

INDEPENDENT ASSESSMENT OF THUNDER BAY HYDRO ELECTRICITY DISTRIBUTION INC. SYSTEM RENEWAL CAPITAL REQUIREMENTS

Review Based on the Asset Condition Assessment
Report by Kinectrics and Thunder Bay Hydro's
Distribution System Plan



May 11, 2017

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EXECUTIVE SUMMARY

I was retained by Thunder Bay Hydro Electricity Distribution Inc. (TBHEDI) to review its Distribution System Plan (DSP) with a particular focus on System Renewal investments in the test year. The review was primarily aimed at evaluating how and to what extent the results of Asset Condition Assessment (ACA) study performed for TBHEDI by Kinectrics Inc. (Kinectrics) were incorporated in establishing TBHEDI's System Renewal capital needs as presented in the TBHEDI's DSP.

I was also asked to perform a high level brief overview of TBHEDI's DSP compatibility with the OEB's Filing Requirements for Electricity Transmission and Distribution Applications Chapter 5 "Consolidated Distribution System Plan Filing Requirements" (Chapter 5).

In addition to reviewing TBHEDI's ACA report and DSP, I benchmarked some of the TBHEDI's OEB prescribed measures against several comparable Ontario's Local Distribution Companies (LDCs). I also compared useful life values used in the Kinectrics ACA study for TBHEDI's assets with that in the OEB publication entitled "Asset Deprecation Study for the Ontario Energy Board" issued on July 8, 2010.

The following report is structured to address the seven (7) specific questions related to the methodology I used in my assessment, as per instructions from the lawyer for TBHEDI Mr. John A.D. Vellone contained in *Appendix A*.

Based on my review of TBHEDI's System Renewal expenditure requirements as presented in the DSP, I have concluded that the ACA study findings were properly incorporated in the development of System Renewal Capital investments portfolio while striking a balance between addressing the backlog of assets identified in the ACA report as being in "poor" and "very poor" condition and avoiding an undesired significant increase in System Renewal investment level.

It is important to note that the final System Renewal budget for 2017 was not directly and exclusively derived from the Health Index distribution in the ACA report (the relationship is described in detail in the body of this report). Furthermore, although condition based needs represent an important input in developing System Investment capital requirements, there are other factors that are taken into account when deciding on appropriate System Renewal level, such as physical obsolescence, functional obsolescence, compliance with standards, municipal initiatives, and corporate considerations, e.g. financial constraints, input from customers, safety and environmental concerns, etc.

Although increase in System Renewal investments is expected to result in improved reliability it is not possible to quantify such an improvement due to many unknown factors that contribute to supply interruptions to customers.



Based on my high level overview of the DSP I have concluded that the DSP structure is well aligned with the Chapter 5 requirements.

INTRODUCTION AND BACKGROUND

Background

In 2015 TBHEDI hired Kinectrics to perform ACA study that resulted in the ACA report submitted to TBHEDI by Kinectrics in 2016. I was a major contributor to this project, including preparing the proposal, participating in all face-to-face meetings between Kinectrics and TBHEDI in Thunder Bay throughout the project execution, and developing the ACA report's structure and contents. The results of this report formed one of the important inputs in developing TBHEDI's System Renewal requirements. In 2017, I was hired by TBHEDI and instructed to provide testimony as an independent expert witness at the OEB hearing regarding their Rate Application EB-2016-0105 with a particular focus on 1) providing opinion regarding appropriateness of their System Renewal investment levels presented in the DSP and 2) compatibility of the System Renewal programs with the recommendations in the Kinectrics ACA report. I was also asked to provide a high level overview of the DSP compatibility with the Chapter 5 requirements.

My role at Kinectrics is to lead the Asset Management line of business and under my direct supervision Kinectrics has successfully completed a number of Asset Management projects, including ACAs, for numerous utilities across North America. I am the Canadian representative at the CIGRE Study Committee SC1 as well as the Asset Management Convener. I have taught Asset Management courses for many utilities in North America as well as in Asia and the Middle East.

My detailed resume and particulars of my education and professional affiliations are provided in *Appendix B*.

A list of my publications in the Asset Management area is provided in *Appendix C*.

I acknowledge and provide a signature confirming that my testimony at the OEB hearing will be in accordance with the OEB's section 13 of the Rules of Practice and Procedure and Form A (*Appendix D*).

Report Structure

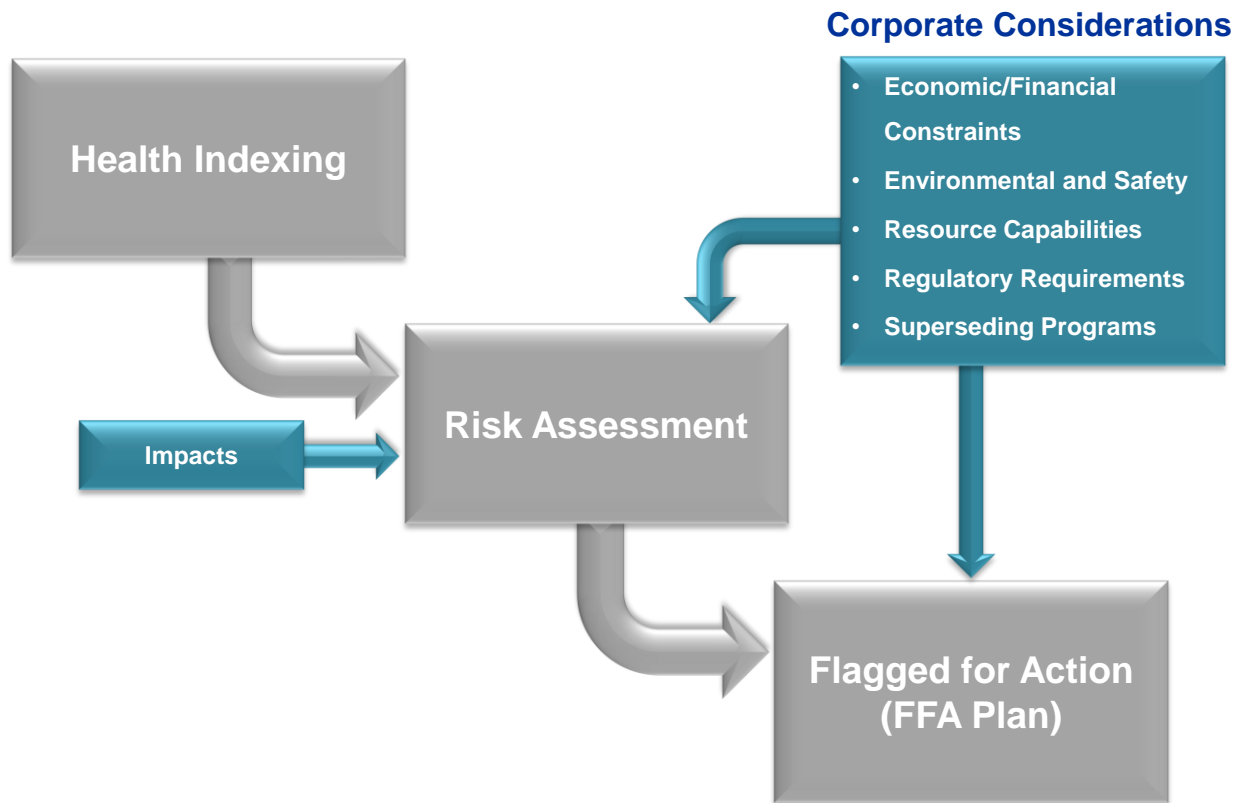
This report is based on seven (7) specific questions related to assessing appropriateness of TBHEDI's System Renewal investments level in the test year. They are contained in the letter to me from Mr. John A.D. Vellone, lawyer for the TBHEDI at this hearing (*Appendix A*). The seven sections are listed below corresponding to the headings of the attached report:

1. Methodology Used in Forming the Opinion
2. Benchmarking Considerations
3. Impact on Reliability
4. Impact on O&M
5. Government-mandated obligations
6. Compatibility with Kinectrics ACA Study Results
7. Compatibility of the DSP with Chapter 5 Requirements

1. METHODOLOGY USED IN FORMING THE OPINION

The diagram in Figure 1 shows the process steps used by Kinectrics in performing ACA:

Figure 1 – Kinectrics ACA Process



As seen in the diagram, the process involves 3 phases:

Determining Condition of Assets Using Health Indexing Approach

Kinectrics Health Indexing (HI) formulas have been widely accepted by the OEB and other utilities in Canada and USA and are based on “hands on” experience and the resultant intimate understanding of behaviour and ageing of electrical power equipment by Kinectrics staff: Kinectrics is a premier Canadian consulting firm which has been providing laboratory and field testing, incident investigations and post-mortem analysis involving all transmission and distribution assets for utilities across the world. Kinectrics HI approach is included in CIGRE publications and is used by one of the biggest ACA platform providers in the world, ABB.

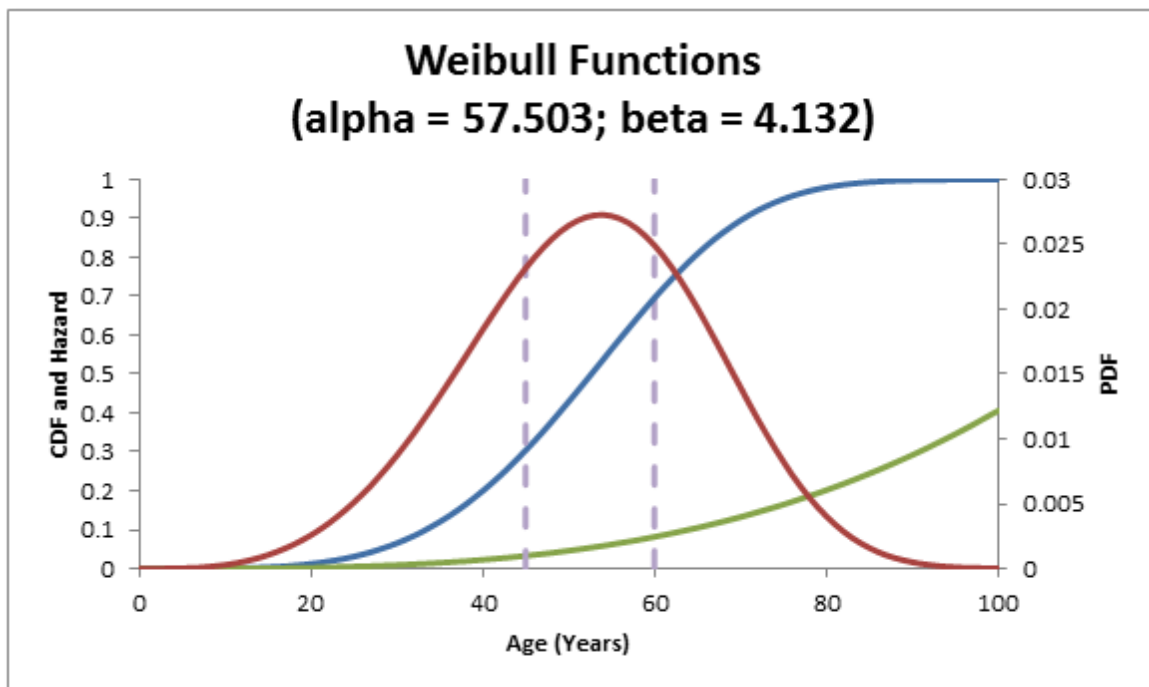
Condition of assets is quantitatively expressed in terms of HI score on the scale from 0 (end-of-life) to 100 (brand new) and was calculated using TBHEDI-specific Kinectrics formulas based on available condition data and information, such as test results, inspections and corrective

maintenance records, loading and age. The ACA report included in Exhibit 2, Attachment 2B, provides details of HI distribution for the TBHEDI's assets considered in the ACA study.

