment metrics based on Griffiths (1980) with the results of the CANDU Owners Group study examining thermal effects to round whitefish eggs (underway by others).	Two monitoring periods (not withstanding any additional monitoring to be developed as part of an adaptive management plan): • **One winter season (November to April) during the Refurbishment Phase.** • **One winter season (November to April) following restart of all reactors.** (The comparison with the CANDU Owners Group study will occur once the study is published).	$60K	$10K

Program Element Reference Number	Applicable Environmental Component	Description of Follow-up Program Element	Expected Time and Duration	Cost (Test Period 2014)	Cost (Test Period 2015)
4	Aquatic Habitat/Habitat	Monitor entrainment and impingement mortality associated with DNGS intake.	Program will comprise three components (not withstanding any additional monitoring to be developed as part of an adaptive management plan): • Entrainment monitoring with larger sample size and invertebrate component – **prior to refurbishment outage**. • Benthic invertebrate community study – **prior to refurbishment outage**. • Impingement and entrainment – **two years of monitoring following restart of all reactors**.	 $150K $100K $0	 $150K $100K $0

Program Element Reference Number	Applicable Environmental Component	Description of Follow-up Program Element	Expected Time and Duration	Cost (Test Period 2014)	Cost (Test Period 2015)
5	Malfunctions and Accidents	Design changes related to safety improvement opportunities (SIOs) will reduce accident frequency achievable. The assignment of probabilities to represent the SIO design changes is judged to be sufficient to approximate the reduction in accident frequency achievable. Per the requirements of CNSC S-294, the station PRA will be updated to reflect the detailed design and as-installed configuration prior to bringing refurbished units back on-line.	Prior to bringing refurbished units back on-line with updates provided to CNSC as part of this process. **(during Refurbishment)**	Normal Practice to comply with requirements of S-294. No additional incremental cost projected $0	$0
6	Effects of the Environment on the Project	Undertake a full review of available documentation regarding fill materials and their liquefaction potential in the Protected Area. Should sufficient verification not be realized for the prediction of low liquefaction potential, undertake a liquefaction assessment of fill materials as appropriate.	Prior to bringing refurbished units back on-line. **(during Refurbishment)**	$0	$0