ONTARIO ENERGY BOARD

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

AND IN THE MATTER OF an application by Upper Canada Transmission Inc., operating as NextBridge Infrastructure LP, for leave to construct an electricity transmission line between Thunder Bay and Wawa, Ontario;

AND IN THE MATTER OF an application by Hydro One Networks Inc. to upgrade existing transmission facilities in the districts of Thunder Bay and Algoma, Ontario;

AND IN THE MATTER OF an application by Hydro One for leave to construct an electricity transmission line between Thunder Bay and Wawa, Ontario.

EB-2017-0182
EB-2017-0194
EB-2017-0364

CROSS-EXAMINATION COMPENDIUM

ADDENDUM

HYDRO ONE PANEL

ANWAATIN INC.

October 3, 2018

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15 (Schedule B) s. 78;

AND IN THE MATTER OF an application by Hydro One Networks Inc. for the relief necessary to increase transmission rates in 2017 and 2018.

EB-2016-0160

FINAL ARGUMENT

ANWAATIN INC.

February 2, 2017

C. Reliability, Capital Spending, and the Transmission System Plan

Relative Reliability in Overall Ontario, Northern Ontario, and the Anwaatin Communities

36. Hydro One's 10-year transmission system reliability data shows a striking difference between the top quartile reliability and the transmission system investment in Southern Ontario, much worse and unbenchmarked reliability in Northern Ontario, and the entirely unreliable electricity transmission in the Anwaatin First Nation Communities.

Table 1: Frequency of Interruptions (SAIFI) Compared Across Hydro One, Northern Ontario, and the Anwaatin First Nation Communities[35]

Year	Hydro One Overall	Northern Ontario	Anwaatin First Nation Communities	Increased Frequency in Northern Ontario Interruptions Relative to Hydro One Overall	Increased Frequency in Anwaatin Interruptions Relative to Hydro One Overall
2006	1.67	4.38	3.40	2.62	2.04
2007	1.36	4.29	6.60	3.15	4.85
2008	1.5	4.29	2.40	2.86	1.60
2009	1.16	3.03	2.40	2.61	2.07
2010	1.14	3.24	4.00	2.84	3.51
2011	1.19	3.24	4.20	2.72	3.53
2012	1.26	3.66	2.40	2.90	1.90
2013	1.26	3.81	4.40	3.02	3.49
2014	1.08	2.66	1.80	2.46	1.67
2015	1.09	3.47	2.40	3.18	2.20

[35] Hearing Transcripts, Volume 7, 154:4-156:10.

Year	Hydro One Overall	Northern Ontario	Anwaatin First Nation Communities	Increased Frequency in Northern Ontario Interruptions Relative to Hydro One Overall	Increased Frequency in Anwaatin Interruptions Relative to Hydro One Overall
Average	1.271	3.607	3.40	2.84	2.69

Table 2: Duration of Interruptions (SAIDI) Compared Across Hydro One, Northern Ontario, and the Anwaatin First Nation Communities[36]

Year	Hydro One Overall	Northern Ontario	Anwaatin First Nation Communities	Increased Duration of Northern Ontario Interruptions Relative to Hydro One Overall	Increased Duration of Anwaatin Interruptions Relative to Hydro One Overall
2006	62.0	153.5	85.4	2.48	1.38
2007	40.5	150.4	260.6	3.71	6.43
2008	50.5	196.9	228.8	3.90	4.53
2009	38.4	95.0	114.0	2.47	2.97
2010	56.4	251.2	850.2	4.45	15.07
2011	127.9	591.6	371.0	4.63	2.90
2012	71.5	356.0	151.8	4.98	2.12
2013	66.0	196.1	689.8	2.97	10.46
2014	36.6	117.1	556.8	3.20	15.21
2015	44.3	178.4	522.8	4.03	11.80
Average	59.41	228.62	383.12	3.68	7.29

[36] Hearing Transcripts, Volume 7, 156:11-161:14.

Table 3: Delivery Point Unreliability Index Compared Across Hydro One, Northern Ontario, and the Anwaatin First Nation Communities[37]

Year	Hydro One Overall	Northern Ontario	Anwaatin First Nation Communities	Decreased Reliability in Northern Ontario Relative to Hydro One Overall	Decreased Reliability in Anwaatin Relative to Hydro One Overall
2006	18.7	65.4	35.0	3.50	1.87
2007	11.4	61.2	175.9	5.37	15.43
2008	14.2	65.0	24.9	4.58	1.75
2009	15.7	31.8	118.1	2.03	7.52
2010	12.9	62.1	673.8	4.81	52.23
2011	21.6	145.0	492.6	6.71	22.81
2012	14.0	108.0	106.7	7.71	7.62
2013	20.9	97.0	430.2	4.64	20.58
2014	12.2	60.1	474.8	4.93	38.92
2015	11.8	68.8	463.9	5.83	39.31
Average	15.34	76.44	299.59	5.01	20.81

37. Specifically, Table 1 indicates that the 10-year average frequency of interruptions is nearly three (3) times worse in Northern Ontario and the Anwaatin First Nation Communities than the overall Ontario average. Table 2 indicates that the 10-year average duration of interruptions is almost four (4) times longer in Northern Ontario and more than seven (7) times longer in the Anwaatin First Nation Communities than the overall Ontario average.

[37] Hearing Transcripts, Volume 7, 161:15-162:28.

Table 3 shows the delivery point unreliability index, which indicate that delivery points in Northern Ontario are over five (5) times (500%) less reliable than the Ontario average, and delivery points in the Anwaatin First Nation Communities are a staggering 20.81 times (2081%) less reliable than the Ontario average.[38]

38. Mr. McLachlan of Hydro One confirmed that, across numerous reliability metrics, Hydro One's reliability get progressively worse for Northern Ontario and is the worst for the Anwaatin First Nation Communities:

> MS. DeMARCO: And so fair to say that First Nations communities are far less reliable than the north as a whole?
>
> MR. McLACHLAN: Based on all the comparisons we just did here, from the CEA to the Hydro One to the northern system, to then the First Nations communities, yes, the reliability is actually progressively worse in each four of those categories.[39]

39. Further, Hydro One's transmission service reliability for the Anwaatin First Nation Communities has not been improving with time. It has been declining since 2006.[40]

40. Moreover, the Hydro One evidence confirms that a full sixty percent (60%) of the delivery points serving the Anwaatin First Nation Communities are customer delivery point performance standard "outliers".[41] Specifically, each of Longlac TS, Moosonee DS, and Beardmore #2 DS.[42]

[38] Hearing Transcripts, Volume 7, 155:22-156:10; 160:26-161:14; 162:9-20; and 162:21-28.
[39] Hearing Transcripts, Volume 7, 162:21-28.
[40] Hearing Transcripts, Volume 4, 141:9-18. See also Exhibit I, Tab 10, Schedule 3, 5-6, for the underlying data.
[41] Hearing Transcripts, Volume 7, 163:19-22.
[42] Hearing Transcripts, Volume 7, 151; Exhibit I, Tab 10, Schedule 3, 6.

ONTARIO ENERGY BOARD

FILE NO.:	**EB-2016-0160**	**Hydro One Networks Inc. Transmission**

VOLUME:	**7**	
DATE:	**December 5, 2016**	
BEFORE:	**Ken Quesnelle**	**Presiding Member**
	Emad Elsayed	**Member**
	Peter C.P. Thompson, Q.C.	**Member**

MR. NG: Page 1, the second map at the bottom, kind of in the middle, the top part of it, it says "Beardmore DS number 2".

MS. DeMARCO: Yes.

MR. NG: That's the location of the DS.

MS. DeMARCO: Okay. It's not listed in the list of assets in TCJ2.10. is that right?

MR. NG: That's because this is a distribution station.

MS. DeMARCO: Okay. And it's listed as part of the outliers for transmission -- let me get you a reference for that. I believe that's Anwaatin I, tab 10, schedule 3, page 6.

MR. McLACHLAN: Ms. DeMarco, maybe I can just clear this up a little bit.

The Beardmore DS is listed there because it is a delivery point from the transmission system off of the A4L circuit. But in that interrogatory response, where Mr. Ng has listed the assets and the age and replacement date and that, Beardmore is not listed there because it is not a transmission asset.

So he would not have any accountability or transmission funding for that asset. It is an accountability of the distribution asset.

MS. DeMARCO: This is very helpful because I was really running into confusion determining what's a delivery point that you are reporting on for the purpose of CDPP -- which I understand Beardmore is. Is that fair?

MR. McLACHLAN: Beardmore is a delivery point from the transmission system.

MS. DeMARCO: Right, but it's not a transmission asset as listed in his --

MR. McLACHLAN: Correct, correct. It's a distribution asset.

MS. DeMARCO: Okay. So in comparing those metrics, CDPP versus anything related to a metric pertaining to a transmission system asset, we have different assets included in those two categories; is that fair?

MR. McLACHLAN: Yes, at it's most basic level, that's correct.

MS. DeMARCO: I am working at a very basic level here, as you can tell.

MR. McLACHLAN: That's fine.

MS. DeMARCO: Would the same be said of Otter Rapids?

MR. PENSTONE: So, Ms. DeMarco, the way that you can make the distinction between a transmission and a distribution asset is DS stands for distribution station. So everything else, SS or TS, would be a transmission asset.

MS. DeMARCO: So Otter Rapids is listed as SS.

MR. PENSTONE: Transmission asset.

MS. DeMARCO: That's a transmission asset?

MR. PENSTONE: Correct.

MS. DeMARCO: Okay. And in this list on TCJ2.10, where do I find that? Isn't that a list of transmission assets?

Oh, it's the second one down. I see that, thank you. I think I have got it now.

So in relation to reliability, I understand that your intention or objective is to be the top quartile; is that right?

MR. PENSTONE: That's correct, for our multi-circuit network.

MS. DeMARCO: So it's just Southern Ontario, it doesn't include Northern Ontario?

MR. McLACHLAN: I will say yes and no to that. It's a correlation to Southern Ontario because the majority of our multi-circuit delivery points are Southern Ontario.

However there are a few minor delivery points that are multi-circuit in north. But the correlate -- it could be said that it's primarily Southern Ontario, yes.

MS. DeMARCO: Okay. So you have no reliability objective for Northern Ontario. Fair to say?

MR. PENSTONE: In terms of quartile ranking with Canadian peers, that's accurate.

MS. DeMARCO: Thank you. Okay. I am going to ask you to play turn the pages with me, and turn up three exhibits simultaneously, if I could.

The first one is B1, tab 1, schedule 3, starting at page 24. The second one is Exhibit I, tab 10, schedule 5, starting at page 3, and I will also be referring to page 5. And the third one is Exhibit I, tab 10, at schedule 3, starting at page 1.

So what I'd like to do is run through three

reliability measures going from the CEA ranking to the Hydro One system ranking, to the Hydro One north ranking, to the Anwaatin rankings.

