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Written submission from Swim Drink Fish Canada / Lake Ontario Waterkeeper

Mémoire de Swim Drink Fish Canada / Lake Ontario Waterkeeper

Regulatory Oversight Report for Canadian Nuclear Power Generating Sites: 2018

Rapport de surveillance réglementaire des sites de centrales nucléaires au Canada : 2018

Commission Meeting

Réunion de la Commission

November 6, 2019

Le 6 novembre 2019

Canada

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Preliminary Submissions of Swim Drink Fish Canada/Lake Ontario Waterkeeper

Re: Commission meeting to consider CNSC Staff Regulatory Oversight Report for Canadian Nuclear Generating Sites: 2018

Notice of Public Meeting, Ref. 2019-M30

October 7, 2019

Submitted to:
Participant Funding Program Administrators cnsc.pfp.ccsn@canada.ca and the CNSC Secretariat cnsc.interventions.ccsn@canada.ca

About Swim Drink Fish Canada/Lake Ontario Waterkeeper

Swim Drink Fish Canada/Lake Ontario Waterkeeper ("Waterkeeper") is a grassroots environmental organization that uses research, education, and legal tools to protect and restore the public's right to swim, drink, and fish in Lake Ontario. Founded in 2001, Waterkeeper is a non-political registered charity focusing on research and justice issues in the public interest. It is dedicated to protecting and celebrating the Lake Ontario watershed, including the wetlands, streams, rivers, and creeks that flow into the lake.

Waterkeeper also works with communities to facilitate the use of environmental laws to protect their rights to swim, drink, and fish. The organization participates in legal processes to help ensure that environmental decisions are made on the basis of sound and tested scientific evidence by independent decision-makers and in the public interest. Waterkeeper is participating in the current Pickering Nuclear Generating Station (PNGS) relicensing process in order to ensure the Commission Tribunal considers the public's need for a swimmable, drinkable, fishable Lake Ontario when considering whether to renew the PNGS licence and add any additional licence terms.

Waterkeeper's current preliminary submissions

Waterkeeper has received participant funding to intervene in this matter, which requires the organization to prepare and deliver written submissions concerning the impacts of the PNGS to local groundwater quality, as well as the adequacy of Ontario Power Generation's (OPG) public information policies and practices for the PNGS and Darlington Nuclear Generating Stations (DNGS).

Waterkeeper was provided with participant funding from the CNSC in order to retain two experts to examine the PNGS and make recommendations for improvements to its operations:

- **Pippa Feinstein, JD, LLM,** counsel and case manager for Waterkeeper. Ms. Feinstein was retained to assess and make recommendations concerning the PNGS' regulatory compliance as well as the adequacy of its public information-sharing policies and practices; and
- **Wilf Ruland, P. Geo**., an experienced hydrogeologist and recognized leading expert on the impacts of industrial facilities on local groundwater and surface water. Mr. Ruland was retained to assess the PNGS' impacts on groundwater and make recommendations for improvements.

With the assistance of its two experts, Waterkeeper had planned to follow up on its intervention in last year's licence renewal hearing for the PNGS, focusing on groundwater issues which it could not address last year due to a lack of information disclosure from OPG.

However, (again) there was insufficient publicly available information to inform Waterkeeper's expert's work. Ultimately, this deficit has prevented Waterkeeper from being able to fulfil its obligations under its funding agreement with the CNSC. The Commission was made aware of these difficulties in advance of today's deadline and has permitted Waterkeeper to file additional submissions by October 30, 2019.

The Secretariat has required Waterkeeper to submit these preliminary written submissions to meet the October 7th deadline, however, the submissions provided on October 30th will likely be considerably more fulsome. Hopefully by that time, OPG will have provided Waterkeeper with additional information materials.

The lack of Information-sharing during the current hearing process

During last year's licence renewal hearing, Waterkeeper was initially prevented from providing a review of groundwater and surface water conditions at the PNGS due to a lack of disclosure by OPG. It was partly on that basis that Waterkeeper was granted the ability to file later supplemental submissions in that process. While OPG subsequently provided more information concerning surface water conditions to help inform Waterkeeper's later submissions at that time, it still withheld information relating to groundwater.

In the Commissioners' Record of Decision granting OPG its requested licence renewal for the PNGS, they directed the company to provide Waterkeeper with more information relating to groundwater.[1] This current intervention opportunity was meant to allow Waterkeeper to follow-up on this issue. However, OPG obfuscation is threatening to prevent this again.

