Exhibit 2:

RATE BASE

Exhibit 2: Rate Base

Tab 1 (of 7): Overview

RATE BASE OVERVIEW

E2/T1/S1/Att1 shows the trend in THI's rate base, which has increased from $8,686k in the 2009 EDR to $9,522k in this application

THI forecasts that its 2013TY average rate base will amount to $9,522k and consist of:

- $6,931k of Physical Distribution Plant assets, net of Accumulated Depreciation and Contribution in Aid of Construction ("CiAC"); and
- $2,591k of Working Cash Allowance.

The purpose of this evidence is to describe:

- THI's existing physical distribution system
- THI's capital budget for the 2013TY and its long range capital spending plans;
- THI's Contribution in Aid of Construction ("CiAC") policies and practices;
- THI's Accumulated Depreciation, and the associated policies'
- THI's asset accounting policies;
- THI's application of the Board's methodology for determining the Working Cash Allowance; and
- The reasons for year over year changes in gross assets, accumulated depreciation and computed working cash allowance.

THI forecasts that its 2013TY closing Rate Base values will consist of:

• Gross Property, Plant, Equipment	$20,050k
• Accumulated Depreciation	($9,605k)
• Contributions in Aid of Construction	($2,925k)
• Closing Physical Distribution Plant	$7,520k
• Opening Physical Distribution Plant	$6,342k
• Average Physical Distribution Plant	$6,931k
• Working Cash Allowance	$2,591k
• Rate Base 2013TY	$9,522k

THI's Physical Plant and Equipment ("PPE") consists of distribution stations, municipal stations, conductors, conduit, poles, transformers, services, meters and a server for the billing system. THI's PPE does not include computers, telecommunications gear, vehicles, buildings; these assets are owned by the Town of Tillsonburg and under the Master Services Agreement ("MSA") between the Town of Tillsonburg and THI, are made available to THI for its use in providing distribution service to the inhabitants of the Town of Tillsonburg. The Town of Tillsonburg retains ownership of all assets that are not specifically and directly required to distribute electricity.

THI proposes to invest $661k (E2/T4/S4 pg 5) in its distribution system and customer information system in the 2013TY. $532k will support the continuation of the Voltage Conversion Program, $64k expansion work, and $132k in changes to existing customer services which THI has assumed the customer will be funding by CiAC, and $65k to upgrade its customer information system. Smart Meter costs of $1,246k incurred in prior years, currently in Account 1555, will also be capitalized. THI's capital asset accounting in 2013 will adhere to MIFRS which is a change from Canadian GAAP in prior years.

The Town procures all the materials required under the capital budget according to its procurement policies to ensure open and competitive processes and prudently incurred costs. The Town's procurement policy is provided at E4/T6/S1/Att2.

The 2013TY MIFRS Rate Base is $622k (see Table 1) greater than that of the 2012BY CGAAP and $836k greater than THI's 2009 EDR rate base.

Table 1 – Annual Rate Base Variances (E2/T1/S1/Att1 & E2/T1/S1/Att2)

	2009 Approved	2009 Actual	2010 Actual	2011 Actual	2012 CGAAP Projection	2012 MIFRS Projection	2013 MIFRS Projection
Net Capital Assets in Service:							
Opening Balance	5,655,006	5,607,674	5,984,742	5,930,755	5,982,518	5,982,518	6,342,449
Ending Balance	6,830,215	5,984,742	5,930,755	5,982,518	6,127,695	6,342,449	7,520,472
Average Balance	6,242,611	5,796,208	5,957,748	5,956,637	6,055,107	6,162,484	6,931,460
Working Capital Allowance	2,443,672	2,557,074	2,640,046	2,844,943	2,844,944	2,866,276	2,590,610
Total Rate Base	**8,686,283**	**8,353,282**	**8,597,795**	**8,801,580**	**8,900,051**	**9,028,760**	**9,522,071**
Annual Rate Base Variance		**(333,001)**	**244,513**	**203,785**	**98,471**	**128,709**	**493,311**
							128,709
							622,020

THI's rate base has increased 9.4% since 2009 or 2.3% per year on average. The increase in distribution system assets is driven by:

- the connection of approximately 141 new residential customers;
- continued investment in the system to support the ongoing provision of distribution services to all existing and new customers in a safe and reliable manner, while maintaining an appropriate level of quality; and
- changes in the level of Working Cash Allowance.