So let's start with SAIFI total. And I am going to refer you first to B 1-T1-S3 at page 24. And in figure 9, we have got the overall SAIDI -- sorry, SAIFI total. Is that right?

MR. McLACHLAN: That is correct.

MS. DeMARCO: For the CEA in 2014 we are at about 1.6, fair?

MR. McLACHLAN: That's correct.

MS. DeMARCO: For Hydro One system-wide, we are at about 1.08 for 2014?

MR. McLACHLAN: Correct.

MS. DeMARCO: 1.09 for 2015?

MR. McLACHLAN: Yes, that's correct.

MS. DeMARCO: And now I am going to ask you to turn to Anwaatin number 5, which is I10-5, starting at page 3. It's the bottom graph there.

For Hydro One north, I have got an average of 3.61, is that right?

MR. NETTLETON: Sorry, Ms. DeMarco, you are asking the witness whether the average of the bars is a particular amount?

MR. McLACHLAN: If I can clarify? It doesn't show it on this chart, but we did respond to that as an undertaking from the technical conference which is, I think, what you are referring to.

MS. DeMARCO: Yes, it's TCJ -- is it 2.5?
MR. McLACHLAN: TCJ2.5.
MS. DeMARCO: Yes.
MR. McLACHLAN: And in TCJ2.5, if you could call that up on the screen. I am not sure what page -- 3?
MS. DeMARCO: Sorry, I have got my graphs wrong. Yes, that's right, page 3. The average is listed as 3.61.
MR. McLACHLAN: Correct.
MS. DeMARCO: And the range goes from 2.66 to 4.38 over a ten-year period?
MR. McLACHLAN: Correct.
MS. DeMARCO: And in the same exhibit, I am going to ask you to turn a few pages to First Nations communities. I am on page 5 of 6, interruption frequency overall.
MR. McLACHLAN: Yes, at the bottom of the page.
MS. DeMARCO: Yes, and we have got an average for First Nations of 3.4.
MR. McLACHLAN: Correct.
MS. DeMARCO: With a range of 1.8 to 6.6; is that right?
MR. McLACHLAN: Correct.
MS. DeMARCO: So fair to say a fairly broad range. In fact a broader -- is that correct?
MR. McLACHLAN: Yes, correct.
MS. DeMARCO: In fact, a broader range than we see for Hydro One north; is that correct?
MR. McLACHLAN: Yes, that's correct.
MS. DeMARCO: And fair to say that Anwaatin average

total number of interruptions per delivery point is approximately three times greater than the Hydro One system average; is that correct?

MR. McLACHLAN: Just to clarify for the record, when you say Anwaatin, we are referring to the graph that says First Nations communities?

MS. DeMARCO: That's right.

MR. McLACHLAN: Okay. And if you'd just allow me to flip back, there is a lot of charts here.

Yes, that's correct.

MS. DeMARCO: Okay. Let's move on to SAIDI, and the same exercise. We are going to go back to B1, T1, schedule 3. And I believe this is Figure 10 on page 24.

MR. McLACHLAN: That's correct.

MS. DeMARCO: CEA average is about 75 in 2014; is that fair?

MR. McLACHLAN: That's fair.

MS. DeMARCO: And Hydro One's system-wide average is about 36.6 in 2014?

MR. McLACHLAN: That's correct.

MS. DeMARCO: 44.3 in 2015?

MR. McLACHLAN: That's correct.

MS. DeMARCO: Let's move on to TCJ2.5, on page 3 of 6.

MR. McLACHLAN: Yes.

MS. DeMARCO: And your average there is 227.6.

MR. McLACHLAN: That's correct.

MS. DeMARCO: Now, just by way of noting in terms of the interrogatory response starting at I10-5 at page 3, my

calculated average comes out slightly different. I wonder if you could just undertake to explain any discrepancy between those two figures.

MR. McLACHLAN: I am sorry, what was the reference that you just gave there, please?

MS. DeMARCO: It was I10-5, starting at page 3, I believe. Yes. Sorry, page 4, it's the top of page 4.

MR. McLACHLAN: Just give me a moment, please.

MS. DeMARCO: Sorry, it's page 3. This is the average northern.

MR. McLACHLAN: So Ms. DeMarco, what I was just checking is that the reference that you are just referring to that's on the screen there, the numbers, if you will, in each year do match the numbers in TCJ2.5, First Nations communities where we have...

MS. DeMARCO: It's the Hydro One northern number. Can I just ask you to undertake to make sure that the math is correct there in TCJ2.5?

MR. McLACHLAN: Just bear with me. You are asking if it's the northern system average interruption duration?

MS. DeMARCO: Yes.

MR. McLACHLAN: Correct?

MS. DeMARCO: Yes. I am not going to die on the sword, Mr. McLachlan. I am very cognizant of time. The difference is minute, it's about --

MR. McLACHLAN: Okay. I guess if it's not material then we move on, or...

MS. DeMARCO: It's just that in both instances on the

delivery point on reliability index and SAIDI there appears to be a discrepancy between what the outcome of TCJ2.5 is and the number provided by taking the average in the interrogatory response I 10-5. Just for the veracity of the record, just to ensure -- tell us which one is right.

MR. PENSTONE: So would you prefer that we take an undertaking to confirm the math?

MS. DeMARCO: Yes, please.

MR. PENSTONE: We will do that.

MR. McLACHLAN: If you can just confirm what it is that we are confirming?

MS. DeMARCO: The averages on the northern system interruption duration, average interruption duration -- this is TCJ2.5, page 3, and the TCJ2.5, page 4, northern system delivery point unreliability index average.

MR. McLACHLAN: Okay.

MS. DeMARCO: To work out with the math that you provided in I10-5 and I10-3 for the same two figures.

MR. NETTLETON: Ms. DeMarco, just a question. Like, are we talking a major difference?

MS. DeMARCO: We may, particularly when it comes to the standard deviations.

MR. NETTLETON: Sorry, I heard only an average, and explain the average. Are you now asking for standard deviations around the average?

MS. DeMARCO: I am not at this point. I may, going forward.

MR. NETTLETON: Well, Mr. Chairman, I am just mindful

of time. I am mindful of where we are going with this line of questioning. The questions that I have heard to date have largely been confirmations of evidence that's on the record.

If there is an issue about the quality or veracity of the evidence, then that's one thing, but I am not sure it's the best use of time to be confirming what's on the record.

MR. QUESNELLE: Ms. DeMarco.

MS. DeMARCO: I certainly don't view this as confirming strictly what's on the record. We have got a linear progression between CEA data, Hydro One system data, Hydro One northern data, and the data provided for First Nations communities, and the differentials among all of those.

MR. QUESNELLE: So the question is -- or are you just pointing out that -- the variance?

MS. DeMARCO: I would like to confirm that I have read that correctly.

MR. QUESNELLE: Okay.

MS. DeMARCO: I am certainly not an expert and would defer to these experts to confirm that.

MR. NETTLETON: So just to be clear, is the undertaking to provide the formula used to calculate the averages found in TCJ2.5?

MR. QUESNELLE: I understood it, Mr. Nettleton, to be confirm which one is correct, because apparently there is a difference between the two. If the difference is explainable and they should be different, fine; if they are

not, then determine which one is correct.

MR. NETTLETON: That's fine.

MS. DeMARCO: Thank you, Mr. Chair.

So just in relation to SAIDI then, we were at --

MS. LEA: So that's Undertaking 7.5.

MR. QUESNELLE: Thank you Ms. Lea, yes.

UNDERTAKING NO. J7.5: TO WORK OUT WITH THE MATH THAT YOU PROVIDED IN I10-5 AND I10-3 FOR THE SAME TWO FIGURES, THE AVERAGES ON THE NORTHERN SYSTEM INTERRUPTION DURATION, AVERAGE INTERRUPTION DURATION -- THIS IS TCJ2.5, PAGE 3, AND THE TCJ2.5, PAGE 4, NORTHERN SYSTEM DELIVERY POINT UNRELIABILITY INDEX AVERAGE.

MS. DeMARCO: We were at Hydro One north, and we were at 227.6; is that right? This is TCJ2.5, page 3.

MR. McLACHLAN: This is the northern system average interruption duration?

MS. DeMARCO: Yes.

MR. McLACHLAN: 227.6.

MS. DeMARCO: And then on page 6 of 6, we've got the First Nations at 383.1.

MR. McLACHLAN: Correct.

MS. DeMARCO: And then there, again, very significant variability?

MR. McLACHLAN: Correct.

MS. DeMARCO: And you'd agree with me that Anwaatin's variability is approximately in the SAIDI -- sorry, Anwaatin is approximately three times the northern average?

MR. NETTLETON: Now, Mr. Chairman, again, the chart isn't specific to Anwaatin, it's all First Nation communities.

MS. DeMARCO: That's fair. I am happy to reclassify the question. So for 2015 data, Anwaatin is approximately three times the northern figure; is that correct?

MR. QUESNELLE: You mean -- Ms. DeMarco, do you mean the First Nations graph that is shown is three times more?

MS. DeMARCO: Yes. I am sorry.

MR. QUESNELLE: Yes. Thank you.

MS. DeMARCO: I am a little thick this afternoon. So the First Nations data is approximately three times that of the north for 2015?

MR. McLACHLAN: That's correct.

MS. DeMARCO: And can we move on to delivery point unreliability index. Going back to Exhibit B1, tab 1, Schedule 3. I am at page 25 of 29.

MR. McLACHLAN: Yes.

MS. DeMARCO: CEA is approximately 19 in 2014; is that correct?

MR. McLACHLAN: Yes, that's fair.

MS. DeMARCO: The Hydro One system average is approximately 12.2 in 2014?

MR. McLACHLAN: Correct.

MS. DeMARCO: 11.8 in 2015?

MR. McLACHLAN: Correct.

MS. DeMARCO: Moving on to TCJ2.5. The north -- Hydro One north system delivery point unreliability index is an

average of 76.7?

MR. McLACHLAN: Correct.

MS. DeMARCO: And First Nations communities on the next page, two pages over, sorry, delivery point unreliability index, this is page 6 of TCJ2.5?

MR. McLACHLAN: Yes.

MS. DeMARCO: It'280.7.

MR. McLACHLAN: Correct.

MS. DeMARCO: So on delivery point unreliability index for 2015, Anwaatin -- sorry, First Nations are approximately eight times the north?

MR. McLACHLAN: That's in a fair range. I would say seven-and-a-half, but in that range, yes.

MS. DeMARCO: And First Nations in relation to the average is approximately four times the north?

MR. McLACHLAN: I am sorry, what was that last question, First Nations in relation to?

MS. DeMARCO: On average, in relation to the north, is about four times?

MR. McLACHLAN: Yes, that's correct.

MS. DeMARCO: And so fair to say the First Nations communities are far less reliable than the north as a whole?

MR. McLACHLAN: Based on all the comparisons we just did here, from the CEA to the Hydro One to the northern system, to then the First Nations communities, yes, the reliability is actually progressively worse in each four of those categories.

