Ohio | Public Utilities Commission

Application for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility

Case No.: 09-1060-EL-REN

A. Name of Renewable Generating Facility: Michigan South Central Power Agency Endicott Generating Station
The name specified will appear on the facility's certificate of eligibility issued by the Public Utilities Commission of Ohio.

Facility Location
Street Address: 720 Herring Road
City: Litchfield State: Michigan Zip Code: 49252

Facility Latitude and Longitude
Latitude: 42° 1' 47" Longitude: -84° 45' 11"
There are internet mapping tools available to determine your latitude and longitude, if you do not have this information.

If applicable, U.S. Department of Energy, Energy Information Administration Form EIA-860 Plant Name and Plant Code.

EIA-860 Plant Name: Endicott Generating

EIA Plant Code: 7970

B. Name of the Facility Owner Michigan South Central Power Agency
Please note that the facility owner name listed will be the name that appears on the certificate. The address provided in this section is where the certificate will be sent.

If the facility has multiple owners, please provide the following information for each on additional sheets.

Applicant's Legal Name (First Name, MI, Last Name): Glen E. White
Title: General Manager
Organization: Michigan South Central Power Agency
Street Address: 720 Herring Road
City: Litchfield State: Michigan Zip Code: 49252
Country: United States
Phone: 517-542-2346, ext. 308 Fax: 517-542-3049 Email Address: whiteg@mscpa.net
Web Site Address (if applicable): www.mscpa.net

C. List name, address, telephone number and web site address under which Applicant will do business in Ohio.

Applicant's Legal Name (First Name, MI, Last Name): Glen E. White
Title: General Manager
Organization: Michigan South Central Power Agency
Street Address: 720 Herring Road
City: Litchfield State: Michigan Zip Code: 49252
Country: USA
Phone: 517-542-2346, ext. 308 Fax: 517-542-3049 Email Address: whiteg@mscpa.net
Web Site Address (if applicable): www.mscpa.net

D. Name of Generation Facility Operating Company: Michigan South Central Power Agency
Legal Name of Contact Person (First Name, MI, Last Name): Glen E. White
Title: General Manager
Organization: Michigan South Central Power Agency
Street Address: 720 Herring Road
City: Litchfield State: Michigan Zip Code: 49252
Country: USA
Phone: 517-542-2346, ext. 308 Fax: 517-542-3049 Email Address: whiteg@mscpa.net
Web Site Address (if applicable): www.mscpa.net

E. Contact person for regulatory or emergency matters
Legal Name of Contact Person (First Name, MI, Last Name): Glen E. White
Title: General Manager
Organization: Michigan South Central Power Agency
Street Address: 720 Herring Road
City: Litchfield State: Michigan Zip Code: 49252
Country: USA
Phone: 517-542-2346, ext. 308 Fax: 517-542-3049 Email Address: whiteg@mscpa.net
Web Site Address (if applicable): www.mscpa.net

F. Certification Criteria 1: Deliverability of the Generation into Ohio

Ohio Revised Code (ORC) Sec. 4928.64(B)(3)

The facility must have an interconnection with an electric utility.

Check which of the following applies to your facility's location:

__ The facility is located in Ohio.

X The facility is located in a state geographically contiguous to Ohio (Indiana, Kentucky, **Michigan**, Pennsylvania, or West Virginia).

__ The facility is located in the following state:

If the renewable energy resource generation facility is not located in Ohio, Indiana, Kentucky, Michigan, Pennsylvania, or West Virginia, you are required to submit a study by one of the regional transmission organizations (RTO) operating in Ohio, either PJM or Midwest ISO, demonstrating that the power from your facility is physically deliverable into the state of Ohio. The study may be conducted by someone other than the RTO provided that the RTO approves the study. This study must be appended to your application as an exhibit.

G. Certification Criteria 2: Qualified Resource or Technology

You should provide information for only one resource or technology on this application; please check and/or fill out only one of the sections below. If you are applying for more than one resource or technology, you will need to complete a separate application for each resource or technology.

G.1. For the resource or technology you identify in Sections G.4 – G.13 below, please provide a written description of the system. **See attached report.**

G.2. Please include a detailed description of how the output of the facility is going to be measured and verified, including the configuration of the meter(s) and the meter type(s). **See attached report.**

G.3. Please attach digital photographs that depict an accurate characterization of the renewable generating facility. Please indicate the date(s) the photographs were taken. For existing facilities, these photographs must be submitted for your application to be reviewed. For proposed facilities or those under construction, photographs will be required to be filed within 30 days of the on-line date of the facility.

Photograph(s) will be provided within 30 days of the start-up of the tire fractionation column.

The Applicant is applying for certification in Ohio based on the following qualified resource or technology (Sec. 4928.01 O.R.C.):

G.4 __ SOLAR PHOTOVOLTAIC

Total PV Capacity (DC):
Total PV Capacity (AC):
Expected Capacity Factor:
Capacity factor is the ratio of the energy produced to the maximum possible at full power, over a given time period. Capacity factor may be calculated using this formula:

Projected annual generation (kWh or MWh) ***divided by*** *[the nameplate capacity (in kW or MW)* ***times*** *8760]*

Anticipated Annual output in kWh/yr:
Location of the PV array: __ Roof __ Ground __ Other
# of Modules and/or size of the array:

G.4a PV Modules
For each PV module, provide the following information:

Manufacturer:
Model and Rating:

G.5 __ SOLAR THERMAL (FOR ELECTRIC GENERATION)

G.6 __ WIND

Total Nameplate Capacity (kilowatts AC): or kW DC:
Expected Capacity Factor:
Anticipated Annual Output in kWh/yr or MWh/yr:
# of Generators:

G.6a Wind Generators
If your system includes multiple generators, please provide the following information for each unique generator you have in your system

Manufacturer:
Model Name and Number:
Generator Nameplate Capacity (kilowatts AC):
Wind Hub Height (ft):
Wind Rotor Diameter (ft):

G.7 __ HYDROELECTRIC ("hydroelectric facility" means a hydroelectric generating facility that is located at a dam on a river, or on any water discharged to a river, that is within or bordering this state or within or bordering an adjoining state (Sec. 4928.01(35) O.R.C.)

Check each of the following to verify that your facility meets each of the statutory standards (Sec. 4928.01(35) O.R.C.):

__ (a) The facility provides for river flows that are not detrimental for fish, wildlife, and water quality, including seasonal flow fluctuations as defined by the applicable licensing agency for the facility.

__ (b) The facility demonstrates that it complies with the water quality standards of this state, which compliance may consist of certification under Section 401 of the "Clean Water Act of 1977," 91 Stat. 1598, 1599, 33 U.S.C. 1341, and demonstrates that it has not contributed to a finding by this state that the river has impaired water quality under Section 303(d) of the "Clean Water Act of 1977," 114 Stat. 870, 33 U.S.C. 1313.