THI's Distribution System

Distribution Plant is used to deliver energy and power from Hydro One's transmission system to the inhabitants of the Town of Tillsonburg and chiefly consists of:

- Distribution Stations;
- Conductors;
- Poles, towers;
- Conduit;

- Transformers;
- Service; and
- Meters

THI's physical distribution plant includes:

- 157 km of circuit km of line, that is characterized as:
  - 102 km of overhead line and 55 km of underground line; or
  - 73 km of 3 phase line and 84 km of single phase line;
- 1016 transformers
  - 2 Municipal Stations; and
  - 1014 distribution transformers

A schematic of THI's distribution system is provided at E1/T1/S6/Att1

These assets are deployed over a licensed service area that is 22 square kilometers or 9 square meters and provide redelivery of energy and power to approximately 6,900 end users during 2011.

THI takes delivery of power and energy from Hydro One Networks Inc. (HONI) at the Tillsonburg Transmission Station ("TS") which has 8 feeders. THI presently has exclusive use of four of these feeders. The maximum delivery capacity of the four feeders that are currently relied on is approximately 80 MVA, individually their maximum permitted long range loading is approximately 20 MVA.

HONI delivers power to THI at 27.6 kV. THI further transforms the 27.6 kV supply:

- To distribution voltages at its distribution transformers; or
- To 4.16 kV at its 2 Municipal Stations ("MS") and then to distribution voltages.

19 customers own their own transformers. Four of these customers take delivery at voltages greater than 750V.

THI's conductors, poles and conduit consist of two different systems – one being a legacy system and the other the renewed system. The legacy distribution system

operates at 4.16 kV, is typically situated along rear lot lines and serves the established residential customers of the Town of Tillsonburg. The renewed distribution system operates at 27.6 kV, is typically situated in public road allowance and serves the large commercial and industrial customers situated in south Tillsonburg as well as the newer developed areas of the Town that surround the central core area.

THI owns and operates approximately 6,800 meters. Consistent with provincial government policy, all of THI's Residential and GS<50 customers are equipped with smart meters. Approximately 10 of THI's GS 50 – 499 kW customers' demand exceed 200 kW and are equipped with meters with IT functionality. The remaining members of the GS 50 – 499 customer class are equipped with conventional meters. THI's GS 500 – 1499 and GS > 1500 customers are equipped with interval meters that satisfy the requirements of the Retail Settlement Code. THI owns and is responsible for all the Potential Transformers and Current Transformers and other gear required for metering purposes.

THI's distribution physical plant assets have an average remaining life of approximately 27 years. The system is appropriately maintained so that the physical plant assets will achieve their design service life. A key element of this maintenance program is monthly inspections of all THI's Municipal Stations and appropriate scheduling of regular and preventative maintenance activities. The inspections are also relied on to identify any assets that must or should be removed from service in order to maintain secure and reliable supply.

THI's physical assets are confined to the distribution plant required to receive and deliver power and energy in a safe and reliable manner to the inhabitants of the Town of Tillsonburg. THI does not own, operate or have any responsibility for fleet, IT, telecommunications, office and related assets and infrastructure. These assets are owned by the Town of Tillsonburg and are made available to THI pursuant to a Master Service Agreement ("MSA"), it is provided at E1/T2/S9/Att1. This ownership arrangement was implemented upon the dissolution of Tillsonburg Public Utilities Commission and the formation of THI. It is consistent with the Town's practice of

requiring a corporate entity or Town department to retain ownership of only those assets having unique application; as a result, THI owns those assets that are dedicated to the provision of electricity distribution service.

Under the terms of the MSA, THI has the use of Town owned assets such as:

- Vehicles, that include appropriately equipped boom and bucket trucks and service vehicles;
- Information Technology and telecommunications assets;
- Appropriate materials, tools etc; and
- Building and other facilities (eg, garage, warehouse).

It is important to recognize that THI's capital is understated versus that of other electricity distributors who own such assets. From an accounting perspective, THI rents these assets from the Town.

THI's asset accounting policies adhered to Canadian Generally Accepted Accounting Principles until the end of the its 2012 fiscal year and are described in the notes of the 2011 Financial Statements (E1/T3/S1/Att1). As of 2013, THI's accounting policies will adhere to Modified International Financial Reporting Standards. THI uses historic cost accounting and records asset acquisition costs and appropriately capitalized costs (eg. labour, materials, and burdens). Direct labour, fleet and material costs are assigned to projects and accounts based on a time sheet system. Engineering and Administration costs are burdened at 14% and 6% respectively and were capitalized until the end of 2012. Effective 2013, these costs will be expensed. THI uses pooled asset accounting for all assets other than Municipal Stations, which are accounted for as specific assets.
THI applies the Board's economic evaluation to all system expansions. The calculation relies on THI's actual capital structure rather than its hypothetical capital structure that is used for rate making purposes. THI seeks the maximum amount of CiAC from each project that is determined to be uneconomic at existing rates. CiAC is recorded as an offset to the gross value of all distribution assets and is appropriately amortized.

