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January 9, 2013

BY COURIER (2 COPIES) AND EMAIL

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
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Dear Ms. Walli:

Re: Responses to Interrogatories to Environmental Defence
EB-2012-0064 – Toronto Hydro-Electric System Ltd. ("THESL")

I am writing on behalf of Environmental Defence in the above matter.

Enclosed please find responses to THESL's interrogatories to Environmental Defence, dated January 9, 2013.

We respectfully request that any hearing days relating to the Bremner Station project be scheduled for a date after Monday, February 4th, 2013, as I am scheduled to attend a week-long hearing from January 28, 2013 to February 1, 2013.

As we indicated previously, the expert for Environmental Defence in this matter, Bob Bach, will be out of the province from January 30, 2013 to February 14, 2013. We therefore request that his appearance not be scheduled during this time.

Please do not hesitate to contact me if anything further is required.

Yours truly,

Kent Elson

cc: Applicant and Intervenors

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LTD. INTERROGATORIES

Interrogatory No 2.2 THESL-1

Reference: Exhibit JT1.15

Environmental Defence indicated that the information requested in undertaking JT1.15 was required for the preparation of this report. Please indicate where in this report the hourly interval data for the downtown stations has been utilized.

Response:

This information was reviewed to determine the seasonality and daily diversity of the load on the five transformer stations.

Interrogatory No. 2.2 THESL-2

Reference: Environmental Defence Report, Page 1
In reference to Navigant's Business Case Analysis (page 16, Table 6) please clarify how the author arrived at the conclusion that "Navigant's analysis assumed that the maximum amount of incremental CDM that Toronto Hydro could reasonably achieve in downtown Toronto by 2014 would be 18 MW."

Response:
Based on Table 2 of Navigant's Business Case Analysis (the "Navigant Report"), and the assumption appearing on page 16 of that report that the maximum achievable amount of additional CDM is 50% above levels already proposed or achieved, the Terms of Reference should have more correctly stated that "Navigant's analysis assumed that the maximum amount of incremental CDM that Toronto Hydro could reasonably achieve in downtown Toronto in 2014 is 10.5 MW." The figure of 10.5 MW is 50% of the 21 MW of forecast CDM savings based on existing programs, as listed in the first line of the last column of Table 2.

The figure of 18 MW in 2014 was provided to Mr. Bach in the Terms of Reference for his report, and was based on a mistaken reading of Table 6. According to the second last line in the last column of Table 6 in the Navigant Report, the maximum targeted CDM is 18 MW by 2023, not 2014 as stated in the Terms of Reference. Also, Table 6 refers to the CDM at Windsor and Esplanade, not the entire downtown area. Again, the Terms of Reference should have more correctly stated that "Navigant's analysis assumed that the maximum amount of incremental CDM that Toronto Hydro could reasonably achieve in downtown Toronto in 2014 is 10.5 MW."

Mr. Bach notes that Table 2 in the Navigant Report is not entirely clear as it is entitled "Downtown Toronto CDM Firm Demand" but appears to include figures and totals for the entire Toronto Hydro system,. Furthermore, the meaning and relevance of the bolded "Cumulative CDM" row for planning purposes with respect to the Bremner station is unclear. The above

figure of 10.5 MW is based on the assumption that, according to Table 2, the base CDM for downtown Toronto in 2014 is 21 MW.

Interrogatory No. 2.2 THESL-3

Reference: Figures 3.1-1, 3.1-2 and Table 3.1-1

Please provide the source data from BOMA that is referenced in Table 3.1-1.

Response:

BOMA Toronto has advised Mr. Bach that this information has already been provided to Toronto Hydro.

Interrogatory No. 2.2 THESL-4

Reference: Figures 3.1-1, 3.1-2 and Table 3.1-1

Please re-tabulate the BOMA data to show the realized savings specific to the geographic area served by the five downtown transformer stations. Please provide these savings broken down by type (lighting retrofit, HVAC, VSDs, etc.).

Response:

The information provided by BOMA is not broken down to this level of detail.

Interrogatory No. 2.2 THESL-5

Reference: Figures 3.1-1, 3.1-2 and Table 3.1-1

Please indicate whether the results are verified results, or a "gross" value (i.e., prior to being discounted for additional factors).

Response:

The results were evaluated using the detailed measurement and verification procedures established by BOMA, and approved the Ontario Power Authority ("OPA"), and subsequently adopted by the OPA with minor revisions.

Interrogatory No. 2.2 THESL-6

Reference: Environmental Defence Report, Section 3.2

Is Environmental Defence aware of any proposed changes by the Ministry of Environment to the existing emission limits or Certificate of Approval process governing the operation of emergency generators that would allow the emergency generators to make a significant contribution to reducing peak demand?