__ (c) The facility complies with mandatory prescriptions regarding fish passage as required by the Federal Energy Regulatory Commission license issued for the project, regarding fish protection for riverine, anadromous, and catadromus fish.

__ (d) The facility complies with the recommendations of the Ohio Environmental Protection Agency and with the terms of its Federal Energy Regulatory Commission license regarding watershed protection, mitigation, or enhancement, to the extent of each agency's respective jurisdiction over the facility.

__ (e) The facility complies with provisions of the "Endangered Species Act of 1973," 87 Stat. 884, 16 U.S.C. 1531 to 1544, as amended.

__ (f) The facility does not harm cultural resources of the area. This can be shown through compliance with the terms of its Federal Energy Regulatory Commission license or, if the facility is not regulated by that commission, through development of a plan approved by the Ohio Historic Preservation Office, to the extent it has jurisdiction over the facility.

__ (g) The facility complies with the terms of its Federal Energy Regulatory Commission license or exemption that are related to recreational access, accommodation, and facilities or, if the facility is not regulated by that commission, the facility complies with similar requirements as are recommended by resource agencies, to the extent they have jurisdiction over the facility; and the facility provides access to water to the public without fee or charge.

__ (h) The facility is not recommended for removal by any federal agency or agency of any state, to the extent the particular agency has jurisdiction over the facility.

G.8 __ GEOTHERMAL

G.9 X SOLID WASTE (as defined in ORC section 3734.01), electricity generation using fuel derived from solid wastes through fractionation, biological decomposition, or other process that does not principally involve combustion. (Sec. 4928.01(A)(35) O.R.C.)

Identify all fuel types used by the facility and respective proportions (show by the percent of heat input): **Fractionated/gasified rubber tires – up to 20 pct. of total heat input and coal – not less than 80 pct. of total heat input. See attached report for further details.**

G.10__ BIOMASS (includes biologically-derived methane gas, such as landfill gas)

Identify the fuel type used by the facility:

If co-firing an electric generating facility with a biomass energy resource, the proportion of fuel input attributable to the biomass energy resource shall dictate the proportion of electricity output from the facility that can be considered biomass energy.

G.10a List all fuel types used by the facility and respective proportions (show by the percent of heat input):

G.10b Please attach the formula for computing the proportions of output per fuel type by MWh or kWh generated.

G.11 __ FUEL CELL (any fuel cell used in the generation of electricity, including, but not limited to, a proton exchange membrane fuel cell, phosphoric acid fuel cell, molten carbonate fuel cell, or solid oxide fuel cell; Sec. 4928.01(35)(A) O.R.C.).

Identify all fuel types used by the facility and respective proportions:

G.12 __ STORAGE FACILITY

If using compressed air or pumped hydropower, the renewable energy resource used to impel the resource into the storage reservoir is (include resource type and facility name):

H. Certification Criteria 3: **Placed in Service Date** (Sec. 4928.64. (A)(1) O.R.C.)

The Renewable Energy Facility:

__ has a placed-in-service date before January 1, 1998; (month/day/year):

__ has a placed-in-service date on or after January 1, 1998; (month/day/year):

__ has been modified or retrofitted on or after January 1, 1998; (month/day/year):

Please provide a detailed description of the modifications or retrofits made to the facility that rendered it eligible for consideration as a qualified renewable energy resource. In your description, please include the date of initial operation and the date of modification or retrofit to use a qualified renewable resource. Please include this description as an exhibit attached to your application filing and identify the subject matter in the heading of the exhibit.

X Not yet online; projected in-service date (month/day/year): **3/15/10**

H.1 Is the renewable energy facility owner a mercantile customer?

ORC Sec. 4928.01 (19) "Mercantile customer" means a commercial or industrial customer if the electricity consumed is for nonresidential use and the customer consumes more than seven hundred thousand kilowatt hours per year or is part of a national account involving multiple facilities in one or more states.

X No

__ Yes

Has the mercantile customer facility owner committed to integrate the resource under the provisions of Rule 4901:1-39-08 O.A.C?

__ No

__ Yes

If yes, please attach a copy of your approved application as an exhibit to this filing.

I. Facility Information

The nameplate capacity of the entire facility in megawatts (MW): 55

If applicable, what is the expected heat rate of resource used per kWh of net generation: 12,919 BTU/kWh

Number of Generating Units: 1

I.1 For each generating unit, provide the following information:

In-Service date of each unit	The nameplate capacity of each unit in megawatts (MW)	Projected Annual Generation (MW)	Expected Annual Capacity Factor %
December 1982	55	433,620	90

(To expand the number of rows if more units need to be reported, place your cursor in the bottom right cell and hit tab).

J. Regional Transmission Organization Information

J.1 In which Regional Transmission Organization area is your facility located:

__ Within Geographic Area of PJM Interconnection, L.L.C.

X Within Geographic Area of Midwest ISO

__ Other (specify):

J.2 Are you a member of a regional transmission organization?

X Yes; specify which one: Midwest ISO

__ No; explain why you are not a member of a regional transmission organization:

J.3 Balancing Authority operator or control area operator for the facility:

__ PJM

X Midwest ISO

__ Other (specify):

K. Attribute Tracking System Information

Are you currently registered with an attribute tracking system: __ Yes **X** No

In which attribute tracking system are you currently registered or in which do you intend to register ***(the tracking system you identify will be the system the PUCO contacts with your eligibility certification):***

X GATS (Generation Attribute Tracking System)

__ M-RETS (Midwest Renewable Energy Tracking System)

__ Other (specify):

K.1 Enter the generation ID number you have been assigned by the tracking system:
If the generation ID number has not yet been assigned, you will need to provide this number to the PUCO within 15 days of your facility receiving this number from the tracking system).

L. Other State Certification

Is the facility certified by another state as an eligible generating resource to meet the renewable portfolio standards of that state?

__ Yes

X No

L.1 If yes, for each state, provide the following information:

Name of State	State Certification Agency	State Certification Number	Date Issued

(To expand the number of rows if more units need to be reported, place your cursor in the bottom right cell and hit tab).

M. Type of Generating Facility

Please check all of the following that apply to your facility:

X Utility Generating Facility:

- __ Investor Owned Utility
- __ Rural Electric Cooperative
- X Municipal System

__ Electric Services Company (competitive retail electric service provider certified by the PUCO)

__ Distributed Generation with a net metering and interconnection agreement with a utility.
Identify the utility:

__ Distributed Generation with both on-site use and wholesale sales.
Identify the utility with which the facility is interconnected:

__ Distributed Generation, interconnected without net metering.
Identify the utility with which the facility is interconnected:

Note: if the facility does not yet have an interconnection agreement with a utility or transmission system operator, please note here the status of the application for such an agreement:

N. Meter Specifications

All facilities are required to measure output with a utility grade meter. Please provide this information for each meter used in your system.

