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File 20805

September 5, 2012

VIA COURIER AND *RESS* FILING

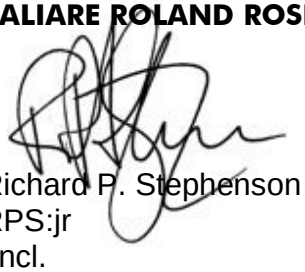
Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto, Ontario M4P 1E4

Dear Ms. Walli

Re: Hydro One Transmission Rates – Interrogatories
Charges for the transmission of electricity for 2013 and 2014
Ontario Energy Board File No. EB-2012-0031

Please find enclosed the Interrogatories of Power Workers' Union in connection with the above-noted proceedings.

Yours very truly,
PALIARE ROLAND ROSENBERG ROTHSTEIN LLP



Richard P. Stephenson
RPS:jr
encl.

Via Email:
cc: J. Kwik
J. Sprackett
All Participants

Doc 837271v1

EB-2012-0031

IN THE MATTER OF the *Ontario Energy Board Act, 1998*, S. O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF a review of an application filed by Hydro One Networks Inc. for an order or orders approving a transmission revenue requirement and rates and other charges for the transmission of electricity for 2013 and 2014.

POWER WORKERS' UNION INTERROGATORIES

GENERAL

2) Is the overall increase in 2013 and 2014 revenue requirement reasonable?

2.0-PWU-1

Ref (1): Exhibit A/Tab 13/Sch 1/Appendix A/Page 1/Lines 6-8 (2012 Business Plan Assumptions-Economics)

	2012	2013	2014	2015	2016
CPI – Ontario (%)	2.1	2.1	2.0	2.0	2.0
Tx cost escalation for Construction (%)	3.8	2.7	2.2	3.0	2.6
Tx cost escalation for Operations & Maintenance (%)	2.7	2.5	2.1	2.9	1.9

Ref (2): Exhibit A/Tab 15/Sch 1/Page 2/Table 1

Table 1

	Historic			Bridge	Test	
	2009	2010	2011	2012	2013	2014
Transmission Cost Escalation for Construction (%)	-2.6	1.9	4.4	4.3	2.0	2.0
Transmission Cost Escalation for Operations & Maintenance (%)	-0.1	1.6	3.7	1.9	2.4	2.8

a) In Ref (1), Hydro One indicates that CPI-Ontario forecasts were based on the IHS Global Insight April 2011 forecast. Please confirm if the data for the other two items (Transmission cost escalation for construction & Transmission cost escalation for OM) are also based on the IHS Global Insight April 2011 forecast.

b) Hydro One indicates that the data in Table 1 in Ref (2) was provided by Global Insight's February 2012 forecast. It appears that there is a discrepancy between the data in the Table in Ref (1) and the data in the Table in Ref (2) in particular with reference to the Transmission cost escalation forecasts. Please reconcile the two sets of data.

c) Please provide explanation for the assumptions behind the sharp decrease in Transmission cost escalation forecast for Operations & Maintenance from 2.9% in 2015 to 1.9% in 2016 in the table in Ref (1).

d) Please provide the labour escalation forecasts that are used to derive the Transmission cost escalation forecasts for both construction and for Operations & Maintenance.

OPERATIONS MAINTENANCE & ADMINISTRATION COSTS

5) Are the proposed spending levels for Sustaining, Development and Operations OM&A in 2013 and 2014 appropriate, including consideration of factors such as system reliability and asset condition?

5.0-PWU-2

Ref (1): Exhibit C1/Tab 3/Sch 2/Page 42 of 63/Table 12 (Vegetation Management)

Table 12
Vegetation Management ($ Millions)

Description	Historic			Bridge	Test	
	2009	2010	2011	2012	2013	2014
Brush control	16.0	15.5	17.0	15.2	17.0	17.2
Line Clearing	3.9	3.2	4.3	4.1	4.7	4.7
Property Owner Contact	1.0	0.6	1.2	1.1	1.2	1.3
Condition Patrols & Annual Inspections	0.9	1.1	1.3	1.9	2.1	2.1
Demand Maintenance	1.3	1.3	1.0	1.3	1.3	1.3
Grounds Maintenance	2.7	2.3	1.9	2.7	2.7	2.7
Total	**25.7**	**24.0**	**26.6**	**26.2**	**29.0**	**29.3**

a) Please provide the corresponding historic and planned levels of accomplishment for the test years for brush control (ha) and line clearing (km).