Risk Assessment

The Figure 2 below shows Weibull curves used extensively in electrical utilities business to estimate relationship between HI score of individual assets and the corresponding Rate of Failure.

Figure 2 - Weibull Probability of Failure Curves



Failure density curve (the red curve) is first generated using removal statistics and then the rate of failure curve (the green curve) and probability of failure curve (the blue curve) are derived from the failure density curve. TBHEDI, like most other utilities, did not have sufficient removal statistics records required to generate the curves, so instead assumptions based on the experience of the TBHEDI's staff regarding typical useful life and extreme useful life of various assets were used to generate these curves. This is common practice amongst utilities who do not currently have removal statistics available. It is expected that going forward TBHEDI will start collecting removal information so that the risk assessment phase of the ACA process will improve in the future.

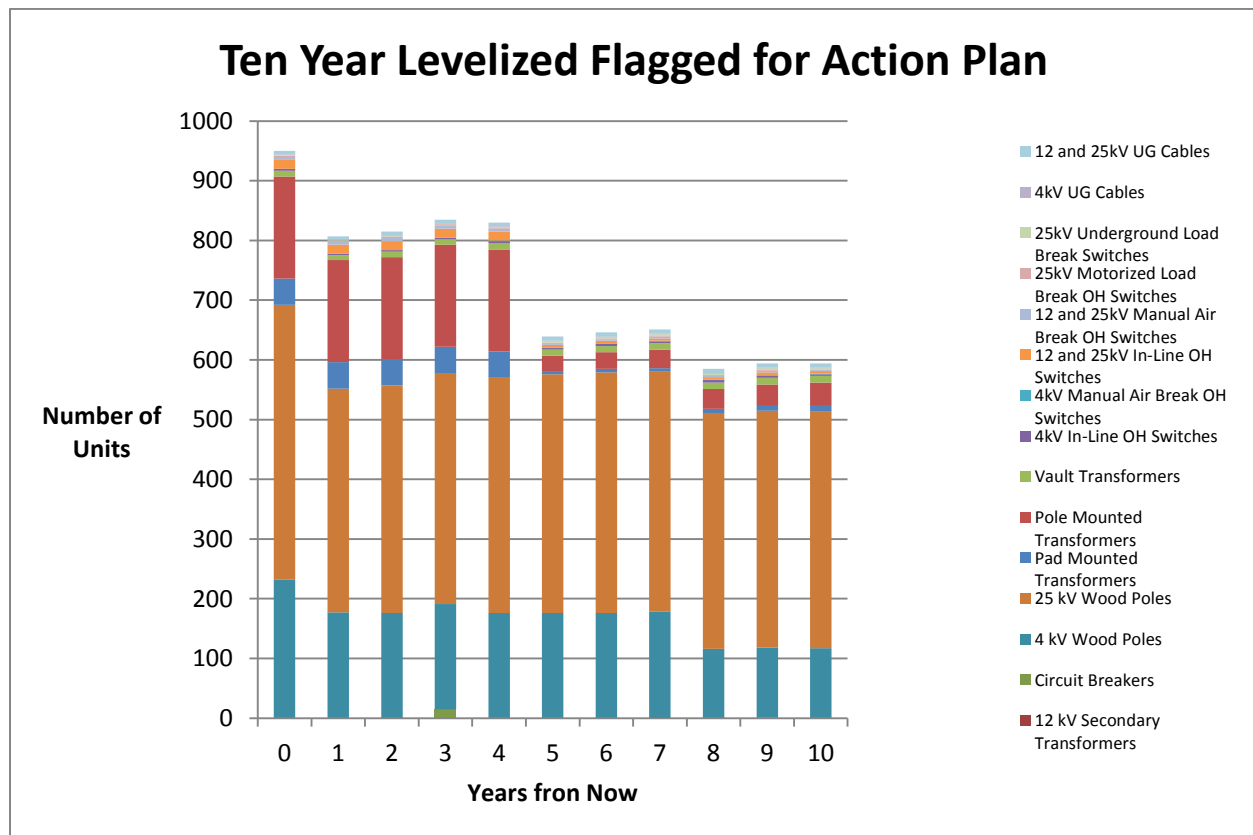
Flagged-for-Action Plan (FFAP)

Rather than using the term "Replacement Plan", FFAP was used because replacement is NOT the only option available when asset is found to be in a poor condition. For example some assets that are typically replaced proactively or before they fail are station transformers, circuit breakers and wood poles. Rather than replacement there are a number of actions that could be taken, such as

refurbishment, more frequent inspections, specific operating procedures, increased spare equipment inventory, etc.

By its nature forecasting future capital needs is a probabilistic process that requires consistent approach based on sound assumptions and available actual data and information. Furthermore, since not all units with the same HI score will fail at the same time, rate of failure was used to estimate the number of units that are expected to fail (for the assets run to failure) or units close to the end-of-life (for assets typically replaced before they fail). Such an approach in developing FFAP is far superior to simply using age and/or historical replacement rates for forecasting future condition based requirements. Figure 3 below shows the overall TBHEDI's FFAP based on the ACA study results.

Figure 3 – TBHEDI's 10-Year FFAP



Relationship between FFAP and System Renewal Investments

FFAP is an input in identifying a number of units within each asset category that require attention based on their condition and associated failure rate. Utility then establishes what the appropriate action is on a case-by-case basis to translate FFAP into condition based System Renewal requirements. This, however, represents only the condition based portion of the System Renewal investments. There are also other drivers that contribute to the System Renewal requirements,



such as physical obsolescence, functional obsolescence, compliance with standards, municipal initiatives, and corporate considerations, e.g. financial constraints, input from customers, safety and environmental concerns, etc.

Section of this report entitled “6. Compatibility with Kinectrics ACA Study Results” explains how condition based portion of the System Renewal investments incorporated finding from the Kinectrics ACA report.

2. BENCHMARKING CONSIDERATIONS

Comparison of TBHEDI's Performance with Selected LDCs

I compared TBHEDI's reliability and cost performance with that of the OEB defined peer group of 4 LDCs using 2015 OEB data (the latest data available) and the comparison is shown in the Figure 4, Figure 5 and Figure 6 below.

Figure 4 – Benchmarking TBHEDI's 2015 Reliability

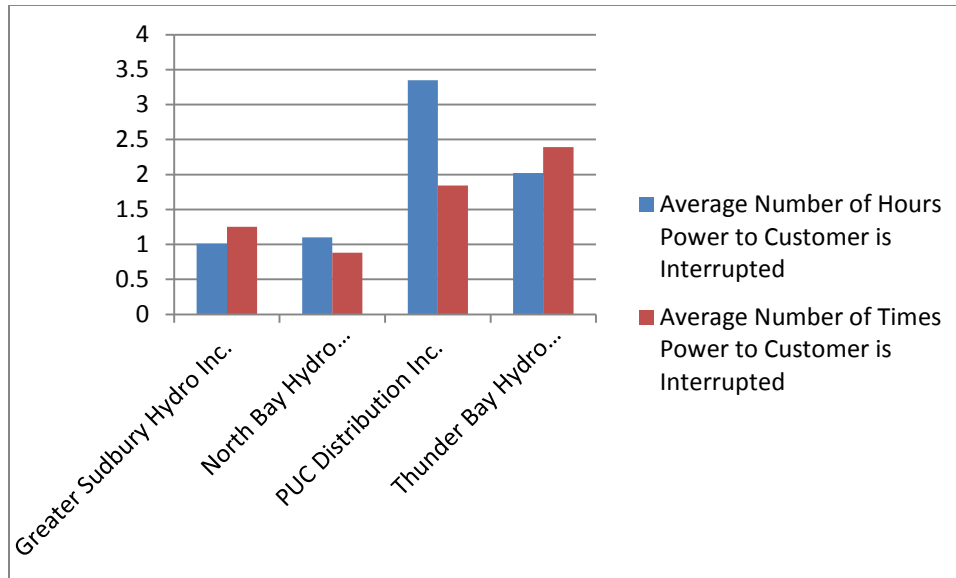


Figure 5 – Benchmarking TBHEDI's Costs Per Customer

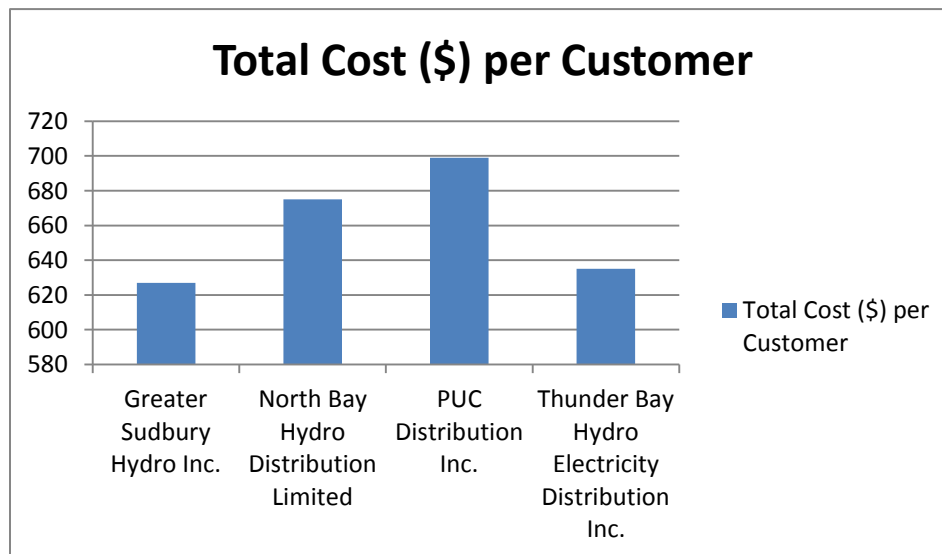
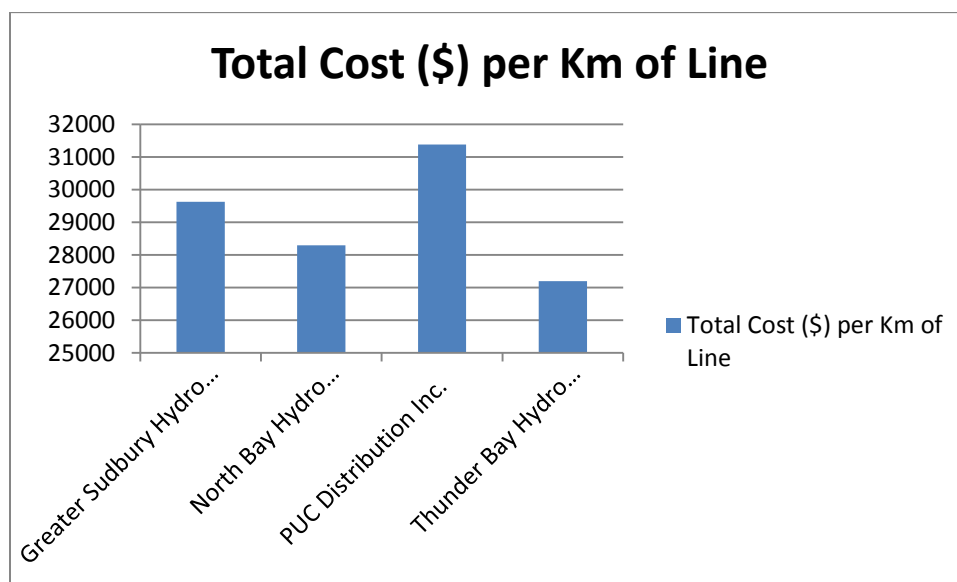