Manufacturer: **Power Measurement, Inc. ION 8300 – two meters TB1 and TB2**
Serial Number: **PS 050A1036-01 and PS 0501A038-01**
Type: **Multi-function revenue-class revenue and power meters**
Date of Last Certification: **Meter TB1 – 2-13-09; Meter TB2 – 1-10-09**

Attach a photograph of the meter with date image taken. The meter reading must be clearly visible in the photograph. **See attached photos taken 11-13-09**

Report the total meter reading number at the time of the photograph and specify the appropriate unit of generation (e.g., kWh): **TB1 – 00745802.562 kWh deliver**
TB2 – 00710620.500 kWh deliver

INSERT PHOTOGRAPH(S)

The Public Utilities Commission of Ohio reserves the right to verify the accuracy of the data reported to the tracking system and to the PUCO.

PUCO Case No. 09-1060-EL-REN
Application for Certification as an Eligible Renewable Energy Resource Generating Facility
Michigan South Central Power Agency Endicott Generating Station

Addendum to Section G. Certification Criteria 2

Michigan South Central Power Agency (MSCPA) will generate up to 20 percent of electricity from Project 1 at the Endicott Generating Station using a fuel-rich gas stream derived from fractionated whole scrap tires. Project 1 is a 55 MW electric generating unit currently fired primarily on coal and petroleum coke (pet coke) with the capability to also fire distillate oil used as an emergency backup fuel. Project 1 will be modified to equip the boiler with up to four wall burners to fire the alternative fuel-rich gas stream beginning in the second quarter 2010. MSCPA received Permit to Install No. 362-06A issued on July 10, 2009 from the Michigan Department of Environmental Quality, Air Quality Division, to construct and operate the tire fractionation process and to modify Project 1 to fire the alternative fuel-rich gas stream.

The tire fractionation process to be installed on Project 1 is very unique, and is the first design of this type in the United States for a utility boiler application. The tire fractionation process is based on a design offered by technology suppliers Symbiotic Energy LLC and Recyclean Technology LLC. Recyclean Technology LLC has applied for a patent for their system – U.S. patent pending: ENERGY AND STEEL RECOVERY SYSTEM, Number 10/908,525.

Whole scrap tires are delivered to the site by truck and stored in enclosed trailers or other suitable enclosed containers. The tires will be removed from these containers and fed by an incline conveyor directly into the top of the fractionation column. The maximum tire feed rate into the process is one 20 lb tire every 6 seconds, or 600 tires per hour or 12,000 lbs/hr. Upon entering the top of the fractionation unit, the tires cascade downward through a series of forks and begin to thermally decompose into carbon-based particulate, combustible gases, and waste metal (steel belting). At the top of the fractionation column, the combination of gas and carbon solids are ducted to a set of dedicated burners located on the wall of the boiler burner system. Near the base of the unit, the waste steel belting material is collected and the steel is then sold to a scrap metal reclamation service.

Figures 1 and 2 give an overview of the tire fractionation process. Whole tires are introduced at the top of a vertical column through an air lock. The fractionation column is a vertical cylindrical tower and is approximately 120 feet tall. The tires are suspended within the gasification column by means of a series of retractable steel alloy rods or "fingers" that allow hot gases to pass through unimpeded. A slip-stream of hot combustion gases (750 to 850°F) is taken from Project 1 following the superheater and introduced at the bottom of the column. The hot boiler gas stream rises countercurrent to the descending tire movement within the enclosed vertical column allowing for a number of phase zones and fractionation/gasification stages. The column operates at sub-stoichiometric oxygen levels causing the tires to pyrolyze or gasify forming a high-Btu fuel-rich gas stream comprised of carbon solids and combustible gas. There is no supplemental fuel firing or combustion in the fractionation column.

Tires will move down the column through the sequential retraction of the alloy fingers. The column will operate under negative pressure. Hot combustion gases entering the bottom of the column are drawn from the boiler while the fuel rich gases exiting the column are ducted back to the boiler by a forced draft fan located between the exit of the column and the boiler. The fuel-rich gas stream from the column is introduced as a gaseous fuel into the boiler combustion zone thereby releasing its latent heat content as it is combusted. Once all rubber is consumed and gasified, the steel contained in the tires is discharged at the bottom of the column, and is recovered for its value as scrap metal.

MSCPA Endicott Generating Station Project 1 is rated at 55 MW electrical output. Project 1 has a maximum heat input rating of 570 MMBtu/hr and is capable of producing 480,000 lb/hr of steam at 1,250 psig and 950°F. MSCPA plans for full-scale implementation would be to produce up 20 percent fuel heat input augmentation with the tire-derived fuel-rich gas stream. This level of augmentation equates to 114 MMBtu/hr heat input and approximately 4.5 tons per hour of coal/pet coke conservation at maximum heat input conditions.

MSCPA will measure and verify Project 1 electrical output and the amount attributable to the combustion of a renewable energy resource; i.e., the tire-derived fuel-rich gas stream, through a combination of metering systems and other instrumentation. The basic algorithm for this determination is as follows:

$$\text{Electrical Output}_{\text{renewable energy}} = \text{Electrical Output}_{\text{total}} \times \text{Percentage Total Heat Input}_{\text{renewable energy}}$$

MSCPA will determine the amount of electricity output produced by Project 1 from combustion of the tire-derived fuel-rich gas stream on a monthly basis. Each month, the total electricity output in MW produced will be accessed from the main station power meter – see application Section N for a description of this meter.

The percentage of total boiler heat input generated from combustion of the renewable energy resource will be determined on a monthly basis. The percent heat input attributable to the burning of tire-derived fuel-rich gas stream will be calculated by knowing the monthly heat inputs from each fuel stream combusted in Project 1.

$$\text{Percentage Total Heat Input}_{\text{renewable energy}} = [\text{Heat Input}_{\text{renewable energy}} \div \text{Total Heat Input}_{\text{all fuels}}] \times 100$$

The total monthly heat input to Project 1 is the summation of the measured and calculated heat input for each fuel stream.

Coal/Pet Coke –

Weekly composite samples of coal/pet coke are obtained from the coal feed system and analyzed for heat content among other parameters; for example, sulfur content. The weekly coal/pet coke samples are further composited to a single monthly sample and analyzed to determine the monthly average heat content in Btu per pound of coal/pet coke.

The monthly coal/pet coke firing rate will be obtained from the fuel monitoring records taken from the calibrated and certified coal feeder weigh scales.

