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FILED BY RESS and DELIVERED BY COURIER

October 23, 2014
File No.: 129316.1017

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
Yonge-Eglinton Centre
P.O. Box 2319
2300 Yonge Street, Suite 2700
Toronto ON M4P 1E4

Dear Ms. Walli:

Re: wpd White Pines Wind Incorporated (the "Applicant")
EB-2013-0339

On September 18, 2013, wpd White Pines Wind Incorporated ("**wpd**") filed an application for leave to construct transmission facilities (the "**Application**") with the Ontario Energy Board (the "**Board**") associated with a renewable wind energy generation facility proposed to be developed by wpd in Prince Edward County, Ontario. In the Application, wpd advised the Board that due to a modification to the form of the Transmission Line (as defined in the Application) from an overhead line to an underground line, wpd had applied to the IESO for an amended System Impact Assessment. wpd also advised the Board that the IESO had indicated that it would notify HONI in the event that an amended Customer Impact Assessment was also required.

Since filing the Application, wpd has received a System Impact Assessment Report (Addendum) and a Notification of Addendum of Conditional Approval to Connection Proposal from the IESO, each dated July 21, 2014. In emails dated February 19, 2014 and October 20, 2014, HONI confirmed that a Customer Impact Assessment addendum would not be issued for the Transmission Project (as defined in the Application). Enclosed with this letter are additions to wpd's pre-filed evidence regarding the System Impact Assessment and the Customer Impact Assessment for the Transmission Project. The additions include the following:

- Exhibit A, Tab 1, Schedule 1 - Exhibit List;
- Exhibit H, Tab 3, Schedule 1 - System Impact Assessment Report (Addendum);

- Exhibit H, Tab 3, Schedule 2 - Notification of Addendum of Conditional Approval to Connection Proposal; and

- Exhibit H, Tab 3, Schedule 3 – Emails from HONI regarding Customer Impact Assessment Report addendum.

We ask that you update wpd's Application and pre-filed evidence by inserting the enclosed evidence in the materials previously provided. This letter and the enclosures have been filed by RESS and hardcopies will be delivered to the Board.

Yours truly,

Ingrid Minott

IM/dl
Encl.
cc: All participants

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REPORT

Power to Ontario.
On Demand.

System Impact Assessment Report (Addendum)

CONNECTION ASSESSMENT & APPROVAL PROCESS

Final Report

CAA ID: **2010-401**
Project: **White Pines Wind Generation Station**
Applicant: **White Pines Wind Farm Inc.**

Market Facilitation Department
Independent Electricity System Operator

Date: July 21, 2014

Document ID	CAA 2010-401
Document Name	System Impact Assessment Report (Addendum)
Issue	2.0
Reason for Issue	Addendum Report
Effective Date	July 21, 2014

System Impact Assessment Report (Addendum)

Acknowledgement

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

Disclaimers

IESO

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of conditional approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Conditional approval of the proposed connection is based on information provided to the IESO by the connection applicant and Hydro One at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by Hydro One at the request of the IESO. Furthermore, the conditional approval is subject to further consideration due to changes to this information, or to additional information that may become available after the conditional approval has been granted.

If the connection applicant has engaged a consultant to perform connection assessment studies, the connection applicant acknowledges that the IESO will be relying on such studies in conducting its assessment and that the IESO assumes no responsibility for the accuracy or completeness of such studies including, without limitation, any changes to IESO base case models made by the consultant. The IESO reserves the right to repeat any or all connection studies performed by the consultant if necessary to meet IESO requirements.

Conditional approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed project to the IESO-controlled grid. However, the conditional approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. The IESO assumes no responsibility to any third party for any use, which it makes of this report. Any liability which the IESO may have to the connection applicant in respect of this report is governed by Chapter 1, section 13 of the Market Rules. In the event that the IESO provides a draft of this report to the connection applicant, the connection applicant must be aware that the IESO may revise drafts of this report at any time in its sole discretion without notice to the connection applicant. Although the IESO will use its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that the most recent version of this report is being used.

Hydro One

The results reported in this report are based on the information available to Hydro One, at the time of the study, suitable for a System Impact Assessment of this connection proposal.