Figure 6 – Benchmarking TBHEDI's Cost per Line km


It is seen from the graphs that TBHEDI's *cost per customer* is on a low side (within 1% from the lowest cost but almost 10% lower than the highest cost and about 6% lower than the second highest cost for the peer LDCs). The TBHEDI's cost per km of line is the lowest (more than 13% lower than the highest cost and about 4% lower than the second lowest cost for the peer LDCs).

At the same time, the comparison shows that TBHEDI's *average number of hours power to customers was interrupted* was second highest (almost double of the lowest and second lowest numbers for the peer LDCs) while *average number of times the power to customers was interrupted* was the highest among the peer LDCs (almost 3 times as high as the lowest number and about 30% higher than the second highest number).

Since most of the equipment caused outages are due to line components failures and TBHEDI spends the least amount per line km and close to the lowest cost per customer among the peer LDCs while experiencing by far the highest number of outage frequency rate and second highest outage duration rate, it could be concluded based on this benchmarking that TBHEDI is underspending on its line assets.

Comparison of Useful Life Values used in the ACA Report with OEB Guideline

Table 1 below provides a comparison of Typical Useful Life (TUL) and Maximum useful Life (Max UL) used in the Kinectrics ACA study with the values provided as a guideline in the OEB's publication "Asset Deprecation Study for the Ontario Energy Board" issued on July 8, 2010.

Table 1 – Comparison of TBHEDI's Useful Lives with OEB Guideline Values

Asset Category	TBHEDI		OEB	
	TUL	Max UL	TUL	Max UL
Station Transformers	60	70	45	60

Circuit Breakers	60	70	45	65
Wood Poles	60	75	45	75
Painted Wood Poles	45	60	N/A	N/A
Pad Mounted Transformers	35	45	40	45
Pole Mounted Transformers	50	65	40	60
Vault Transformers	40	55	35	45
Overhead Switches	45	60	45	55
Non-TR Underground Cables	35	55	25	30
TR Underground Cables	40	60	40	55

It is seen from this comparison that in the Kinectrics ACA study TBHEDI's assets were assumed to last longer than the OEB's guideline values and, thus, the results of the ACA report were derived using conservative assumptions regarding assets useful lives. This means that if TBHEDI's TULs were assumed to be shorter, e.g. in line with the OEB guideline, than the ACA study would have identified more units for the inclusion in the FFAP thus resulting in higher System Renewal requirements.

3. IMPACT ON RELIABILITY

It was observed in the previous section “2. Benchmarking Considerations” that based on the comparison with similar Ontario LDCs TBHEDI’s average outage duration and average number of interruptions per customer are higher than for the sample LDCs while the cost per km of line is lower. Increasing investments in lines assets, specifically initiating programs to proactively replacing 25 kV wood poles and 12 and 25 kV underground cables, is expected to increase overall reliability of supply to customers

When electrical assets at the end-of-life are replaced by brand new assets since these new assets have lower probability of failure than the assets they replaced and, as a result, the contribution to unreliability from these new assets will be less than from the asset they have replaced. However, for assets that are replaced proactively this may not be the case as they are usually replaced before reaching their end-of-life or before they failed.

In addition to the outages caused by equipment failures due to equipment at the end-of-life, there are also random equipment failures involving assets recently installed or at mid-life. In such cases equipment is replaced or repairs are made and equipment stays in service, yet such outages also contribute to unreliability and cannot be addressed proactively.

Finally, there are many factors that impact reliability performance, such as weather induced stresses, electrical faults, external causes (e.g. animals and drivers).

Therefore, although it could be stated qualitatively that increase in System Renewal investments aimed and proactively replacing line assets found to be in poor condition is expected to improve system reliability, it is not possible to quantify the amount of improvement.

4. IMPACT ON O&M

The increase in System Renewal capital in the test year addresses asset needs identified in the ACA report and involves initiating programs to start replacing proactively 25 kV poles and underground cables. Unlike substation assets, linear assets are not subjected to significant preventative maintenance and, thus, this capital increase will not result in a noticeable reduction in preventative O&M. At the same time renewing linear asset is expected to improve reliability and, as a consequence, is expected to reduce corrective O&M. It is worth noting that these planned replacements represent a much more efficient use of capital funds since planned replacement unit cost is always lower than forced replacement unit cost.

TBHEDI also intends to defer some of the voltage conversion programs due to the longer than expected life of 4 kV substation transformers and described their associated O&M strategy regarding the substations marked for voltage conversion on page 88 of the DSP as follows:

“Thunder Bay Hydro will delay O&M spending in areas that align with system renewal efforts, to the extent possible, where doing so will pose no safety or environmental hazard. This strategy is of particular importance in areas of voltage conversion. The O&M costs associated with maintaining substation assets are approximately \$15,000 per year per station. The final outcome of the conversion process is to decommission the substations, resulting in elimination of maintenance associated with that station. Thunder Bay Hydro maintains an annual listing of substations targeted for decommissioning. This strategy focuses on attempting to reduce or defer spending on those substations which are being decommissioned first while ensuring the substations that will be online the longest are being appropriately attended to.”

5. GOVERNMENT-MANDATED OBLIGATIONS

There are several government mandated obligations that could have an impact on capital requirements:

- Removal of equipment with over 50 ppm of PCB – would typically fall under System Renewal or System Access
- System enhancement to accommodate planned Renewable Energy Generation – would typically fall under System Access
- System enhancement to accommodate requirements from the Integrated Regional Resource Plan managed by IESO – would typically fall under System Access

Based on the information in the TBHEDI's DSP there is \$118,656 included in the System Access investment driver for PCB removal and no other capital expenditures identified to meet other government-mandated obligations.

6. COMPATIBILITY WITH KINETRICS ACA STUDY RESULTS

FFAP is an input in identifying a number of units within each asset category that require attention based on their condition and estimated failure rate. Utility then establishes what the appropriate action is on a case-by-case basis to translate FFAP into a condition based System Renewal investments. This, however, represents only the condition based portion of the System Renewal investments. There are also other drivers that contribute to the System Renewal requirements, such as physical obsolescence, functional obsolescence, compliance with standards, municipal initiatives, and corporate considerations, e.g. financial constraints, input from customers, safety and environmental concerns, etc.

FFAP from Kinectrics ACA report identified a number of units within each asset category requiring attention based on their condition and the corresponding failure rate. This represents condition driven asset requirements and as stated on page 52 of the DSP “Thunder Bay Hydro has revised its previous capital plan to harmonize with results of the Kinectrics report. In doing so, Thunder Bay Hydro considered the impact this shift would have on projects currently under execution, the impact to the current planning cycle, and the impacts to customers, the municipality and 3d party attachers.”

Specific areas of the System Renewal expenditures in the test year influenced by the ACA report finding were:

- Slowing down voltage conversion programs due to the longer than expected lives of substation transformers
- Putting in place a new proactive 25 kV wood poles replacement program
- Putting in place a new proactive underground cables replacement program
- Delaying to the extent possible O&M spending on some substation assets included in the voltage conversion plan

DSP states on pages 129-130 that “Thunder Bay Hydro has purposely taken a conservative approach and paced the shift in expenditures over a 3 year period to minimize cost impact to the customer and to complete work in progress. Specifically work in progress on 4kV conversion projects, where there are only one or two project areas prior to be completed, prior to decommissioning of a station. In addition, this change is a fundamental shift in philosophies, and requires changes in construction practices, scheduling and labor allocations. Allowing 3 years to become aligned will allow Thunder Bay Hydro the chance to implement these changes in the most cost effective manner.”

A comparison of FFAP numbers vs test year numbers for 25 kV wood poles and 12 and 25 kV underground cables are shown in the Table 2 below.

Table 2 – Comparison of Test Year and FFAP Proactive Replacements

Asset Category	FFAP	Test Year Plan
25 kV Wood Poles	460	193
12&25 kV Underground Cable	6 km	2.4 km

The numbers for the test year represent an increase from the 2016 since these programs were created in 2017 in response to the results from the ACA study. The test year planned quantities are , however, lower than the FFAP numbers and reflects 3-year time frame for implementing the changes in System Renewal category triggered by the ACA report results.

7. COMPATIBILITY OF THE DSP WITH CHAPTER 5 REQUIREMENTS

The main focus of my assessment was on various aspects associated with System Renewal expenditures. I have also performed a high level overview of the DSP to assess its compatibility with the Chapter 5 requirements. This overview was not as thorough as the assessment of the System Renewal planned expenditures and merely included checking whether the main areas prescribed by OEB have been addressed. Following are my observations:

- The DSP's structure followed the prescribed Chapter 5 format
- In putting together capital plans, TBHEDI engaged in consultations with:
 - Customers,
 - City of Thunder Bay,
 - Ministry of Transportation
 - Ministry of Environment
 - First Nations
 - Public Coordinating Committee
 - Third party attachers,
 - CDM program partners
 - IESO
- There are Performance Metrics in place to monitor DSP performance
- Decision making follows the Asset Management Framework
- DSP provides an overview of asset managed and their condition based on the Kinectrics ACA report
- Existing capital planning process includes prioritization
- No capital is required to integrate forecasted REG nor address system enhancements identified via IRRP process

Appendix A

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May 4, 2017

Delivered by Email

Yury Tsimberg
Director, Asset Management
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Attention: Mr. Tsimberg

Re: EB-2016-0105
Thunder Bay Hydro Expert Report

You have asked me to provide you with revised instructions on preparing a new expert report (the "**New Report**") following the Ontario Energy Board's (the "**Board's**") determination made on April 20, 2017 regarding your March 24, 2017 opinion letter (the "**Old Letter**").