The monthly heat input from coal and pet coke is calculated as follows:

$$\text{Heat Input}_{\text{coal/pet coke}}\text{, Btu/month} = \text{Quantity Fired}_{\text{coal/pet coke}}\text{, lbs/month x Heat Content}_{\text{coal/pet coke}}\text{, Btu/lb}$$

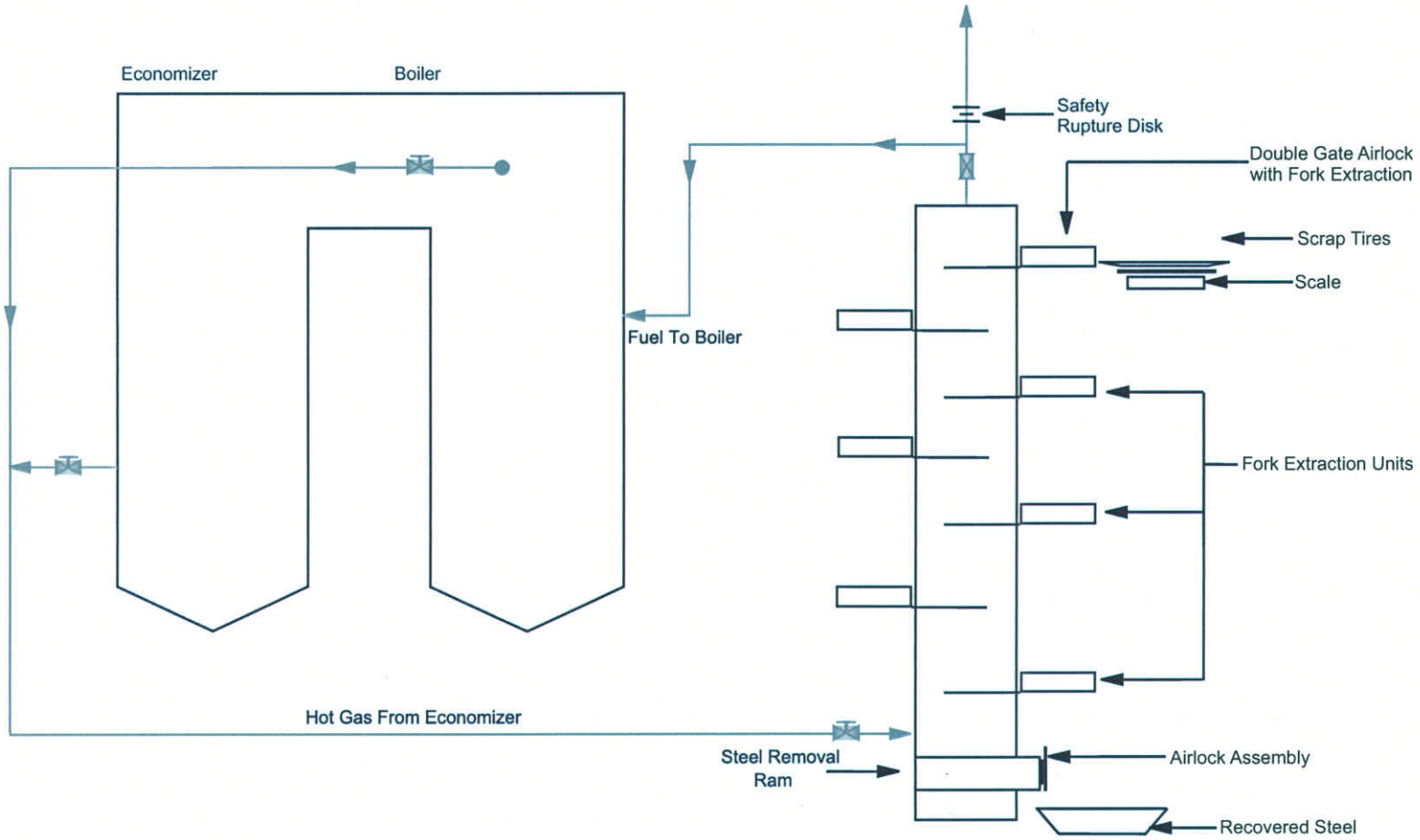
Renewable Energy Resource --

The monthly heat input rate from the tire fractionation process will be based on the amount of scrap tires fed to the column and a heat input constant derived for the tire-derived fuel-rich gas stream. The scrap tire feed rate in pounds will be measured by a load cell located at the entry point to the fractionation column. Each tire that is introduced to the column will be weighed and recorded. The total weight of scrap tires charged in a given month will be recorded.

The technology supplier, ERAtech, has conducted pilot scale testing of their fractionation process and has derived a nominal heating value released from gasifying a typical scrap tire. The heat content that will be used as a constant for heat input calculations is 13,362 Btu released per pound of scrap tire gasified. (Btu/lb scrap tire).

The monthly heat input from scrap tire fractionation/gasification is calculated as follows:

$$\text{Heat Input}_{\text{tires}}\text{, Btu/month} = \text{Quantity Fed}_{\text{tires}}\text{, lbs/month x Heat Release/Content}_{\text{tires}}\text{, 13,362 Btu/lb}$$