5.0-PWU-3

Ref (1): Exhibit A/Tab 15/Sch 3/Page 6 of 21/Lines 3-11

> **<u>Assessing the asset demographics:</u> Assets entering mid or end-of-life are expected to require increased attention to maintain satisfactory level of performance. Maintenance costs of an asset in these periods can increase significantly and the likelihood of needing to refurbish or replace the asset will increase as well. Inspections and testing of such assets are undertaken to assess these needs. The demographic analysis includes a greater planning scope (up to 30 years) to facilitate an understanding of the bow wave of potential future costs. It provides a tangible understanding of the need to ramp up some of our programs to get ahead of and smooth out the future costs of our system to ratepayers.**

Ref (2): EB-2010-0002/Exhibit D1/Tab 2/Sch 1/Pages 9-11 of 74 (Asset End of Life Indication)

Hydro One states (Page 9, Lines 16- 24) the following:

> **Assets are declared EOL in the context of Hydro One's Capital Sustainment programs when the risk of allowing an asset to remain in service in its present condition/situation exceeds acceptable risks associated with Hydro One's business values. EOL is defined as the likelihood of failure, or loss of an asset's ability to provide the intended functionality, wherein the failure or loss of functionality would cause unacceptable consequences. Identifying the appropriate**

indicators to project an asset's EOL is an important factor in Sustainment planning. Some assets have very specific and agreed to EOL markers, perhaps based on regulations or industry-accepted standards. Others require a number of inputs to identify the risks that prompt an EOL determination.

Hydro One also lists (page 10-11) factors that it generally considers when assessing an asset's remaining life, including: Condition, Reliability and Performance; Utilization; Technical Obsolescence; Safety & Environment; Cost; Age and Health Indices.

Ref (3): Exhibit C1/Tab 2/Sch 2/Page 21 of 72/Lines 3-5

Demographics
Hydro One uses a normal expected service life of 50 years for most transformers. This is based on Hydro One's experience, and is beyond the CEA-average of 40 years.

a) What is Hydro One's definition of "expected service life"?
b) Is the definition that Hydro One provided in Ref (2) for End of Life (EOL) the definition that Hydro One applies to EOL today? If not, what is Hydro One's definition of EOL?
c) Is "expected service life" the same as EOL?
d) Ref (2) contains descriptions of factors that were generally used when assessing an asset's remaining life. Are these factors the same compliment of factors used today? If there are changes, please describe the changes and the reasons for the changes.
e) As per questions (a) and (b), please confirm that EOL based on age is an appropriate indicator for the suite of considerations that an asset manager considers in making his/her replacement decisions; i.e. asset performance, cost, obsolescence, reliability and safety, etc.
f) Please describe how Hydro One determines the expected service life and/or EOL for its various types of transmission assets.
g) Does Hydro One have targets and/or maximum limits for % EOL (e.g. the percentage of assets beyond the EOL) of its various assets? If no, please explain why not. If yes:

i. Please provide EOL targets and/or limits for the following transmission asset categories: transformers, breakers, protection and control, underground cables, steel tower structures, conductors and wood pole structures.

ii. For each of the transmission category listed in (g) (i) above, please explain how the EOL targets and/or limits are derived and the key considerations taken into account in determining the targets/limits.

h) Does Hydro One have asset condition targets based on specific metrics (e.g. the percentage of assets in “poor” or “very poor” condition) for its various assets? If no, please explain why not. If yes,

i. Please provide asset condition targets and/or limits for the following transmission asset categories: transformers, breakers, protection and control, underground cables, steel tower structures, conductors and wood pole structures.

ii. For each of the transmission category listed in (h) (i) above, please explain how the asset condition targets are derived.

i) Please outline the considerations that Hydro One has taken into account from its experience to determine that the normal expected life for transformers is 50 years and not 40 years as is used by the CEA.

j) Please confirm if Hydro One currently uses and determines Health Indices as described in Ref (2).

k) Please describe how Hydro One determines when it is economically beneficial to replace or refurbish an asset.

l) Please discuss the influencing factors, other than cost-benefit criterion, that Hydro One takes into account to replace or refurbishment key transmission assets.

m) Does Hydro One use a target for customer and equipment reliability performance based on the performance of Canadian utilities as tracked by the CEA?