The short circuit and thermal loading levels have been computed based on the information available at the time of the study. These levels may be higher or lower if the connection information changes as a result of, but not limited to, subsequent design modifications or when more accurate test measurement data is available.

This study does not assess the short circuit or thermal loading impact of the proposed facilities on load and generation customers.

In this report, short circuit adequacy is assessed only for Hydro One circuit breakers. The short circuit results are only for the purpose of assessing the capabilities of existing Hydro One circuit breakers and identifying upgrades required to incorporate the proposed facilities. These results should not be used in the design and engineering of any new or existing facilities. The necessary data will be provided by Hydro One and discussed with any connection applicant upon request.

The ampacity ratings of Hydro One facilities are established based on assumptions used in Hydro One for power system planning studies. The actual ampacity ratings during operations may be determined in real-time and are based on actual system conditions, including ambient temperature, wind speed and project loading, and may be higher or lower than those stated in this study.

The additional facilities or upgrades which are required to incorporate the proposed facilities have been identified to the extent permitted by a System Impact Assessment under the current IESO Connection Assessment and Approval process. Additional project studies may be necessary to confirm constructability and the time required for construction. Further studies at more advanced stages of the project development may identify additional facilities that need to be provided or that require upgrading.

1. Notification of Conditional Approval

White Pines Wind Farm Inc. (the "connection applicant") is developing a new 59.5 MW wind power generation farm, White Pines Wind Farm (the "project") in Milford, Prince Edward County, Ontario. The project will be connected to the Hydro One (the Transmitter) owned 230 kV circuit X22 out of Lennox TS, in the proximity of the existing Picton TS. The project was awarded a contract under the government FIT program, and is expected to start commercial operation in Q4 2015.

The System Impact Assessment for White Pines Wind Farm (CAA ID 2010 - 401) was completed on October 26, 2011. Recently, the connection applicant has notified the IESO that they will make the following changes to the original proposal:

1. Install 28 km underground cable instead of overhead line for the 69 kV tap line;
2. Modify impedances for two step-up transformers (230/69 kV and 69/34.5 kV);
3. Modify the collector system design to use underground cables;
4. Install three collector feeders instead of two;
5. Install a 10 MVAr @ 115 kV inductor at LV side of 230/69 kV transformer.

This assessment examines the impact of the proposed changes with respect to the amount of reactive power compensation required at the facility to meet IESO Market Rules requirements.

This assessment concludes that the connection of the project with the proposed changes, operating up to 59.5 MW, subject to the requirements specified in this report and the original SIA report, is expected to have no material adverse impact on the reliability of the integrated power system. It is recommended that a *Notification of Conditional Approval for Connection* be issued for the White Pines wind project subject to implementation of the requirements outlined in this report and the original SIA report.

2. IESO Requirements for Connection

Applicant Requirements

Specific requirements:

(1) The project is required to have the capability to inject or withdraw reactive power continuously (i.e. dynamically) at the connection point up to 33% of its rated active power at all levels of active power output.

Based on the updated information on the 69 kV cable and collector system provided by the connection applicant, in addition to the requirement for the dynamic reactive power compensation, a static capacitive compensation device of 3 Mvar @34.5 kV installed at the White Pines Wind Farm would satisfy the reactive power requirement for the incorporation of the proposed project.

The connection applicant has the obligation to ensure that the wind farm has the capability to meet the Market Rules requirement at the connection point and be able to confirm this capability during the commission tests.

This requirement supersedes the applicant's specific requirement (1) in the Executive Summary of the original SIA report.

(2) In order to have capability of injecting the required maximum reactive power to the system, the 69 kV system shall have maximum continuous operating voltage rating of 1.14 per unit (79 kV), or the 230/69 kV step-up transformer should be equipped with under load tap changers (ULTCs).

3. Assessments

Updated Equipment Parameters

For comparison purposes, the original parameters are listed with the new parameters.