MS. DeMARCO: Thank you. Can I ask you now to turn to page 6 of Exhibit I, tab 3 -- sorry, I, tab 10, schedule 3, Anwaatin number 3?

Fair to say that of the five delivery points servicing -- of the five lines servicing the Anwaatin communities, three are outliers?

MR. McLACHLAN: Just to clarify, is this the exhibit on the screen here, Ms. DeMarco?

MS. DeMARCO: Yes.

MR. McLACHLAN: And your question is -- what was your question again, please?

MS. DeMARCO: Of the -- I believe that's also been updated in TCJ2.5.

MR. McLACHLAN: Yes, you are correct, it has.

MS. DeMARCO: Of the five lines or delivery points serving the Anwaatin communities, fair to say that three are outliers?

MR. McLACHLAN: Yes, that's correct.

MS. DeMARCO: So 60 percent of the delivery points servicing the Anwaatin members are outliers?

MR. McLACHLAN: Yes, three of the five delivery points are outliers in the latest report, correct.

MS. DeMARCO: Okay, thank you. I would now like to turn you to TCJ2.10, to make sure I understand correctly the age of assets. Do you have that up?

So in relation to the Alexander switching station, the A4LA protection system is currently 24 years old; is that right?

Anwaatin Inc. (Anwaatin) INTERROGATORY #003

Reference:

Exhibit B1, Tab 1, Schedule 3, pages 22-29 of 29
Exhibit B1, Tab 1, Schedule 3, Attachment 1

Interrogatory:

Regional and customer-specific data on reliability and related price is relevant to establishing the value of the services that Hydro One provides relative to the price/bills that customers pay.

a) Given the importance Hydro One has attached to reliability measures in this application (including frequency of momentary interruptions, frequency of sustained interruptions, overall frequency of interruptions, duration of sustained interruptions, delivery point unreliability, delivery point unreliability and customer delivery point performance outliers, and customer delivery point performance standards (CDPP)), Hydro One's focus on customers, and that Hydro One conducts a detailed annual assessment of the performance measures described above, please provide detailed data and calculations for (i) all Hydro One service territory, (ii) northern and remote communities, and (iii) First Nation communities, including Aroland First Nation, Moose Factory and Moosonee, Rocky Bay First Nation, and Red Rock Indian Band, Geraldton and Beardmore in the planning regions of Northwest Ontario and North/East of Sudbury, on the following:

(i) the frequency of momentary interruptions;
(ii) the frequency of sustained interruptions;
(iii) overall frequency of interruptions, including both momentary and sustained interruptions;
(iv) the duration of sustained interruptions;
(v) delivery point unreliability;
(vi) delivery point unreliability outliers; and
(vii) CDPP outliers.

b) Please provide Hydro One's CDPP standards.

c) Please provide a description of how Hydro One measures customer focus and any and all related data and results pertaining to customer focus.

Witness: Mike Penstone

Response:

a) For Hydro One Service Territory performance, please refer to Figures in Exhibit B1, Tab 1, Schedule 3, for following measures:

Figure	Page	Question	Measure
Figure 8a	23	(i)	the frequency of momentary interruptions
Figure 8b	23	(ii)	the frequency of sustained interruptions
Figure 9	24	(iii)	overall frequency of interruptions, including both momentary and sustained interruptions
Figure 10	24	(iv)	the duration of sustained interruptions
Figure 11	25	(v)	delivery point unreliability
Figure 14	28	(vii)	CDPP outliers

For (vi), delivery point unreliability outliers, please refer (vii) for details.

2. The performance data in the filing doesn't include remote communities since it is not integrated with the bulk electric system and we don't have readily available performance data for the system supplying remote communities.

Following tables are provided for Northern transmission system performance:

i) Frequency of Momentary Interruptions

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of momentary interruptions	285	313	370	219	304	253	270	368	217	272
# of DPs in Northern Region	150.5	150.0	150.6	149.2	147.5	146.4	146.7	148.6	149.2	148.6
T-SAIFI-m*	1.89	2.09	2.46	1.47	2.06	1.73	1.84	2.48	1.45	1.83

**T-SAIFI-m= Total number of momentary interruptions / total number of DP monitored*

ii) Frequency of Sustained Interruptions:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of sustained interruptions	375	330	276	233	174	222	267	198	180	244
# of DPs in Northern Region	150.5	150.0	150.6	149.2	147.5	146.4	146.7	148.6	149.2	148.6
T-SAIFI-s*	2.49	2.20	1.83	1.56	1.18	1.52	1.82	1.33	1.21	1.64

**T-SAIFI-s= Total number of sustained interruptions / total number of DP monitored*

Witness: Mike Penstone

iii) Overall Frequency of Interruptions:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of overall interruptions	660	643	646	452	478	475	537	566	397	516
# of DPs in Northern Region	150.5	150.0	150.6	149.2	147.5	146.4	146.7	148.6	149.2	148.6
T-SAIFI-all*	4.38	4.29	4.29	3.03	3.24	3.24	3.66	3.81	2.66	3.47

**T-SAIFI-all= Total number of momentary and sustained interruptions / total number of DP monitored*

iv) Duration of Sustained Interruptions:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Duration of sustained interruptions (minutes)	23108	22555	29650	14167	37063	86609	52229	29136	17466	26512
# of DPs in Northern Region	150.5	150.0	150.6	149.2	147.5	146.4	146.7	148.6	149.2	148.6
T-SAIDI*	153.5	150.4	196.9	95.0	251.2	591.6	356.0	196.1	117.1	178.4

**T-SAIDI= Total duration of sustained interruptions / total number of DP monitored*

v) Delivery Point Unreliability Index:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total Unsupplied Energy (MW× minutes)	142549	127241	126905	62776	125811	297938	215415	194942	111602	125489
System Peak Load (MW)	2179.6	2079.2	1952.0	1971.8	2025.7	2054.7	1995.3	2010.5	1856.1	1822.7
DPUI*	65.4	61.2	65.0	31.8	62.1	145.0	108.0	97.0	60.1	68.8

**DPUI =Total unsupplied energy / system peak load*

vi) Delivery point Unreliability Outliers: please refer to (vii) for details

vii) CDPP Outliers:

	2010	2011	2012	2013	2014	2015
Total # of DPs in Northern Region	148	149	149	150	152	149
# of Outliers in Northern Region	64	56	53	53	65	not available

Witness: Mike Penstone

3. First Nation Communities, as provided in this IR, plus Nipigon provided in Anwaatin IR #5 are supplied by following Hydro One transmission delivery points:

- Beardmore DS #2
- Long Lac TS
- Moosonee DS
- Nipigon DS
- Red Rock DS

Moosonee and Moose Factory Community is also supplied by Kashechewan CTS and Fort Albany CTS which are not in Hydro One's transmission service territory and they are excluded from the performance study.

Following tables are provided for the transmission system supplying First Nation Communities:

i) Frequency of Momentary Interruptions

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of momentary interruptions	8	13	6	2	8	12	5	9	3	7
# of DPs Supplying First Nation Communities	5	5	5	5	5	5	5	5	5	5
T-SAIFI-m*	1.60	2.60	1.20	0.40	1.60	2.40	1.00	1.80	0.60	1.40

**T-SAIFI-m = Total number of momentary interruptions / total number of DP monitored*

ii) Frequency of Sustained Interruptions:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of sustained interruptions	9	20	6	10	12	9	7	13	6	5
# of DPs supplying First Nation Communities	5	5	5	5	5	5	5	5	5	5
T-SAIFI-s*	1.80	4.00	1.20	2.00	2.40	1.80	1.40	2.60	1.20	1.00

**T-SAIFI-s = Total number of sustained interruptions / total number of DP monitored*

iii) Overall Frequency of Interruptions:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of overall interruptions	17	33	12	12	20	21	12	22	9	12
# of DPs supplying First Nation Communities	5	5	5	5	5	5	5	5	5	5
T-SAIFI-all*	3.40	6.60	2.40	2.40	4.00	4.20	2.40	4.40	1.80	2.40

**T-SAIFI-all = Total number of momentary and sustained interruptions / total number of DP monitored*

iv) Duration of Sustained Interruptions:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Duration of sustained interruptions (minutes)	427	1303	1144	570	4251	1855	759	3449	2784	2614
# of DPs supplying First Nation Communities	5	5	5	5	5	5	5	5	5	5
T-SAIDI*	85.4	260.6	228.8	114.0	850.2	371.0	151.8	689.8	556.8	522.8

**T-SAIDI = Total duration of sustained interruptions / total number of DP monitored*

v) Delivery Point Unreliability Index:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total Unsupplied Energy (MW×minutes)	1452	6951	962	4164	19869	15267	3171	13996	15206	14828
System Peak Load (MW)	41.5	39.5	38.6	35.3	29.5	31.0	29.7	32.5	32.0	32.0
DPUI*	35.0	175.9	24.9	118.1	673.8	492.6	106.7	430.2	474.8	463.9

**DPUI =Total unsupplied energy / system peak load*

vi) Delivery point Unreliability Outliers: please refer (vii) for details

vii) CDPP Outliers:

Year	Hydro One Delivery Points
2010	LONGLAC TS, MOOSONEE DS
2011	LONGLAC TS, MOOSONEE DS
2012	LONGLAC TS, MOOSONEE DS
2013	MOOSONEE DS
2014	LONGLAC TS, MOOSONEE DS, BEARDMORE #2 DS
2015	not available

b) Please refer to Exhibit B1, Tab 1, Schedule 3, Attachment 1 for Hydro One's CDPP Standard.

c) Customer focus is best described as an attribute or value that is an integral part of Hydro One's corporate culture rather than a separate process and metric. As such, the measurement of customer focus is reflected in the proposed Transmission Regulatory Scorecard in Exhibit B2, Tab 1, Schedule 1, Attachment 1. The Performance Outcomes, Performance Categories and Measures proposed in this Scorecard measure overall corporate performance which in turn is driven by underlying processes and actions. Thus the specific measures that directly relate to customer outcomes and experience in this proposed Scorecard illustrate Hydro One's emphasis and measure of customer focus. The Performance Categories that directly relate to customer outcomes are Service Quality, Customer Satisfaction and System Reliability. The results for the corresponding Measures are listed in Attachment 1 for the years 2011 to 2015.

UNDERTAKING – TCJ2.5

Undertaking

To update the number once the report is available. Also to update the table when the report becomes available.

Response

This undertaking was to provide two updates, as follows:

Response Part 1: Updating of 2015 CDPP Outliers numbers

In response to interrogatory #I-10-003, part vii) CDPP outliers, to update the chart at the bottom of page 3 with the number of Outliers in the 2015 CDPP report, and to update the list at the top of page 6 of which First Nations delivery points are identified as Outliers in the 2015 CDPP report, when available. The report has now been finalized and the chart and list are updated below with this information.