5.0-PWU-4

Ref (1): Exhibit C1/Tab2/Sch 2/Page 19 of 72 (Transformers at a Glance)

The Chart in this reference presents historic and proposed levels of investments in transformers as well as the 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

a) Please provide estimates of the annual capital budgets and OM&A costs for transformers for 2016 and 2021 assuming the demographic outlook and the asset condition that Hydro One would expect at that time. Please provide the estimates assuming:
    i. the historic replacement rate of 10 transformers per year (i.e. 2009-2011 average per year); and
    ii. The proposed replacement rate of 19 transformers per year (i.e. 2012-2014 average per year).
b) What are the reliability, safety, environmental and/or operational risk implications for 2016 and 2021 that Hydro One would expect as a result of keeping the transformers sustainment replacements at the historic replacement rate of 10 transformers per year (i.e. 2009-2011 average per year) compared to the proposed replacement rate of 19 transformers per year (i.e. 2012-2014 average per year)?
c) What would be the replacement rate to achieve a target of 0% transformers beyond EOL (i.e. 0% EOL target) in 2021?
d) What would be the annual capital expenditures and OM&A associated with (c) above, i.e., 0% EOL target?
e) Please describe the resourcing constraints that Hydro One is currently facing to meet:
    i. The proposed replacement rate for transformers; and
    ii. The replacement rate for transformers to achieve a 0% EOL target by 2021.
f) If Hydro One is facing resourcing constraints to achieve the proposed replacement rate for transformers, please describe the actions that Hydro One is implementing to tackle those resourcing constraints.

5.0-PWU-5

Ref (1): Exhibit C1/Tab 2/Sch 2/Page 25 of 72/Lines 17-19

Historic and Future Investment

Transformer Portfolio - Historic & Proposed	2007	2008	2009	2010	2011	2012 Forecast	2013 Test Year	2014 Test Year
# of Sustainment replacements*	9	10	4	10	16	11	20	27
% of Fleet	1.2%	1.3%	0.5%	1.4%	2.2%	1.5%	2.7%	3.7%
Capital ($M, Net)	18.7	40.7	48.7	106.8	81.1	72.4	125.6	170.8
OM&A ($M, Net)	28.5	22.6	29.3	26.4	30.2	24.8	23.8	24.9

**Note that transformer replacements above are conducted under both the categories of Power Transformers and Station Re-Investment as outlined in Exhibit D1, Tab 3, Schedule 2.*

a) Please provide the reasons for the decrease in the projected replacement rate for transformers from 16 in 2011 to 11 in 2012. Was the 2012 decrease not a result of Hydro One's inability to go through with some of the planned work?

5.0-PWU-6

Ref (1): Exhibit C1/Tab 2/Sch 2/Page 24 of 72/Lines 6-13/Figure 10 (Transformer Forced Outage Frequency and Comparison to CEA):

Hydro One indicates that despite the slight improvement in the trend of transformer forced outages, there is still a significant gap relative to the CEA all-Canada transmission average and that increased replacements are required to maintain the current level of reliability of the transformer fleet given the demographics and changing condition of the fleet.

a) Does Hydro One expect to achieve in the future a Transformer Forced Outage Frequency close to the current CEA transmission average? If not, what would be the replacement rate required to achieve the current CEA benchmark in 2021?

5.0-PWU-7

Ref (1): Exhibit C1/Tab2/Sch 2/Page 9 of 72 (Circuit Breakers at a Glance)

The Chart in this reference presents historic and proposed levels of investments in circuit breakers as well as 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

a) Please provide estimates of annual capital budgets and OM&A costs for circuit breakers for 2016 and 2021 assuming the demographic outlook and asset condition that Hydro One would expect at that time. Please provide the estimates assuming:
    i. The historic replacement rate of 71 circuit breakers per year (i.e. 2009-2011 average per year); and
    ii. The proposed replacement rate of 95 circuit breakers per year (i.e. 2012-2014 average per year).
b) What are the reliability, safety, environmental and/or operational risk implications for 2016 and 2021 that Hydro One would expect as a result of keeping the circuit breaker sustainment replacements at the historic replacement rate of 71 transformers per year (i.e. 2009-2011 average per year) compared to the proposed replacement rate of 95 circuit breakers per year (i.e. 2012-2014 average per year)?
c) What would be the replacement rate to achieve a target of 0% circuit breakers beyond EOL (i.e. 0% EOL target) in 2021?
d) What would be the annual capital expenditures and OM&A associated with (d) above, i.e., 0% EOL target?
e) Please describe the resourcing constraints that Hydro One is currently facing to meet:
    i. The proposed replacement rate for circuit breakers;
    ii. The replacement rate for circuit breakers to achieve a 0% EOL target; and
    iii. The replacement rate for circuit breakers to maintain the current percentage of circuit breakers beyond EOL by 2021. (The resource constraints could include, in principles, insufficient regular labour, hiring hall labour, equipment –breakers in this case, or insufficient up-front planning to carry the increased work, or the inability to get sufficient outages to carry out the work.

f) If Hydro One is facing resourcing constraints to achieve the proposed replacement rate for circuit breakers, please describe the actions that Hydro One is implementing to tackle such resourcing constraints.