Tap Line

The tap line parameters are listed as follows:

Table 1: Impedance of tap line

Tap Line	New impedance			Original impedance		
	R	X	B	R	X	B
230 kV	0	0	0	0	0	0
69 kV	0.0347	0.0870	0.1005	0.0374	0.1851	0

Per unit data are based on 100 MVA & 230 kV/69 kV.

Transformers T1 & T2

Parameters for the 34.5/69 kV (T2) and 69/230 kV (T1) step-up transformers are listed below.

T1 is equipped with an Off Load Tap Changer (OLTC) that has 4×5% steps (+10/-10) that will provide voltage range of 207 kV – 253 kV.

T2 is equipped with an Under Load Tap Changer (ULTC) that has 25×1% steps (+15/-10) that will provide voltage range of 62.1 kV – 79.35 kV.

Table 2: Specifications for transformers

Unit	Transformation	Rating (MVA) (ONAN/ONAF/ONAF)	Configuration		New Impedance (pu) S_B=100 MVA	Original Impedance (pu) S_B=39 MVA
			HV-Side	LV-Side		
T1	69/230 kV	39/52/65MVA	Yg	Yg	0.011+j0.282	0.008+j0.074
T2	34.5/69 kV	39/52/65MVA	Delta	Yg	0.0087+j0.218	0.008+j0.074

Inductor

10 MVAr @ 115 kV inductor will be installed at LV side of 230/69 kV transformer through a 121 kV 300 A reactor switcher.

Collector System

Parameters for collector system feeders are listed below. The equivalent values are in per unit based on 34.5 kV and 100 MVA and include the collector system cables and the turbine step-up transformers.

Table 3: Equivalent impedance of collectors

Circuit	New arrangement and impedances					Original arrangement and impedances				
	# of Turbines	MW	Impedance (pu, S_B=100MVA)			Unit #	MW	Impedance (pu, S_B=100MVA)		
			R	X	B			R	X	B
F1	13	26.65	0.0619	0.1121	0.01133	14	28.70	0.0266	0.104	0.007
F2	15	30.75	0.0831	0.2075	0.01934	15	30.75	0.0462	0.183	0.004
F3	1	2.05	0.4268	2.528	0.00016	-	-	-	-	-

The updated connection arrangement highlighting the modified equipment is shown in Figure 1 below.