MSCPA

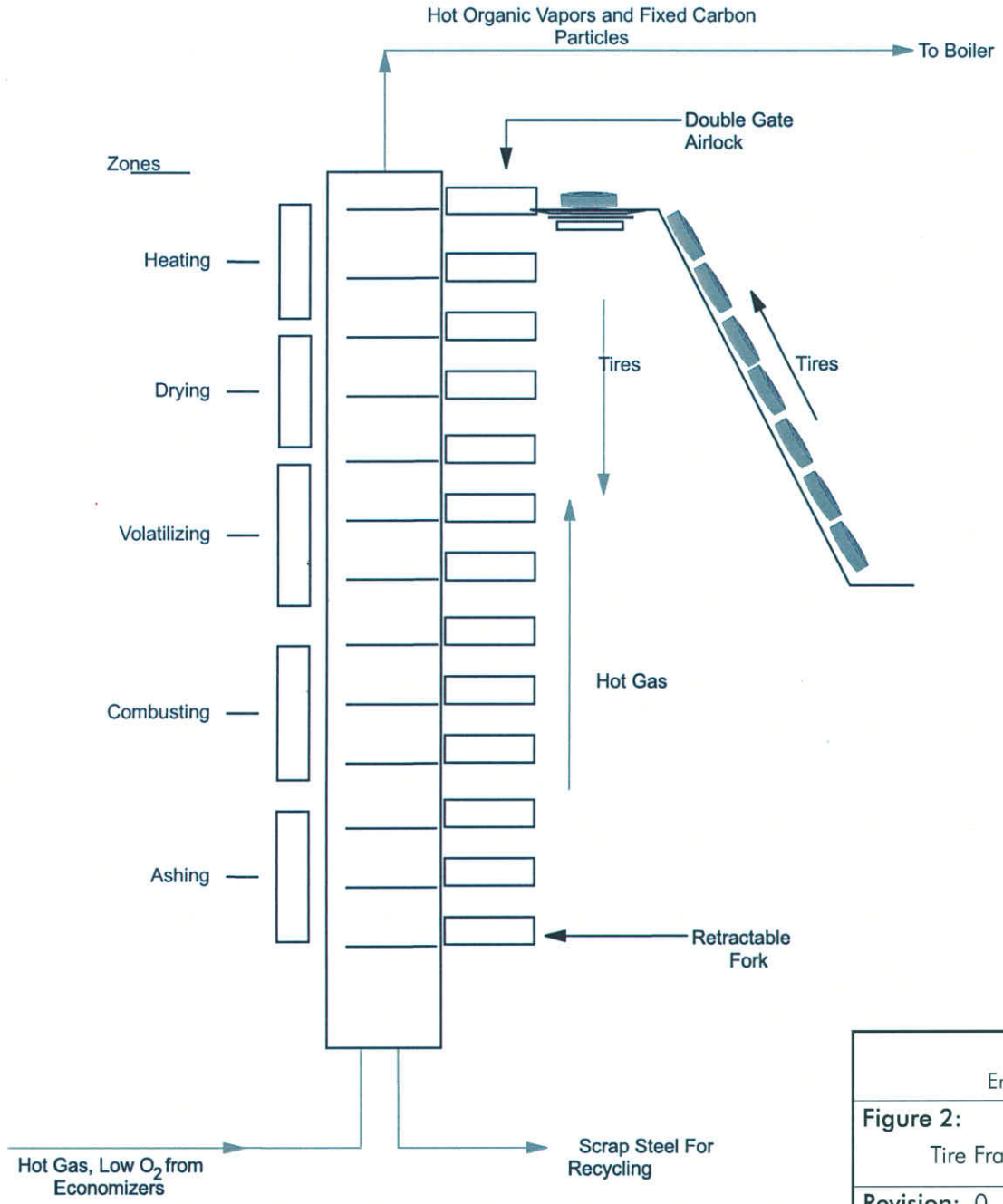
Endicott Generating Station

Figure 1:

Tire Fractionation Process Schematic

Revision: 0

Date: 11/9/09



MSCPA

Endicott Generating Station

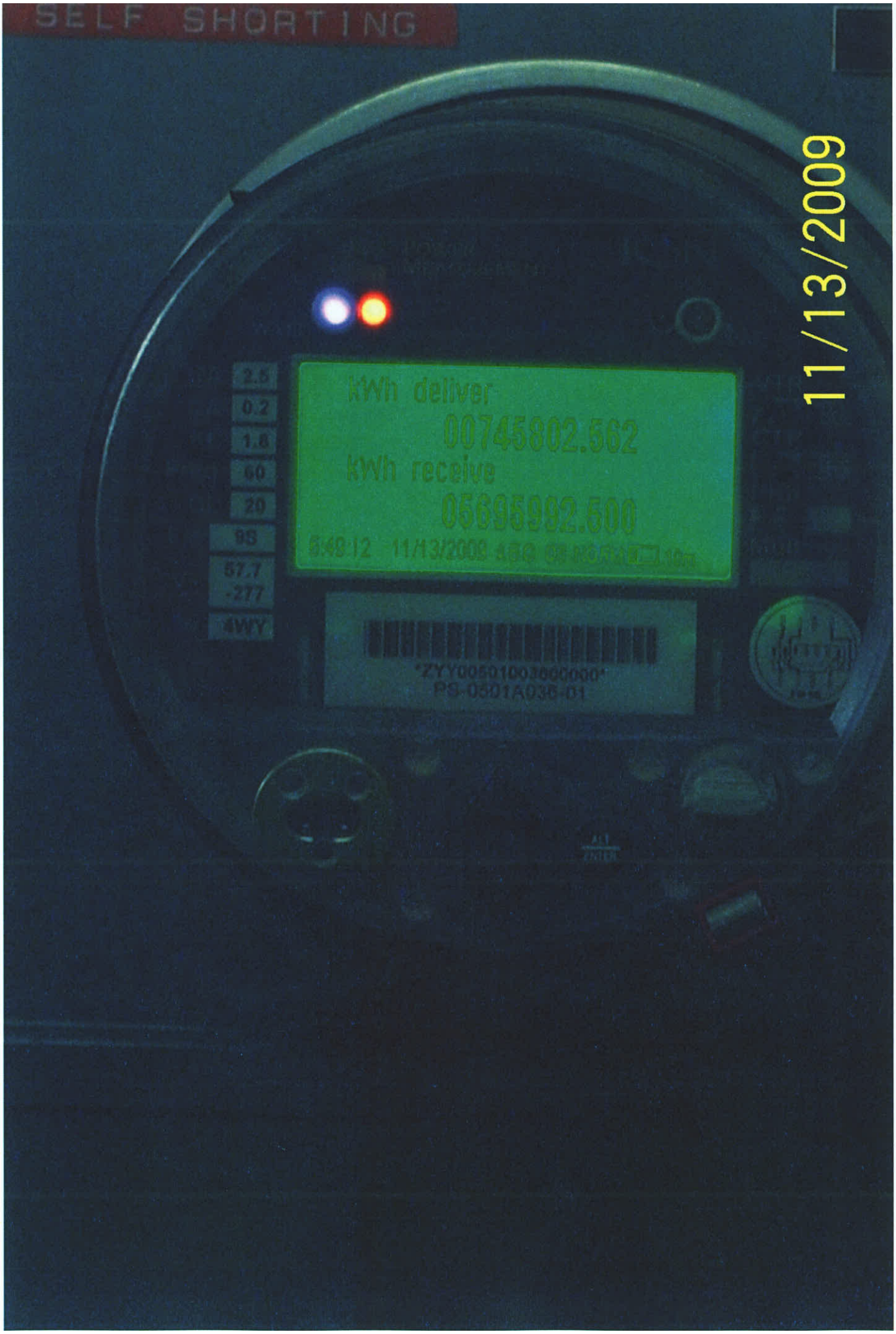
Figure 2:

Tire Fractionation Process Schematic

Revision: 0

Date: 11/9/09


TB 2
MET
P3
11/13/2009
kWh deliver
00710620.500
kWh receive
08213087.000
2.6
0.2
1.8
60
20
98
57
-277
4WY


SELF SHORTING
kWh deliver
00745802.562
kWh receive
05695992.500
11/13/2009

POWER MEASUREMENT

CERTIFICATE OF COMPLIANCE AND CALIBRATION

Power Measurement certifies that the product listed below meets the published specifications and has been calibrated and tested using equipment and standards traceable to the National Institute of Standards and Technology (***NIST***) in the US or the National Research Council of Canada (***NRC***).