CDPP Outliers:

NE115,NE230,NW115,NW230	2010	2011	2012	2013	2014	2015
Total # of DPs in Northern Region	148	149	149	150	152	149
# of Outliers	64	56	53	53	65	54

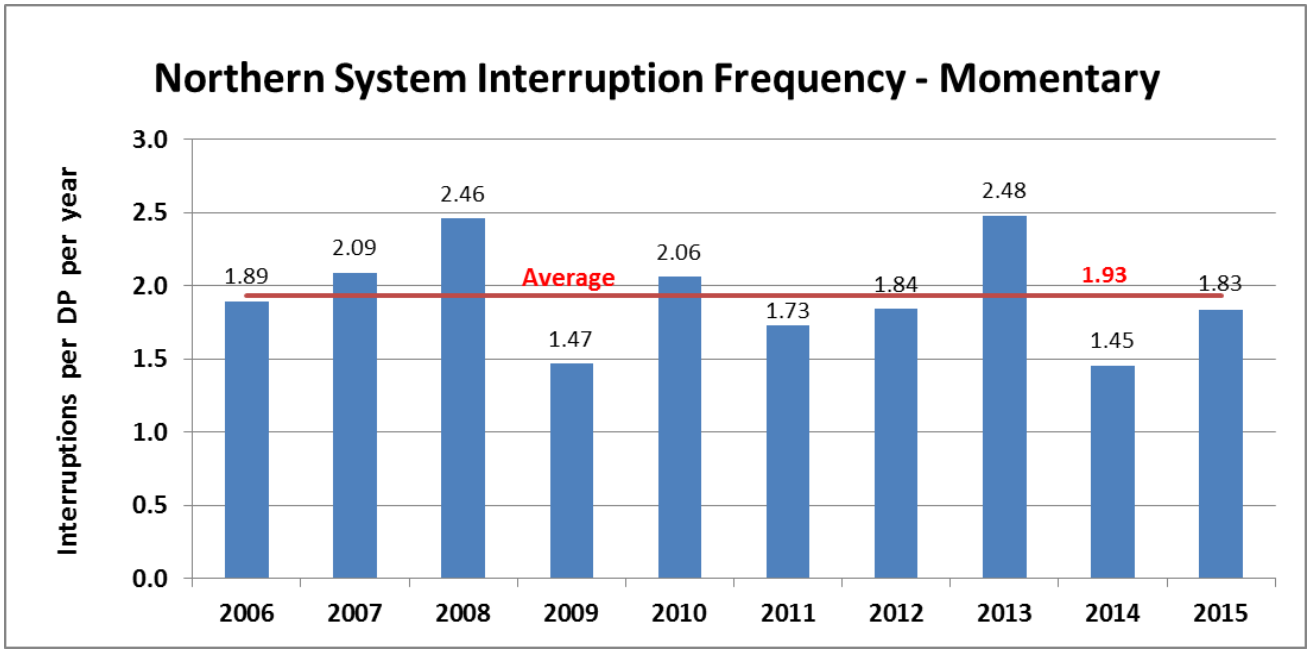
CDPP Outliers:

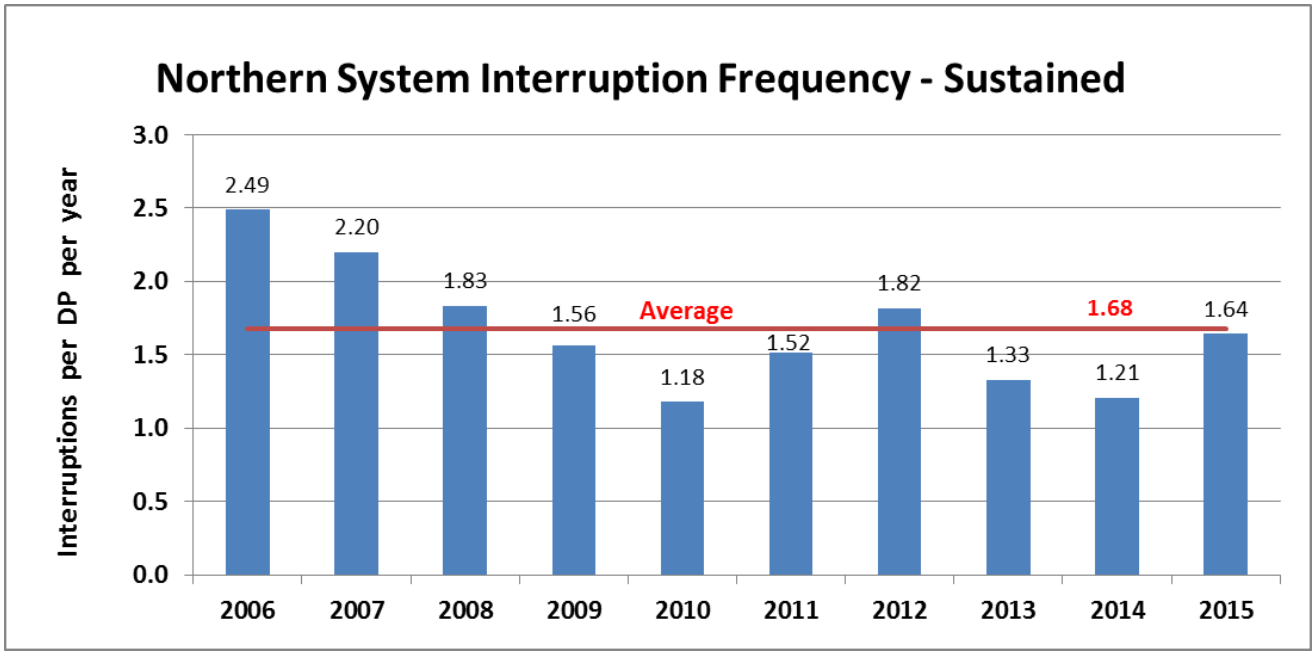
2010	LONGLAC TS, MOOSONEE DS
2011	LONGLAC TS, MOOSONEE DS
2012	LONGLAC TS, MOOSONEE DS
2013	MOOSONEE DS
2014	LONGLAC TS, MOOSONEE DS, BEARDMORE #2 DS
2015	LONGLAC TS, MOOSONEE DS, BEARDMORE #2 DS

Witness: Scott McLachlan

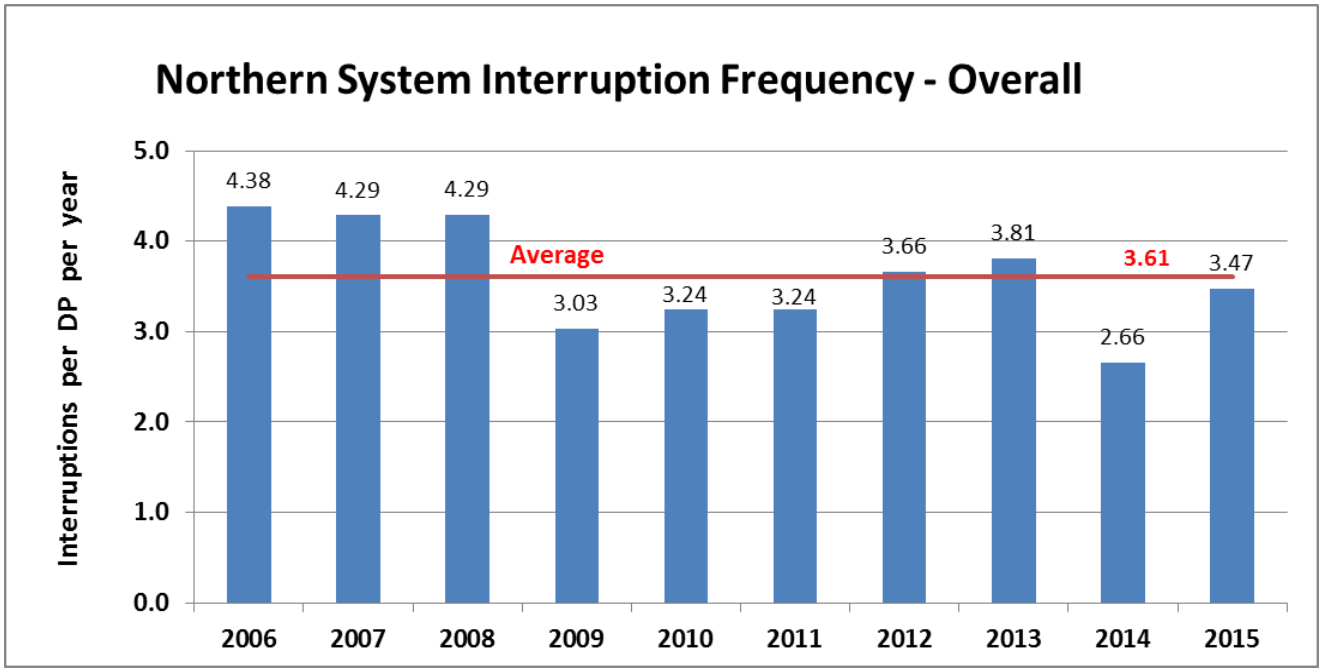
Response Part 2: Provide the Northern Transmission System Performance and Transmission System Performance supplying First Nations Communities in a Chart format similar to Exhibit B1, Tab 1, Schedule 3. These charts are provided below, with the 10-year average line included, as requested.