The lack of OPG cooperation during this hearing process is incredibly frustrating and unfortunate. Until last year's PNGS licence renewal hearing, and since that time, Waterkeeper has never experienced this degree of obfuscation before.

<u>Public access to information during the 2017 Pickering Waste Management Facility relicensing hearing</u>

In the Commission Tribunal's 2017decision to relicense the PWMF it expressed concern over the lack of public access to environmental data concerning the Pickering site at

[1] Canadian Nuclear Safety Commission, "Record of Decision In the matter of Ontario Power Generation's Application to Renew the Nuclear Power Reactor Operating Licence for the Pickering Nuclear Generating Station", online: < http://www.suretenucleaire.gc.ca/eng/the-commission/pdf/DetailedDecision-OPG-Pickering-2018-e.pdf > at para 403.

that time. The Commission addressed deficiencies in both CNSC staff and OPG's lack of transparency during the hearing process.

Commissioners expressed concerns over CNSC staff's use of "ambiguous terminology: such as "very minor percentages" in reference to contaminant releases. They also supported Waterkeeper's recommendations that CNSC characterizations of environmental effects be supported by publicly available data in order to support greater transparency.[2] Further, the Commission supported a more active role by CNSC staff to step in if intervenors find it difficult to acquire information from regulated facilities.[3]

While CNSC staff has not provided Waterkeeper with the information it requested of OPG, and it is unclear whether (or to what extent) CNSC staff have worked behind the scenes to ensure more recent OPG disclosures in this proceeding, Waterkeeper is grateful for their understanding and offer of more time to prepare written submissions in this matter. Waterkeeper also hopes they may continue to assist the organization in obtaining the information it needs in order to perform the review it has been funded to provide.

Ultimately, in its PWMF decision, the Commission Tribunal recognized there could be instances in which need for future public information disclosure may be broader than the reporting requirements specified in CNSC REGDOC 3.2.1, the Commission's policy concerning public information and disclosure.[4] Waterkeeper submits that the current Regulatory Oversight Report meeting constitutes such a circumstance.

[2] Record of Decision In the Matter of Ontario Power Generation Application to Renew the Waste Facility Operating Licence for the Pickering Waste Management Facility, at para 169.
[3] *Ibid* at para 234.
[4] *Ibid* at para 71.

APPENDIX A: Information Requests Made by LOW to OPG (To Date)

- August 22 Information request made to OPG:

1) The last five years' worth of Annual Groundwater Monitoring Reports; and
2) Raw monitoring data from all groundwater monitoring wells on and around the Pickering site (collected over the last three years at least), if the Annual Groundwater Monitoring Reports do not include raw data.

- August 26 received response with promise that OPG staff would respond to LOW requests.

- September 4, LOW receives invitation for site visit at PNGS. Agrees to attend but stresses the need to obtain requested information in advance and as soon as possible.

- September 13, LOW sends follow-up query about requested information.

- September 16, LOW sends follow-up query about requested information.

- September 17, OPG provides its 2018 Groundwater Monitoring Report to LOW.

- September 19, after reviewing the 2018 Groundwater Monitoring Report, LOW makes the following additional requests for information:

1) Was the 2018 Pickering Nuclear Groundwater Monitoring Program Results report submitted to the CNSC, and if so on what date?

2) Please provide a full copy of the 2018 Groundwater Sampling and Analysis Plan (SAP) referred to on pages 6 and 7 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report.

3) Please provide a legible map showing the locations and designations of all 146 sampling locations referred to in Section 2.2 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report.

4) Please provide a legible map showing the locations and designations of all 80 wells referred to in Section 3.1 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report. Please also provide the 2018 water level data for each of the wells, and confirm which of the wells were used in preparing the groundwater contour map in Figure 2.

5) Please provide a detailed description (including hydraulic conductivities) of each of hydrostratigraphic units listed in Section 3.1 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report. If possible, please provide cross-section(s) showing the units.

6) For each of the monitoring wells and ground tubes sampled in 2018, please indicate which hydrostratigraphic unit(s) the well or ground tube was screened/completed in.

7) Please confirm whether there was any sampling done of the storm sewer systems in the Unit 1 to 4 areas (and any other areas) where groundwater contamination dramatically worsened in 2018, and if sampling was done then please provide full results of that sampling.

8) If there are any other groundwater sampling results for 2018 which have not been included in the 2018 Pickering Nuclear Groundwater Monitoring Program Results report then please provide them.