Model	Part #	Serial #	Calibration Date
ION8300	P8300E0C0H6C1B0A	PS-0501A038-01	1/10/2009

AUTOMATED TESTING	• Power supply levels tested and adjusted on variable power supply units • Communications verified • Unit ID and serial number programmed • Voltage and current inputs calibrated • Aux I/O calibrated and tested (if applicable) • Required software options programmed • Calibration constants saved to external file
FINAL TESTING AND INSPECTION	• Serial number verified • Firmware version verified • LCD/Keypad functionality checked (if applicable) • Memory checked • Calibration verified • Software options downloaded and verified (if applicable) • Applicable counters and registers cleared • Dielectric Withstand Test Passed

TEST EQUIPMENT USED TO CALIBRATE METER

Model	S/N	Test Equipment Calibration Due Date
Rotek_8000_A	117	7/6/2010
Rotek_8000_BC	117BC	7/7/2010

Quality Manager

Production Manager

Quality System
Certified to
ISO 9001:2000

POWER MEASUREMENT

Certificate of Compliance and Verification

Model **ION8300**

Part # **P8300E0C0H6C1B0A**

Serial # **PS-0501A038-01**

The following data contains the energy test results verifying the accuracy of the above meter at the time this test was performed.

The meter has been factory tested in accordance with ***Power Measurement's*** verification procedures on equipment that is traceable to either ***N.I.S.T.*** (US) or ***N.R.C.*** (Canadian) standards.

Accuracy Data

Step	Acc	Volt A	Volt B	Volt C	Pab	Pac	AMP A	AMP B	AMP C	PH A	PH B	PH C
1	100	120	120	120	120	240	0.25	0.25	0.25	0	120	240
2	99.97000 12207031	120	120	120	120	240	2.5	2.5	2.5	0	120	240
3	99.98300 17089844	120	120	120	120	240	2.5	2.5	2.5	60	180	300
4	99.98799 89624023	120	120	120	120	240	5	5	5	0	120	240
5	100.0189 97192383	120	120	120	120	240	5	5	5	60	180	300
6	99.97699 73754883	120	120	120	120	240	10	10	10	0	120	240
7	100.0100 0213623	120	120	120	120	240	10	10	10	60	180	300
8	100.0469 97070313	120	120	120	120	240	15	15	15	60	180	300
9	100.0410 00366211	120	120	120	120	240	20	20	20	60	180	300

Quality System

Certified to
ISO 9001:2000

Substation: Project 1

Meter Information

Circuit Name: Tot DEL

Serial Number: 0501A03601

Manufacturer: SD

Model/Type: ION8300

Test Results

Three Phase:	As Found	As Left
Series Full Load	100.0110	100.0110
Series Power Factor	99.8600	99.8600
Series Light Load	100.0310	100.0310

Phase A:	As Found	As Left
A Full Load	100.0050	100.0050
A Power Factor	99.9280	99.9280

Phase B:	As Found	As Left
B Full Load	100.0070	100.0070
B Power Factor	99.8740	99.8740

Phase C:	As Found	As Left
C Full Load	100.0020	100.0020
C Power Factor	99.8050	99.8050

Comments:

Test Device:

Calibration Date:

Technician: REH

Date Tested: 2/13/2009 15:11:50

AAC APR 07 2009

PAM APR 07 2009

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1W042508.PSR** Mode: **Watthours** Standard No: **200757**

External Master Element: **A Phase** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**
0.25	-0.013	-0.062	0.000	0.000	0.006	0.027	-0.003	0.015
0.50	-0.013	-0.031	0.000	0.000	0.000	0.013	0.000	0.015
1.50	-0.015	0.000	-0.006	-0.010	-0.005	0.004	-0.002	0.003
2.50	-0.010	0.000	0.000	-0.003	-0.004	-0.005	0.000	0.004
3.00	-0.011	-0.030	-0.003	0.017	-0.004	0.017	-0.003	0.005
5.00	-0.008	-0.003	-0.005	0.009	-0.002	-0.001	-0.002	0.002
15.00	-0.008	-0.006	-0.005	0.011	-0.003	0.014	-0.001	0.008
30.00	-0.011	0.026	-0.006	0.020	-0.002	0.015	-0.003	0.016
50.00	-0.019	0.020	-0.007	0.009	-0.007	0.012	-0.005	0.004
Average:	-0.012	-0.010	-0.004	0.006	-0.002	0.011	-0.002	0.008
Max:	-0.008	0.026	0.000	0.020	0.006	0.027	0.000	0.016
Min:	-0.019	-0.062	-0.007	-0.010	-0.007	-0.005	-0.005	0.002

Overall	0'	60'
Average:	-0.005	0.004
Max:	0.006	0.027
Min:	-0.019	-0.062

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1W042508.PSR** Mode: **Watthours** Standard No: **200757**

External Master Element: **Series** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**
0.25	-0.009	0.021	-0.002	0.000	0.002	0.009	0.000	0.000
0.50	-0.013	-0.030	-0.001	0.010	-0.003	0.000	0.001	-0.003
1.50	-0.006	-0.023	0.001	0.008	0.002	0.003	0.001	0.002
2.50	-0.008	0.028	0.000	0.000	-0.001	0.014	0.003	0.005
3.00	0.000	-0.018	0.001	0.008	0.001	0.009	0.001	0.014
5.00	-0.007	0.012	-0.002	0.014	-0.002	0.012	0.000	0.008
15.00	-0.011	-0.018	0.002	0.010	0.002	0.011	-0.002	0.010
30.00	-0.004	-0.003	-0.002	0.001	-0.005	0.000	-0.004	0.000
50.00	-0.014	-0.031	-0.006	-0.001	-0.004	-0.005	-0.003	-0.006
Average:	-0.008	-0.007	-0.001	0.006	-0.001	0.006	-0.000	0.003
Max:	0.000	0.028	0.002	0.014	0.002	0.014	0.003	0.014
Min:	-0.014	-0.031	-0.006	-0.001	-0.005	-0.005	-0.004	-0.006

Overall	**0'**	**60'**
Average:	-0.003	0.002
Max:	0.003	0.028
Min:	-0.014	-0.031

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1W042508.PSR** Mode: **Watthours** Standard No: **200757**