a) Northern Transmission System Performance

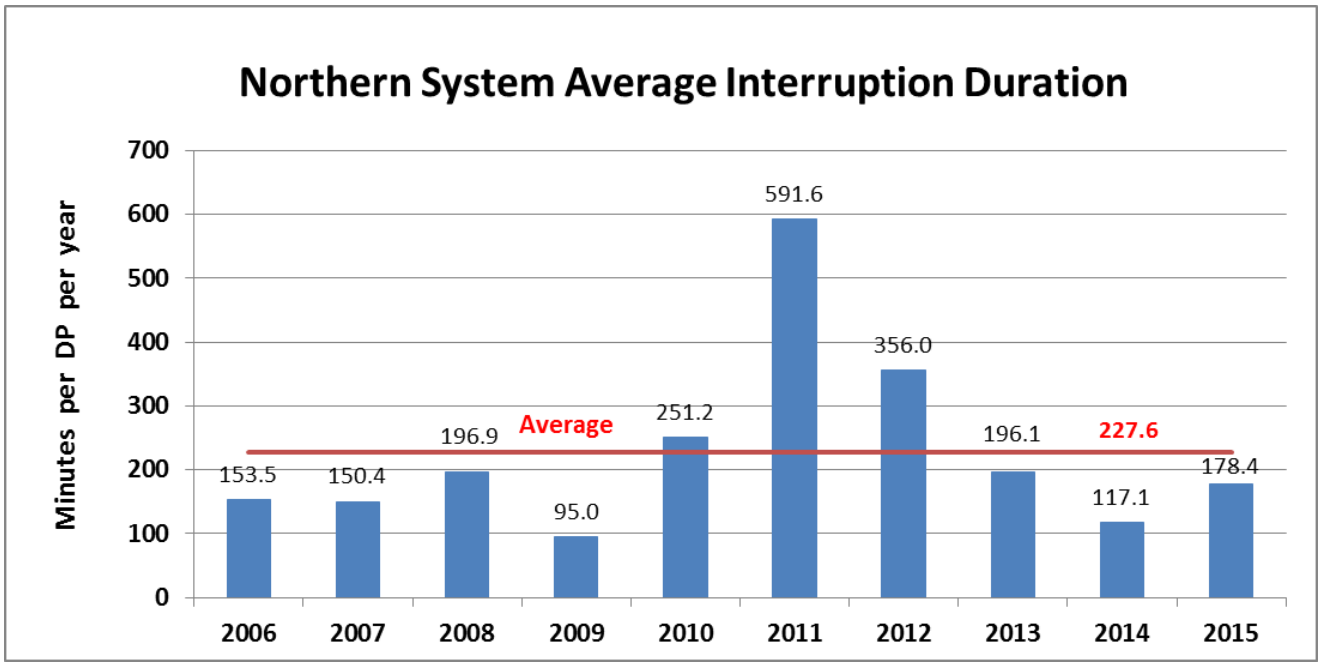




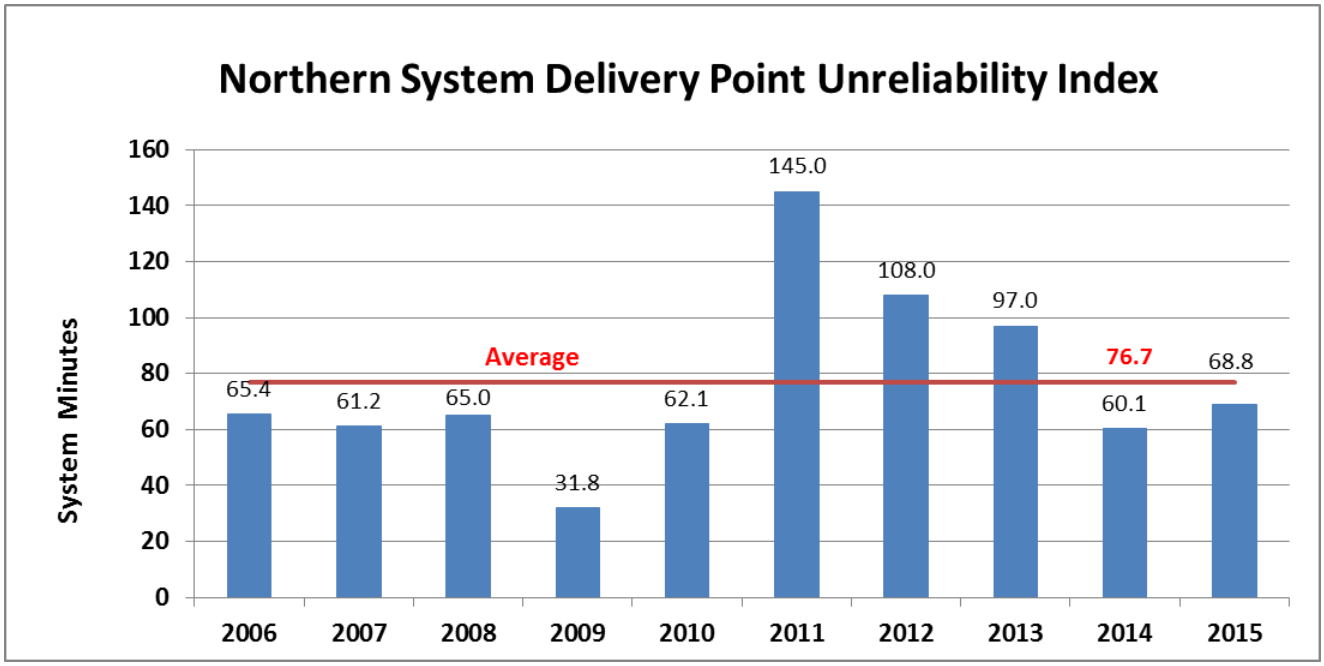
Witness: Scott McLachlan


Northern System Interruption Frequency - Overall
Interruptions per DP per year
5.0
4.0
3.0
2.0
1.0
0.0
4.38
4.29
4.29
3.03
3.24
3.24
3.66
3.81
2.66
3.47
Average
3.61
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

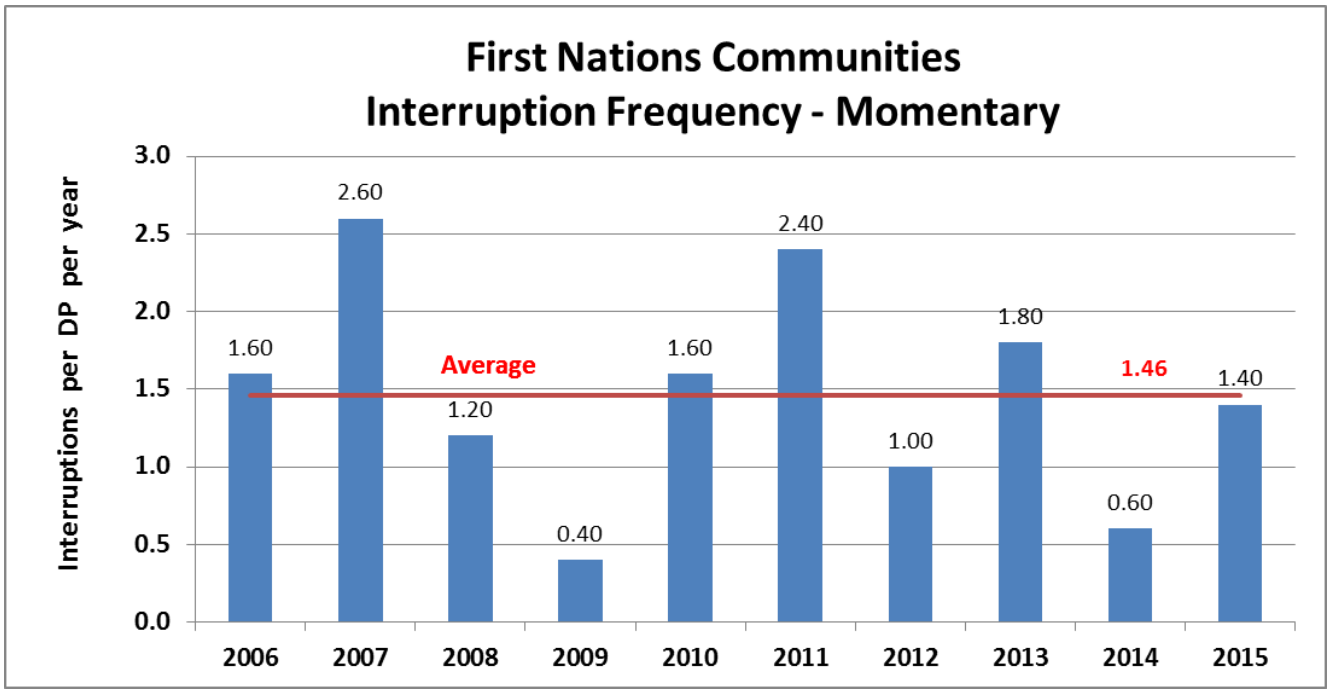
1

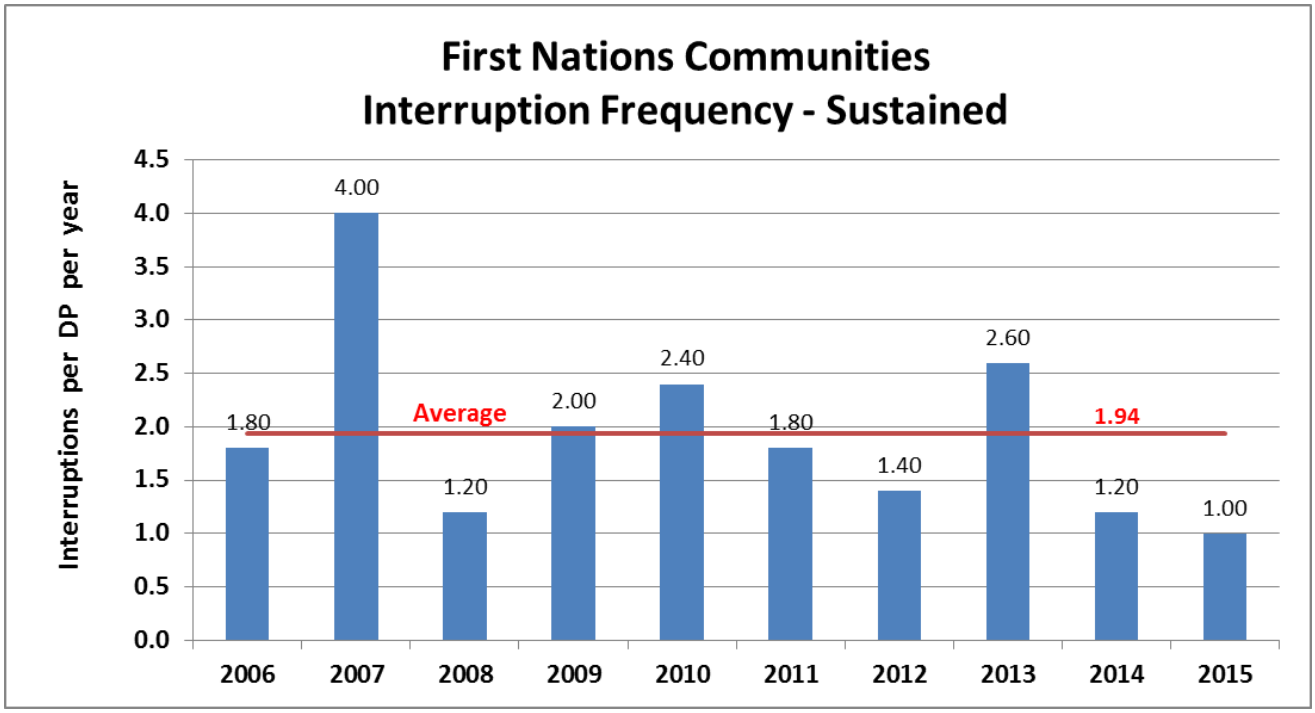

Northern System Average Interruption Duration
Minutes per DP per year
700
600
500
400
300
200
100
0
153.5
150.4
196.9
95.0
251.2
591.6
356.0
196.1
117.1
178.4
Average
227.6
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