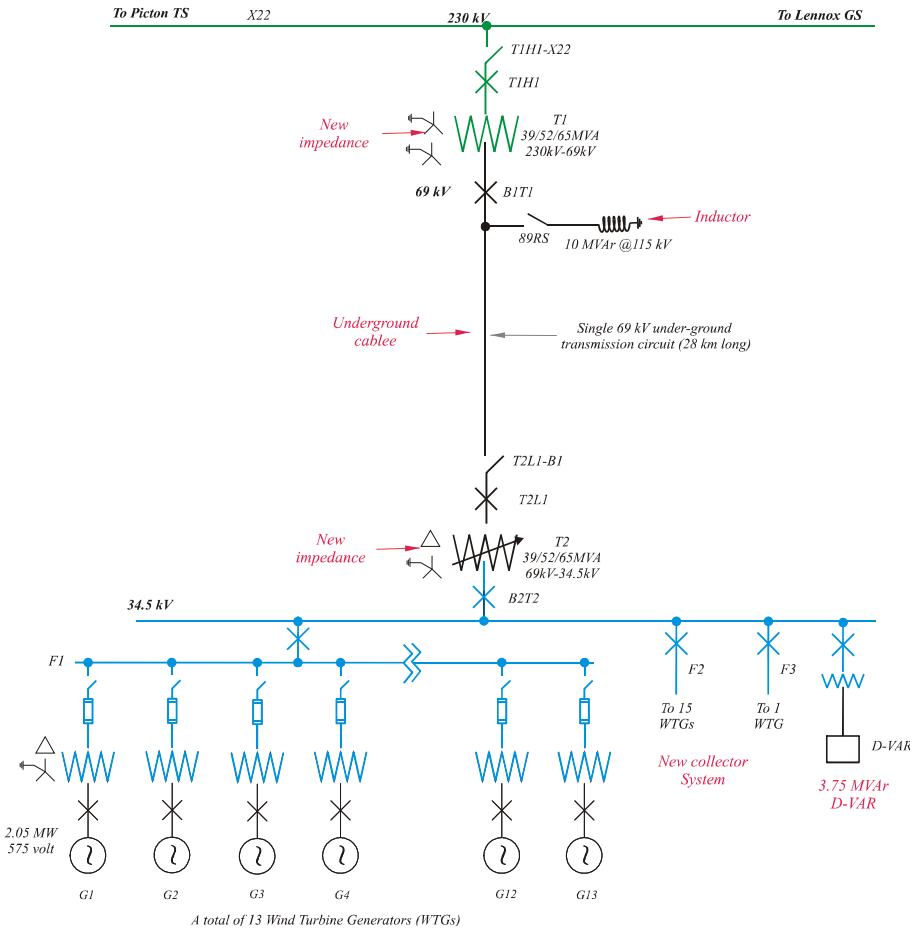

Figure 1: Updated connection arrangement

Reactive Power Compensation

The Market Rules (MR) require that a generation facility be able to inject or withdraw reactive power continuously (i.e. dynamically) at a connection point up to 33% of its rated active power at all levels of active power output except where a lesser continually available capability is permitted by the IESO. A generating unit with a power factor range of 0.90 lagging and 0.95 leading at rated active power connected via impedance between the generator and the connection point not greater than 13% based on rated apparent power provides the required range of dynamic reactive capability at the connection point.

Dynamic reactive compensation device (e.g. STATCOM or SVC) is required for a generation facility which employs generating unit(s) that cannot provide a reactive power range of 0.90 lagging power factor and 0.95 leading power factor at rated active power. For a wind farm with impedance between the generator and the connection point greater than 13% based on rated apparent power, provided the wind turbine generators (WTGs) have the capability to provide a reactive power range of 0.90 lagging power factor and 0.95 leading power factor at rated active power, the IESO accepts that the wind farm compensates for excessive reactive losses in the collector system of the project with static shunts (e.g. capacitors and reactors).

The System Impact Assessment Report (Addendum) proposes a solution for the White Pines Wind Farm to meet the MR requirements on reactive power capability. However, the connection applicant can deploy any other solutions which result in its compliance with the MR. The applicant shall be able to confirm this capability during the commission tests.

Dynamic Reactive Power Capability

As concluded in the original SIA report, the proposed REPower MM92 WTG cannot deliver IESO required dynamic reactive power to the generator terminal at rated power and at rated voltage. Thus, the IESO has determined that the connection applicant is required to install an additional dynamic reactive power compensation device of approximately 3 Mvar.

The connection applicant confirmed that a dynamic reactive compensation device of ±3.75 Mvar will be installed at 34.5 kV bus in White Pines Wind Farm.

Static Reactive Power Capability

In addition to the dynamic reactive power requirement identified above, White Pines Wind Farm has to compensate for the reactive power losses and generation within the facility, to ensure that it has the capability to inject or withdraw reactive power up to 33% of its rated active power at the connection point. As mentioned above, the IESO accepts this compensation to be made with switchable shunt devices.

As such, White Pines Wind Farm must have a minimum capability of supplying approximately **+19.6 MVAr** (capacitive) to **-19.6 MVAr** (inductive) at the connection point at all active power outputs.

Load flow studies were performed to calculate the need for static reactive compensation, based on the equivalent parameters for the White Pines Wind Farm provided by the connection applicant.

The reactive power capability in lagging power factor of the generation facility was assessed under the following assumptions:

- Typical voltage of 242 kV at the connection point;
- Maximum active power output (59.5 MW) from the equivalent WTG;
- Maximum reactive power output (lagging power factor) from the equivalent WTG, unless limited by the maximum acceptable WTG terminal voltage;
- Maximum acceptable WTG terminal voltage of 1.08 pu, as per WTG voltage capability;

- A dynamic reactive compensation device of ±3.75 MVAr at 34.5 kV bus.