External Master Element: **B Phase** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**
0.25	-0.026	0.000	-0.007	0.000	0.057	0.000	0.000	0.031
0.50	-0.013	0.031	-0.006	0.015	-0.006	0.000	-0.003	0.015
1.50	-0.008	-0.010	-0.002	0.015	0.000	0.004	-0.005	0.013
2.50	-0.013	0.006	0.001	0.018	-0.002	0.013	-0.003	0.010
3.00	-0.012	-0.005	-0.001	0.012	-0.001	0.017	-0.003	0.022
5.00	-0.012	-0.009	-0.002	-0.002	-0.002	0.021	-0.005	0.018
15.00	-0.012	0.001	-0.003	0.002	0.001	0.023	-0.006	0.015
30.00	-0.008	0.002	-0.002	0.009	-0.002	0.036	-0.006	0.028
50.00	-0.012	-0.021	-0.007	0.007	-0.005	0.020	-0.010	0.022
Average:	-0.013	-0.001	-0.003	0.008	0.004	0.015	-0.005	0.019
Max:	-0.008	0.031	0.001	0.018	0.057	0.036	0.000	0.031
Min:	-0.026	-0.021	-0.007	-0.002	-0.006	0.000	-0.010	0.010

Overall	**0'**	**60'**
Average:	-0.004	0.011
Max:	0.057	0.036
Min:	-0.026	-0.021

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1W042508.PSR** Mode: **Watthours** Standard No: **200757**

External Master Element: **C Phase** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**
0.25	-0.013	0.000	-0.007	0.000	0.000	0.055	-0.003	0.047
0.50	-0.006	0.031	0.000	0.030	0.003	0.026	0.000	0.015
1.50	-0.011	0.010	-0.004	0.015	-0.003	0.013	-0.003	0.015
2.50	-0.010	0.000	-0.001	0.009	-0.002	0.026	0.000	0.027
3.00	-0.013	-0.010	-0.001	0.025	-0.003	0.026	0.001	0.023
5.00	-0.015	0.021	-0.001	0.032	-0.004	0.025	0.000	0.006
15.00	-0.006	0.010	-0.005	0.021	-0.005	0.024	-0.001	0.023
30.00	-0.010	0.021	-0.004	0.026	-0.006	0.031	-0.001	0.023
50.00	-0.012	0.013	-0.008	0.018	-0.004	0.021	-0.006	0.023
Average:	-0.011	0.011	-0.003	0.020	-0.003	0.027	-0.001	0.022
Max:	-0.006	0.031	0.000	0.032	0.003	0.055	0.001	0.047
Min:	-0.015	-0.010	-0.008	0.000	-0.006	0.013	-0.006	0.006

Overall	**0'**	**60'**
Average:	-0.005	0.020
Max:	0.003	0.055
Min:	-0.015	-0.010

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1W042508.PSR** Mode: **Watthours** Standard No:

External Master Element: **Average** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**	**0'**	**60'**
0.25	-0.013	-0.016	-0.004	0.000	0.016	0.021	-0.002	0.023
0.50	-0.008	0.008	-0.002	0.011	-0.001	0.010	-0.001	0.011
1.50	-0.009	0.000	-0.003	0.005	-0.002	0.005	-0.003	0.008
2.50	-0.008	0.002	0.000	0.006	-0.002	0.009	-0.001	0.010
3.00	-0.009	-0.011	-0.001	0.014	-0.002	0.015	-0.001	0.013
5.00	-0.009	0.002	-0.002	0.010	-0.002	0.011	-0.002	0.007
15.00	-0.007	0.001	-0.003	0.009	-0.002	0.015	-0.002	0.012
30.00	-0.007	0.012	-0.003	0.014	-0.003	0.021	-0.003	0.017
50.00	-0.011	0.003	-0.006	0.009	-0.004	0.013	-0.005	0.012
Average:	-0.009	0.000	-0.003	0.009	-0.000	0.013	-0.002	0.013
Max:	-0.007	0.012	0.000	0.014	0.016	0.021	-0.001	0.023
Min:	-0.013	-0.016	-0.006	0.000	-0.004	0.005	-0.005	0.007

Overall	0'	60'
Average:	-0.004	0.009
Max:	0.016	0.023
Min:	-0.013	-0.016

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1R042508.PSR** Mode: Varhours Standard No: **200757**

External Master Element: **Series** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**
0.25	0.035	0.011	0.031	0.025	0.038	0.022	0.037	0.029
0.50	0.024	0.008	0.028	0.018	0.032	0.027	0.035	0.033
1.50	0.029	0.003	0.030	0.025	0.032	0.026	0.034	0.031
2.50	0.019	0.020	0.033	0.019	0.033	0.024	0.038	0.034
3.00	0.034	0.005	0.029	0.023	0.032	0.019	0.035	0.033
5.00	0.030	0.000	0.036	0.019	0.036	0.028	0.037	0.032
15.00	0.022	0.006	0.030	0.018	0.034	0.023	0.033	0.032
30.00	0.025	0.000	0.027	0.013	0.029	0.018	0.031	0.025
50.00	0.006	-0.008	0.024	0.013	0.024	0.015	0.029	0.029
Average:	0.025	0.005	0.030	0.019	0.032	0.022	0.034	0.031
Max:	0.035	0.020	0.036	0.025	0.038	0.028	0.038	0.034
Min:	0.006	-0.008	0.024	0.013	0.024	0.015	0.029	0.025

Overall	**90'**	**30'**
Average:	0.030	0.019
Max:	0.038	0.034
Min:	0.006	-0.008

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1R042508.PSR** Mode: **Varhours** Standard No: **200757**

External Master Element: **A Phase** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**
0.25	0.026	0.017	0.026	0.017	0.034	0.029	0.029	0.025
0.50	0.032	0.008	0.032	0.020	0.036	0.021	0.037	0.033
1.50	0.029	0.011	0.036	0.020	0.032	0.019	0.037	0.030
2.50	0.024	0.018	0.035	0.024	0.036	0.017	0.036	0.028
3.00	0.026	0.008	0.033	0.027	0.034	0.023	0.036	0.033
5.00	0.027	0.006	0.034	0.020	0.036	0.021	0.036	0.033
15.00	0.027	0.002	0.034	0.020	0.031	0.017	0.033	0.033
30.00	0.018	0.014	0.032	0.018	0.028	0.015	0.033	0.026
50.00	0.011	-0.005	0.031	0.012	0.028	0.011	0.030	0.022
Average:	0.024	0.009	0.033	0.020	0.033	0.019	0.034	0.029
Max:	0.032	0.018	0.036	0.027	0.036	0.029	0.037	0.033
Min:	0.011	-0.005	0.026	0.012	0.028	0.011	0.029	0.022

Overall	**90'**	**30'**
Average:	0.031	0.019
Max:	0.037	0.033
Min:	0.011	-0.005

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1R042508.PSR** Mode: **Varhours** Standard No: **200757**