2

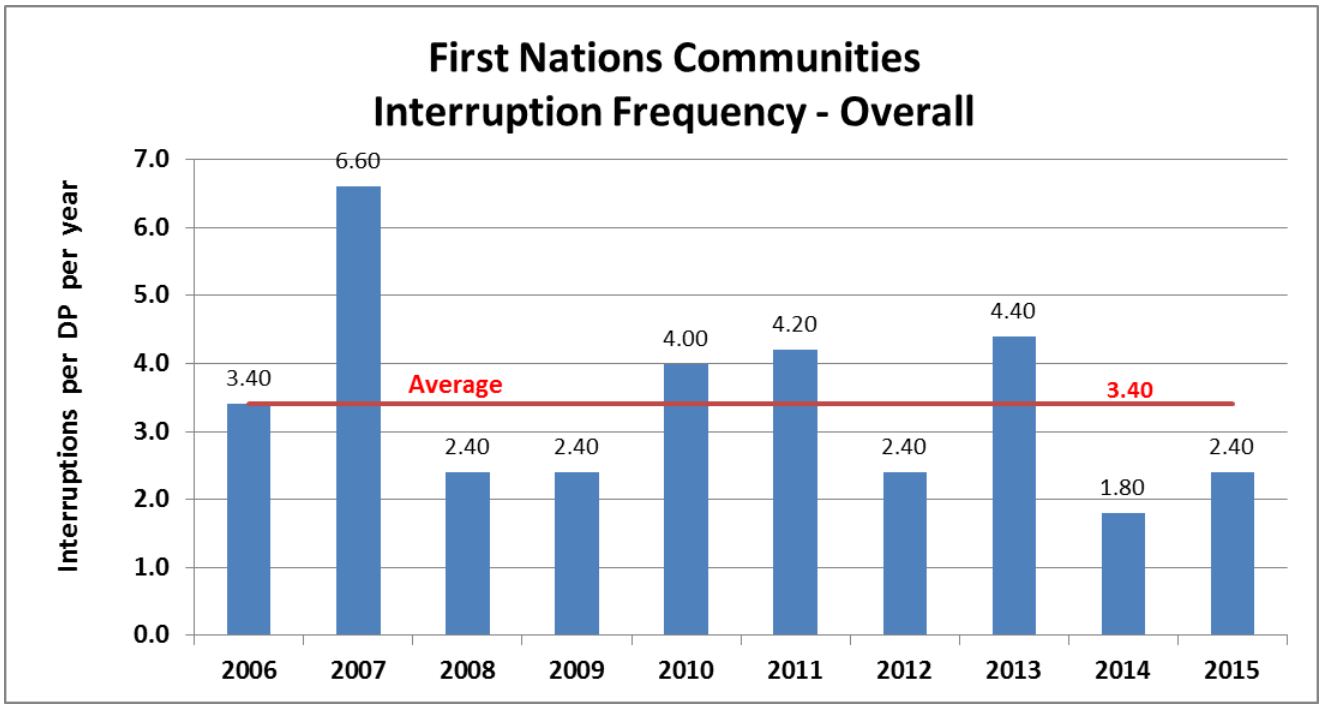


b) Transmission System Performance supplying First Nations Communities

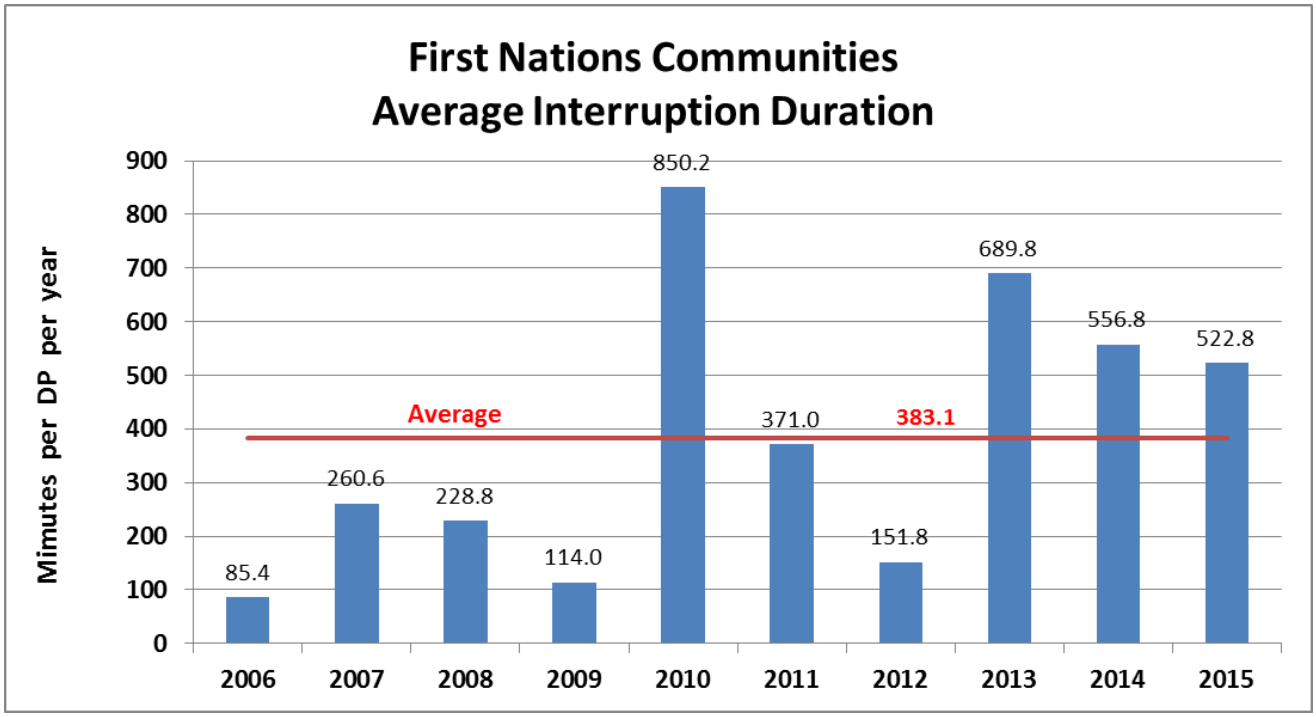



First Nations Communities
Interruption Frequency - Sustained
Interruptions per DP per year
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1.80
4.00
1.20
2.00
2.40
1.80
1.40
2.60
1.20
1.00
Average
1.94
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

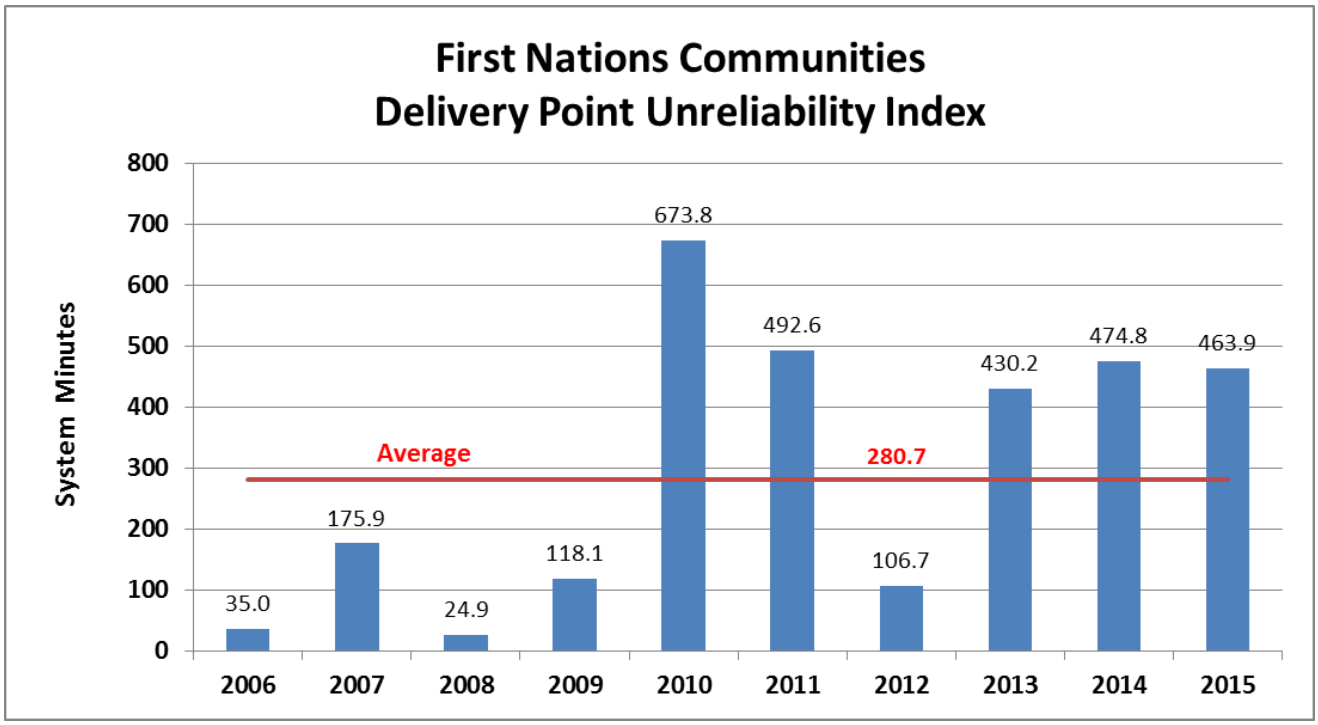
1


First Nations Communities
Interruption Frequency - Overall
Interruptions per DP per year
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
3.40
6.60
2.40
2.40
4.00
4.20
2.40
4.40
1.80
2.40
Average
3.40
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

2


First Nations Communities
Average Interruption Duration
Mimutes per DP per year
900
800
700
600
500
400
300
200
100
0
85.4
260.6
228.8
114.0
850.2
371.0
151.8
689.8
556.8
522.8
Average
383.1
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

1


First Nations Communities
Delivery Point Unreliability Index
System Minutes
800
700
600
500
400
300
200
100
0
35.0
175.9
24.9
118.1
673.8
492.6
106.7
430.2
474.8
463.9
Average
280.7
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

2

Anwaatin Inc. (Anwaatin) INTERROGATORY #005

Reference:

Exhibit B 1, Tab 1, Schedule 3, page 25 of 29
Exhibit B1, Tab 1, Schedule 3, Attachment 1
Office of the Auditor General of Ontario, 2015 Annual Report, Chapter 3: Reports on Value-for-money Audits, section 3.06 "Hydro One-Management of Electricity Transmission and Distribution Assets", pages 248-261 (Attachment 2)

Interrogatory:

Ontario's Auditor General (AG) found that Hydro One was not replacing assets it had determined were in very poor condition and at very high risk of failing and that it used these assets in successive rate applications to the Ontario Energy Board to justify and receive rate increases.