The reactive power capability in leading p.f. of the generation facility was assessed under the following assumptions:

- Typical voltage of 242 kV at the connection point;
- Minimum active power (10% of rated active power) output from the equivalent WTG;
- Maximum reactive power consumption (leading power factor) from the equivalent WTG, unless limited by the minimum acceptable WTG terminal voltage;
- Minimum acceptable WTG terminal voltage of 0.92 pu, as per WTG voltage capability;
- A dynamic reactive compensation device of ±3.75 MVAr at 34.5 kV bus;
- An inductor of 10 MVAr @ 115 kV at LV side of 230/69 kV transformer.

A summary of the results is provided in Table 4.

Table 4: Project's reactive power capability at the connection point

Operation	230/69 Transformer Tap	69/34.5 Transformer Tap	69 kV Voltage (pu)	Collector Bus Voltage (pu)	Generator Terminal Voltage (pu)	Reactive Power at PCC (MVAr)
Lagging PF	241.5	79.4	1.14	1.05	1.08	19.3
Leading PF	241.5	62.1	0.93	0.99	0.94	-23.7

The studies showed that with the specified ±3.75 MVAr dynamic reactive compensation device installed at the 34.5 kV bus the Wind Pines Wind Farm can inject 19.3 MVAr or absorb 23.7 MVAr at the 230 kV connection point. As result, additional static compensation of 0.3 MVAr static capacitive would meet the reactive power requirements at the connection point.

It should be noted that in lagging power factor scenario the voltage at 69 kV system could be as high as 1.14 pu. Therefore, the 69 kV system shall have maximum continuous operating voltage rating of 1.14 per unit (79 kV), or the 230/69 kV step-up transformer should be equipped with under load tap changer (ULTC). If neither of these can be realized further study will be needed to find other solutions.

Locked Tap Changer and 10% Voltage Change Scenario

In addition, the White Pines wind farm is expected to inject or withdraw its full reactive power requirement for a 10% voltage change on the 230 kV system within an acceptable voltage range at the connection point, without provision for tap changer action. The acceptable post contingency voltage range 207 to 250 kV. The response time is expected to be similar to that of a synchronous generator that meets the minimum Market Rules' requirements, outlined in Appendix 4.2 of the Market Rules, which is in the order of a few seconds.

For this scenario, the reactive power capability in lagging power factor was assessed under the following assumptions:

- Reactive power output of about 0 MVAr at the connection point prior to voltage drop;
- Maximum active power output (59.5 MW) from the equivalent WTG;
- The 230/34.5 kV transformer on 241 kV fixed tap position and the 69/34.5 kV transformer on 73.6 kV fixed tap position;

- A 230 kV system voltage of 218 kV at the connection point (10% voltage decline from average voltage of 242 kV);
- A ±3.75 MVAr dynamic reactive compensation device installed at 34.5 kV bus.

For this scenario, the reactive power capability in leading power factor was assessed under the following assumptions:

- Reactive power output of about 0 MVAr at the connection point prior to voltage rise;
- Minimum active power (10% of rated active power) output from the equivalent WTG;
- The 230/69 kV transformer on 241 kV fixed tap position and the 69/34.5 kV transformer on 67.1 kV fix tap position;
- A 230 kV system voltage of 250 kV at the connection point;
- A ±3.75 MVAr dynamic reactive compensation device installed at 34.5 kV bus;
- An inductor of 10 MVAr @ 115 kV at LV side of 230/69 kV transformer.

The test results are summarized in Table 5 below.

Table 5: Project's reactive power capability for locked tap and 10% voltage change

Operation	230 kV Bus Voltage At Connection Point (kV)	Collector Bus Voltage (pu)	Generator Terminal Voltage (pu)	Reactive Power at Connection Point (MVAr)
Lagging PF	218	1.03	1.07	17.8
Leading PF	250	0.96	0.92	-23.4

For the lagging PF case, the White Pines Wind Farm cannot inject the required amount of reactive power of 19.6 MVAr. As result, additional static compensation of 3 MVAr static capacitive would meet the reactive power requirements at the connection point.

Therefore, a static capacitive compensation device of 3 MVAr @34.5 kV installed at the White Pines Wind Farm would satisfy the reactive power requirement for the incorporation of the proposed project.