The Board explained in its oral decision made April 20, 2017 that it could use more information in two regards.

First, Rule 13A.03(c) states that an expert's evidence shall, at a minimum, include:

the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;

The Board stated in its decision that its understanding of the instructions you have been provided as: "I was instructed to provide expert testimony at the OEB hearing particularly as it relates to the reasonableness of the capital investment levels requested under the system renewal category based on the findings of the Kinectrics 216 ACA study" and "I was hired by Thunder Bay to provide evidence in relation to Thunder Bay's 2017 rate application to the OEB."

The instructions you have been provided are detailed in the Old Letter as well as in the Kinectrics' proposal and the Thunder Bay Hydro purchase order, both of which are attached to this letter as Appendix "A" and "B" respectively. These instructions are now being supplemented by this letter to reflect the Board's oral decision made April 20, 2017. Our recommendation is that all of this information should be disclosed as an attachment to your New Report.

Second, Rule 13A.03(d) states that an expert's evidence shall, at a minimum, include:

the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;

The Board stated that “[t]he information that you would be filing should contain his opinions, what he looked at, and how he reached those opinions.” In particular, the Board will want to understand the underlying methodology that you used to arrive at your opinion.

In explaining your opinion and methodology, it will be helpful to consider Issue 1.1 in the Board’s Approved Issues List issued February 10, 2017, which states:

“1.1 Capital

Is the level of planned capital expenditures appropriate and is the rationale for planning and pacing choices appropriate and adequately explained, giving due consideration to:

- *customer feedback and preferences;*
- *productivity;*
- *compatibility with historical expenditures;*
- *compatibility with applicable benchmarks;*
- *reliability and service quality;*
- *impact on distribution rates;*
- *trade-offs with OM&A spending;*
- *government-mandated obligations;*
- *the objectives of Thunder Bay Hydro and its customers; and*
- *the five-year Distribution System Plan.”*

The “level of planned capital expenditures” proposed by Thunder Bay Hydro are detailed in Exhibit 2, pages 35-47 of the Application.

Your role, in accordance with Rule 13A.02 of the *Rules of Practice and Procedure*, is to assist the Board impartially by giving evidence that is fair and objective. Your evidence relates principally to Issue 1.1.

In explaining your methodology, particular attention should be given to explaining matters that are relevant to the Board’s decision making. Specifically:

1. To the extent that you assessed the compatibility of Thunder Bay Hydro’s planned capital expenditures in the test year with productivity, compatibility with historical expenditures, and rate impacts you should explain the methodology you used and how that methodology informed the opinion you provide.
2. To the extent that you assessed the compatibility of Thunder Bay Hydro’s planned capital expenditures in the test year with applicable benchmarks, you should explain what benchmarks you considered (such as industry standards, other utilities’ asset management plans, or otherwise), and your methodology, and how your review of those benchmarks informed the opinion you provide. To the extent you can comment on whether or not an average percentage of depreciation across the industry is an appropriate benchmark against which to assess Thunder Bay Hydro’s system renewal spending, this would be informative.
3. To the extent that you assessed the compatibility of Thunder Bay Hydro’s planned capital expenditures in the test year with reliability and service quality metrics, you should explain how these factors informed your opinion. To the extent you can comment on

whether or not an increase in capital spending in the test year can be causally or directly linked to increases in reliability or service quality metrics for the specific projects proposed by Thunder Bay Hydro, please provide your views on this topic as well.

4. To the extent that you considered potential trade-offs with OM&A spending, you should explain your considerations including how you concluded where such trade-offs may exist and where they may not.
5. To the extent you considered government-mandated obligations; you should explain what you considered and how these factors informed your opinion.
6. To the extent you assessed the compatibility of Thunder Bay Hydro's planned capital expenditures in the test year with the five-year Distribution System Plan (DSP) and the underlying Asset Condition Assessment (ACA), you should explain in detail how you linked the ACA to the DSP and ultimately to the test year capital budget so the Board understands the methodology that you used and the opinions you arrived at.
7. To the extent that you considered any other factors which I have failed to identify here, you should once again explain the factor you considered, what you examined and how you arrived at your opinion.

The deadline for filing the New Report with the Ontario Energy Board is May 15, 2017. Please treat this as a firm deadline as the Board needs to schedule subsequent procedural steps in the hearing based on this date.

To the extent it is helpful, in the footnotes below I've provided links to some sample expert reports on capital plans that have been filed with and accepted by the Ontario Energy Board to refer to as you prepare the New Report.¹ You might also want to make reference to other expert reports on unrelated topics which have been filed with and accepted by the Ontario Energy Board to get a sense of the different approaches different experts have taken in the past.²

Finally:

- Rule 13A.03(a) requires the New Report to include your name, business name, address and a description of your general area of expertise. The description of your general area of expertise is what is used to qualify you as an expert.

¹ See: http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/445473/view/THESL_CIR_Exh1B_20150115.PDF (starting at page 75 and at page 203)

² See: http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/521601/view/UNION_Evidence_20160321.PDF (starting at page 40 of the pdf)

http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/521545/view/EPCOR_%20Evidence_Sub_20160321.PDF

http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/521637/view/South%20Bruce_Todd%20Report_20160322.PDF

http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/521626/view/OGA%20_Evidence_20160321.PDF

http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/521615/view/VECC_EVIDENCE_%2020160321.PDF

- Rule 13A.03(b) requires the New Report to include a description of your qualifications, including your relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates. Attaching a full CV to the New Report which includes experience, education, publications, and any prior hearings you were involved with is advisable.
- Rule 13A.03(f) requires that the any expert report include an acknowledgement of the expert's duty to the Board in Form A to these Rules, signed by the expert. We would ask that a new Form A be completed, signed and appended to the New Report to reflect your continued acknowledgement of your ongoing duty in this regard.

Regards,

John A.D. Vellone

Appendix “A”

Kinectrics proposal

See attached.

KINECTRICS INC. QUOTATION

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Work Title: **Assistance with Thunder Bay Hydro OEB Oral Hearing**

Date: March 2, 2017
Page 1 of 3

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Authorizing Signature: 

Print Name: Yury Tsimberg

Services Offered and Schedule: Kinectrics Inc (Kinectrics) is pleased to offer the following services to Thunder Bay Hydro (TBH) related to the impending Ontario Energy Board (OEB) Oral Hearing regarding TBH's Rate Application:

1. Review TBH's Distribution System Plan (DSP) with the focus on decision making methodology regarding investment levels required to sustain and enhance the existing asset base.
2. Provide a letter to be filed with the OEB commenting on the reasonableness of the decision making approach for deciding on distribution system related investments magnitude and mix as outlined in the DSP
3. One day of witness training in Thunder Bay
4. One day of providing expert testimony at the oral hearing in support of the TBH's Rate Application

The assessment of the DSP is to be completed prior to the witness training on March 22d, 2017 and the letter with Kinectrics comments regarding the DSP is to be provided to TBH by the end of March, 2017.

The witness training is to take place on March 22d, 2017, and the OEB oral hearing is to take place on April 11, 2017.

Deliverables: 1. Reviewing and TBH's DSP

2. Preparing a letter summarizing Kinectrics opinion regarding the reasonableness of the TBH's approach in deciding on levels and mix of investments in their distribution system.
3. Participating in the witness training
4. Testifying at the OEB oral hearing on behalf of TBH on matters related to

Payment: Monthly progress billing, net 30 days.

Price before taxes-	15,000
Includes all travel costs	

Notice: Any notice to be sent to either Kinectrics or the Customer shall be sent to the addresses listed above. If to Kinectrics addressed to the Kinectrics Contact and if to Customer addressed to Customer Contact.

ACCEPTANCE OF QUOTATION

This Quotation, including the pricing and payment terms, is only valid until 4:00 pm Eastern Standard Time, March 16, 2017, (hereafter called the "Expire Time"). Upon acceptance of this Quotation by the Customer before the Expire Time, the Customer retains Kinectrics Inc. (Kinectrics) to perform the services described herein, pursuant to the **Quotation Standard Terms and Conditions**, attached hereto.

BY ISSUE OF THE CUSTOMER PURCHASE ORDER OR CONTRACT AGREEMENT TO KINECTRICS, THE CUSTOMER ACKNOWLEDGES THAT IT HAS READ AND HEREBY ACCEPTS THIS QUOTATION, INCLUDING KINECTRICS STANDARD TERMS AND CONDITIONS WHICH SHALL APPLY TO THIS TRANSACTION AND SHALL TAKE PRECEDENCE OVER ANY OTHER TERMS AND CONDITIONS CONTAINED IN THE CUSTOMER'S PURCHASE ORDER OR CONTRACT.