The AG further found that significant transmission assets beyond their expected service life were still in use and that Hydro One's distribution system was consistently one of the least reliable among large Canadian electricity distributors between 2010 and 2014 (pages 249; 260-261). The AG also found that 47% of Hydro One's transmission outages between 2010 and 2014 occurred in northern Ontario, even though fewer than 20% of Hydro One's delivery points are located there (page page 254). The AG further noted that:

"In Northern Ontario, 86% of the delivery points are single circuit supplied. As it is costly to build additional towers and lines, Hydro One does not attempt to convert rural single-circuit delivery points that serve fewer, or smaller, customers to multi-circuit delivery points because it does not consider it cost effective to do so, even if it would improve system reliability for these customers." (Page 254)

In EB-2013-0416, the Board also concluded that Hydro One's distribution investment planning does not yet appear to be properly aligned with the actual condition of its assets; that its vegetation management does not show sufficient efficiencies or productivity improvements; and that its productivity commitments do not show the company to have a strong enough orientation toward continuous improvement.

a) Please provide the following information for customers in the territory of Aroland First Nation, Moose Factory and Moosonee, Rocky Bay First Nation, Red Rock Indian Band, Geraldton, Nipigon and Beardmore areas:

Witness: Chong Kiat Ng

i. transmission system reliability trends plotted on a graph showing each of the last 1 0 years;

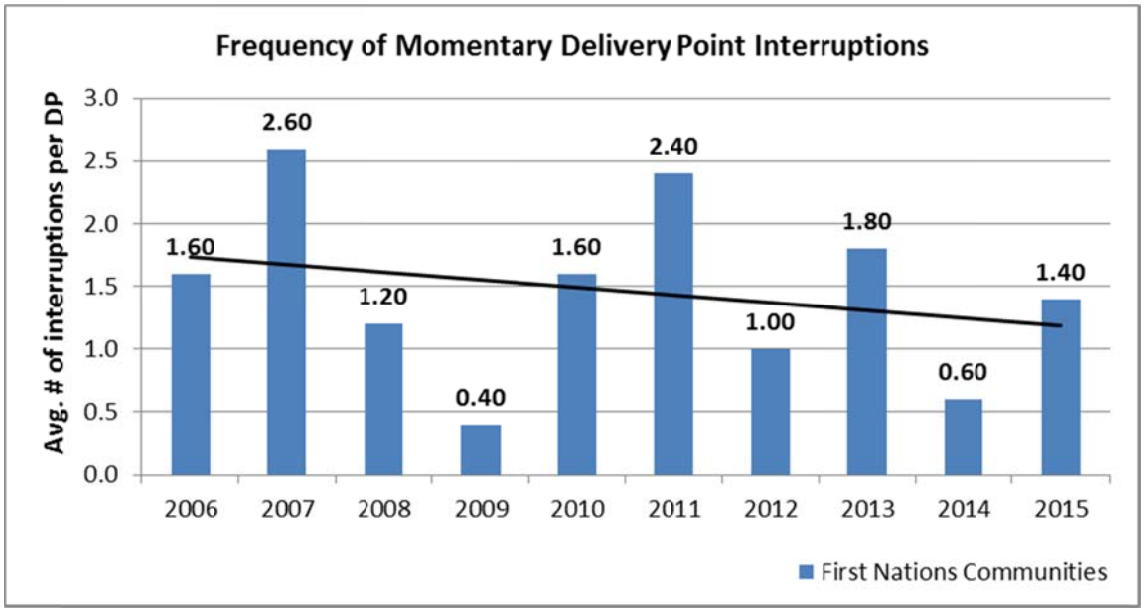
ii. the annual backlog, if any, of preventative maintenance for transmission lines, including vegetation management, plotted on a graph, showing each of the last 10 years;

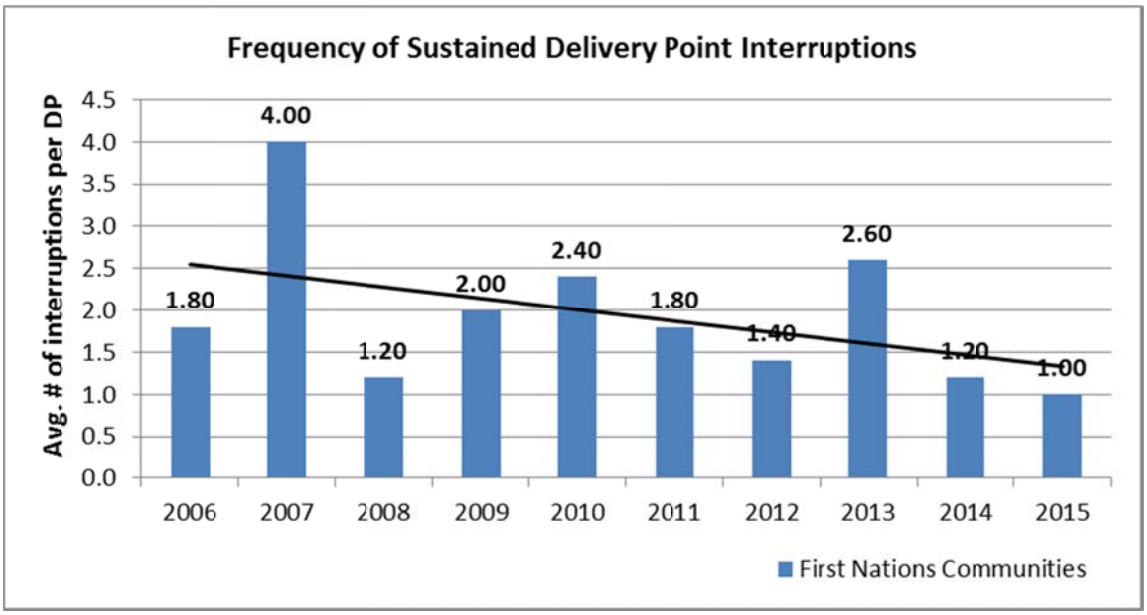
iii. please provide a list of any high risk assets in sub-optimal condition; and

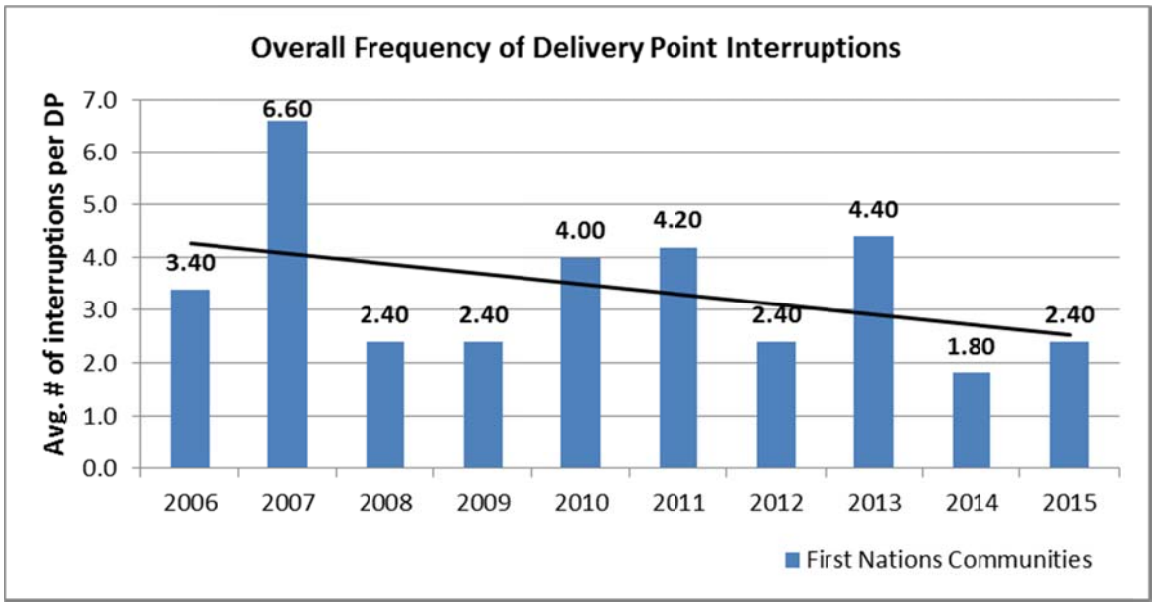
iv. a table showing a list of all of Hydro One's transmission assets, their age, their originally-anticipated replacement date and their actual or anticipated replacement date.

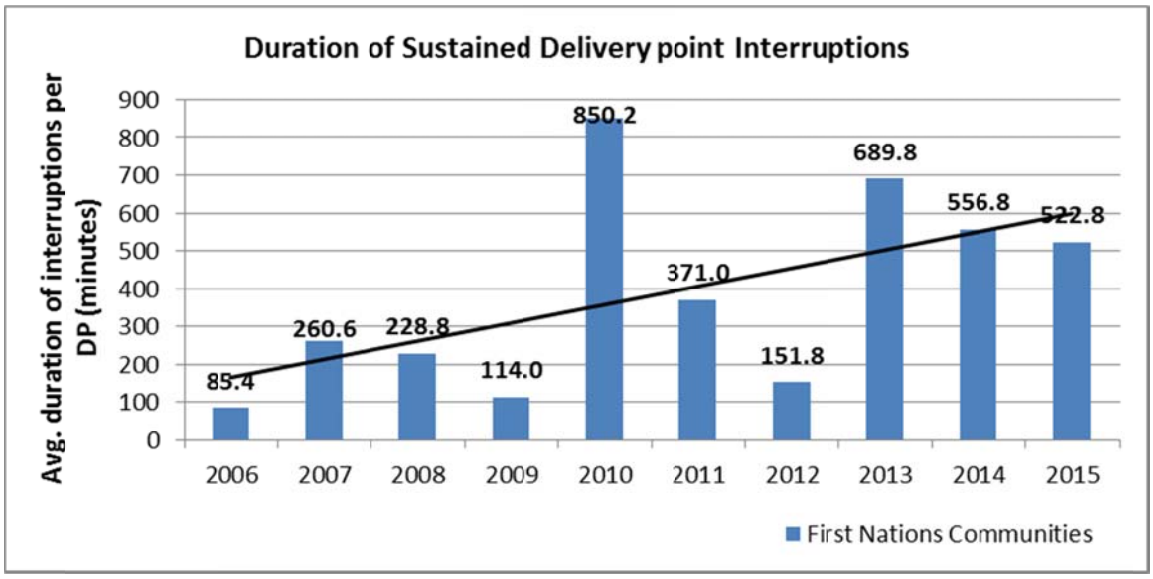
Response:

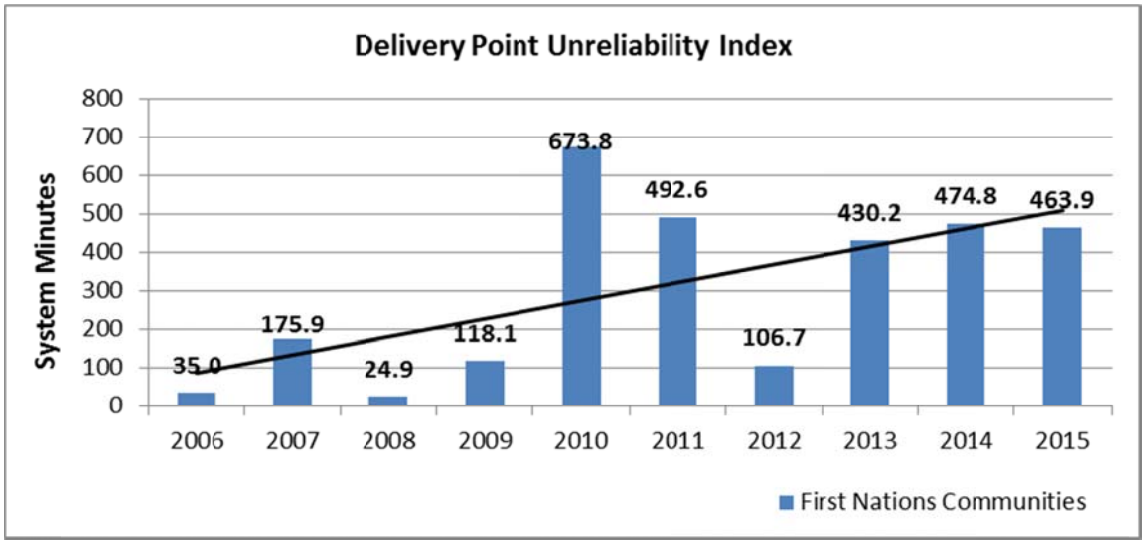
i. Following graphs provide transmission reliability performance and trends for five delivery points serving the identified territories.