5.0-PWU-8

Ref (1): Exhibit C1/Tab 2/Sch 2/Page 16 of 72/Lines 17-21

Circuit Breaker Portfolio	Historic					Bridge	Test	
	2007	2008	2009	2010	2011	2012	2013	2014
# of Sustaining replacements*	31	49	33	81	100	57	104	124
% of Fleet	0.7%	1.1%	0.7%	1.8%	2.2%	1.3%	2.3%	2.8%
Capital ($M)	42.6**	75.1**	48.7**	40.4	55.8	77.2	129.3	111.2
OM&A ($M)	19.5	19.8	19.6	16.4	19.3	16.8	18.1	17.3

* Test-year expenditures are a combination of Circuit Breaker capital and System reinvestment expenditures detailed in Sustaining Capital Exhibit D1, Schedule 3, Tab 2.
** Significant expenditures in 2007, 2008, and 2009 for the Claireville 230kV GIS breaker replacements and reconfiguration ($34 million, $50 million, and $20 million respectively).

a) Please indicate if the decrease in the projected replacement rate for circuit breakers from 100 in 2011 to 57 in 2012 was a result of Hydro One's inability to go through with some of the planned work?

5.0-PWU-9

Ref (1): Exhibit C1/Tab 2/Sch 2/Page 15 of 72/Lines 1-8

> **Condition**
> **Without a further increase in replacement rates, the condition of the circuit breaker fleet is expected to degrade over the next 10 years due to the number of breakers exceeding their expected service lives. A 10-year forecast in Figure 6 shows that even with continuing at approximately the proposed replacement rate, the number of breakers in fair/poor condition will continue to increase from today. This is a leading indicator for equipment reliability. As such, prioritization of units for replacement will be critical and further increases in the program are expected beyond the test years.**

a) Does Hydro One expect a decrease in circuit breaker reliability in 2021 as a result of adopting its proposed replacement rate for this asset category? If so, what is the

replacement rate for breakers that would be required to maintain the current level of breakers reliability in 2021?

5.0-PWU-10

Ref (1): Exhibit C1/Tab2/Sch 2/Page 27 of 72 (Protections at a Glance)

The Chart in this reference presents historic and proposed levels of investments in protection systems as well as the 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

Ref (2): Exhibit C1/Tab 2/Sch 2/Page 33 of 72/Line 2

Protection Systems Portfolio	2009	2010	2011	2012 Forecast	2013 Test Year	2014 Test Year
# of replacements	259	283	389	380	400	450
% of Fleet	2.4	2.6	3.5	3.5	3.6	4.0
Capital ($M)	29	32	28.5	36.4	35.6	53.6
OM&A ($M)	10.4	9	11.3	10.5	11.8	12.5

a) Please provide estimates of the capital budgets and OM&A costs for protection systems for 2016 and 2021 assuming the demographic outlook and asset condition that Hydro One would expect at that time. Please provide the estimates assuming:
   i. The historic replacement rate of 310 protection systems per year (i.e. 2009-2011 average per year); and
   ii. The proposed replacement rate of 410 protection systems per year (i.e. 2012-2014 average per year).

b) What are the reliability, environmental, safety and/or operational risk implications for 2016 and 2021 that Hydro One would expect as a result of keeping protection system sustaining replacements at the historic replacement rate of 310 protection systems per year (i.e. 2009-2011 average per year year) compared to the proposed replacement rate of 410 protection systems per year (i.e. 2012-2014 average per year)?

c) What would be the replacement rate to achieve a target of 0% of the protection systems beyond EOL (i.e. 0% EOL target) in 2021?

d) What would be the annual capital expenditures and OM&A associated with (c) above, i.e., 0% EOL target?
e) Please describe the resourcing constraints, if any, that Hydro One is currently facing to meet:
    i. The proposed replacement rate for protection systems;
    ii. The replacement rate for protection systems to achieve a 0% EOL target.
f) If Hydro One is facing resourcing constraints to achieve the proposed replacement rate for protection systems, please describe the actions that Hydro One is implementing to tackle such resourcing constraints.