Purchase orders are to be faxed to 416-207-6192 or e-mailed to PO@Kinectrics.com

KINECTRICS – STANDARD TERMS AND CONDITIONS

1. **Acceptance:** Notwithstanding anything to the contrary contained in any other related document, the Customer accepts that this offer and any resulting contract shall be based solely on the terms and conditions contained herein ("Agreement") and no additional or different terms and conditions shall apply except as may be explicitly agreed in writing by the Parties. The Parties acknowledge that these terms and conditions may be for use with Kinectrics Inc. and all subsidiaries including Kinectrics North America, Inc., Kinectrics US Inc., Kinectrics International Inc., Kinectrics International Europe ApS, Kinectrics GmbH, Kinectrics International Inc. Sucursala Bucuresti and AXIOM N.D.T. Corporation ("Kinectrics") and that the applicable contracting entity will be defined in the purchase order. The Parties agree that only the Kinectrics entity specified in a purchase order will have liability in relation to this Agreement. This offer may be revoked by Kinectrics if the Customer's credit rating is not in good standing. In the absence of written acceptance of these terms and conditions by the Customer, either acceptance of, or payment for, the products or services will constitute the Customer's acceptance. The invalidity or unenforceability of any provisions of these terms and conditions shall not affect the validity or enforceability of any other provision of this Agreement, which shall remain in full force and effect.
2. **Services:** Kinectrics shall deliver to the Customer only those documents, reports, software, data or things (the "Services" or the "Deliverables") as specified in the scope of work and within the specified schedule. Additional Services may be agreed to in writing between the Parties. If Kinectrics cannot deliver the Services within the schedule, then Kinectrics shall inform the Customer of the expected completion date of the Services. Services which are experimental or research in nature may be subject to review by the Parties for a mutual decision on continuing the Services in the event anticipated results are not being achieved. Unless otherwise specified in writing by the Customer, draft and final reports will be sent to the Customer as an attached file to an electronic mail message.
3. **Customer Deliverables/Obligations:** The Customer shall provide Kinectrics with any information, materials, equipment, utility services, assistance, access to facilities and other necessities as may be required by Kinectrics to deliver the Services. Timely receipt by Kinectrics of the Customer's Deliverables shall be considered of essence to this Agreement. The Customer shall expeditiously review and/or inspect the Services and, unless otherwise agreed in writing between the Parties, the Customer will provide Kinectrics with a single round of consolidated comments on any Kinectrics' Deliverable. Following the completion of the Services, Kinectrics shall advise the Customer of any waste or surplus materials remaining or created pursuant to the Services. The Customer shall arrange, at its expense, for the disposition of such materials within two (2) months of such advice. Customer attendance at Kinectrics' work site, for any purpose, shall be entirely at the Customer's own risk. In the event the Customer provides any specifications or designs for products, Customer will indemnify Kinectrics for all claims, costs and expenses (including attorney's fees and disbursements) from any patent, trademark or copyright infringement claim resulting from compliance with these specifications and designs. Kinectrics will not be responsible for the accuracy or suitability of Customer supplied specifications and designs or the performance of any products built in conformance with the specifications or designs.
4. **Charges for Suspension/Delay/Cancellation ("Stoppage") by Customer:** In the event the Customer suspends, delays and/or cancels any Services, then applicable standby, dead time, demobilization, remobilization, non-cancellable commitments and/or facility charges will be invoiced to the Customer as additional to the contract price ("Additional Expenses"). In the event such unplanned Customer initiated Stoppage extends for a period in excess of twenty (20) working days, then the Customer shall also be invoiced for all work performed up to the date of such Stoppage, on a time/material basis or as a prorated fixed price whether or not any milestone remains incomplete due to such Stoppage ("Work Performed"). Invoices for Additional Expenses and Work Performed shall become due and payable by the Customer upon receipt.
5. **Payment:** Customer shall pay Kinectrics the invoiced amount within 30 days of the invoice date. Interest on overdue accounts shall be charged at the greater of (i) one and one half percent (1.5%) per month for a yearly effective rate of eighteen percent (18%) and (ii) the maximum amount permitted by applicable law, until paid. Payments by cheque from outside of Canada must be sent via courier at Customer's expense.
6. **Taxes:** Where applicable, Customer will pay all taxes, fees, duties, charges, or assessments of any nature whatsoever imposed by any governmental authority on or measured by the Services or any amount payable pursuant to this invoice. Customer will provide Kinectrics with all withholding tax certificates and filing documentation required by the Canadian government on a timely basis and at no additional charge to Kinectrics, in the event any withholding tax is deducted from any payments to Kinectrics for work done by Kinectrics employees outside of Canada. Customer will provide Kinectrics any applicable tax exemption certificates prior to the provision of any Services.
7. **Warranty:** Kinectrics warrants that the Services, excluding any as may be performed under the direction or supervision of Customer, performed pursuant to this Agreement will be performed in a professional manner consistent with the standards of quality and care typical within the industry at the time of performance for similar work. Such warranty will be effective for a period of one (1) year from the date of performance of the Service. Any such Services performed by Kinectrics which do not conform with Kinectrics above-stated warranty obligation will be re-

performed by Kinectrics at Kinectrics' expense; or if re-performance is impracticable or impossible, Kinectrics will refund to Customer the price paid to Kinectrics for the non-conforming Services. The warranties and remedies set forth herein are exclusive, and no other warranty or remedy of any kind, whether statutory, written, oral, express, or implied, including without limitation warranties of performance, merchantability and fitness for a particular purpose, shall apply. In no event shall Kinectrics be responsible for decontamination of equipment; or any work done by others; or for any loss, damage, cost, or expense arising out of or resulting from such work done by others; provided, that in the event Kinectrics has engaged Subcontractors in the performance of its obligations, Kinectrics will have the same responsibilities to Customer for such Services as it has with respect to its own Services. The foregoing Warranty shall be voided if, during the Warranty period: (i) performance of recommended maintenance is contracted by the Customer to a party other than Kinectrics or Kinectrics' designated subcontractor; or (ii) the Customer elects not to carry out recommended maintenance or (iii) improper use or storage of any Deliverable; or (iv) the Deliverable becomes contaminated.

8. **Limitation of Liability:** Kinectrics total aggregate liability for damages arising from any cause or action whatsoever, including liability for any claim of infringement of intellectual property rights, shall not exceed the total consideration paid to Kinectrics pursuant to this Agreement. In no event shall Kinectrics at any time be liable to the Customer for any indirect, incidental or consequential damages which may be sustained by them, including but not limited to loss of revenue, profit, business reputation or opportunity whether such liability arises out of contract, tort (including negligence), strict liability, warranty or other legal theory whether at law, in equity or otherwise. Kinectrics liability, whether based upon contract, tort (including negligence), strict liability or otherwise, for any claims, loss or damage arising out of, connected with, or resulting from the performance or breach of this Agreement by Kinectrics shall be limited to specifically identified written claims submitted by the Customer to Kinectrics prior to the expiration of the Warranty period. The Customer recognizes that the Customer's material or equipment under test may be damaged due to the nature or requirements of such test (such as the application of high tension or voltage to material or equipment being tested) and agrees that in no event shall Kinectrics be liable for any damages which may be caused to Customer's material or equipment under test including, but not limited to, any accessories. The provisions of this Article shall apply notwithstanding any other provision of this Agreement or any other agreement.
9. **Delay in Performance:** Kinectrics shall not be liable for any expense, loss or damage resulting from delay or prevention of performance caused by fires, floods, Acts of God, public health risks, quarantine, epidemic, pandemic, strikes, labor disputes, labor shortages, inability to secure materials or equipment, fuel or other energy shortages, riots, thefts, accidents, transportation delays, acts or failure to act of Customer, acts or failure to act of governmental authorities, Customer's delay in obtaining licenses, major equipment breakdown, or any other cause whatsoever, whether similar or dissimilar to those enumerated above, which are beyond the reasonable control of Kinectrics. In the event of any delay arising by reason of any of the foregoing, the schedule and compensation shall be equitably adjusted as may be required.
10. **Proprietary Information:** Information disclosed pursuant to this Agreement is disclosed in confidence, and the recipient shall not publish or otherwise disclose it to others, or use it for purposes unconnected with the delivery of the Services, without the written approval of the disclosing Party. Customer understands that special techniques in the arts and sciences, developed or accumulated by Kinectrics, will be employed to benefit Customer under this Agreement, and agrees that such special techniques are proprietary and shall not be disclosed to any third party during or subsequent to the term of this Agreement nor shall the Customer use it for purposes unconnected with the delivery of the Services without Kinectrics prior written consent; provided, however, that nothing herein shall limit Customer's right to disclose any data provided by Kinectrics hereunder which (a) was furnished by Kinectrics prior to this Agreement without restrictions; (b) becomes knowledge available within the public domain; (c) is received by Customer from a third party without restriction and without breach of this Agreement; or (d) is required to be disclosed in order to comply with applicable laws or government regulations.
11. **Intellectual Property:** Kinectrics shall own all right, title and interest in and to all intellectual property, including without limitation all inventions, patents, patent applications, copyrights, and trade secrets, in any report, data, software or thing created or reduced to practice by Kinectrics during the course of performing the Services. Except as is necessary to the Customer's use of the Deliverables, the Customer shall not reproduce, make or distribute copies, either in whole or in part, of any report, document, video, software or thing created by Kinectrics during the course of performing the Services, without the specific written permission of Kinectrics.
12. **Publicity:** Kinectrics shall have the right to make general references to the Services in promotional materials, but shall not include detailed results of the Services without the written consent of the Customer.
13. **Applicable Laws, Assignment and Dispute Resolution:** This Agreement shall be governed by, and be construed in accordance with, the laws of the Province of Ontario and Canada and the Parties consent to the exclusive jurisdiction of the courts of the Province of Ontario. Customer may not assign or transfer this Agreement or any interest herein without the prior written consent of Kinectrics. The Parties shall use all reasonable efforts to amicably settle all disputes arising in relation to this Agreement and its interpretation. Neither Party will resort to the courts until a good faith effort to resolve such dispute has been made by the Parties' executive levels. The Parties expressly exclude the application of the United Nations Convention on Contracts for the International Sale of Goods.

Appendix “B”

Thunder Bay Hydro purchase order

See attached.



34 N. Cumberland Street
Thunder Bay, Ontario P7A 4L4

PURCHASE ORDER

170006

to . KINECTRICS INC
. 800 KIPLING AVENUE
. UNIT 2
. ETOBICOKE, ON
M8Z 5G5

* BLANKET *
* ORDER *

ship to

. 37 FRONT STREET
. THUNDER BAY, ON
. P7A 8B2

page 01

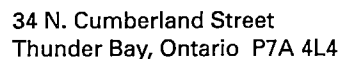
delivery	AS REQUIRED	vendor contact	f.o.b.	date of order: 7/03/2017	
	HST Extra	terms: NET	requisitioned by: KBAILEY	vendor number 2456	
t.b.h spec's	distribution	AS PER RECEIPT		requisition # 0000013711	
t.b.h item number	description		quantity ordered	unit of measure	unit price
	ORDER NOT TO EXCEED TOTAL PRICE AS SET		.00		16,950.00
	START DATE: 01/03/2017				
	EXPIRY DATE: 30/09/2017				
	THIS BLANKET PURCHASE ORDER				
	Covers all costs to supply and deliver				
	Assistance with Thunder Bay Hydro OEB				
	Oral Hearing.				
	*				
	Reference: TBHEDI File #17-C1, dated Mar 7/17				
	Kinectrics Inc. Project #: 418-TSI-03-01				
	Kinectrics Inc. quote dated Mar 2/17				
	Per Yury Tsimberg, P. Eng.				
	*				
	Pricing and scope of work as per Quotation				
	Dated March 2, 2017 (attached).				
	*				

This order is subject to all specifications and conditions indicated hereon
and subject to cancellation if not in accordance to this contract.

ORIGINAL

by

thunder bay hydro



170006

to . KINECTRICS INC
 . 800 KIPLING AVENUE
 . UNIT 2
 . ETOBICOKE, ON
 M8Z 5G5

ship to

. 37 FRONT STREET
. THUNDER BAY, ON
. P7A 8B2

* BLANKET *
* ORDER *

page 02

This order is subject to all specifications and conditions indicated hereon and subject to cancellation if not in accordance to this contract.