Frequency of Sustained Delivery Point Interruptions
Avg. # of interruptions per DP
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1.80
4.00
1.20
2.00
2.40
1.80
1.40
2.60
1.20
1.00
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
First Nations Communities


Overall Frequency of Delivery Point Interruptions
Avg. # of interruptions per DP
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
3.40
6.60
2.40
2.40
4.00
4.20
2.40
4.40
1.80
2.40
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
First Nations Communities


Duration of Sustained Delivery point Interruptions
Avg. duration of interruptions per DP (minutes)
900
800
700
600
500
400
300
200
100
0
85.4
260.6
228.8
114.0
850.2
371.0
151.8
689.8
556.8
522.8
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
First Nations Communities


Delivery Point Unreliability Index
System Minutes
800
700
600
500
400
300
200
100
0
35.0
175.9
24.9
118.1
673.8
492.6
106.7
430.2
474.8
463.9
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
First Nations Communities

ii. The following table shows the status of all transmission lines preventative maintenance in the subject territories.

Maintenance Activity	Sub-Category	Status	Comments
Vegetation Management	All categories	Up-to-date	
Overhead Lines Maintenance	Helicopter Patrol	Up-to-date	
	Foot Patrol	Up-to-date	
	Thermovision	Up-to-date except for M9K & M3K	M9K & M3K are scheduled for thermovision in 2017
	Detailed Helicopter Inspection	Up-to-date	
Overhead Lines Condition Assessment	Conductor	28.3% require assessment	The system wide conductor assessment need is 31%
	Wood pole	1.4% require assessment	The system wide pole assessment need is 6%

iii. There are no high risk transmission class transformers that supply customers in the territory of Aroland First Nation, Moose Factory and Moosonee, Rocky Bay First Nation,Red Rock Indian Band, Geraldton, Nipigon and Beardmore.

Approximately 70 km of line is near end-of-life and is being targeted for refurbishment in the next 5 years.

iv. The below table shows a list of all of Hydro One's transmission assets, their age, their originally-anticipated replacement date and their actual or anticipated replacement date.

Hydro One's Transmission Asset	Age (Year)	Original/Anticipated Replacement Date	Actual / Plan Replacement Date
Longlac TS			
Power Transformer -T2	5	2010	2011
Power Transformer - T3	5	2010	2011
Breaker -116M1	5	2010	2011
Breaker -116M2	5	2010	2011
Breaker - SC1Z	5	2010	2011
Breaker - SC2Z	5	2010	2011
M2 feeder protection	5	Beyond 2018	Beyond 2018
Moosonee SS			
M9K A protection	9	Beyond 2018	Beyond 2018
M9K B protection	9	Beyond 2018	Beyond 2018
OtterRapid SS			
Breaker -L6L7	9	2005	2007
Breaker -L6L8	6	2005	2010
Alexander SS			
A4L A protection	24	2017/2018	
A4L B protection	15	2017/2018	
A6P A protection	15	2017/2018	
A6P B protection	14	2017/2018	
HL6 BF protection	19	2017/2018	
L5L6 BF protection	19	2017/2018	

Hydro One's Transmission Asset	Age (Year)	Original/Anticipated Replacement Date	Actual / Plan Replacement Date
Port Arthur TS			
Power Transformer -T1	42	Beyond 2018	Beyond 2018
Power Transformer - T2	42	Beyond 2018	Beyond 2018
Breaker -2A6P	62	Beyond 2018	Beyond 2018
Breaker -2L3P	70	Beyond 2018	Beyond 2018
Breaker -2L4P	70	Beyond 2018	Beyond 2018
Breaker -2P1P	66	Beyond 2018	Beyond 2018
Breaker -2P1T	68	Beyond 2018	Beyond 2018
Breaker -2P3B	63	Beyond 2018	Beyond 2018
Breaker -2P5M	64	Beyond 2018	Beyond 2018
Breaker -2P7B	64	Beyond 2018	Beyond 2018
Breaker -BY	65	Beyond 2018	Beyond 2018
Breaker -M1-27	67	Beyond 2018	Beyond 2018
Breaker -M2	64	Beyond 2018	Beyond 2018
Breaker -M3	64	Beyond 2018	Beyond 2018
Breaker -M4	68	Beyond 2018	Beyond 2018
Breaker -M5	67	Beyond 2018	Beyond 2018
Breaker -M6	68	Beyond 2018	Beyond 2018
Breaker -T1B	59	Beyond 2018	Beyond 2018
Breaker -T2B	59	Beyond 2018	Beyond 2018
A6P A protection	16	Beyond 2018	Beyond 2018
A6P B protection	18	Beyond 2018	Beyond 2018
2A6P BF protection	47	Beyond 2018	Beyond 2018

Elliot Lake TS			
Power Transformer -T1	59	Beyond 2018	Beyond 2018
Power Transformer - T2	68	Beyond 2018	Beyond 2018
Power Transformer - T3	20	Beyond 2018	Beyond 2018
Breaker -M1	61	Beyond 2018	Beyond 2018
Breaker -M2	66	Beyond 2018	Beyond 2018
Breaker -M3	35	Beyond 2018	Beyond 2018

1

Hydro One's Transmission Asset	Average Age (Year)	Original/Anticipated Replacement Date	Actual / Plan Replacement Date
M9K circuit/conductor	41	2045 (ESL of 70 years)	
M3K circuit/conductor	12	2074 (ESL of 70 years)	
A4L circuit/conductor	74	2012 (ESL of 70 years)	A portion of this line is scheduled for refurbishment in 2017-2022 business plan. Some sections require assessments
T1B circuit/conductor	63	2023 (ESL of 70 years)	Requires assessment
56M1 circuit/conductor	19	2067 (ESL of 70 years)	
57M1 circuit/conductor	19	2067 (ESL of 70 years)	

UNDERTAKING – TCJ2.10

Undertaking

To fill out this table to give an indicator of the anticipated date for asset replacement in the future. Also, to include the expected service life of those assets in that table.

Response

The table below provides a list of all of Hydro One's transmission assets, their age, their originally-anticipated replacement date and their actual or anticipated replacement date.

In responding to Anwaatin IR#5, Hydro One provided info on "Original/Anticipated Replacement Date" and "Actual/Plan Replacement Date". The "Original/Anticipated Replacement Date" is referring to previously planned replacement dates. The "Actual/Plan Replacement Date" is referring to actual date when the replacement took place. The table below consolidates the info and simplifies the presentation.

Hydro One's Transmission Asset	Age (Year)	Expected Service life	Recent Replacement Or Planned Replacement Date
Longlac TS			
Power Transformer -T2	5	50	2011
Power Transformer - T3	5	50	2011
Breaker -116M1	5	40	2011
Breaker -116M2	5	40	2011
Breaker - SC1Z	5	40	2011
Breaker - SC2Z	5	40	2011
M2 feeder protection	5	20	2011
Moosonee SS			
M9K A protection	9	20	No near term plan to replace
M9K B protection	9	20	No near term plan to replace
OtterRapid SS			
Breaker -L6L7	9	40	2007
Breaker -L6L8	6	40	2010
Alexander SS			
A4L A protection	24	20	2018
A4L B protection	15	20	2018

Witness: Chong Kiat Ng

Hydro One's Transmission Asset	Age (Year)	Expected Service life	Recent Replacement Or Planned Replacement Date
A6P A protection	15	20	2018
A6P B protection	14	20	2018
HL6 BF protection	19	20	2018
L5L6 BF protection	19	20	2018
Port Arthur TS			
Power Transformer -T1	42	60	2021
Power Transformer - T2	42	60	2021
Breaker -2A6P	62	55	2021
Breaker -2L3P	70	55	2021
Breaker -2L4P	70	55	2021
Breaker -2P1P	66	55	2021
Breaker -2P1T	68	55	2021
Breaker -2P3B	63	55	2021
Breaker -2P5M	64	55	2021
Breaker -2P7B	64	55	2021
Breaker -BY	65	55	2021
Breaker -M1-27	67	55	2021
Breaker -M2	64	55	2021
Breaker -M3	64	55	2021
Breaker -M4	68	55	2021
Breaker -M5	67	55	2021
Breaker -M6	68	55	2021
Breaker -T1B	59	55	2021
Breaker -T2B	59	55	2021
A6P A protection	16	25	2021
A6P B protection	18	25	2021
2A6P BF protection	47	45	2021
Elliot Lake TS			
Power Transformer -T1	59	40	2024
Power Transformer - T2	68	40	2024
Power Transformer - T3	20	40	2024
Breaker -M1	61	55	2024
Breaker -M2	66	55	2024
Breaker -M3	35	55	2024

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Hydro One's Transmission Asset	Average Age (Year)	Expected Service life	Recent Replacement Or Planned Replacement Date
M9K circuit/conductor (Less than 1 km)	41	70	No near term plan to replace
M3K circuit/conductor (Recently was bought by First Nation)	12	70	No near term plan to replace
A4L circuit/conductor (153 km)	74	70	70 km in 2021*
T1B circuit/conductor (65 km)	63	70	Requires assessment
56M1 circuit/conductor (8 km)	19	70	No near term plan to replace
57M1 circuit/conductor (5 km)	19	70	No near term plan to replace

*A4L circuit is about 153 km. 70 km of this circuit is secluded for a complete line refurbishment in 2021. 55 km of the circuit has been assessed and no line refurbishment is required in the foreseeable future. The remaining 28 km of the circuit requires assessment.