



Wellington North Power Inc.

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November 29, 2013

Attention: Michael Janigan
Counsel for VECC
Public Interest Advocacy Centre (PIAC)
ONE Nicholas Street, Suite 1204
Ottawa, ON K1N 7B7

Dear Mr. Janigan:

Re: OEB File Number: EB-2013-0178
Wellington North Power Inc. – ED-2002-0511
2014 4th Generation Distribution Rate Application
Response to VECC Interrogatories

Enclosed are Wellington North Power Inc.'s responses to the Vulnerable Energy Consumers Coalition (VECC) Interrogatories relating to the LDC's Incentive Rate Mechanism Adjustment Application for 2014 Distribution rates (file number: EB-2013-0178).

An electronic copy of these Interrogatory Responses has been filed on the OEB's RESS site and two hard copies have been sent by courier to the Board's office for the attention of the Board Secretary.

Should VECC have questions regarding this matter please contact Richard Bucknall at rbucknall@wellingtonnorthpower.com or myself at rosebrugh@wellingtonnorthpower.com or call 519-323-1710.

Yours truly,


Judy Rosebrugh

President & CEO

cc: Board Secretary (by e-mail)
cc: Intervenors on Record (by e-mail)
cc: Mr. Randy Aiken, Consultant to Energy Probe (by e-mail)
cc: Ms. Shelley Grice, Consultant to VECC (by e-mail)

**Wellington North Power Inc. (“WNP”)
2014 IRM Rate Application
Applicants Responses to VECC Interrogatories
EB-2013-0178**

VECC Interrogatory #1

Reference: Exhibit 5, Incremental Capital Module

- a) Please confirm the actual station age and transformer age at each of the six Substations.
- b) Page 60 – please identify the types of deficiencies where Wellington North has the capability (i.e. knowledge, training and expertise) to address the deficiencies.
- c) Page 60 – please identify the types of deficiency where Wellington North does not have the capability (i.e. knowledge, training and expertise) to address the deficiencies.
- d) Page 63 – Under alternative #3, when does Wellington North estimate the transformer would need to be replaced?
- e) Please summarize Wellington North’s assessment of the risk of major equipment failure for each station for Station MS2 and MS4 assuming none of the proposed rehabilitation/replacement work was completed.

Wellington North Power Inc. - Response:

a) The table below shows the station age and transformer age (in years) for each of Wellington North Power Inc.'s (WNP) substations:

Station	Station Age		Transformer		Comments
	In-Service Year	Age	In-Service Year	Age	
MS-1	1986	27	1986	27	Station was completely re-built in 1986
MS-2	1972	41	1972	41	
MS-3	1978	35	1988	25	
MS-4	1992	21	1964	49	Transformer was from another substation and has a plate date of 1964
MS-5	1990	23	1994	19	This station was re-built in 1990
MS-6	1980	3	2010	3	Transformer was replaced in 2010 as a result of a lightning strike

b) The types of deficiencies where WNP has the capability (i.e. knowledge, training and expertise) to address as highlighted in 3rd party "Substation Condition Assessment Study" report are as summarized in the table below:

Problem Name / Description	Comments
Sub-Station: MS2 <ul style="list-style-type: none"> Add locks to equipment within sub-station Use more secure, less readily available, lock and key 	Comment <ul style="list-style-type: none"> WNP staff can complete this work
Sub-Station: MS2 <ul style="list-style-type: none"> Replace grounding clamps used at sub-stations 	Comment <ul style="list-style-type: none"> WNP staff can complete this work WNP purchased CSA-rate clamps for installation. WNP has completed 60% of this work.
Sub-Station: MS2 <ul style="list-style-type: none"> Add stone 	Comment <ul style="list-style-type: none"> WNP staff resolved this issue. WNP worked with a local contractor to increase the amount of stone at all of WNP sub-stations.

Problem Name / Description	Comments
Sub-Station: MS1 <ul style="list-style-type: none"> • Barbed Wire needs to be Bonded 	Comment <ul style="list-style-type: none"> • WNP staff can complete this work.
Sub-Station: MS5 <ul style="list-style-type: none"> • Transformer Nameplate 	Comment <ul style="list-style-type: none"> • WNP staff can complete this work. • WNP will purchase a replacement nameplate from the transformer manufacturer.

c) The types of deficiencies where WNP does not have the capability (i.e. knowledge, training and expertise) to address as highlighted in 3rd party "Substation Condition Assessment Study" report are summarized in the table below:

Problem Name / Description	Comments
Sub-Station: Common <ul style="list-style-type: none"> • Existing ground grid does not extend out at swing gate locations <u>Engineering expertise required to ensure standards are met</u>	Comment <ul style="list-style-type: none"> • WNP staff can complete some of this work. • WNP will sub-contract excavation services. • WNP will sub-contract engineering services.
Sub-Station: MS2 <ul style="list-style-type: none"> • Poor perimeter fencing <u>Engineering expertise required to ensure standards are met</u>	Comment <ul style="list-style-type: none"> • WNP would sub-contact the fence replacement work. • WNP plans to replace the fencing at MS2 when the station is rebuilt.
Sub-Station: MS5 <ul style="list-style-type: none"> • Storm catch basin in proximity to MS5 on Isabella Street <u>Design expertise required</u>	Comment <ul style="list-style-type: none"> • WNP staff can complete some of this work. • WNP will sub-contact design services. • WNP will sub-contract some installation services.
Sub-Station: MS1 & MS5 <ul style="list-style-type: none"> • Metal communication cable run between sub-station and communication cabinet <u>Information technology expertise required</u>	Comment <ul style="list-style-type: none"> • WNP staff can complete some of this work. • WNP has sub-contracted for communication equipment services. • WNP has sub-contracted for system programming services.

- d) As per the LDC's IRM application, Exhibit 5: Incremental Capital, Recommendation on page 62, WNP's recommendation is Alternative #2, namely to replace the aged MS2 Substation. If WNP was instructed to pursue Alternative #3 of building a new substation with the re-use of the existing transformer, then the LDC would seek an independent inspection and if required, refurbishment of this transformer before re-using it.

As highlighted in the response to IR#1(a) above, this transformer is 41 years old. According to the Kinectrics Study, the "new" Typical Useful Life for a transformer is 45 years (*source: Table F Summary of Results, pages 39 – 41, "Asset Depreciation Study for the Ontario Energy Board" (July 8, 2010) by Kinectrics Inc. Report No: K-418033-RA-001-R000*). WNP adopted the typical useful life depreciation rate for assets (derived from the Kinectrics report) effective from January 1, 2012 and without an independent assessment of the transformer once it was removed, the LDC would assume a remaining useful life of 4 years (41 years used with a useful life expectancy of 45 years as per Kinectrics Study).

WNP's plan with this transformer is to keep it on-hand as spare, once removed from service. Although the transformer is 41 years old, it has shown good performance characteristics. The most recent oil analysis indicated an increase in CO and CO2 gases, which was noted to indicate cellulose overheating. WNP feels the remaining four years of life for this transformer are best served as a back-up for our utility, as all WNP stations (except MS4) are 5MVA units.

e) Assuming none of the proposed rehabilitation / replacement work was completed, WNP's assessment of the risk of major equipment failure for each station for Station MS2 and MS4 is summarised below:

Substation and Failure	Risk Assessment
Substation MS2 - Transformer failure	MEDIUM-HIGH <ul style="list-style-type: none"> • Transformer is approaching end of life • Recent transformer oil testing has shown signs of overheating
Substation MS2 - Switchgear failure	MEDIUM-HIGH <ul style="list-style-type: none"> • Switchgear is approaching end of life • Recent switchgear testing showed low insulation resistance readings
Substation MS4 - Transformer failure	HIGH <ul style="list-style-type: none"> • Transformer is past end of life • Recent transformer oil testing has shown signs of moisture, particles and cellulose
Substation MS4 - Switchgear failure	MEDIUM <ul style="list-style-type: none"> • Switchgear was installed in late 1990's • Recent switchgear testing showed no concern

The impact of a major equipment failure at MS2 is significant when compared with the impact of a major equipment failure at MS4. In its current configuration, a complete failure of MS4 results in only one feeder having to be backed-up by MS2. If MS2 was to fail, the four feeders leaving MS2 would have to be backed-up by MS1, MS3 and MS4. That said, the impact of a MS2 failure affects the entire distribution system in Mount Forest whereas a failure of MS4 only impacts MS2.