9) The linear graphical representations of tritium data in the 2018 Report all suffer from a major problem, in that there is a discontinuity between the 0 level on the y-axis and the next increment above the 0 level. This discontinuity makes it impossible to obtain an accurate visual overview of the sampling results on many of the graphs. Please explain why this linear method (with a major discontinuity) of data presentation is being used, instead of using other ways of presenting the data (for example using orders of magnitude)?

10) How does the leakage-related spike in groundwater contamination by tritium (in the Unit 1 to 4 area) in 2018 compare to other prior incidents of groundwater contamination at PNGS? Am I correct in considering this to be one of the worst groundwater contamination events in the station's history?

11) It appears that the majority of sampling locations in the TAB foundation drains could not be sampled in 2018 - is this a recent development, or how long has there been an inability to sample these locations? What is being done to remedy the situation?

12) In my 2018 Report on the PNGS License Application, I identified several locations where the PNGS storm sewer system is significantly contaminated. Is it possible that there is a groundwater source for this contamination (i.e. leakage into the system at times of higher groundwater levels)? If not, then what are the most likely sources, and what efforts are underway to remediate them?

13) The 2018 Pickering Nuclear Groundwater Monitoring Program Results report does not appear to have any recommendations, and to the extent that there are conclusions these appear to only be listed in the Executive Summary. Is this common practice?

- September 25, LOW writes to CNSC Secretariat to request assistance in obtaining requested information from OPG.

- October 4, OPG provides the following responses (in red) to LOW's questions:

1) Was the 2018 Pickering Nuclear Groundwater Monitoring Program Results report submitted to the CNSC, and if so on what date? ***OPG RESPONSE – Yes. It was submitted on April 26, 2019.***

2) Please provide a full copy of the 2018 Groundwater Sampling and Analysis Plan (SAP) referred to on pages 6 and 7 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report. ***OPG RESPONSE - Please see attached P-PLAN document.***

3) Please provide a legible map showing the locations and designations of all 146 sampling locations referred to in Section 2.2 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report. ***OPG RESPONSE - Figure 1 (pg 8) shows all the locations sampled. Figure 3 (pg 15), Figure 4 (pg 29), Figure 5 (pg 27) and Figure 6 (pg 34) zoom in on the various areas of the site and show the well identification names.***

4) Please provide a legible map showing the locations and designations of all 80 wells referred to in Section 3.1 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report. Please also provide the 2018 water level data for each of the wells, and confirm which of the wells were used in preparing the groundwater contour map in Figure 2. ***OPG RESPONSE – The well names and 2018 water levels (below reference elevation) are provided below. The locations can be found on the two attached monitoring well location drawings. The well names in the table below do not exactly coincide with the drawings, as they are shortened, but it should be fairly straightforward to figure out. I've also generate and attached a drawing that shows the elevations in addition to the contours. The * in the table below indicates the 44 wells that were used to generate the shallow groundwater contour map.***

Well	Value	Unit
MW-024 *	4.8	mbref
MW-025 *	10.11	mbref
MW-027	9.85	mbref
MW-028	10.85	mbref
MW-033	7.72	mbref

MW-037 *	1.18	mbref
MW-040 *	4.23	mbref
MW-046	5.6	mbref
MW-047	8.24	mbref
MW-049 *	6.1	mbref
MW-055 *	3.1	mbref
MW-056 *	2.78	mbref
MW-057	3.05	mbref
MW-066 *	1.87	mbref
MW-075	3.19	mbref
MW-076 *	2.98	mbref
MW-089	2.14	mbref
MW-090 *	2.4	mbref
MW-091	3.64	mbref
MW-093 *	2.09	mbref
MW-096 *	2.8	mbref
MW-102	1.53	mbref
MW-105	2.42	mbref
MW-111	2.45	mbref
MW-117 *	2.65	mbref
MW-121	1.91	mbref
MW-122	2.46	mbref
MW-123 *	1.58	mbref
MW-124	2.61	mbref
MW-125	2.04	mbref
MW-145	2.35	mbref
MW-150	2.6	mbref
MW-161	4.08	mbref
MW-170 *	4.48	mbref
MW-171	2.2	mbref
MW-172 *	2.25	mbref
MW-186 *	2.92	mbref
MW-215 *	3.42	mbref
MW-221 *	2.75	mbref