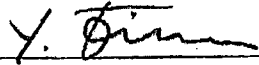
ORIGINAL

by

thunder bay hydro

KINECTRICS INC. QUOTATION

800 Kipling Ave., Unit 2, Toronto, Ontario, Canada, M8Z 5G5

Work Title: Assistance with Thunder Bay Hydro OEB Oral Hearing		Date: March 2, 2017 Page 1 of 3
Customer: Thunder Bay Hydro Address: 37 Front Street Thunder Bay, Ontario P7A 8B2 Contact: Karla Bailey, P. Eng. Telephone: 807 343 1172 Fax/e-mail: kbailey@lbhydro.on.ca	Kinectrics Project Number: 418-TSI-03-01 Kinectrics Contact: Yury Tsimberg, P. Eng. Telephone: 416 207 6000 ext. 6106 Fax/e-mail: yury.tsimberg@kinectrics.com Authorizing Signature:  Print Name: Yury Tsimberg	
Services Offered and Schedule: Kinectrics Inc (Kinectrics) is pleased to offer the following services to Thunder Bay Hydro (TBH) related to the impending Ontario Energy Board (OEB) Oral Hearing regarding TBH's Rate Application: <ol style="list-style-type: none">1. Review TBH's Distribution System Plan (DSP) with the focus on decision making methodology regarding investment levels required to sustain and enhance the existing asset base.2. Provide a letter to be filed with the OEB commenting on the reasonableness of the decision making approach for deciding on distribution system related investments magnitude and mix as outlined in the DSP3. One day of witness training in Thunder Bay4. One day of providing expert testimony at the oral hearing in support of the TBH's Rate Application <p>The assessment of the DSP is to be completed prior to the witness training on March 22d, 2017 and the letter with Kinectrics comments regarding the DSP is to be provided to TBH by the end of March, 2017.</p> <p>The witness training is to take place on March 22d, 2017, and the OEB oral hearing is to take place on April 11, 2017.</p>		
Deliverables: 1. Reviewing and TBH's DSP 2. Preparing a letter summarizing Kinectrics opinion regarding the reasonableness of the TBH's approach in deciding on levels and mix of investments in their distribution system. 3. Participating in the witness training 4. Testifying at the OEB oral hearing on behalf of TBH on matters related to		
Payment: Monthly progress billing, net 30 days.	Price before taxes- Includes all travel costs	15,000
Notice: Any notice to be sent to either Kinectrics or the Customer shall be sent to the addresses listed above. If to Kinectrics addressed to the Kinectrics Contact and if to Customer addressed to Customer Contact.		
ACCEPTANCE OF QUOTATION This Quotation, including the pricing and payment terms, is only valid until 4:00 pm Eastern Standard Time, March 16, 2017, (hereafter called the "Expire Time"). Upon acceptance of this Quotation by the Customer before the Expire Time, the Customer retains Kinectrics Inc. (Kinectrics) to perform the services described herein, pursuant to the Quotation Standard Terms and Conditions , attached hereto. BY ISSUE OF THE CUSTOMER PURCHASE ORDER OR CONTRACT AGREEMENT TO KINECTRICS, THE CUSTOMER ACKNOWLEDGES THAT IT HAS READ AND HEREBY ACCEPTS THIS QUOTATION, INCLUDING KINECTRICS STANDARD TERMS AND CONDITIONS WHICH SHALL APPLY TO THIS TRANSACTION AND SHALL TAKE PRECEDENCE OVER ANY OTHER TERMS AND CONDITIONS CONTAINED IN THE CUSTOMER'S PURCHASE ORDER OR CONTRACT. Purchase orders are to be faxed to 416-207-6192 or e-mailed to PO@Kinectrics.com		



KINETRICS – STANDARD TERMS AND CONDITIONS

1. **Acceptance:** Notwithstanding anything to the contrary contained in any other related document, the Customer accepts that this offer and any resulting contract shall be based solely on the terms and conditions contained herein ("Agreement") and no additional or different terms and conditions shall apply except as may be explicitly agreed in writing by the Parties. The Parties acknowledge that these terms and conditions may be for use with Kinectrics Inc. and all subsidiaries including Kinectrics North America, Inc., Kinectrics US Inc., Kinectrics International Inc., Kinectrics International Europe ApS, Kinectrics GmbH, Kinectrics International Inc. Sucursala Bucuresti and AXIOM N.D.T. Corporation ("Kinectrics") and that the applicable contracting entity will be defined in the purchase order. The Parties agree that only the Kinectrics entity specified in a purchase order will have liability in relation to this Agreement. This offer may be revoked by Kinectrics if the Customer's credit rating is not in good standing. In the absence of written acceptance of these terms and conditions by the Customer, either acceptance of, or payment for, the products or services will constitute the Customer's acceptance. The invalidity or unenforceability of any provisions of these terms and conditions shall not affect the validity or enforceability of any other provision of this Agreement, which shall remain in full force and effect.
2. **Services:** Kinectrics shall deliver to the Customer only those documents, reports, software, data or things (the "Services" or the "Deliverables") as specified in the scope of work and within the specified schedule. Additional Services may be agreed to in writing between the Parties. If Kinectrics cannot deliver the Services within the schedule, then Kinectrics shall inform the Customer of the expected completion date of the Services. Services which are experimental or research in nature may be subject to review by the Parties for a mutual decision on continuing the Services in the event anticipated results are not being achieved. Unless otherwise specified in writing by the Customer, draft and final reports will be sent to the Customer as an attached file to an electronic mail message.
3. **Customer Deliverables/Obligations:** The Customer shall provide Kinectrics with any information, materials, equipment, utility services, assistance, access to facilities and other necessities as may be required by Kinectrics to deliver the Services. Timely receipt by Kinectrics of the Customer's Deliverables shall be considered of essence to this Agreement. The Customer shall expeditiously review and/or inspect the Services and, unless otherwise agreed in writing between the Parties, the Customer will provide Kinectrics with a single round of consolidated comments on any Kinectrics' Deliverable. Following the completion of the Services, Kinectrics shall advise the Customer of any waste or surplus materials remaining or created pursuant to the Services. The Customer shall arrange, at its expense, for the disposition of such materials within two (2) months of such advice. Customer attendance at Kinectrics' work site, for any purpose, shall be entirely at the Customer's own risk. In the event the Customer provides any specifications or designs for products, Customer will indemnify Kinectrics for all claims, costs and expenses (including attorney's fees and disbursements) from any patent, trademark or copyright infringement claim resulting from compliance with these specifications and designs. Kinectrics will not be responsible for the accuracy or suitability of Customer supplied specifications and designs or the performance of any products built in conformance with the specifications or designs.
4. **Charges for Suspension/Delay/Cancellation ("Stoppage") by Customer:** In the event the Customer suspends, delays and/or cancels any Services, then applicable standby, dead time, demobilization, remobilization, non-cancellable commitments and/or facility charges will be invoiced to the Customer as additional to the contract price ("Additional Expenses"). In the event such unplanned Customer initiated Stoppage extends for a period in excess of twenty (20) working days, then the Customer shall also be invoiced for all work performed up to the date of such Stoppage, on a time/material basis or as a prorated fixed price whether or not any milestone remains incomplete due to such Stoppage ("Work Performed"). Invoices for Additional Expenses and Work Performed shall become due and payable by the Customer upon receipt.
5. **Payment:** Customer shall pay Kinectrics the invoiced amount within 30 days of the invoice date. Interest on overdue accounts shall be charged at the greater of (i) one and one half percent (1.5%) per month for a yearly effective rate of eighteen percent (18%) and (ii) the maximum amount permitted by applicable law, until paid. Payments by cheque from outside of Canada must be sent via courier at Customer's expense.
6. **Taxes:** Where applicable, Customer will pay all taxes, fees, duties, charges, or assessments of any nature whatsoever imposed by any governmental authority on or measured by the Services or any amount payable pursuant to this invoice. Customer will provide Kinectrics with all withholding tax certificates and filing documentation required by the Canadian government on a timely basis and at no additional charge to Kinectrics, in the event any withholding tax is deducted from any payments to Kinectrics for work done by Kinectrics employees outside of Canada. Customer will provide Kinectrics any applicable tax exemption certificates prior to the provision of any Services.
7. **Warranty:** Kinectrics warrants that the Services, excluding any as may be performed under the direction or supervision of Customer, performed pursuant to this Agreement will be performed in a professional manner consistent with the standards of quality and care typical within the industry at the time of performance for similar work. Such warranty will be effective for a period of one (1) year from the date of performance of the Service. Any such Services performed by Kinectrics which do not conform with Kinectrics above-stated warranty obligation will be re-

performed by Kinectrics at Kinectrics' expense; or if re-performance is impracticable or impossible, Kinectrics will refund to Customer the price paid to Kinectrics for the non-conforming Services. The warranties and remedies set forth herein are exclusive, and no other warranty or remedy of any kind, whether statutory, written, oral, express, or implied, including without limitation warranties of performance, merchantability and fitness for a particular purpose, shall apply. In no event shall Kinectrics be responsible for decontamination of equipment; or any work done by others; or for any loss, damage, cost, or expense arising out of or resulting from such work done by others; provided, that in the event Kinectrics has engaged Subcontractors in the performance of its obligations, Kinectrics will have the same responsibilities to Customer for such Services as it has with respect to its own Services. The foregoing Warranty shall be voided if, during the Warranty period: (i) performance of recommended maintenance is contracted by the Customer to a party other than Kinectrics or Kinectrics' designated subcontractor; or (ii) the Customer elects not to carry out recommended maintenance or (iii) improper use or storage of any Deliverable; or (iv) the Deliverable becomes contaminated.