Response:

Mr. Bach is not aware of any changes to regulations that might be made by the Ministry of Environment in this regard. We understand that there are other options available to make use of this standby generating capacity to contribute to peak demand reduction without a change in regulations.

Interrogatory No. 2.2 THESL-7

Reference: Environmental Defence Report, Section 3.2

Please provide a projection of peak demand capacity using emergency generators for backup generation that could be delivered from 2012 through 2021 for the area served by the 5 downtown Transformer Stations.

Response:

Based on information provided by an aggregator, Mr. Bach understands that there are currently 7 standby emergency generators in the downtown area that have been fitted with selective catalytic reduction (SCR) and are permitted by their Certificate of Authorization (C of A) to operate for demand response (DR). The aggregator also advised that there are many others that have been retrofitted with automatic transfer switches and other accessories necessary to provide DR, but they have not been fitted with SCR, and thus their C of A does not permit them to operate for DR. The total of this "locked out" capacity (i.e. those retrofitted with accessories necessary to operate for demand response but not fitted with SCR), combined with the total of other standby generators that have not been retrofitted in any way, is not known to Mr. Bach.

At this point in time, it is not possible for Mr. Bach to develop a further projection without further data and considerable efforts for a variety of reasons, including the need for additional DR, the potential introduction of new technologies, the changing nature of the market, CDM program design and incentive levels, and other factors.

Interrogatory No. 2.2 THESL-8

Reference: Environmental Defence Report, Section 3.2

What incentive would you anticipate (on a per kW basis) would be required to encourage owners to convert emergency generators for use in demand response applications?

Response:

Based on information provided by an aggregator to Mr. Bach, it would require an incentive of approximately $70 to $100/kW for the installation of SCR, depending upon engine-generator capacity and other factors. This would apply to standby generators that have already been fitted with automatic transfer switches and any other accessories necessary to permit them to operate for DR.

Interrogatory No. 2.2 THESL-9

Reference: Environmental Defence Report, Section 3.2, Table 3.2-1.

Please provide the approximate costs required to install, operate and maintain the 130MW of "On-site Generator Dispatch" as listed in Table 3.2-1.

Response:

This estimate was reproduced directly from the report prepared by Toronto Hydro, as indicated on page 4 of Mr. Bach's report (the "EPL Report"). EPL will defer to Toronto Hydro and its consultants and aggregator who are in a much better position to respond to this question.

Interrogatory No. 2.2 THESL-10

Reference: Environmental Defence Report, Section 3.2, Page 6

The report states on page 6 that, "There is a new technology that is expected to permit existing diesel engines to run on 100% natural gas with a much lower investment in engine modifications and no emissions control devices such as catalytic convertors required. This should be available in 2013."

a) Who is developing this technology?

b) Please clarify the statement that, "This should be available in 2013". Does this mean that it will be approved for commercial use by 2013?

c) When is the anticipated date for the first approved installation in the downtown Toronto core?

d) What is the expected cost?

e) Please estimate the peak electricity reduction in the downtown core that Environmental Defence expects to materialize as a result of the introduction of this technology to the marketplace.

Response:

The relevant information in the EPL Report, and the following additional information, was provided to Mr. Bach by an aggregator:

a) The technology is being represented by Green Engines Inc., Contact Peter Weiss, Email: peterweiss@greenenginesinc.; Tel: 480-518-6290.

b) The target date for commercial delivery of this technology is third or fourth quarter, 2013.

c) This has not been determined.

d) The expected cost is in the range of $100,000 - $150,000 per engine-generator, depending on the cost of bringing natural gas to the generator.

e) This information is not yet available.

Interrogatory No. 2.2 THESL-11

Reference: Environmental Defence Report, Section 3.2

In reference to the third tranche of DR3 noted in the report, this capacity was developed for the most part with higher incentive rates when Toronto was a "premium zone". Given that current incentive rates are ~25% lower than what was previously offered (through the elimination of the "premium rates"):

a) What is the controlled load in the program that ED anticipates in the future in the downtown Toronto core from 2013 to 2018 (i.e., the program's five-year duration)?

b) What impact will the lower rates have on re-signing existing or acquiring new DR-3 Participants?

Response:

The relevant information in the EPL Report, and the following additional information, was provided to Mr. Bach by an aggregator:

a) The aggregator expects to sign agreements under DR3 to the full extent of their allocated capacity in 2013, and to continue to do so over the 5-year period as new allocations are offered. These agreements may not necessarily be for generation located in the downtown core.

b) The aggregator has advised that the longer term of agreements under DR3 will be sufficiently attractive to both existing clients whose contract is expiring and to new clients. These agreements may not be for generation located in the downtown core.