MW-230 *	2.71	mbref
MW-235	2.83	mbref
MW-237 *	2.91	mbref
MW-239	2.89	mbref
MW-240 *	2.97	mbref
MW-241	3.24	mbref
MW-242 *	3.79	mbref
MW-243 *	4.93	mbref
MW-244	4.82	mbref
MW-246	2.96	mbref
MW-247	2.07	mbref
MW-260 *	2.65	mbref
MW-261 *	3.82	mbref
MW-264 *	1.59	mbref
MW-265 *	3.1	mbref
MW-266 *	2.99	mbref
MW-267 *	2.81	mbref
MW-269 *	3.03	mbref
MW-270 *	2.79	mbref
MW-273 *	3.03	mbref
MW-282	1.48	mbref
MW-285	1.48	mbref
MW-286 *	2.43	mbref
MW-288 *	2.4	mbref
MW-291	2.43	mbref
MW-293 *	2.37	mbref
MW-301	2.06	mbref
MW-302	2.58	mbref
MW-303 *	3.23	mbref
MW-304 *	3.05	mbref
MW-313	2.99	mbref
MW-315 *	4.19	mbref
MW-317 *	2.99	mbref
MW-318	3.08	mbref

MW-320 *	2.8	mbref
MW-321 *	3.32	mbref
MW-322 *	1.72	mbref
MW-325 *	1.97	mbref
MW-345	2.4	mbref
MW-347	0.75	mbref
MW-348	1.15	mbref

5) Please provide a detailed description (including hydraulic conductivities) of each of hydrostratigraphic units listed in Section 3.1 of the 2018 Pickering Nuclear Groundwater Monitoring Program Results report. If possible, please provide cross-section(s) showing the units. ***OPG RESPONSE – The cross-sections are attached. Descriptions and hydraulic conductivities are provided below.***

- ***HU-1: Landfill – Landfill material consisting of excavated soils, construction debris, and miscellaneous solid wastes generated during construction and operation of the station. Due to the low hydraulic conductivity of the landfill materials, they were classified as an aquitard.***
- ***HU-2: Granular fill – Typically includes sand and gravel fill (i.e. Granular A or Granular B) that was used as bedding/backfill material for underground foundations/slabs, utility/service corridors, and for paved areas of the site. The granular fill materials (HU-2) adjacent to building foundations and service/ utility corridors are expected to be permeable and may act as conduits for the migration of groundwater, where they are present below the water table.***
- ***HU-3: Construction excavation fill (sandy to clayey silt) – The construction excavation fill material (HU-3) predominantly consists of sandy silt to clayey silt fill, containing pebbles, gravel, and shale fragments, which were derived from construction excavations and cut and fill operations.***
- ***HU-4: Organic clayey silt to silty clay –***

The fill material is locally underlain by a high organic silt/clay layer that has been generally described as black silt, peat, and organic clayey silt/silty clay. The presence of HU-4, representing the original ground surface, varies throughout the PNGS site, depending on the amount of re-grading that was undertaken prior to backfilling.

- ***HU-4 is discontinuous and thin across the site. Because of its fine-grained texture, it may act as a partial confining layer or aquitard and may limit groundwater flow from the fill (HU-2 and HU-3) to the till (HU-5) where it is present.***
- ***HU-5: Brown sandy to clayey silt till – This HU generally consists of brown oxidized sandy silt to clayey silt till with some pebbles, gravel, cobbles, and shale fragments, containing local lenses and seams of fine sand. This HU is***

relatively thin and discontinuous and, where present, likely represents the native shallow overburden material prior to re-grading/backfilling of the site. Throughout the PNGS, the presence of HU-5 varies depending on the amount of regrading that was undertaken in various areas of the site. Along the lakeshore and immediately offshore, HU-5 appears to be absent as deeper till units outcrop at surface in this area.

- *HU-6: Grey clayey silt to silty clay till –*

Underlying the brown till is a firm to stiff grey clayey silt to silty clay till with some pebbles, gravel, and shale fragments (HU-6). The till contains local interlayered lenses and seams of soft wet clay and sand with occasional gravel. The clayey silt /silty clay likely acts as an aquitard while the interlayered seams of sand and gravel will act as aquifers, although the seams appear to be localized and discontinuous and will have limited potential fo r groundwater flow.