VECC Interrogatory #2

Reference: Exhibit 5, Substation Assessment Report (Costello Utility Consultants)
June 2013

- a) Page 70 Maintenance Program – Please confirm the frequency of Wellington North’s current regular maintenance schedule.
- b) Page 70 Aging Plant - Please comment on the increase in the cost of metals over the past five years and its impact on the replacement cost of Substation equipment, and if this trend is expected to continue.
- c) Page 71 – Please confirm the frequency of Wellington North’s ongoing asset condition assessments.
- d) Page 71 – Please discuss Wellington North’s response to the following recommendations provided by Costello:
 - Perform a detailed review of the 44 and 4.16 kV feeder protection and coordination
 - Develop a long term forecast for the budgeting and execution of station replacement projects
 - Develop a short term work plan to make necessary repairs

Wellington North Power Inc. - Response:

- a) As per WNP’s IRM application, Exhibit 5: Incremental Capital Module, Background, page 59:

*“On an **annual** basis, WNP has performed scheduled maintenance of its six distribution substations, with the assistance of annual inspections undertaken by a 3rd party”.*

In the past, WNP completed sub-station preventative maintenance on an annual or semi-annual basis. In 2012, all six WNP substations underwent preventative maintenance, including inspection, which interestingly enough did not highlight any of the problems identified by Costello. In 2013, two WNP substations underwent preventative maintenance,

including inspection. WNP staff also performs monthly substation inspections to visually confirm the safety and security of WNP's substation assets.

As discussed within Costello Associates' report, the recommendation is for complete substation maintenance every three or five years for municipal transformer stations. With this information, WNP completed two substation preventative maintenance programs in 2013 and plans to complete two more substation preventative maintenances in 2014, ensuring that every three years WNP's substations are de-energized, isolated and undergo preventative maintenance activities. WNP has also recently engaged Costello to assist with developing a proposed timeline for capital and maintenance work. This work is expected to be completed in early 2014.

- b) The price of copper as a commodity has a significant impact on the project cost of substation projects as a result of need for copper's electrical properties in manufacturing electrical equipment including cable and transformers. The following chart, taken from the internet, shows the price of copper over the past five years.



As shown in the above chart, the price of copper reached a recent high over 4USD/lb in 2011, a recent low of under 2USD/lb in 2008 and currently (fall 2013) sits just over 3USD/lb. There is no doubt that the cost of copper impacts the project cost when rebuilding a substation. Within WNP's budget, approximately \$800,000 of proposed spend for MS2 substation relates to purchasing electrical equipment and/or cable. It can be assumed that the price of copper would have significant influence over the cost of this equipment; however, keeping in mind that electrical equipment and cable are highly engineered products that require advanced manufacturing processes to be created. This engineering design and advanced manufacturing would make the price of resulting electrical equipment and cable less elastic when compared to the price of copper. The decision to replace this substation has been made in consideration of reliability and good asset management practice.

- c) WNP completed a distribution system asset management plan in 2010 utilising the expertise of Rodan Energy Solutions Inc. for this activity. This plan looked at WNP's pole line and underground distribution assets. Since then, WNP has been conducting annual inspections of the distribution system, which include visual inspections and "hammer testing" poles, in order for the LDC to ensure the assets in the service are in a good and safe condition.

WNP engaged Costello in 2013 to perform a condition assessment on WNP's substation assets with a copy of the report included in the LDC's 2014 IRM application. This assessment will be an input into an asset management plan for WNP's substation assets. This is the first time WNP has taken a strategic review of its substation assets and created an asset management plan to direct activities moving forward. In the past, substations were maintained annually or bi-annually by electrical contractors with problems identified and resolved during these maintenance activities.

d) WNP's approach to the Costello's recommendations are summarized below:

i. Perform a detailed review of the 44 and 4.16 kV feeder protection and coordination

WNP, with Costello, will be incorporating protection and coordination studies into our capital and maintenance plans that are being developed. Protection and coordination studies will be completed as part of any new substation build; however, WNP also needs to perform these studies on our existing substations.

ii. Develop a long term forecast for the budgeting and execution of station replacement projects

As per WNP's IRM application, Exhibit 5: Incremental Capital Module, "Proposed 2014 Capital Spending Plan", page 76:

"In studying the 3rd party Substation Condition Assessment Study (June 2013), WNP has reviewed its 2014 Capital Expenditure (CapEx) and has adjusted its plans to cater for the Incremental Capital Project of building a new substation to replace its aged MS2 substation."

In this near-term plan (2014), the LDC has prioritized its 2014 capital project plan into discretionary and non-discretionary spending by considering a number of factors that were described in WNP's IRM application Exhibit 5: Incremental Capital Module, "2014 Capital Spending – Discretionary and Non-Discretionary" pages 76 to 78.