In this context, it is worth noting that on December 21, 2012, the OPA reported that they have received a directive from the Minster of Energy, "...to prepare and submit a DR plan in consultation with the Independent Electricity System Operator within the next three months. The plan will consider how to better align DR with local system needs and further explore innovative DR products and new procurement strategies that can help contribute to renewable integration, surplus energy management, and voltage and frequency regulation."

"The government is interested in the extent to which DR can offer additional gains to the electricity system and the ratepayers of Ontario," said the Minister in his letter to the OPA. "DR provides peak and load shifting benefits and it would be beneficial to know how we can improve on its success."

Interrogatory No. 2.2 THESL-12

Reference: Environmental Defence Report, Section 3.3

For the four potential district energy nodes in the downtown core, please advise:

a) The availability of the proposed land for development

b) The anticipated developer of these sites

c) The capacity of each node

d) The expected timelines for implementation

Response:

This information in the EPL Report was provided by the City of Toronto Energy Efficiency Office (EEO) by reference to their website, and is also available to Toronto Hydro. Recognizing the close relationship between the City of Toronto and Toronto Hydro, the EEO may be able to provide some or all of the detail requested.

Interrogatory No. 2.2 THESL-13

Reference: Environmental Defence Report, Section 3.4

The City of Toronto Energy Plan information presented discusses energy use intensity. Is there a corresponding projection for peak demand reduction? If so, please provide the estimated peak electricity demand reductions in the downtown core expected as a result of the plan for 2012 through 2021.

Response:

There was no request from the City for a projection of peak demand reduction in this report. Some measures implemented to reduce energy consumption will also have a beneficial impact on peak electricity demand, including lighting and space cooling. Others such as receptacle load, will continue to benefit from the introduction of more energy efficient technologies, a process that is ongoing.

Interrogatory No. 2.2 THESL-14

Reference: Environmental Defence Report, Section 3.5

With the addition of 18,125 tons of renewable cooling slated to be operational by 2015, what is the anticipated timeline by which sufficient customers are connected to realize the 18 MW in peak demand savings?

Response:

This information was not provided in the November 21, 2012 memo from Enwave. Additional information has been requested from Enwave, but was not yet available at the time of writing of this response.

Interrogatory No. 2.2 THESL-15

Reference: Environmental Defence Report, Section 3.5

Please provide an estimate of the additional load required to the Enwave DLWC system to enable delivery of the additional 18,125 tons. Is the 18 MW peak demand reduction the net savings?

Response:

This information was not provided in the November 21, 2012 memo from Enwave. Since it is defined as "green" DLWC, the load addition will be limited to pumping energy. Additional information has been requested from Enwave, but was not yet available at the time of writing of this response.

Interrogatory No. 2.2 THESL-16

Reference: Environmental Defence Report, Section 3.5

In reference to the possibility of installing back-pressure steam turbine-generators at the Wallton St Steam Plant, is there a potential date when this capacity could be available?

Response:

This information was not provided in the November 21, 2012 memo from Enwave. Additional information has been requested from Enwave, but was not yet available at the time of writing of this response.

Interrogatory No. 2.2 THESL-17

Reference: Environmental Defence Report, Sections 4.0 and 5.0

a) Please provide the impact of these initiatives on peak demand savings, along with any supporting documentation and calculations.

b) When is the anticipated realization of these savings?

c) What is the anticipated impact on downtown Toronto?

Response:

In Mr. Bach's review of the Navigant Report, there was no recognition of the activities described in Section 4 and 5 and no information in the projections that either acknowledged or recognized the potential demand reduction from any of these initiatives. The specific requested calculations are beyond the scope of the EPL Report and would require considerable additional efforts and data.

Interrogatory No. 2.2 THESL-18

Reference: Environmental Defence Report, Section 8.0

Please clarify the statement that, "the organization is still in the early part of this market readiness and penetration curve even up to the present time."

Response:

An examination of the BOMA CDM program experience would suggest that it requires 3 to 5 years for a new program to become established in the marketplace and to have a significant impact on peak demand reduction. Because of the termination of the BOMA CDM program at the end of 2010, the period where new similar and related programs in the commercial/institutional/multi-unit residential sectors were not offered, the extensive changes made to the programs, and the change in delivery channel, the program "brand recognition" was lost, and the program had to restart in the latter part of 2011.