Additions to Rate Base

THI seeks Board approval to include the capital assets that will be commissioned in the 2013TY in its Board authorized 2013TY rate base:

Capital Investment

THI invests in its distribution system to:

- Attach new customers;
- Renew its existing infrastructure; and
- Implement provincial energy policy

Capital Budgeting Methodology

THI prepares a capital budget for each project it intends to undertake. The capital budget is based on THI's knowledge of the work to be performed, the type and amount of resources required to undertake and complete the work in a safe and efficient manner. Engineering, Administration and Fleet costs are estimated using long standing burden rates.

Using this methodology, THI prepared a five year capital financial plan for 2012 – 2016. This was approved by the THI Board of Directors in March 2012. See E2/T1/S1/Att3

Capital Budget – New Customers

THI will perform all required activities consistent with its Conditions of Service and with the Distribution System Code. Where appropriate, THI will make an Offer to Connect that sets out the services that THI will provide and if a CiAC is sought. No large load customers are forecast to connect to THI's distribution system in the 2013TY.

THI has attached new customers every year since formation. In order to attach a new residential customer THI must evaluate the existing infrastructure's capability of servicing the new customer(s) as well as identify the connection assets that must be put into place. Expansions to add new residential subdivisions typically rely on underground infrastructure, including conduit and conductor, adequate transformation, protection and control/grounding gear, meters, connection conductor – all of which must be co-ordinated with the overall civil infrastructure of the development. These costs are included in the economic evaluation that is conducted for all expansion projects and

impact the computed CiAC. In-fill residential customers typically do not give rise to a system expansion and are simply connected to the existing distribution system.

THI prepares an Offer to Connect for those customers who trigger a system expansion and a CiAC, consistent with the requirements of the DSC. The Offer to Connect sets out the activities that THI is responsible for, the choices available to the customer and the consequences – both financial and legal – to the customer.

In the 2013TY THI forecasts that it will need to invest $80k (E2/T4/S4 pg8) in capital to service 21 new residential lots.

Capital Budget – Voltage Conversion program

THI forecasts that it will invest $523k in the 2013TY through the Voltage Conversion program that renews its existing distribution system infrastructure so that existing customers continue to receive sate, reliable distribution service of an appropriate level of quality as well as benefits such as reduced system losses. The Voltage Conversion capital budget is provided in the table below:

1830	Poles, Towers and Fixtures	$ 155k
1835	Overhead Conductors & Devices	$ 106k
1840	Underground Conduit	$ 33k
1845	Underground Conductors & Devices	$ 7k
1850	Line Transformers	$ 159k
1855	Services	$ 63k
1860	Meters	$ -
1995	Contributions and Grants - Credit	$ -
	Total	$ 523k

The Voltage Conversion program was first implemented on a systematic basis starting in 2000 and will require several more years to complete. Under this program THI's legacy distribution system is replaced with assets operating at 27.6 kV and situated on public road allowance. The Voltage Conversion program provides the following benefits to THI's customers:

- Modernizing the distribution infrastructure;
- Eliminating obsolete or unsupported technologies and devices;
- Replacing devices that have reached or exceeded their designed service life;
- Implementing assets consistent with current safety standards;
- Improving accessibility by relocating assets from rear lot lines to public road allowance; and
- Reducing distribution system losses.

Under this program THI is replacing its legacy assets that operate at 4.16 kV 'delta' configuration with infrastructure that operates at 27.6 kV 'wye' configuration. Simultaneous with the replacement of these assets, THI rebalances the loading on the lines and optimizes the system (eg. to minimize distribution system losses). This program will modernize THI's distribution infrastructure, reduce losses and remove obsolete assets from service through annual phases. The service area that is to be dealt with under the voltage conversion program each year is identified considering:

- System performance;
- Outages and their causes;
- Asset management issues including vintage and condition of assets by area; and
- THI's knowledge of future development and expected changes in loading by area.

The need for the voltage conversion project was identified by Elecsar Engineering Ltd. and is documented in the May 19, 2000 report (E2/T1/S1/Att2). Elecsar conducted an operational audit of THI's system, as it existed in spring 2000, and determined that the distribution system was well maintained and operated in an efficient manner. Elecsar's operational audit identified the following concerns and opportunities:

- Overloading of THI's Municipal Stations;
- Consistent protection documentation and an overall need to clearly document all assets (eg. size ratings of fuses) and their current status (eg. whether switches are normally open);
- A need to test all devices used in the field;

- A need for new neutrals, rather than continuing to lightly load the existing neutral;
- The potential for large ground fault currents that, in the worst case, posed a public safety risk;
- A need to either rebalance the system or improve grounding;
- The need to match lightning arrestors to the distribution system, so that new equipment is not over-stressed;
- Overhead distribution system assets situated at the rear of properties;
- Reliance on gear that is or is approaching technological obsolescence (eg. certain oil filled breakers);
- The need for improved public signage on high voltage gear;
- Observed line losses were greater than average.