The IESO's reactive power calculations are based on an equivalent electrical model of the collector system feeders and all the WTGs. It is very important that the WF has a proper internal design to ensure that the WTGs are not limited in their capability to produce reactive power at their maximum and minimum terminal voltages due to voltage limitations imposed by any other equipment employed within the facility. For example, it is expected that the transformation ratio of the WTG step up transformers will be set in such a way that it will offset the voltage profile along each feeder, and all the WTGs would be able to contribute to the reactive power production of the wind farm equally.

Tap Line and Collector System Charging

The WTGs may automatically disconnect themselves from the feeder during high wind conditions, leaving the collector system and tap line connected. This causes charging reactive power to be provided to the IESO-controlled grid. Simulation results show that under this situation the wind farm will inject about 13.3 MVAr reactive power at the connection point, which may aggravate a high-voltage situation under some system conditions. Should this situation arise, the IESO will direct the wind farm to reduce this injection. This can be obtained by opening feeders or disconnecting the facility from the IESO-controlled grid.

- End of Document -

July 21, 2014

ieso
Power to Ontario.
On Demand.

Mr. Paul Deol
Project Engineer
wpd Canada
2233 Argentia Road, Suite 102
Mississauga, ON L5N 2X7

Dear Mr. Deol:

White Pines Wind Project
Notification of Addendum of Conditional Approval to Connection Proposal
CAA ID Number: 2010-401

Thank you for the updated information regarding the proposed White Pines Wind Project.

From the new information provided, we have concluded that the proposed changes at White Pines Wind Project will not result in a material adverse impact on the reliability of the integrated power system.

The IESO is therefore pleased to grant **conditional approval** for the modification detailed in the attached addendum to the System Impact Assessment (SIA) report. Any material changes to your proposal may require re-assessment by the IESO in accordance with Market Manual 2.10, and may nullify your conditional approval.

Final approval to connect the facility to the IESO-controlled grid will be granted upon successful completion of the IESO **Market Registration** process including, without limitation, satisfactory completion of the requirements set out in the addendum to the SIA report. During this process you will be expected to demonstrate that you have fulfilled the requirements and that the facility you have installed is materially unchanged from the proposal assessed by the IESO. In order to initiate this process, please contact Market Registration at market.registration@ieso.ca at least eight months prior to your energization date.

For further information, please contact the undersigned.

Yours truly,

Ahmed Maria
Manager – Market Facilitation
Telephone: *(905) 855-6457*
Fax: *(905) 855-6319*
E-mail: *ahmed.maria@ieso.ca*
cc: *IESO Records*

Doris Loo

From: Wu, Yishui <yishui.wu@ieso.ca>
Sent: Monday, October 20, 2014 10:55 AM
To: Paul Deol; Jesse Long
Subject: FW: Transformer parameters and D-VAR model

Here it is.

Yishui Wu| Senior Engineer/Technical Officer, IESO| Station A, Box 4474, Toronto, Ontario, M5W 4E5|
Tel: (905) 855-6477| Fax: 905.855.6407| Email: yishui.wu@ieso.ca| Web: http://www.ieso.ca|

From: Quyen.Diep@HydroOne.com [mailto:Quyen.Diep@HydroOne.com]
Sent: October-20-14 10:52 AM
To: Wu, Yishui
Subject: FW: Transformer parameters and D-VAR model

Hi Yishui,

Got your VM. Here is the email confirming no CIA addendum for White Pines. It was from February!

Thanks,

Quyen Diep

From: DIEP Quyen
Sent: Wednesday, February 19, 2014 10:15 AM
To: 'Wu, Yishui'
Cc: QURESHY Farooq
Subject: RE: Transformer parameters and D-VAR model

Hi Yishui,

The changes made to the White Pines wind farm does not significantly change the results of the CIA. There will be no CIA addendum issued for this project.

Thanks,

Quyen Diep

From: Wu, Yishui [mailto:yishui.wu@ieso.ca]
Sent: Wednesday, January 29, 2014 10:54 AM
To: DIEP Quyen
Subject: FW: Transformer parameters and D-VAR model

Hi Quyen,

Please find the attached report for your review.