Interrogatory No. 2.2 THESL-19

Reference: Environmental Defence Report, Section 8.0, Figure 8.2-1

In reference to THESL's total system load information in Figure 8.2-1, ED states that, "This strongly suggests that Toronto Hydro should focus their CDM efforts in the downtown area on loads such as air conditioning and lighting as well as demand response to counter this trend."

a) Please clarify how this system-wide data indicates a need for targeted CDM in the downtown area.

b) Please clarify why air conditioning and lighting loads should be the targeted CDM measures.

Response:

a) System wide data is the only data available. These data were used to demonstrate a trend that has recently developed with respect to the changing relationship between electricity sales and peak demand. Toronto Hydro may usefully pursue this further to learn if the same trend is apparent in the downtown core, and whether there are steps that could be taken to reverse this trend.

b) It is well known that there is an interactive effect between lighting load and air conditioning load. The late Robert T. Tamblyn, P.Eng., a noted expert in the field of energy efficient design and retrofit of commercial buildings, suggested that in a new building, for every kWh of lighting energy that is not consumed through good lighting design, an additional 0.5 kWh of space cooling energy will not be consumed, with a consequent impact on peak load. In a retrofit situation, where lighting retrofit technologies reduce connected lighting power by one kW, if there are no improvements made to the cooling distribution and heat rejection systems, the additional space cooling energy reduction will be about 0.25 kWh. It is for this reason, as well as the seasonality of the cooling load, that CDM programs routinely target lighting retrofits as a first priority.

Interrogatory No. 2.2 THESL-20

Reference: Environmental Defence Report, Section 9.0

Please provide a comparison table for the Consolidated Edison Project and the proposed Bremner TS project, showing:

i) Number of new stations being proposed for construction

ii) Circuit length of new radial feeders proposed for construction

iii) Circuit length of existing radial feeders proposed to be replaced with feeders of higher capacity

iv) Circuit length of new network feeders proposed for construction

v) Circuit length of existing network feeders proposed to be replaced with network feeders of higher capacity

vi) Surface area of project boundary

vii) Peak reduction in MW by total contracted cost including the cost of liquidated damages for non-performance

Response:

The Consolidated Edison information was provided as an example of an alternative approach to deal with rising peak demand at specific transformer stations. The requested comparison is beyond the scope of the EPL Report and would require considerable additional efforts and data. Further information on the Consolidated Edison Project can be found in the following materials:

1. *Con Edison's Targeted Demand Side Management Program: Replacing Distribution Infrastructure with Load Reduction*. Chris Gazze, Steven Mysholowsky, and Rebecca Craft, Consolidated Edison Company of New York. Bruce Appelbaum, ICF International

   http://eec.ucdavis.edu/aceee/2010/data/papers/2059.pdf

2. *Planning for Efficiency - Forecasting the geographic distribution of demand reductions*. Chris Gazze and Madlen Massarlian, Consolidated Edison Company of New York Inc. Public Utilities Fortnightly, August 2011.

   http://www.fortnightly.com/fortnightly/2011/08/planning-efficiency

3. *Forecasting the Geographic Distribution of Demand Reductions from Energy Efficiency*. ACEEE Conference on Energy Efficiency as a Resource, September 27, 2011. Chris Gazze and Madlen Massarlian, Consolidated Edison Company of New York Inc.

   http://aceee.org/files/pdf/conferences/eer/2011/BS5C_Gazze.pdf

4. *US Experience with Efficiency As a Transmission and Distribution System Resource*. Chris Neme, Energy Futures Group, Rich Sedano, Regulatory Assistance Project.

   www.raponline.org/document/download/id/4765

Interrogatory No. 2.2 THESL-21

Reference: Environmental Defence Report, Section 10.0

In reference to the statement that, "The nineteen activities described in this document each on their own have only a limited impact, but the total effect on electricity consumption and summer peak demand is large and growing significantly." Please tabulate the impact over 2012 to 2014 for each of the 19 activities on summer peak demand in the downtown Toronto area served by the five Transformer Stations.

Response:

This information is not available to EPL beyond that which was included in the report for the BOMA Best program and the Race to Reduce initiative. Much of the foundational information would be available in future if the procedure described in the response to 2.2 THESL- 23 for determining natural growth is undertaken by Toronto Hydro.

Interrogatory No. 2.2 THESL-22

Reference: Environmental Defence Report, Section 10.0

For the years 2012-2021, please provide a table for each of the five stations (John/Windsor, Terauley, Strachan, Esplanade, Cecil) listing the 19 conservation and demand initiatives and:

i) the peak reduction in MW for each initiative for each year (noting any underlying factors and assumptions used to calculate it)

ii) the amount of each initiative that would be need to be contracted in order to achieve the peak reduction in MW, stated with 99% statistical confidence.

iii) the unit costs by dividing the total contracted costs (ii) by the corresponding peak reduction in (i).