The Voltage Conversion program is implemented in a manner that allows THI to achieve lower distribution system losses and other benefits. An inspection of THI's system shows that areas served by legacy assets have assets located on the rear of the property's lot. This arrangement presents two reliability issues:

- THI has limited ability to control vegetation on private property; and
- THI cannot restore service as quickly if assets are situated at the rear of property due to equipment access considerations.

To overcome these concerns THI complements the implementation of the Voltage Conversion program with the relocation of distribution system assets to public road allowances. This action is expected to lower the cost of THI's vegetation management program and to improve its reliability performance.

The Voltage Conversion program also presents an opportunity to eliminate obsolete gear and equipment. THI recognizes that as more distributors modernize their distribution assets and it will become increasingly difficult to source replacement parts for its legacy 4.16 kV system. A 4.16 kV distribution system is becoming obsolete in south western Ontario as LDCs convert to higher operating voltages, such as 27.6 kV. As a result there is a well established pool of experienced staff familiar with the technical requirements, operations and maintenance of the newer systems. THI will benefit from

being able to participate in a large labour market of appropriately skilled operations and technical staff. Finally, there is a concern that the lack of access to replacement parts could result in unsatisfactory long outages to some of THI's customers. Replacing the legacy system with more commonly used assets and more modern systems is expected to realize benefits to THI's customers.

Another benefit of replacing legacy assets is that THI's system will be upgraded to current standards (eg. grounding standards). Like all capital systems, distribution assets have been improved over time (eg. for safety, reliability). THI's Voltage Conversion program presents an opportunity to deploy assets that meet or exceed current standards with respect to safety and reliability.

Through the Voltage Conversion program THI also has an opportunity to update its system records. This activity is being undertaken by the Town's Asset Management Technologist, in conjunction with other responsibilities (eg. to conduct an Asset Condition Assessment; to assist in populating the Town's GPS). This presents advantages to customers since it allows THI to document and inventory its assets, assess their condition and to develop an appropriate asset management maintenance and replacement program. These activities will ensure long term system reliability. This information will also be useful when implementing a computerized feeder design and operation program that will deal with balances and minimize line losses.

One of the key benefits to the Voltage Conversion program is reduced distribution system losses. This will benefit all customers in the short term as distribution losses are treated as a pass through. THI's customers have already benefited from an improvement in its loss factor; the Board approved 2009 loss factor was 4.20%. THI proposes to reduce its loss factor to 3.33% (E8/T3/S6/Att2) in the 2013TY. The loss factor will continue to improve as MS's are removed from service; MS 4 is expected to be removed from service in 2014 and MS 5 is expected in 2016.

THI will continue to monitor and evaluate its distribution system. The Asset Management Technologist duties include gathering information to assess the inventory of the

distribution system, populating the Town's GPS with distribution system information and conducting a distribution system condition assessment. All of these activities and tasks are undertaken in support of THI's overall capital replacement program that will ensure a fully functioning, safe and reliable distribution system through appropriate system maintenance and rehabilitation.

Capital Budget – Customer Information System

THI is required to upgrade its customer information system ("CIS") to Windows 7 at an estimated cost of $65k. This upgrade is required since the existing CIS system runs on Windows XP which is no longer supported.

Implementing Government Policy

Consistent with provincial government policy, THI began deployment of smart meters throughout its licensed service area in 2009 and all meters that required conversion were completed by December 2011.

The Town of Tillsonburg, who procures all of THI's assets, participated in the London Hydro Smart Meter RFP; its results provided more reliable pricing information. Consistent with the Board's accounting direction, THI deferred its Smart Meter capital spending in USoA account 1555 and has added it to rate base in the 2013TY. The amount being added is $981k to account 1860 Meters, $257k to account 1611 Computer Software and $8k to account 1920 Computer Equipment – Hardware. (E9/T4/S3/Att1)

THI will maintain and operate Smart Meters through its OM&A budget in the same manner as the electromechanical meters they replaced. These Smart Meters were procured from Elster and do not exceed the government's Minimum Specifications.