Thanks,

Yishui Wu| Senior Engineer/Technical Officer, IESO| Station A, Box 4474, Toronto, Ontario, M5W 4E5|
Tel: (905) 855-6477| Fax: 905.855.6407| Email: yishui.wu@ieso.ca| Web: http://www.ieso.ca|

From: Wu, Yishui
Sent: January-28-14 12:36 PM
To: 'Paul Deol'
Subject: RE: Transformer parameters and D-VAR model

Hi Paul,

Attached please find the SIA addendum report for your review.
In addition, I do have some concerns on the D-VAR model you provided and we can have a meeting after you review the addendum report.

Regards,

Yishui Wu| Senior Engineer/Technical Officer, IESO| Station A, Box 4474, Toronto, Ontario, M5W 4E5|
Tel: (905) 855-6477| Fax: 905.855.6407| Email: yishui.wu@ieso.ca| Web: http://www.ieso.ca|

From: Paul Deol [mailto:paul@wpd-canada.ca]
Sent: January-07-14 11:51 AM
To: Wu, Yishui
Subject: RE: Transformer parameters and D-VAR model

Hi Yishui,

Happy New Year! Hope all is well. I just wanted to quickly touch base to see if you had a chance to get these preliminary results yet.

Thanks,

Paul Deol
Project Engineer

From: Wu, Yishui [mailto:yishui.wu@ieso.ca]
Sent: Wednesday, November 13, 2013 4:19 PM
To: Paul Deol
Cc: Gorka Barrio Fernández
Subject: RE: Transformer parameters and D-VAR model

Hi Paul,

Thanks for the information.

It is better that we have a meeting after I get results based on all the updated information. Now I am busy with other projects and I can start to work on WP by the end of this month. I will provide you preliminary results and then we may have a meeting if necessary.

Regards,

Yishui

Yishui Wu| Senior Engineer/Technical Officer, IESO| Station A, Box 4474, Toronto, Ontario, M5W 4E5|
Tel: (905) 855-6477| Fax: 905.855.6407| Email: yishui.wu@ieso.ca| Web: http://www.ieso.ca|

From: Paul Deol [mailto:paul@wpd-canada.ca]
Sent: November-13-13 3:39 PM
To: Wu, Yishui
Cc: Gorka Barrio Fernández
Subject: RE: Transformer parameters and D-VAR model

Hi Yishui,

Apologies for the delay, we have been working towards finalizing these designs with our consultants at Hatch. Please find attached the following:

- Updated SLDs
- Specifications for DVAR system
- Specifications for Transformers
- Description of Protection Scheme (see Section 9)
- Electrical System Study Report (see Section 3.4)

The Hatch calculations show a need for a +6MVar capacitor and -10MVar shunt reactor to fulfill the static reactive power compensation requirements in the SIA. This doesn't really match up with the statement in your last E-Mail, so we were hoping to have an opportunity to go over this in a bit more detail with you. Would you be available for either a conference call this Friday, or an in-person meeting at your location on Tuesday?

Thank you,

Paul Deol
Project Engineer

From: Wu, Yishui [mailto:yishui.wu@ieso.ca]
Sent: Wednesday, August 14, 2013 1:34 PM
To: Paul Deol
Subject: Transformer parameters and D-VAR model

Hi Paul,

I noted that the two main transformer parameters shown in the SLDs are different with what we used in SIA study. I could not find the detailed tap changer information in the SLDs. Could you please provide the updated information for the transformers including the tap changing range, positions and steps?

As you know in the original SIA it was concluded that +3MVAr D-VAR and +6 MVAr static reactive power compensation device need to be installed. Based on the updated information I did some preliminary simulations and the results show +3MVAr D-VAR is still needed but +6 MVAr static reactive power compensation is not needed since the 69 cable provides large amount charging. However, the charging will also make the WF absorb less reactive power as required so some small amount of reactor is needed. If the installed +3MVAr D-VAR has capability of ±3MVAr (capability of injecting or absorbing up to 3 MVAr), the reactor may not be needed. Can you provide the D-VAR capability and model including dynamic model?

Please call me if you want any clarifications.

Regards,

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