Response:

A forecast of this type is not practical for EPL to generate without a detailed analysis of customer records held by Toronto Hydro. However this could be prepared by Toronto Hydro in the future if the procedure described in the response to 2.2 THESL- 23 for determining natural growth were to be undertaken.

Interrogatory No. 2.2 THESL-23

Reference: Environmental Defence Report, Section 10.0

The report provides a number of potential means of achieving demand reductions.

a) How would Environmental Defence propose to assess the probability of any of the activities occurring?

b) For each activity, what does Environmental Defence believe is the probability of realizing the stated peak load reductions? Please state any assumptions used in your analysis.

Response:

a) Section 10 of the EPL Report speaks to the issue of a changing marketplace in the downtown core, and not relying on past history to forecast future performance, as appears to have been done in the Navigant Report, Appendix 2, *Load Growth*, to arrive at the conclusion that Natural Load Growth will remain at 2% per year compounded. Such a growth rate would suggest that the load will double every 36 years.

Mr. Bach would propose that a significantly more detailed and comprehensive forecast be prepared in the following manner:

1. For a more accurate and detailed determination of Natural Growth, Toronto Hydro could conduct an annual survey among their customers in the General Service >50 kW and Large User rate classes in the downtown core generally with a view to tabulating the results by transformer station. The survey preamble would include information on the specific customer peak demand performance over the past 5 years, and request that they provide information on any changes anticipated in the future that will affect their summer peak demand. This could include the following:
    - Addition of significant load additions such as data centres, major energy intensive retail tenants such as jewellery stores, expanding or de-commissioning of residential amenities, etc.
    - Increase or decrease in vacancy rates and other factors affecting occupant density,

- Planned or recent implementation of energy efficient retrofits,
- Planned or recent overall peak demand reduction measures such as on-site generation, deep lake water cooling, load shifting initiatives such as ice storage, etc.
- Major space additions, deletions, or changes in occupancy type.
- Participation in an energy or environmental performance reporting program.

2. For new customer connections, Toronto City Panning receives applications for Site Plan Review that presage actual construction by up to 7 years in advance of actual construction, depending upon project size and complexity. This information could be acquired through quarterly or semi-annual meetings, and would allow Toronto Hydro to follow the progress of new developments as they move through planning to building permit stages, and ultimately to construction and completion.
3. Detailed tracking of this information would provide Toronto Hydro with a more accurate evaluation of both projected Natural Growth and New Customer Connections.
4. Regular contact through annual surveys with customers would also achieve other objectives, including:

    - Raise their awareness about the impact of their summer peak demand on the electricity infrastructure.
    - Permit Toronto Hydro to introduce applicable CDM program components that would reduce their summer peak demand.
    - Introduce, at some future date, a maximum peak demand for each meter, above which significant rate increases would apply.

b) Provided the research proposed in Part a), above, Toronto Hydro would know the answer to this question in detail. This would also assist in determining which activities to support, and to what degree.

Interrogatory No. 2.2 THESL-24

Reference: Retainer of Energy Profiles Limited

a) When was Energy Profiles Limited first retained by Environmental Defence?

b) What are the terms of that retainer/engagement, including the pricing arrangements and costs incurred by Environmental Defence?

c) What instructions were given to Energy Profiles Limited in respect of their retainer, including preparation of the Environmental Defence Report dated December 7, 2012?

Response:

EPL was asked to provide evidence on the CDM potential in downtown Toronto. The Terms of Reference are contained in section 1 of the EPL Report. Other information about the engagement of EPL, such as the pricing arrangement, is not relevant and/or is privileged.

Interrogatory No. 2.2 THESL-25

Reference: Retainer of Energy Profiles Limited

a) Did Energy Profiles Limited have a retainer either with, or in connection with, Pollution Probe in respect of this proceeding?

b) What are the terms of that retainer/engagement, including the pricing arrangements?

c) What instructions were given to Energy Profiles Limited in respect of their retainer?

d) Was any research conducted, notes and/or report prepared, either in draft or final form, in respect of this retainer?

e) If any research was conducted, notes and/or report prepared (either in whole or part), did that work product form a basis of the Environmental Defence Report and if so, in what respects? (please note sections of the Environmental Defence Report and describe use of prior work product)

Response:

The entire EPL Report was prepared for Environmental Defence. Questions relating to Pollution Probe are not relevant.