THI plans to continue to participate in the OPA provided or sponsored Conservation and Demand Management ("CDM") programs in the 2013TY. THI accounts for these costs and revenues as non-distribution adjustments. Consistent with the OEB's policy, THI will maintain its financial records so that its CDM capital spending is separate and distinct from the costs recovered through regulated rates. As a result, THI does not propose to

include any capital spending in the 2013TY that will be recovered through distribution rates for these activities.

Capital Spending Plans post 2013TY

THI expects to continue to implement the Voltage Conversion program and incur costs to service new residential lots. The forecast 2013TY cost is expected to representative of the overall capital program of each year. The voltage conversion program component is expected to vary from year to year, depending on the complexity of the phase of projects to be implemented and in light of other capital funding requirements. THI anticipates that if any new development capital is required, it would most likely be subject to a related CiAC.

THI's Contribution in Aid of Construction Policies and Practices

THI completes an Economic Feasibility test of all system expansion projects to determine whether a Contribution in Aid of Construction ("CiAC") will be required from the subject customers. THI uses the economic feasibility model prepared by the Electricity Distributors Association. THI runs the Economic Evaluation using its actual capital structure (100% equity), its average consumption/customer (approximately 750 kWh/month for residential customers) and, where applicable, average demand/customer. THI also uses its Board authorized distribution rates, the Board determined Allowed Return on Equity and prevailing tax rates. THI estimates the capital costs of each project uniquely and relies on its historic average OM&A/customer.

THI's long standing policy is to require that developers render the CiAC identified by the Economic Feasibility model. THI adheres to the requirement of the Distribution System Code when running the Economic Evaluation, making an Offer to Connect, recovering the CiAC and administering deposits.

For the purpose of forecasting the 2013TY Rate Base, THI has reflected the CiAC relating to the new residential lots of $80k.

THI does not have detailed knowledge of either the costs of the expansions that will be constructed in the 2013TY or of new customer load parameters.

THI's Accumulated Depreciation and associated policies

THI's opening accumulated depreciation is assumed to be the closing accumulated depreciation of the previous period. The depreciation expense of the period is added to the opening accumulated depreciation to determine the closing accumulated depreciation.

The difference between 2012BY CGAAP vs 2012BY MIFRS depreciation is to be placed into account 1575 in the 2013TY and amortized over four years.

EB-2012-0168

Exhibit 2

Tab 1

Schedule 1

Attachment 1

Rate Base Trend Table - MIFRS

X22 Rate Base Trend

	2009 Approved	2009 Actual	2010 Actual	2011 Actual	2012 Projection	2013 Projection
Net Capital Assets in Service:						
Opening Balance	5,655,006	5,607,674	5,984,742	5,930,755	5,982,518	6,342,449
Ending Balance	6,830,215	5,984,742	5,930,755	5,982,518	6,342,449	7,520,472
Average Balance	6,242,611	5,796,208	5,957,748	5,956,637	6,162,484	6,931,460
Working Capital Allowance *(see below)*	2,443,672	2,557,074	2,640,046	2,844,943	2,866,276	2,590,610
Total Rate Base	**8,686,283**	**8,353,282**	**8,597,795**	**8,801,580**	**9,028,760**	**9,522,071**

Expenses for Working Capital

Eligible Distribution Expenses:						
3500-Distribution Expenses - Operation	714,543	853,629	897,447	744,387	1,053,216	1,093,436
3550-Distribution Expenses - Maintenance	186,092	186,094	170,839	205,657	269,390	275,312
3650-Billing and Collecting	501,622	434,918	484,560	563,328	599,164	596,505
3700-Community Relations	0	0	1,967	5,365	1,000	900
3800-Administrative and General Expenses	459,981	398,456	647,967	709,134	712,501	748,929
3950-Taxes Other Than Income Taxes	0	0	0	0	0	0
Total Eligible Distribution Expenses	1,862,238	1,873,097	2,202,780	2,227,871	2,635,271	2,715,082
3350-Power Supply Expenses	14,428,910	15,174,062	15,397,529	16,738,417	16,473,238	17,212,690
Total Expenses for Working Capital	16,291,148	17,047,159	17,600,309	18,966,288	19,108,508	19,927,772
Working Capital factor	15.0%	15.0%	15.0%	15.0%	15.0%	13.0%
Working Capital Allowance	**2,443,672**	**2,557,074**	**2,640,046**	**2,844,943**	**2,866,276**	**2,590,610**