- *HU-7: Grey sandy silt till – HU-7 comprises a dense to very dense complex of grey sandy silt till containing pebbles, gravel, and shale fragments. The till contains local interlayered lenses and seams of dense silts, sands, and gravel. The silt till likely acts as an aquitard while the interlayered seams of sand and gravel will act as aquifers; however, the seams appear to be localized and discontinuous and will have limited potential for groundwater flow.*
- *HU-8: Shale bedrock – HU-8 is the underlying shale bedrock, generally described as dark-grey soft, weathered fissile shale with some clay along bedding planes. The shallow bedrock is noted to be weathered and fissile with horizontal fractures along bedding planes and infilling of the fractures with silty clay materials. The deeper bedrock, below 3 to 5 m from the bedrock surface, is noted to be more competent with fewer fractures, less weathering and no to slight infilling of fractures.*

HUs	Description	Minimum (m/s)	Maximum (m/s)	Geometric Mean (m/s)
1	Landfill	$6.2x10^{-9}$	$2.2x10^{-6}$	$2.0x10^{-7}$
2	Granular fill	$1.7x10^{-6}$	$8.7X10^{-4}$	$3.2X10^{-5}$
3	Construction fill	$1.7X10^{-8}$	$2.4X10^{-5}$	$3.4X10^{-7}$
4	Organic clayey silt to silty clay		No tests performed	
5	Brown sandy to clayey silt till	$1.4X10^{-8}$	$1.0X10^{-3}$	$6.2X10^{-7}$
6	Grey clayey silt to silty clay till	$1.5X10^{-9}$	$2.9X10^{-4}$	$2.2X10^{-7}$
7	Grey sandy silt till	$4.6X10^{-9}$	$2.5X10^{-4}$	$4.6X10^{-7}$

8	Shale bedrock	$3.5X10^{-8}$	$1.3X10^{-7}$	$7.0X10^{-8}$

6) For each of the monitoring wells and ground tubes sampled in 2018, please indicate which hydrostratigraphic unit(s) the well or ground tube was screened/completed in. ***OPG RESPONSE – We request more time for this particular request due to the time involved in order to extract this information.***

7) Please confirm whether there was any sampling done of the storm sewer systems in the Unit 1 to 4 areas (and any other areas) where groundwater contamination dramatically worsened in 2018, and if sampling was done then please provide full results of that sampling. ***OPG RESPONSE - Monitoring storm sewer systems is not part of the groundwater monitoring program.***

8) If there are any other groundwater sampling results for 2018 which have not been included in the 2018 Pickering Nuclear Groundwater Monitoring Program Results report then please provide them. ***OPG RESPONSE - All results from 2018 are included in the report.***

9) The linear graphical representations of tritium data in the 2018 Report all suffer from a major problem, in that there is a discontinuity between the 0 level on the y-axis and the next increment above the 0 level. This discontinuity makes it impossible to obtain an accurate visual overview of the sampling results on many of the graphs. Please explain why this linear method (with a major discontinuity) of data presentation is being used, instead of using other ways of presenting the data (for example using orders of magnitude)? ***OPG RESPONSE - More clarification is needed with respect to this inquiry.***

10) How does the leakage-related spike in groundwater contamination by tritium (in the Unit 1 to 4 area) in 2018 compare to other prior incidents of groundwater contamination at PNGS? Am I correct in considering this to be one of the worst groundwater contamination events in the station's history? ***OPG RESPONSE - The concentration of tritium in groundwater noted in the Unit 1 area during 2018 were significantly higher than would be expected, which prompted the investigation and corrective action.***

11) It appears that the majority of sampling locations in the TAB foundation drains could not be sampled in 2018 - is this a recent development, or how long has there been an inability to sample these locations? What is being done to remedy the situation? ***OPG RESPONSE – Progress has been made with respect to modifying the IAD sump lids in order to simplify the collection of these samples.***

12) In my 2018 Report on the PNGS License Application, I identified several locations where the PNGS storm sewer system is significantly contaminated. Is it possible that there is a groundwater source for this contamination (i.e. leakage into the system at times of higher groundwater levels)? If not, then what are the most likely sources, and what efforts are underway to remediate them? ***OPG RESPONSE - Monitoring storm sewer systems is not part of the groundwater monitoring program.***

13) The 2018 Pickering Nuclear Groundwater Monitoring Program Results report does not appear to have any recommendations, and to the extent that there are conclusions these appear to only be listed in the Executive Summary. Is this common practice? ***OPG RESPONSE - The conclusions in the Executive Summary are also found in the many body of the report (pg 9, 11, and 28).***

- *On October 7, LOW made the following follow-up request:*

1) Your Response #4 provides a table showing a list of wells and 2018 water levels. The units are "mbref" which I am assuming is short for "meters below reference" - please confirm that this is the case.
Assuming I have interpreted "mbref" correctly, the next question is what the reference elevation? If all of the wells are surveyed in to a common datum, then please provide the datum's elevation in meters above sea level (masl). If the reference elevation is unique to each well, then please provide the water levels in meters above sea level (masl), as the data in the table will not on their own be very useful.
Please note that I very much appreciate the drawing which you generated with the groundwater elevations in masl shown on the map. However comparison of the water levels and the contours on the figure raises questions about how the contours were generated, as there is often a discrepancy between the spot elevations and the nearest contours. Could you please confirm how the contours on the 2018 Q4 Shallow Groundwater Contours map were generated?