5.0-PWU-11

Ref (1): Exhibit C1/Tab 2/Sch 2/Page 31 of 72/Lines 1-9/Figure 12

Figure 12 indicates that forced outage frequency remains significantly above the CEA 5 year moving average and Hydro One states that the demographics and increase in defects as demonstrated in Figure 11 (Exhibit C1/Tab 2/Sch 2/Page 30); require continued investments to maintain the current trend.

a) Does Hydro One expect protection forced outage frequency close to the current CEA 5 year average? If not, what would be the replacement rate required to achieve the current CEA benchmark in 2021?

5.0-PWU-12

Ref (1): Exhibit C1/Tab2/Sch 2/Page 35 of 72 (Underground Cables at a Glance)

The Chart in this reference presents historic and proposed levels of investments in Underground Cables as well as 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

Ref (2): Exhibit C1/Tab 2/Sch 2/Page 43 of 72/Lines 23-24

Cable Portfolio – Historical & Proposed	2009	2010	2011	2012	2013	2014
Capital – Replacement (km)	0	0	0	0	5.0	6.2
Capital – Replacement (% of fleet)	0	0	0	0	1.7	2.1
Capital ($M Net)	0.2	1.0	0.6	2.6	30.8	54.5
OM&A ($M Net)	4.4	4.0	6.6	3.6	4.3	4.4

Ref (3): Exhibit C1/Tab 2/Sch 2/Page 39 of 72/Lines 17-21 and Page 40/Figures 14-15

In reference to Figures 14 & 15, Hydro One states that although there has been an improvement in forced outage frequency, the duration of each occurrence over the past 5 years is increasing as are the corrective maintenance costs. This is representative of problems becoming more serious. Considering the deteriorating condition and demographics of the fleet, an increase in the rate of replacement is required to maintain the current forced outage frequency.

a) Please provide estimates of the capital budgets and OM&A costs for underground cables by 2016 and 2021 assuming the demographic outlook and asset condition that Hydro One would expect at that time. Please provide the estimates assuming:
   i. The historic replacement rate of 0 kilometres of underground cables per year (i.e. 2009-2011 average per year); and
   ii. The proposed replacement rate of 3.7 kilometres of underground cables per year (i.e. 2012-2014 average per year).
b) What are the reliability, safety and/or operational risk implications for 2016 and 2021 that Hydro One would expect as a result of keeping underground cables sustaining replacements at the historic replacement rate of 0 kilometres per year (i.e. 2009-2011 average per year) compared to the proposed replacement rate of 3.7 kilometres per year (i.e. 2012-2014 average per year)?
c) What would be the replacement rate to achieve a target of 0% of the underground cables beyond EOL (i.e. 0% EOL target) for 2021?
d) What would be the annual capital expenditures and OM&A associated with (c) above?

e) Please describe the resourcing constraints, if any, that Hydro One is currently facing to meet:
    i. The proposed replacement rate for underground cables;
    ii. The replacement rate for underground cables to achieve a 0% EOL target.

f) If Hydro One is facing resourcing constraints to achieve the proposed replacement rate for underground cables, please describe the actions that Hydro One is implementing to tackle such resourcing constraints.

g) Please confirm that the proposed replacement rate is required to maintain the current forced outage frequency of underground transmission cables and the average duration of each occurrence as well.

5.0-PWU-13

Ref (1): Exhibit C1/Tab2/Sch 2/Page 55 of 72 (Steel Structures at a Glance)

The Chart in this reference presents historic and proposed levels of investments in Steel Structures as well as the 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

Ref (2): Exhibit C1/Tab 2/Sch 2/Page 64 of 72/Line 6

6

Tower Portfolio - Historic Trend	2007	2008	2009	2010	2011	2012	2013	2014
Capital – Coating/Refurb (quantity)	73	176	71	33	0	200	350	350
Capital – Coating/Refurb (% of Fleet)	0.1	0.4	0.1	0.1	0	0.4	0.7	0.7
Capital – Replacements (quantity)	0	0	0	0	0	16	4	4
Capital – Replacements (% of Fleet)	0	0	0	0	0	0.03	0.01	0.01
Capital ($M)	1.6	1.8	2.5	2.9	0.6	8.7	14.6	14.5
OM&A ($M)	3.3	5.0	5.1	3.6	4.7	4.8	4. 8	5.0

a) Please provide estimates of the capital budgets and OM&A costs for steel structures for 2016 and 2021 assuming the demographic outlook and asset condition that Hydro One would expect at that time. Please provide the estimates assuming:

i. The historic replacement/refurbishment rate of 35 steel structures per year (i.e. 2009-2011 average per year); and
ii. The proposed replacement/refurbishment rate of 308 steel structures per year (i.e. 2012-2014 average per year).