EB-2012-0168

Exhibit 2

Tab 1

Schedule 1

Attachment 2

Rate Base Trend Table - CGAAP

X22 Rate Base Trend

	2009 Approved	2009 Actual	2010 Actual	2011 Actual	2012 Projection	2013 Projection
Net Capital Assets in Service:						
Opening Balance	5,655,006	5,607,674	5,984,742	5,930,755	5,982,518	6,127,695
Ending Balance	6,830,215	5,984,742	5,930,755	5,982,518	6,127,695	7,089,160
Average Balance	6,242,611	5,796,208	5,957,748	5,956,637	6,055,107	6,608,428
Working Capital Allowance *(see below)*	2,443,672	2,557,074	2,640,046	2,844,943	2,844,944	2,575,200
Total Rate Base	**8,686,283**	**8,353,282**	**8,597,795**	**8,801,580**	**8,900,051**	**9,183,627**
Expenses for Working Capital						
Eligible Distribution Expenses:						
3500-Distribution Expenses - Operation	714,543	853,629	897,447	744,387	911,002	974,196
3550-Distribution Expenses - Maintenance	186,092	186,094	170,839	205,657	269,390	275,312
3650-Billing and Collecting	501,622	434,918	484,560	563,328	599,164	596,505
3700-Community Relations			1,967	5,365	1,000	900
3800-Administrative and General Expenses	459,981	398,456	647,967	709,134	712,501	748,929
3950-Taxes Other Than Income Taxes						
Total Eligible Distribution Expenses	1,862,238	1,873,097	2,202,780	2,227,871	2,493,057	2,595,842
3350-Power Supply Expenses	14,428,910	15,174,062	15,397,529	16,738,417	16,473,238	17,213,386
Total Expenses for Working Capital	16,291,148	17,047,159	17,600,309	18,966,288	18,966,295	19,809,228
Working Capital factor	15.0%	15.0%	15.0%	15.0%	15.0%	13.0%
Working Capital Allowance	**2,443,672**	**2,557,074**	**2,640,046**	**2,844,943**	**2,844,944**	**2,575,200**

EB-2012-0168

Exhibit 2

Tab 1

Schedule 1

Attachment 3

Elecsar Report

Elecsar Engineering Ltd.
Sarnia • Toronto
1149 Vanier Rd, Suite 1001
PO Box 2009
Tel: (519) 337-6580
Fax: (519) 332-6198
sarnia@elecsar.com

May 18, 2000

Mr. John Puhr
Superintendent of Water
Customer Service Centre of Tillsonburg
10 Lisgar Avenue
Tillsonburg, Ontario
N4G 5A5

Dear John,

Attached are four complete copies of the Due Diligence Report for the electrical system in Tillsonburg.

It has been a pleasure working with you and the other members of the Tillsonburg staff. We are prepared to present our report to your Board of Directors when they are in place. We would be happy to review our recommendations with you in the fall, after incorporation has been completed.

Good luck with your new corporate utility.

Sincerely,
Elecsar Engineering Ltd.,

Glen McFarlane, P. Eng.
Project Manager

cc Steven T. Lund, P. Eng.

Elecsar Engineering Ltd.
Sarnia Toronto
1149 Vanier Rd, Suite 1001
PO Box 2009 N7T 7K2
Tel: (519) 337-6580
Fax: (519) 332-6198
sarnia@elecsar.com

DUE DILIGENCE (OPERATIONAL) AUDIT

TILLSONBURG ELECTRIC SYSTEM

Prepared by: Elecsar Engineering Co. Ltd.
G.A. McFarlane, P.Eng.
D. McGarry, C.E.T.

Date: May 19, 2000

Revision: 0

TABLE OF CONTENTS

1.0 FORWARD

Elecsar Engineering has been engaged to perform a Due Diligence Study of the Tillsonburg Electric System.

In phase I of our study, we performed a general review of the following areas:

1.1 Condition of Physical Resources

- Overhead and Underground Lines
- Substations
- Fixed Assets
- Rolling Stock

This study is NOT intended as a detailed engineering audit of the facilities. In a number of areas, further investigation/review is indicated.

In particular, the following sections of the Ontario Electrical Safety Code (OESC) are relevant to our review:

- Fencing: 26-300
- Grounding: 10-000 to 10-1108, 36-302
- Warning Notices: 36-006

1.2 Human Resources/Safety

- Current competence level of trades staff
- Adequate relevant operating procedures
- Safety policy, procedures, training and records

The purpose of health and safety legislation is to ensure the health and safety of workers. Specific emphasis has been given in this report to items which could constitute a safety hazard to the general public as well as the workers. The corporation, as well as individuals (owners, directors, and officers) may be subject to fines and the individuals may be imprisoned if the courts decide that legislation has been contravened.

It is therefore prudent for employers to review their health and safety policies and practices. This is not only to ensure a safe work environment, but also to determine whether their practices would be sufficient to provide a defence of "Due Diligence" in the event of prosecution. Documentation is required to show that all reasonable care was taken to ensure compliance with the Act, for protection of workers and the public, regardless of the individual's own incompetence, recklessness or stupidity.