Regarding WNP's long-term forecast for budgeting and execution:

- As per the LDC's IRM application, Appendix 4: "Capital Expenditure 2013 – 2018" page 168 to page 174 inclusive, WNP has provisioned \$250,000 each year for 2015 to 2018 to replace major components of the substations;
- As per the LDC's IRM application Exhibit 5: Incremental Capital Module, "Background". Page 59 point 2 states:

2. The LDC is planning to replace MS4 substation in the near-future and may include this as part of WNP's next Cost of Service application (i.e. 2015

submission for 2016 rates) or in an IRM application. This is dependent upon the learning and experience gained from replacing MS2.

It should be noted that the MS4 substation currently supplies one 4,160V circuits at a supply capacity of 2MW and station was out of service from May 8, 2013 to November 19, 2013 for repair work. During this period, there were no reliability or system issues whilst the load was transferred to another substation. This work at MS4 substation was to repair the neutral and address many of the other items identified in Costello's report as in need.

iii. Develop a short term work plan to make necessary repairs

WNP Inc. has taken immediate action to ensure MS2 safety was improved. The LDC has been working through all items identified as critical in Costello's report and this has been reported at the monthly at WNP's Operations Committee meeting. A summary of the issues and updates as well as actions to date are summarized in the table below:

Problem Description	Comments
<p>Sub-Station: Common</p> <ul style="list-style-type: none"> Existing ground grid does not extend out at swing gate locations 	<p>Issue</p> <ul style="list-style-type: none"> When touching the swing gate, a person may not be standing on station's the ground grid. This results in a possible electrical hazard during a catastrophic electrical fault. <p>Action:</p> <ul style="list-style-type: none"> WNP has engaged AESI to complete an engineered work instruction for this work which will be followed by installation. <p>Update:</p> <ul style="list-style-type: none"> AESI has provided WNP with engineered instructions for this work which is being undertaken by WNP's linemen.
<p>Sub-Station: Common</p> <ul style="list-style-type: none"> Improperly installed riser cable 	<p>Issue</p> <ul style="list-style-type: none"> Costello feels these cables place unnecessary weight on the riser pole. <p>Action</p> <ul style="list-style-type: none"> AESI has provided direction which indicates although this is not current standard practice; it is not in need of immediate action. The cost of building these risers to current standard would be significant. The issues within the risers will be dealt with during station rebuild.

Problem Description	Comments
<p>Sub-Station: Common</p> <ul style="list-style-type: none"> Add locks to equipment within sub-station Use more secure, less readily available, lock and key 	<p>Issue</p> <ul style="list-style-type: none"> WNP currently uses lock and key the old Ontario Hydro used. These lock and key are readily available, which creates an accessibility risk. <p><u>Action</u></p> <ul style="list-style-type: none"> Centre Wellington Hydro and Hydro One both use Abloy lock and key. Abloy locks and key are approximately \$80 per lock. Kitchener-Wilmot Hydro use a lock similar to WNP's with a less readily available key. These lock and key are approximately \$20 per lock. AESI agrees that new locks for WNP equipment are necessary. <p>Update:</p> <ul style="list-style-type: none"> WNP has contacted Master locks for an alternative to Abloy.
<p>Sub-Station: Common</p> <ul style="list-style-type: none"> Replace grounding clamps used at sub-stations 	<p>Issue</p> <ul style="list-style-type: none"> Pipe clamps have been used for grounding clamps at sub-stations. Copper grounding clamps, CSA-rated, are available/required for these installations. <p><u>Action</u></p> <ul style="list-style-type: none"> WNP purchased clamps for installation. <p>Update:</p> <ul style="list-style-type: none"> WNP has completed 60% of this work.
<p>Sub-Station: MS1</p> <ul style="list-style-type: none"> Add stone 	<p>Issue</p> <ul style="list-style-type: none"> Station requires additional stone to provide adequate cover. <p><u>Action</u></p> <ul style="list-style-type: none"> WNP has resolved this issue. WNP worked with a local contractor to increase the amount of stone at all of WNP sub-stations.
<p>Sub-Station: MS2</p> <ul style="list-style-type: none"> Poor perimeter fencing 	<p>Issue</p> <ul style="list-style-type: none"> Perimeter fencing is in poor condition. <p><u>Action</u></p> <ul style="list-style-type: none"> WNP is replacing MS2 which will include new fencing.
<p>Sub-Station: Common</p> <ul style="list-style-type: none"> Stone required 1.5m around sub-station 	<p>Issue</p> <ul style="list-style-type: none"> 1.5m of stone required around outside of sub-station fence <p><u>Action:</u></p> <ul style="list-style-type: none"> No further action required for this item. Stone will be added when sub-stations are replaced.