b) What are the reliability, safety, environmental and/or operational risk implications for 2016 and 2021 as a result of keeping steel structures sustaining replacements at the historic replacement/refurbishment rate of 35 units per year (i.e. 2009-2011 average per year year) compared to the proposed replacement/refurbishment rate of 308 units per year (i.e. 2012-2014 average per year)?
c) What would be the replacement rate to achieve a target of 0% of the steel structures beyond EOL (i.e. 0% EOL target) in 2021?
d) What would be the annual capital expenditures and OM&A associated with (c)?
e) Please describe the resourcing constraints, if any, that Hydro One is currently facing to meet:
   i. The proposed replacement/refurbishment rate for steel structures; and
   ii. The replacement/refurbishment rate for steel structures to achieve a 0% EOL target.
f) If Hydro One is facing resourcing constraints to achieve the proposed replacement/refurbishment rate for steel structures, please describe the actions that Hydro One is implementing to tackle such resourcing constraints.

5.0-PWU-14

Ref (1): Exhibit C1/Tab2/Sch 2/Page 67 of 72 (Conductors at a Glance)

The Chart in this reference presents historic and proposed levels of investments in Conductors as well as the 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

Ref (2): Exhibit C1/Tab 2/Sch 2/Page 72 of 72/Lines 20-21

Conductor Portfolio – Historical & Proposed	2009	2010	2011	2012	2013	2014
Capital – circuit km	30	30	37	22	75	95
Capital - % of fleet	0.1	0.1	0.13	0.08	0.26	0.33
Capital ($M Net)	**14.4**	**14.7**	**10.2**	**8.6**	**36**	**37.5**
OM&A ($M Net)	8.4	7.3	10.6	10.6	12.8	13.6

Ref (3): Exhibit C1/Tab 2/Sch 2/Page 70/Figure 31 (Conductor Forced Outage Duration)

In reference to Figure 31, Hydro One states (Page 70, Line 10 / Page 71, Line 2) that the forced outage duration displayed in Figure 31 demonstrates that conductor outage duration has increased over the last 10 years. This is a measure of the severity of the defects that caused the circuit to be forced from service. This trend is expected to continue given the demographics and condition of the fleet.

a) Please provide estimates of the capital budgets and OM&A costs for conductors for 2016 and 2021 assuming the demographic outlook and asset condition that Hydro One would expect at that time. Please provide the estimates assuming:
    i. The historic replacement rate of 32 kilometres of conductors per year (i.e. 2009-2011 average per year); and
    ii. The proposed replacement rate of 64 kilometres of conductors per year (i.e. 2012-2014 average per year).
b) As per Ref (2), please provide the reasons for the drop off of the projected replacement rate for conductors from 37 km in 2011 to 22 km in 2012. Was the 2012 drop off not a result of Hydro One's inability to go through with some of the planned work?
c) What are the reliability, safety, environmental and/or operational risk implications for 2016 and 2021 that Hydro One would expect as a result of keeping conductor sustaining replacements at the historic replacement rate of 32 kilometres per year (i.e. 2009-2011 average per year year) compared to the proposed replacement rate of 64 kilometres per year (i.e. 2012-2014 average per year)? Please describe the specific risk implications.

d) What would be the replacement rate to achieve a target of 0% of the conductors beyond EOL (i.e. 0% EOL target) in 2021?
e) What would be the annual capital expenditures and OM&A associated with (d)?
f) Please describe the resourcing constraints, if any, that Hydro One is currently facing to meet:
    i. The proposed replacement rate for conductors;
    ii. The replacement rate for conductors to achieve a 0% EOL target; and
    iii. The replacement rate for conductors to achieve the current percentage of conductors beyond EOL in 2021.
g) If Hydro One is facing resourcing constraints to achieve the proposed replacement rate for conductors, please describe the actions that Hydro One is implementing to tackle such resourcing constraints.
h) As per Ref (3), please confirm that at the proposed replacement rate for conductors Hydro One expects an increase of forced outage duration in 2021. What is the replacement rate for conductors that would be required to maintain the current level of reliability in 2021?