1.3 Environmental Responsibility

Along with a change in ownership, goes the responsibility for environmental liabilities that existed prior to sale. The new Board of Directors must be aware of potential liabilities, which could accrue or have occurred in the past. These typically include: P.C.B. contamination, heavy metal contamination (lead), arsenic contamination, and coal tar contamination.

1.4 Economic Viability

In addition to other responsibilities, the new Board of Directors will now have responsibility to produce income (dividend) for the shareholders. They will also have to investigate opportunities to expand and/or partner with others.

Item 1.4 was not considered part of our Phase I study.

2.0 GENERAL OBSERVATIONS

2.1 Site Security

The Utility is required to provide protection to the public at all sites.

Due Diligence dictates that all reasonable effort must be taken to prevent entry and, secondly, if the public comes within the vicinity of any facility, they should not be harmed.

Two things provide security when a site is constructed as a Distribution Station. First, Ground Resistance studies are done to ensure the ground counterpoise is constructed in such a manner as to prevent Step and Touch Potentials from appearing that would put people at risk. This includes an area outside the fence of approximately three feet, which would be a typical reach of a person coming up to the fence. Secondly, all areas should be fenced in accordance with the OESC Code, Section 26-300.

2.2 Nomenclature (Personnel Protection)

In order to safely operate a utility, all devices must be identified with a singular name that is not repeated and is clearly visible to all personnel who are called upon to operate the devices. All devices should be noted on an operating diagram. This diagram should be available to all personnel so they can visualize the operations they are to perform.

Written procedures in the form of orders to operate refer to these devices, which they can then follow.

One common nomenclature system should be adopted.

The nomenclature system will need to be reviewed or revised.

All stations need current single-line diagrams posted to reflect what is in service, what is open, and what is closed. Every station needs a current AC and DC elementary, so that proper isolation can be achieved for personnel doing work on equipment. This would not only protect people, but also would prevent the unnecessary interruption to customers and damage to equipment. A complete and current set of prints should be available for all stations showing the wiring diagrams. See Section 36-006 of OESC Code.

Where two jurisdictions come together, there should be nomenclature to inform all parties that this is where care must be taken. Typically, there are open points that should remain open to ensure the metering is always correct and, when faults occur, the equipment is cleared properly, as expected, so that people are not put at risk.

Switches, which are non-load break, should be labelled as such, to prevent inadvertent operation under load.

Identification is important to prevent personnel from thinking they are working on 4 kV equipment instead of 8 kV equipment or vice versa, and to prevent the installation of equipment that is the wrong class. The size of the insulators and arrestors cannot be used as a guide to identify voltage levels because many have been upgraded to 16 kV as a result of a previous failure.

2.3 Safety Equipment

The use of untested switch sticks violates the letter and intent of EUSA Rule 114. These devices should not be used, nor should they remain available to use. See EUSA Rules 113 and 114.

2.4 Distribution System

Over the years, the systems have grown and some things have not kept pace with the changes. The 27.6 kV system was a 3 wire, 27.6 kV delta system, with distribution stations throughout the service area to step down the voltage and distribute to customers. The distribution systems from all these stations, at that time, had a limited ground fault capability (450 Amps) at 27.6 kV. These systems were made up of 4160 Wye connected feeders going out to the streets to be stepped down by transformers for distribution to houses. A small neutral was strung along the streets and care was taken to balance the load between the phases to ensure very small current unbalance would flow in the neutral.

These distribution stations were becoming overloaded. A choice was made to change to a Wye connected 27.6/16 kV system and supply distribution transformers directly from the primary feeder, rather than increase the size or number of these feeders. The maximum ground current during faults at 27.6 kV is now 10kA. Feeders from the main transformer stations were placed into service. However, instead of installing a neutral for all feeders, the existing 4 kV neutral was utilized in some cases. If the system were balanced again, the neutral would carry very little current.

Along with this, every time a 16 kV single-phase transformer was installed, the neutral would be grounded at this point and there would be a shared path for ground currents. Over time, a new neutral should have been pulled back to the station.

Large imbalances present a serious problem. At least 10,000 Amps of ground current can be delivered out on these feeders in a fault condition and with the small conductor, it is not possible to deliver this magnitude of current. This situation could result in high ground fault currents that could cause step potential to the public, and damage telephone type cables, railway crossing warning signals, etc. In addition, there could be slow clearing faults that could cause voltage reductions for a longer time, until relays would time out and trip breakers to clear them. This could cause undesirable outages to customers.