8. **Limitation of Liability:** Kinectrics total aggregate liability for damages arising from any cause or action whatsoever, including liability for any claim of infringement of intellectual property rights, shall not exceed the total consideration paid to Kinectrics pursuant to this Agreement. In no event shall Kinectrics at any time be liable to the Customer for any indirect, incidental or consequential damages which may be sustained by them, including but not limited to loss of revenue, profit, business reputation or opportunity whether such liability arises out of contract, tort (including negligence), strict liability, warranty or other legal theory whether at law, in equity or otherwise. Kinectrics liability, whether based upon contract, tort (including negligence), strict liability or otherwise, for any claims, loss or damage arising out of, connected with, or resulting from the performance or breach of this Agreement by Kinectrics shall be limited to specifically identified written claims submitted by the Customer to Kinectrics prior to the expiration of the Warranty period. The Customer recognizes that the Customer's material or equipment under test may be damaged due to the nature or requirements of such test (such as the application of high tension or voltage to material or equipment being tested) and agrees that in no event shall Kinectrics be liable for any damages which may be caused to Customer's material or equipment under test including, but not limited to, any accessories. The provisions of this Article shall apply notwithstanding any other provision of this Agreement or any other agreement.
9. **Delay in Performance:** Kinectrics shall not be liable for any expense, loss or damage resulting from delay or prevention of performance caused by fires, floods, Acts of God, public health risks, quarantine, epidemic, pandemic, strikes, labor disputes, labor shortages, inability to secure materials or equipment, fuel or other energy shortages, riots, thefts, accidents, transportation delays, acts or failure to act of Customer, acts or failure to act of governmental authorities, Customer's delay in obtaining licenses, major equipment breakdown, or any other cause whatsoever, whether similar or dissimilar to those enumerated above, which are beyond the reasonable control of Kinectrics. In the event of any delay arising by reason of any of the foregoing, the schedule and compensation shall be equitably adjusted as may be required.
10. **Proprietary Information:** Information disclosed pursuant to this Agreement is disclosed in confidence, and the recipient shall not publish or otherwise disclose it to others, or use it for purposes unconnected with the delivery of the Services, without the written approval of the disclosing Party. Customer understands that special techniques in the arts and sciences, developed or accumulated by Kinectrics, will be employed to benefit Customer under this Agreement, and agrees that such special techniques are proprietary and shall not be disclosed to any third party during or subsequent to the term of this Agreement nor shall the Customer use it for purposes unconnected with the delivery of the Services without Kinectrics prior written consent; provided, however, that nothing herein shall limit Customer's right to disclose any data provided by Kinectrics hereunder which (a) was furnished by Kinectrics prior to this Agreement without restrictions; (b) becomes knowledge available within the public domain; (c) is received by Customer from a third party without restriction and without breach of this Agreement; or (d) is required to be disclosed in order to comply with applicable laws or government regulations.
11. **Intellectual Property:** Kinectrics shall own all right, title and interest in and to all intellectual property, including without limitation all inventions, patents, patent applications, copyrights, and trade secrets, in any report, data, software or thing created or reduced to practice by Kinectrics during the course of performing the Services. Except as is necessary to the Customer's use of the Deliverables, the Customer shall not reproduce, make or distribute copies, either in whole or in part, of any report, document, video, software or thing created by Kinectrics during the course of performing the Services, without the specific written permission of Kinectrics.
12. **Publicity:** Kinectrics shall have the right to make general references to the Services in promotional materials, but shall not include detailed results of the Services without the written consent of the Customer.
13. **Applicable Laws, Assignment and Dispute Resolution:** This Agreement shall be governed by, and be construed in accordance with, the laws of the Province of Ontario and Canada and the Parties consent to the exclusive jurisdiction of the courts of the Province of Ontario. Customer may not assign or transfer this Agreement or any interest herein without the prior written consent of Kinectrics. The Parties shall use all reasonable efforts to amicably settle all disputes arising in relation to this Agreement and its interpretation. Neither Party will resort to the courts until a good faith effort to resolve such dispute has been made by the Parties' executive levels. The Parties expressly exclude the application of the United Nations Convention on Contracts for the International Sale of Goods.

Thunder Bay Hydro Electricity Distribution Inc. Standard Terms and Conditions for Services

1. DEFINITIONS

"TBHEDI" – Thunder Bay Hydro Electricity Distribution Inc., its successors and assigns.

"Bidder" – The person, firm or corporation submitting a bid to TBHEDI

"Company" – The person, firm or corporation to whom TBHEDI has awarded the contract.

"Contract" – The purchase order authorizing the company to do the work, purchase order alterations, the document and addenda, the company's bid.

"Subcontractor" – a person, firm or corporation having a contract with the company for any part of the work.

"Document" – The documents issued by the Region in response to which bids are invited for the performance of the work or supply of equipment.

"Work" – All labour, materials, equipment, fixtures, services, supplies, and acts required to be done, furnished or performed by the company.

2. SUBMISSION OF BID

Bids must be submitted on the form supplied by TBHEDI unless otherwise provided herein.

Bids must not be restricted by a statement added to the bid form or by a covering letter, or by alterations to the bid form supplied unless otherwise provided in the document.

The bid must be signed by a designated signing officer of the bidding firm.

Bids must be legible, written in ink, or typewritten. Erasures, overwriting or strikeouts must be initialed by the person signing on behalf of the bidder.

Bids received after the closing time specified in the documents will not be considered and will be returned unopened.

Should a dispute arise from the terms and conditions of any part of the contract, regarding meaning, intent or ambiguity, the decision of TBHEDI shall be final.

3. CONTRACT DOCUMENTS AND ORDER OF PRECEDENCE

The contract consists of the documents aforementioned.

These documents and portions thereof, take precedence in the order in which they are named above, notwithstanding the chronological order in which they are issued or executed.

The intent of the contract is that the company shall supply work, which is fit and suitable for TBHEDI's intended use and complete for an intended use.

None of the conditions contained in the bidder's (seller's) standard or general (printed) conditions of sale shall be of any effect unless explicitly agreed to by TBHEDI and set forth in the purchase order or specifically referred to therein.

4. CLARIFICATION OF THE DOCUMENT

Any clarification of the Document required by the Bidder prior to submission of its bid shall be requested through TBHEDI's contact identified in the document. Any such clarifications so given shall not in any way alter the document and the company and TBHEDI hereby agrees that in no case shall oral arrangements be considered.

No officer, agent or employee of TBHEDI is authorized to alter orally any portion of these documents.

During the period prior to submission of bids, alterations will be issued to bidders as written addenda. The bidder shall list in its bid all addenda that were considered when its bid was prepared.

5. PROOF OF ABILITY

The bidder may be required to show, in terms of experience and facilities, evidence of its ability, as well as that of any proposed subcontractor, to perform the work by the specified delivery date.

6. DELIVERY

Unless otherwise stated, the work specified in the contract shall be delivered or completely performed by the Company as soon as possible and in any event within the period set out herein as the guaranteed period of delivery or completion after receipt of a purchase order thereof.

Work shall be subject to further inspection and approval by TBHEDI.

7. PRICING REQUIREMENT

Prices shall be in Canadian Funds, quoted separately for each item stipulated, F.O.B. the point specified therein.

All prices bid shall include applicable customs duty, excise tax, freight, insurance and all other charges of every kind attributable to the work, and where applicable, Harmonized Sales Tax (HST) shall be extra and not shown, unless otherwise specified.

If the bidder intends to manufacture or fabricate any part of the work outside of Canada, it shall arrange its shipping procedures so that its agent or representative in Canada is the importer of record for customs purposes.

Except as provided elsewhere in this document, the prices bid shall not be subject to adjustment for any cost of the work to the company.

Prices bid must include all incidental costs and the Company shall be deemed to be satisfied as to the full requirements of the bid. No claims for extra work will be entertained and any additional work must be authorized in writing prior to commencement. Should the Company require more information or clarification on any point, it must be obtained prior to the submission of the bid.

Should any additional tax, duty or any variation in any tax or duty be imposed by the Government of Canada or the Province of Ontario become directly applicable to work specified in this document subsequent to its submission by the Bidder and before the delivery of the work covered thereby pursuant to a purchase order issued by TBHEDI, appropriate increase or decrease in the price of work shall be made to compensate for such changes as of the effective date thereof.

8. TERMS OF PAYMENT

Payments made will be thirty (30) days after delivery pursuant to the Bidder submitting an invoice, contract requirements being completed and work being deemed satisfactory.

Where required by the *Construction Lien Act* appropriate monies may be held back until sixty (60) days after the completion of the work.

Payments made hereunder, including final payment shall not relieve the Company from its obligations or liabilities under the contract. Acceptance by the Company of the final payment shall constitute a waiver of claims by the Company against TBHEDI, except those previously made in writing in accordance with the contract and still unsettled.

TBHEDI shall have the right to withhold from any sum otherwise payable to the Company such amount as may be sufficient to remedy any defect or deficiency in the work, pending correction of the same.

9. PATENTS AND COPYRIGHTS

The Company shall, at its expense, defend all claims, actions or proceedings against TBHEDI based on any allegations that the work or any part of the work constitutes an infringement of any patent, copyright or other proprietary right, and shall pay to TBHEDI all costs, damages, charges and expenses, including its lawyers' fees on a solicitor and his own client basis occasioned to TBHEDI by reason thereof.

The Company shall pay all royalties and patent license fees required for the work.

If the work or any part thereof is in any action or proceeding held to constitute an infringement, the Company shall forthwith either secure for TBHEDI the right to continue using the work or shall at the Company's expense, replace the infringing items with non-infringing work or modify them so that the work no longer infringes.

10. ASSIGNMENT AND SUBCONTRACTING

The company shall not assign or subcontract the contract or any portion thereof without the prior written consent of TBHEDI.

The contract shall be governed by and interpreted in accordance with the laws of the Province of Ontario.

11. CORRECTION OF DEFECTS

If at any time prior to one year (or specified warranty/guarantee period if longer than one year) after the actual delivery date of the equipment (or completion of the work) any part of the equipment (or work) becomes defective or is deficient or fails due to defect in design, material or workmanship, or otherwise fails to meet the requirements of the contract, then the Company, upon request, shall make good every such defect, deficiency or failure without cost to TBHEDI. The Company shall pay all transportation costs for parts and/or equipment both ways between the Company's factory or repair depot and the point of use.

12. BID ACCEPTANCE

TBHEDI reserves the right to award by item, or part thereof, regions of items, or parts thereof, or all items of the document and to award contracts to one or more bidders submitting identical bids as to price; to accept or reject any bids in whole or in part; to cancel the tender at any point when the price in the bid submissions exceed the funds allocated for the work; to waive irregularities and omissions, if in so doing, the best interest of TBHEDI will be served. No liability shall accrue to TBHEDI for its decision in this regard.

Unless otherwise specified, bids shall be irrevocable for sixty (60) days after the official closing time.

The placing in the mail or delivery to the Bidder's shown address given in the bid of a notice of award to a bidder by TBHEDI shall constitute notice of acceptance of contract by TBHEDI to the extent described in the notice of award.

13. BY-LAW

Bids will be called, received, evaluated, accepted and processed in accordance with TBHEDI's Purchasing By-law and related procedures (copy available upon request). By submitting a bid for this contract, the bidder agrees to be bound by the terms and conditions of such by-law any amendments thereto and related procedures, as fully as if it were incorporated herein.

14. DEFAULT BY COMPANY

If the Company: commits any act of bankruptcy; or if a receiver is appointed on account of its insolvency or in respect of any of its property; or if the Company makes a general assignment for the benefit of its creditors; then, in any such case, TBHEDI may, without notice: terminate the contract.

If the Company: fails to comply with any request, instruction or order of TBHEDI; or fails to pay its accounts; or fails to comply with or persistently disregard statutes, regulations, by-laws or directives of relevant authorities relating to the work; or fails to prosecute the work with skill and diligence; or assigns or sublets the contract or any portion thereof without TBHEDI's written consent; or refuses to correct

defective work; or is otherwise in default in carrying out its part of any of the terms, conditions and obligations of the contract, then, in any such case, TBHEDI may, upon expiration of ten (10) days from the date of written notice to the Company, terminate the contract.

Any termination of the contract by TBHEDI, as aforesaid, shall be without prejudice to any other rights or remedies TBHEDI may have.