Problem Description	Comments
<p>Sub-Station: MS1 & MS5</p> <ul style="list-style-type: none"> • Metal communication cable run between sub-station and communication cabinet 	<p>Issue</p> <ul style="list-style-type: none"> • Metal conductor creates possible electrical hazard <p>Action</p> <ul style="list-style-type: none"> • WNP has issued purchase orders for communication equipment and installation services for this replacement work <p>Update:</p> <ul style="list-style-type: none"> • WNP has installed fibre at MS5 & MS1 but still needs to connect equipment to its monitoring system • Item remains a work-in-progress
<p>Sub-Station: MS5</p> <ul style="list-style-type: none"> • Storm catch basin in proximity to MS5 on Isabella Street 	<p>Issue</p> <ul style="list-style-type: none"> • Transformer oil leak would penetrate the Township's storm water management system <p>Update:</p> <ul style="list-style-type: none"> • WNP has contacted Sorbweb to investigate spill containment solution

VECC Interrogatory #3

Reference 1: Substation Assessment Report (Costello Utility Consultants) June 2013, Page 69

Reference 2: Exhibit 5, Incremental Capital Module, Page 56

Reference 3: Substation Assessment Report (Costello Utility Consultants) June 2013, Page 68

Preamble: At reference 1, Substation MS4 is classified as red due to the age of the transformer, the system neutral connection and the diagnostic test results. At reference 2, Wellington North indicates substation MS4 should be marked for replacement in the near future (2016). At reference 3, Substation MS2 has a rating of red that can be improved to a yellow once the safety issues are resolved and switchgear efficiencies are corrected.

- a) If Wellington North is suggesting 2016 as the replacement year for Substation MS4 with a final red rating, why isn't the suggested year of replacement for Substation MS2 beyond 2016 given the potential to move from a red to a yellow rating once issues are resolved / corrected?

Wellington North Power Inc. - Response:

- a) The 3rd party assessment report assessed each of the LDC's substations independently based upon their condition, as per objective of the report. This report did not consider the substations interaction with the LDC's distribution system, i.e. how much load each substation manages and how each substation provides its supply to WNP's distribution infrastructure. Using WNP's experience and knowledge of its distribution infrastructure, WNP believes that MS-2 station should be prioritized above MS-4 station.

Furthermore, WNP has prioritized MS-2 (5MVA) station above MS-4 (2MVA) station based upon considering the following factors listed below. It's important to note that both MS2 & MS4 stations, according to the details provided within Costello's report, showed "problems with cables, wiring code violations, bonding and grounding issues..."

MS2 Station:

- The station transformer is 42 years old and future reliability is a concern;
- WNP seeks to proactively replace its aging assets to protect reliability and allow for planned capital activities rather than funding future repair and maintenance work;
- The station transformer is more heavily utilized than MS4. MS2 station currently supplies four 4,160V circuits with capacity to supply 5MVA; whereas MS4 station currently supplies one 4,160V circuit with a capacity to supply 2MW;
- The integration of “smart technology” at MS2 will impact a larger population of WNP customers than would MS4. It would also provide increased service and reliability over the existing technology in service at the substation. This includes but is not limited to recloser equipment, advanced protection schemes and scada and communication technology;
- MS2 exists in the critical industrial area in the north part of Mount Forest, i.e. location is close to important load with the majority of WNP’s industrial customers being fed from MS2;
- The perimeter fence is in a poor condition which needs resolve. This item has been temporarily resolved. This was noted under section “2.2 Mt. Forest MS-2 Substation” of the 3rd party assessment report that was filed with WNP’s IRM application – Appendix 5, page 180;
- MS2 is a large parcel of land, which allows for more design flexibility. WNP, working with Costello, has determined a design concept for this site.

MS4 Station:

- Although the transformer is 50 years old, the substation currently supplies one 4,160V circuit with a capacity to supply 2MW;
- The distribution plant in and around MS4 station requires significant upgrade to fully utilize this substation asset (for instance, the distribution plant (pole lines) at MS4 are under sized and need upgrading.) MS4 station will take more capital planning and related distribution plant construction. This will increase project schedule and cost and, for these reasons, WNP believes it will be difficult to re-build this asset and have it in-service before the end of 2014;

- MS4 station neutral connection was repaired using an engineered work instruction. The station was out of service from May 8, 2013 to November 19, 2013 for this repair work; and
- MS4 has land constraints, being a 50' by 50' parcel. WNP is still working with Costello to develop a design concept for MS4 that will be effective.