5.0-PWU-15

Ref (1): Exhibit C1/Tab 2/Sch 2/Page 45 of 72 (Tx Wood Poles at a Glance)

The Chart in this reference presents historic and proposed levels of investments in wood poles as well as the 5-year and 10-year demographic outlook under historic and proposed levels of rates of replacement.

Ref (2): Exhibit C1/Tab 2/Sch 2/Page 53 of 72/Line 17

Wood Pole Portfolio – Historic & Proposed	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Capital - # of replacements	817	774	811	880	862	850	850	850
Capital - % of fleet replaced	1.9	1.8	1.9	2.1	2.1	2.0	2.0	2.0
Capital ($M Net)	**24.8**	**21.8**	**28.0**	**29.6**	**30.1**	**27.2**	**28.0**	**28.8**
OM&A ($M Net)	**2.5**	**3.6**	**3.5**	**3.5**	**2.9**	**4.5**	**4.6**	**4.8**

a) Please provide estimates of the capital budgets and OM&A costs for transmission wood poles for 2016 and 2021 assuming the demographic outlook and asset condition that Hydro One would expect at that time. Please provide the estimates assuming the proposed replacement/refurbishment rate of 850 wood poles per year (i.e. 2012-2014 average per year).
b) What would be the replacement rate to achieve a target of 0% of the wood poles beyond EOL (i.e. 0% EOL target) in 2021?
c) What would be the annual capital expenditures and OM&A associated with (b) above?
d) What would be the replacement rate to maintain the current percentage of wood poles beyond EOL in 2021?
e) What would be the annual capital expenditures and OM&A associated with (d) above?
f) Please describe the resourcing constraints, if any, that Hydro One is currently facing to meet:
    i. The proposed replacement rate for wood poles;
    ii. The replacement rate for wood poles to achieve a 0% EOL target; and
    iii. The replacement rate for wood poles to maintain the current percentage of wood poles beyond EOL in 2021.
g) If Hydro One is facing resourcing constraints to achieve the proposed replacement rate for wood poles, please describe the actions that Hydro One is implementing to tackle such resourcing constraints.

5.0-PWU-16

Ref (1): Asset Condition Assessment, EB-2005-0501, Exhibit D1/Tab 2/Sch 1

Ref (2): Transmission Assets and Investment Structure, EB-2010-0002, Exhibit C1/Tab 2/Sch 2

Ref (3): Transmission Assets and Sustaining Investment Overview, EB-2012-0031, Exhibit C1/Tab 2/Sch 2

Ref (4): Transmission 10 Year Outlook, EB-2012-0031, Exhibit A/Tab 13/Sch 2

a) Please fill out the following table. Please also provide references for the sources of data or provide explanation on derivation of numbers/percentages.

	Asset Class	Transformers	Breakers	Protection and Control systems	Underground Cables	Towers	Conductors	Wood Pole Structures
(1)	*Fleet Size - Number of Units 2012*							
(2)	*Expected End-of-life (EOL)*							
(3)	*Historic Replacement Rate -2009 - 2011 Average replacement rate*							
(4)	*Proposed Replace Rate - average replacement per year 2012 -2014*							
(5)	*% of assets beyond EOL – 2006*							
(5)	*% of assets beyond EOL – 2009*							
(7)	*% of assets beyond EOL – 2012*							
	% of assets beyond EOL – 2021 Assuming historical average replacement rate(i.e. 2009-2011)							
(8)	*% of assets beyond EOL – 2021 Assuming proposed replacement rate(i.e. avg. 2012-2014)*							
(9)	*% of assets in "poor and "very poor condition – 2006*							
(10)	*% of assets in "poor and "very poor condition – 2009*							
(11)	*% of assets in "poor and "very poor condition – 2012*							
(12)	*% of assets in "poor and "very poor condition – 2021 Assuming historical average replacement rate(i.e. 2009-2011)*							
(13)	*% of assets in "poor and "very poor condition – 2021 Assuming proposed replacement rate(i.e. 2012-2014)*							
(14)	*Equipment Frequency of forced outages - comparison to CEA Average ("better" or "worse")*							

b) Figure 5.3b of the Transmission 10 Year Outlook (Ref 4) provides asset condition of circuit breakers as of 2011. Please provide the numbers and the respective percentages of breakers in “very good”, “good”, “fair”, “poor” and “very poor” conditions.

c) Figure 5.4b of the Transmission 10 Year Outlook (Ref 4) provides asset condition of the overhead conductors as of 2011. Please provide the kilometers and the respective percentages of overhead conductors in "very good", "good", "fair", "poor" and "very poor" conditions.