If TBHEDI terminates the contract, it is entitled to:

- i) take possession of all of the work in progress, materials and construction equipment then at the project site (at no additional charge for the retention or use of the construction equipment), and finish the work by whatever means TBHEDI may deem appropriate under the circumstances;
- ii) withhold any further payments to the Company until the completion of the work and the expiry of all obligations under the Correction of Defect Clause;
- iii) recover from the Company loss, damage and expense incurred by TBHEDI by reason of the Company's default (which may be deducted from any monies due or becoming due to the Company, any balance to be paid by the Company to TBHEDI).

15. CONTRACT CANCELLATION

TBHEDI shall have the right, which may be exercised from time to time, to cancel any uncompleted or unperformed portion of the work or part thereof. In the event of such cancellation, TBHEDI and the Company shall negotiate a settlement.

TBHEDI shall not be liable to the Company for loss of anticipated profit on the cancelled portion or portions of the work.

16. QUANTITIES

Where quantities are shown as approximate, they are not guaranteed to be accurate and are furnished without any liability on behalf of TBHEDI and shall be used as a basis for comparison only.

17. LIABILITY

The Company agrees to defend, fully indemnify and save harmless TBHEDI from all actions, suits, claims, demands, losses, costs, charges and expenses whatsoever for all damage or injury including death to any person and all damage to any property which may arise directly or indirectly by reason of a requirement of the contract, save and except for damage caused by the negligence of TBHEDI or its employees.

The Company agrees to defend, fully indemnify and save harmless TBHEDI from any and all charges, fines, penalties and costs that may be incurred or paid by TBHEDI if TBHEDI or any of its employees shall be made a party to any charge under the *Occupational Health and Safety Act* in relation to any violation of the Act arising out of this contract.

Appendix B

Summary of Qualifications

Yury Tsimberg is a senior engineer and manager with over 35 years of experience in both consulting and utility businesses gained throughout his career with Kinectrics Inc and Hydro One / Ontario Hydro.

Tsimberg is currently a Director of Asset Management with Kinectrics Inc. where he is heading Asset Management Line of Business. His responsibilities include business development, leading client projects and refining existing Asset Management tools and methodologies. He is a recognized expert in all aspects of Asset Management, both equipment-focused involving assessing condition of equipment, and strategy-focused involving providing guidance to utilities' senior executives on corporate level Asset Management issues, such as investments prioritization, long-term capital planning, and providing support and advice in dealing with regulatory bodies. He successfully completed Asset Management projects for numerous clients, including several major utilities across United States and Canada, and taught Asset Management courses all over the world. Tsimberg is a frequent speaker and presenter at various industry forums, such as IEEE, CIGRE, CEATI and EUCL.

At Ontario Hydro/Hydro One Tsimberg worked in various areas of transmission and distribution utility business, including lines maintenance, power system operation, Bulk and Local System Planning, Mergers & Acquisition, and Regulatory. In his last position at Hydro One Tsimberg managed a large department responsible for development and implementation of Hydro One's Asset Management strategies and methodologies, developing new standards and policies, leading public consultation processes associated with major projects, and negotiating with the First Nations.

Tsimberg was a member of the international advisory panel revising Asset Management PAS 55 specifications developed by the British Institute of Asset Management and a member of the NERC committee developing North American planning standards. At the present time Tsimberg is the Canadian representative on CIGRE Study Committee SC1 "System Development and Economics" and a member of the Committee's management team as Asset Management Group Convener.

Tsimberg is also an effective negotiator with extensive industry contacts with utilities, other power industry consultants and IT companies in North America, Europe and Middle East.

Expertise

Asset Management:

- End-of-life (EOL) and Economic End-of-life (EEOL) estimation of investments timing for various asset classes using total life cycle cost approach
- Condition and risk assessment of power systems assets
- Long-term capital planning
- Investment prioritization, i.e. optimizing ratios of sustainment investment vs. resultant risk for different classes of assets across

the whole OM&A and CAPEX investment portfolios

- Evaluating cost vs. benefit to ratepayers using Customer Interruption Cost (CIC) approach
- Developing Asset Management Plan (AMP) that integrates asset specific strategies with business programs based on the Corporate Business Values and actual asset needs
- Assessing effectiveness of investments made using Performance Metrics

Mergers and Acquisitions

- Due diligence assessment of prospective acquisitions
- Post-acquisition integration of newly-acquired assets
- Assessment of actual vs. projected savings

Reliability Compliance:

- Assessing compliance with North American reliability standards
- Preparing for the reliability compliance audit
- Advising on interpretation of reliability standards

Project Approvals

- Positioning and Preparing Regulatory applications for specific projects
- Public consultations process and negotiating with the First Nations

Education

M. Eng. Electrical Engineering, University of Toronto, 1987.
B.A. Sc. Electrical engineering, University of Toronto, 1978.

Professional Affiliations

Member, Professional Engineers of Ontario, 1980.

Former Member, AFTSDT (Assess Future Transmission System Needs SAR Team and Standard Drafting Teams), NERC

Member, CIGRE Working Group C1.25 “Risk Management and Information Processes for Asset Management in Electricity Transmission Companies for current and future power systems”.

Canadian Representative, CIGRE Study Committee SC1 “System Development and Economics”.

Details of Expertise 2008 – Present. Kinectrics Inc. Director - Asset Management

Responsible for:

Integrating knowledge and expertise of staff across various departments to develop new, and refine existing Asset Management methodologies and approaches.

Business development related to all aspects of Asset Management and exploring business opportunities in the areas related to Asset Management, such as technical issues associated with DG integration, M&A, Reliability compliance and supporting Regulatory applications.

Leading Asset Management projects such as Asset Condition Assessments, Risk Assessments and development of Asset Management Plans and Distribution System Plans, for electrical utilities across North America.

Assessing Distribution System Plans produced by distribution utilities on behalf of the Regulator to ensure that these plans are compliant with the prescribed requirements and provide sound justification for the investment sought.

1978-2008. Hydro One (Ontario Hydro)

Manager, Asset Strategies & Standards (2004-2008)

Responsible for:

Managing department accountable for developing asset specific strategies, standards and policies.

Creating new and refining existing customized applications to enable utilization of “state-of-the-art” Asset Management techniques.

Establishing corporate strategy regarding reliability compliance developments across North America and within Ontario, including participation on various North American reliability Committees and Working Groups.

Leading cross-functional teams responsible for securing the required approvals for building new transmission facilities, including negotiations with the First Nations and other stakeholders, and leading public consultation process for major planned projects.

Prioritizing and selecting projects to be included in the corporate R&D portfolio.

Manager – Regulatory Support (2002-2004)

Responsible for:

Managing a cross-functional team charged with preparing Cost-of-Service component of Hydro One’s Rate Application, including:

Preparing direct evidence exhibits explaining and justifying revenue

requirements for individual programs associated with various asset classes.

Co-ordinating input from other groups within the Corporation participating in Rate Application filing to ensure consistency of materials submitted and intended overall themes / messages.

Managing external consultants delivering third party assessments and supporting studies.

Manager – M&A Integration Planning (1999-2002)

Responsible for:

Managing department accountable for all aspects of due diligence and integration phases of distribution utilities acquisition program that resulted in Hydro One successfully acquiring 86 distribution utilities. This included:

Developing due diligence process for physical evaluation of assets and determining potential synergies and liabilities.

Developing and implementing a process for integrating newly acquired utilities into Hydro One's system, including integration of employees, operations and assets.

Senior Policy Advisor (1997-1999)

Responsible for:

Creating and refining policies and strategies for transmission component of Asset Management business, including:

Assessing impacts of regulatory proposals and models from the Asset Manager's perspective, and developing company's position on various emerging issues associated with entering open electricity market environment in Ontario

Evaluating commercial feasibility and various regulatory and technical aspects of establishing new interconnections with neighbouring utilities.

Senior Account Executive (1996-1997)

Responsible for:

Managing Ontario Hydro's interface with major municipal utilities and directly connected transmission customers. Achievements as Senior Account Executive:

- Led Ontario Hydro team carrying out economic and risk assessments of acquiring transmission and distribution assets of major direct transmission customers.
- Negotiated business deals and led studies addressing specific customers'

needs, such as determining the most cost-effective alternatives for meeting forecasted load growth in local areas.

Senior Planning Engineer (1988 - 1996)

Responsible for:

Planning transmission and sub-transmission system facilities required to increase capability of integrated transmission network and to address specific local area or customer needs. Major accomplishments and responsibilities as Senior Transmission Planning engineer included:

- Led joint Manitoba Hydro / Minnesota Power / Ontario Hydro team assessing impact of the new Minnesota Power - Ontario Hydro interconnection on interconnected transmission system and led joint Minnesota Power - Ontario Hydro project management team during construction phase of the project.
- Led the team developing long-term transmission plans for meeting system needs in Northern Ontario. The team successfully completed an integrated plan that mitigated risk of bulk system exposure to major contingencies and at the same time addressed reliability needs of specific customers and local areas.

Engineer – Operations (1985-1988)

Responsible for:

Identifying opportunities for electricity sales and purchase to /from neighbouring utilities, and for providing liaison with the Canadian National Energy Board (NEB) on matters related to electricity exports., such as participation in NEB hearing assessing export applications by other Canadian utilities, and co-ordinating preparation of Ontario Hydro's submissions to the NEB in support of various Export License applications.

Engineer – Technical Services (1978 – 1985)

Responsible for:

Providing functional support and direction to field staff on all matters related to maintenance of transmission lines, including technical assessments, economic evaluations of different maintenance methods, and developing new procedures and practices.

Appendix C

Appendix C

Yury Tsimberg Asset Management Related Publications

1. Electricity To-day magazine, January/February 2012, Volume 25, No.1 “Keep your assets healthy”
2. Electricity To-day magazine, March 2013, Volume 26, no.2, “Asset Management Practices”
3. CIGRE Technical Brochure TB 541 “Asset Management Decision Making using different Risk Assessment Methodologies, June 2013
4. CIGRE Technical Brochure TB 597 “Transmission Asset Risk Management”, June 2014
5. IEEE Paper, 2014, “Determining Transmission Line Conductor Condition and Remaining Life”, IEEE proceedings April 2014
6. CEATI Report “Methodology for Integrating New Technologies in Asset Management Practices, August 2015
7. Asset Depreciation Study for the Ontario Energy Board, July 8, 2010

Appendix D

FORM A

Proceeding: Thunder Bay Hydro Electricity Distribution Inc.
2017 Rate Application (EB 2016-0105)

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is Yury Tsimberg (name). I live at Vaughan (city), in the Ontario (province/state) of Canada.
2. I have been engaged by or on behalf of Thunder Bay Hydro Electrical Distribution Inc. (name of party/parties) to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
 - (a) to provide opinion evidence that is fair, objective and non-partisan;
 - (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
 - (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date May 12, 2017

Y. Tsimberg
Signature