A neutral review program should be undertaken to upgrade the 27.6 kV and 4.16 kV systems. In the meantime, the distribution stations and 27.6 kV feeders should have the currents balanced and, approximately every 6 to 10 pole spans, a ground must be dropped down the pole to ground rods. If a transformer is located at these intervals, the transformer ground connection will suffice.

2.5 Lightning Surge Protection

Lightning outages are a major problem because of power interruptions and equipment damage. Very long 27.6/16 kV feeders should be checked to ensure that 21 kV lightning arrestors are located on all phases at frequent intervals. When the feeders were converted to 27.6/16 kV, all 34 kV arrestors protecting lines, cables, transformers, etc. should have been changed to 21 kV. The 34 kV arrestors over-stress new equipment because the new equipment is designed for a lower voltage class.

2.6 Protection Issues

Protections are handled differently from station to station. Protection tags may be left over, partially filled out, and some systems, like reclosure, need to be reviewed, to explain the intent of a reclosure block and the reason it needs to be put back when "hold off" is no longer required. This whole process needs to be reviewed and standardized.

Work protection courses are an ongoing requirement and must be reviewed and recorded annually for all employees who use the code. Supervisors should not allow employees, who are not trained in the latest code, to hold work protections.

2.7 Oil Containment/Spill Remediation Plan

An oil containment and oil spill remediation plan is in place. The plan should typically contain the following:

- Vacuum truck providers phone numbers/response time
- 100 feet of floating oil containment boom if required
- Supply of oil absorbents
- Spare drums
- In some instances, a clay type berm should be installed around transformers when oil may reach the street/sewers or waterways in the first few minutes of a major leak

2.8 Liability Insurance

Tillsonburg carries liability insurance through MEARIE, which implies that they carry spills abatement insurance, and officers' and directors' insurance.

3.0 SPECIFIC COMMENTS: TILLSONBURG

- Tillsonburg has been an efficiently run Utility supplying electricity and water services to 6,000 customers in the Town of Tillsonburg.
- At dissolution, Tillsonburg PUC had a staff of 20 employees, with approximately 8 of those dedicated to the water system.
- On January 1, 2000, all employees were transferred to the Town of Tillsonburg.
- Tillsonburg operates an electrical system comprising about 135 km of lines, about 90 km of overhead and 45 km of underground circuits. About 10% of the system has been converted to 27.6 kV.
- All 27.6 feeder neutrals have been upgraded to 336.MCM aluminum
- They own and operate 5 electrical substations, stepping voltage down from 27,600 volts to 4160 volts.
- Total system peak load in 1999 was 37,000 kW, and nearly 200,000 megawatt hours of electricity were delivered to customers.
- Tillsonburg has a worker-management safety committee, which meets regularly to discuss and solve safety issues. The Commission safety policy is posted.
- WHMIS data sheets and Department of Labour safe practices are posted in conspicuous locations.
- PCB handling and storage procedures, and records are well documented. PCB's have been cleared from all substation transformers. However, a program has not yet been initiated to identify and label PCB containing distribution transformers.
- System losses are relatively high, at 4.48% in 1998.
- There are several rear lot overhead circuits remaining, which may constitute a public safety concern. They have made a good start at cleaning up rear lot overhead, but some remaining areas still require cleaning up, particularly downtown.
- Tillsonburg is supplied at 27.6 kV via three feeders from Tillsonburg T.S. (Ontario Hydro). There is good backup to all feeders.

- Tillsonburg has five 27.6/4.16 kV substations, all relatively lightly loaded so that there is no serious problem switching load from one station to another, except at peak load times.

- Overhead systems appear to have been well maintained. They have an ongoing conversion program to convert 4.16 kV to 27.6 kV.

- Tillsonburg has a good mix of industrial, commercial, and residential customers. There are six larger industrial customers in the range of 1 to 4.5 MW

3.1 Municipal Station #1 – Corner of Park and Concession Streets

- There is a 5000 kVA transformer located here, 27.6/4.16 kV, 1957 vintage.

- Impedance: 5.8%

- This station supplies four 4.16 kV feeders via very old oil circuit breakers. Although these breakers are operating satisfactorily, and have been tested and inspected in the last few years, we would be concerned that in the event of a failure, it would be difficult to obtain replacement parts.

- Ground conductors, where visible, appear to be in good condition.

- Location signs should be added to the front of the building for assistance to emergency crews. Warning signs are satisfactory.

- Fencing is satisfactory.

- Oil containment curb has been added around transformer.

- We were unable to determine the size rating of the 27.6 kV fuses. These should be no greater than 150E.

3.2 Municipal Station #2 – Bloomer Street

- There is a 4000 kVA, 27.6/4.16 kV transformer located here, 1951 vintage.
- Impedance: 6.62%