d) Figure 5.5b of the Transmission 10 Year Outlook (Ref 4) provides asset condition of underground cables as of 2011. Please provide kilometers and the respective percentages of underground cables in “very good”, “good”, “fair”, “poor” and “very poor” conditions.

e) Figure 5.6b of the Transmission 10 Year Outlook (Ref 4) provides asset condition of the steel tower structures as of 2011. Please provide the numbers and the respective percentages of steel tower structures in "very good", "good", "fair", "poor" and "very poor" conditions.

f) Figure 5.7b of the Transmission 10 Year Outlook (Ref 4) provides asset condition of the population of wood poles as of 2011. Please provide the numbers and the respective percentages of wood poles in "very good", "good", "fair", "poor" and "very poor" conditions.

g) Figure 5.9b of the Transmission 10 Year Outlook (Ref 4) provides asset condition of the protection and control relay portfolio as of 2011. Please provide the numbers and the respective percentages of protection and control relays in "very good", "good", "fair", "poor" and "very poor" conditions.

h) Is Hydro One satisfied with its current customer reliability levels?

i) Does Hydro One monitor the percentage of time (and year to year trend) the transmission system is operating such that a single contingency (where it is designed to operate under double contingency standard) would result in increased customer reliability deterioration? If so, please provide the historical trend of the percentage of the time the transmission system is operating such that a single contingency would result in customer outage or derating.

7) Are the 2013/14 Human Resources related costs (wages, salaries, benefits, incentive payments, labour productivity and pension costs) including employee levels appropriate? Has Hydro One demonstrated improvements in efficiency and value for dollar associated with its compensation costs?

7.0-PWU-17

Ref (1): Exhibit C1/Tab 5/Sch 1/Page 1 of 12/Lines 5-9

> **Hydro One faces the prospect of unprecedented challenges in the years ahead associated with the availability of skilled and professional staff to operate, sustain and develop its transmission and distribution systems. Hydro One's greatest corporate risk with respect to its human resources continues to be an aging workforce and, with a world-wide scarcity of core skills in the electricity industry, a highly competitive labour market.**

Ref (2): Exhibit C1/Tab 5/Sch 1/Page 2 of 12/Lines 9-23

> **By December 31, 2011, approximately 1,150 Networks staff (transmission and distribution) were eligible for an undiscounted retirement. By December 31, 2013, approximately 1,460 Networks staff will be eligible for an undiscounted retirement. This number increases to approximately 1,633 by year end 2014. Hydro One is seeing a larger uptake in actual retirements. In 2009, 105 employees retired while in 2010, 137 employees retired. In 2011, 166 employees retired. This represents an increase of approximately 58% over the retirement uptake in 2009. To place this into context, between 2009 and 2011 cumulatively roughly 10% of the employees who were on staff at the start of 2009 have retired. This is a trend which is expected to continue through the next decade and is consistent with challenges faced by other utilities in the electricity sector throughout the world. Recent studies suggest that up to half the workforce in the North American electricity industry will be eligible for retirement in the next five years. Furthermore, it is anticipated that a greater number of staff eligible to retire will elect to retire sooner given the increased competition for these scarce resources in the marketplace.**

a) Please describe the challenges facing Hydro One in sustaining productivity gains in the coming years given the bow wave of retirements of experienced workforce and its replacement with increased levels of new staff? What training and staff development strategies and plans are in place to offset the “learners”’ lower productivity in their first few years?

EXPORT TRANSMISSION SERVICE RATES

23) What is the appropriate level for Export Transmission Rates in Ontario?

23.0-PWU-18

Ref (1): Independent Electricity System Operator (IESO) News Release, August 23, 2012. IESO to Recommend Limiting Payments to Exports during Negative Prices.

http://www.ieso.ca/imoweb/news/newsItem.asp?newsItemID=6165

The news release advises that the IESO's management will present on September 7, 2012 to its Board of Directors, a market rule amendment to limit payments to exporters during periods of negative energy prices. The proposal would limit the settlement price for energy as well as congestion management settlement credits for export transactions when the intertie zonal clearing price in the applicable zone is negative and the intertie is not import congested.

Ref (2): IESO Export Transmission Service Study, prepared for the IESO by Charles River Associates (Exhibit H1/Tab 5/Sch 2/Appendix B).

a) Please discuss how the assumptions, analyses, and findings of the IESO Export Transmission Service Study in Ref (2) above would be impacted by the recommended market rule amendment Ref (1).