2) Your Response #6 requests further time to respond. It would be very helpful if the requested information could be provided by October 21, 2019.

3) Your Response #9 indicates that "more information is needed with respect to this inquiry". This is an understandable comment, as I expressed myself poorly.
If we consider Graph 1 on page 13 of the 2018 PNGS Groundwater Monitoring Results report, then when compared to prior years' results shown for location U1-RBFD-1 (in Graph 1) there is a very clear spike in tritium levels in early 2018. Consideration of the data table (Table A-1) in the report shows that indeed tritium levels for U1-RBFD-1 were very high at 1.19 billion Bq/L in Q1. Where Graph 1 is particularly unhelpful is when it comes to trying to put the Q1 spike into context. It can be seen from Graph 1 that the Q1 2018 spike in tritium levels dwarfs all prior sampling results back through 2009. Where Graph 1 is problematic for me, is that it is really hard to read 2009 through 2017 data from the graph, because the 2018 spike is taking up most of the "bandwidth" on the Y-axis. Normally this wouldn't matter much, because I could just go back and look at the data for previous years. It matters here, because OPG is refusing to either release the actual data from prior years or the prior years' monitoring reports.

I would again urge OPG to release the 2014-2017 groundwater monitoring reports. This should not be an onerous task, as I am assuming that they were provided to CNSC previously.

4) With respect to your Response #10, you did not answer the question which was put to you. In my review of the 2018 PNGS Groundwater Monitoring Results report, I am planning to share with CNSC my determination that (based on the information available to me) the 2017 leak from the Unit 5 Moderator Room was likely the worst leak in PNGS history until that time in terms of measured groundwater tritium contamination levels (which reached about 400 million Bq/L at RBU5-GT-1). Then in 2018, the leak from the Unit 1 Moderator Purification Room exceeded the 2017 leak in terms of measured groundwater tritium contamination levels (which reached about 1.2 billion Bq/L at U1-RBFD-1) - making it the new worst leak in PNGS history.
If you have information which indicates I am incorrect in making the above statements then please let me know, and please provide the data confirming this to be the case.

5) Regarding the major leak of tritium-contaminated water from the Unit 1 Moderator Purification Room, please provide any available information on the following:
- the estimated length of time over which the leakage was occurring
- the estimated total volume of tritium-contaminted water which leaked into the groundwater system
- the estimated tritium levels in the leaking water
- any memo(s) or report(s) prepared in the course of the "very intensive and thorough investigation" (mentioned on page 12 of the 2018 PNGS Groundwater Monitoring Results report) of the elevated tritium levels found in the foundation drain at Reactor Unit 1,

6) The 2018 major leak occurred from the Unit 1 Moderator Purification Room, as outlined on page 12 of the 2018 PNGS Groundwater Monitoring Results report. There were also significant leaks of tritium contamination from the Moderator Room at Unit 5 (in 2017) and from the Moderator Room at Unit 6 (in 2018), as outlined on pages 16 and 17 of the 2018 Groundwater Report. Is there a difference between the "Moderator Purification Room" from which the 2018 leak occurred at Unit 1, and the "Moderator Room" from which the 2017 and 2018 leaks occurred at Unit 5 and Unit 6? If so, then please explain.
Also, it appears that Moderator Room floor construction joints were implicated in the leaks from Unit 5 in 2017 and Unit 6 in 2018 - so I am interested in understanding why preventative inspections and/or maintenance on Moderator Room floor construction joints was not recommended for Units 4, 7 and Unit 8 in the 2018 PNGS Groundwater Monitoring Results report?

7) I note that OPG has only minimally responded to the information request submitted on my behalf by Ms. Pippa Feinstein on August 22nd, 2019. In her e-mail to yourself, Ms. Feinstein made the following request:

"At this time, we request the following information:

1) The last five years worth of Annual Groundwater Monitoring Reports; and
2) Raw monitoring data from all groundwater monitoring wells on and around the Pickering site (collected over the last three years at least), if the Annual Groundwater Monitoring Reports do not include raw data."

The requested information is needed for my CNSC-funded review, and I would very much appreciate OPG providing it.