External Master Element: **B Phase** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**
0.25	0.026	0.017	0.020	0.017	0.040	0.029	0.033	0.033
0.50	0.026	0.016	0.041	0.029	0.039	0.018	0.040	0.032
1.50	0.025	0.019	0.037	0.031	0.039	0.024	0.036	0.033
2.50	0.038	0.016	0.037	0.032	0.038	0.026	0.038	0.034
3.00	0.035	0.016	0.038	0.028	0.036	0.025	0.040	0.036
5.00	0.021	0.018	0.039	0.030	0.034	0.029	0.037	0.035
15.00	0.033	0.013	0.035	0.026	0.037	0.024	0.039	0.031
30.00	0.030	0.015	0.035	0.026	0.039	0.021	0.036	0.033
50.00	0.033	0.003	0.035	0.031	0.034	0.019	0.035	0.027
Average:	0.030	0.015	0.035	0.028	0.037	0.024	0.037	0.033
Max:	0.038	0.019	0.041	0.032	0.040	0.029	0.040	0.036
Min:	0.021	0.003	0.020	0.017	0.034	0.018	0.033	0.027

Overall	90'	30'
Average:	0.035	0.025
Max:	0.041	0.036
Min:	0.020	0.003

Standards Compare

Test Board Serial No: **3771** Test Date: **04/28/2008** Report Date: **04/28/2008**

Filename: **1R042508.PSR** Mode: **Varhours** Standard No: **200757**

External Master Element: **C Phase** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**
0.25	0.026	0.017	0.039	0.017	0.034	0.029	0.040	0.033
0.50	0.019	0.024	0.039	0.033	0.039	0.028	0.040	0.035
1.50	0.034	0.016	0.037	0.029	0.037	0.027	0.039	0.036
2.50	0.038	0.016	0.040	0.031	0.039	0.024	0.040	0.032
3.00	0.043	0.023	0.039	0.031	0.036	0.026	0.039	0.037
5.00	0.030	0.022	0.038	0.036	0.039	0.025	0.039	0.035
15.00	0.035	0.019	0.038	0.034	0.037	0.032	0.040	0.034
30.00	0.033	0.020	0.042	0.026	0.039	0.022	0.039	0.033
50.00	0.032	0.016	0.035	0.031	0.034	0.022	0.037	0.032
Average:	0.032	0.019	0.039	0.030	0.037	0.026	0.039	0.034
Max:	0.043	0.024	0.042	0.036	0.039	0.032	0.040	0.037
Min:	0.019	0.016	0.035	0.017	0.034	0.022	0.037	0.032

Overall	**90'**	**30'**
Average:	0.037	0.027
Max:	0.043	0.037
Min:	0.019	0.016

Standards Compare

Test Board Serial No: **3771** Test Date: **04/25/2008** Report Date: **04/28/2008**

Filename: **1R042508.PSR** Mode: **Varhours** Standard No:

External Master Element: **Average** External Std No: **4302**

	120.0 Volts		240.0 Volts		277.0 Volts		480.0 Volts	
Amps	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**	**90'**	**30'**
0.25	0.020	0.013	0.021	0.013	0.027	0.022	0.026	0.023
0.50	0.019	0.012	0.028	0.021	0.029	0.017	0.029	0.025
1.50	0.022	0.012	0.028	0.020	0.027	0.018	0.028	0.025
2.50	0.025	0.013	0.028	0.022	0.028	0.017	0.029	0.024
3.00	0.026	0.012	0.028	0.022	0.027	0.019	0.029	0.027
5.00	0.020	0.012	0.028	0.022	0.027	0.019	0.028	0.026
15.00	0.024	0.009	0.027	0.020	0.026	0.018	0.028	0.025
30.00	0.020	0.012	0.027	0.018	0.027	0.015	0.027	0.023
50.00	0.019	0.004	0.025	0.019	0.024	0.013	0.026	0.020
Average:	0.022	0.011	0.027	0.020	0.027	0.018	0.028	0.024
Max:	0.026	0.013	0.028	0.022	0.029	0.022	0.029	0.027
Min:	0.019	0.004	0.021	0.013	0.024	0.013	0.026	0.020

Overall	**90'**	**30'**
Average:	0.026	0.018
Max:	0.029	0.027
Min:	0.019	0.004

ITC/*ULC*

REVENUE METER TEST RECORD

ATTENDEES: LEAD TESTER: R Hupkas		ITC/ULC REP: C. Denton	
STATION: Project	LINE: TB1	DATE: 2-13-2009	TIME: 1450
METER 1 OF 2	DEL ☒	REC ☒	
METER MANUFACTURER/MODEL: Ion 8300		SERIAL #: PS 0501A0336-01	
TEST EQUIPMENT/MODEL: UEICO Model 3010 SN# 3771		TEST EQUIPMENT CALIBRATION DATE: April-25-2008	
TIME OUT: 1500	TIME IN: 1600		
AS FOUND WATTS REC: 2690807.560		AS FOUND WATTS DEL: 566779	
AS FOUND VARS REC: 75522263		AS FOUND VARS DEL: 217307.156	
AS LEFT WATTS REC: 2692459		AS LEFT WATTS DEL: 566779	
AS LEFT VARS REC: 75572554		AS LEFT VARS DEL: 217307.156	
METER PHYSICAL LOCATION: Relay House PAUL M2			
NOTIFIED BALANCING AUTHORITY: ☒	TIME: 1505	CONTACT: Terry Bair	
NOTIFIED OTHER ENTITY: ☒	TIME: 1505	CONTACT: Laura Rochford MVPD	
WITNESS:		COMPANY:	
WITNESS:		COMPANY:	
SIGNATURE(S):			
TEST RESULTS: ELECTRONIC COPY ☐	HARD COPY ☐	CERTIFICATE OF CALIBRATION ☐	DATE:

NOTES:

Process # 205-140-1004 Seal # 0307809, 0591344, 0591376

ITC/*ULC* **REVENUE METER TEST RECORD**

ATTENDEES: LEAD TESTER: B. HyBKAS		ITC/ULC REP: C. [illegible]	
STATION: Project 1	LINE: TB2	DATE: 2-13-2009	TIME: 1450
METER 2 OF 2	DEL ☒	REC ☒	
METER MANUFACTURER/MODEL: Ion 8300		SERIAL #: PS 0509A0037-01	
TEST EQUIPMENT/MODEL: Hioko Model: 3010 SN# 3771		TEST EQUIPMENT CALIBRATION DATE: April 25-2008	
TIME OUT: 1500	TIME IN: 1620		
AS FOUND WATTS REC: 4950707		AS FOUND WATTS DEL: 3238870.750	
AS FOUND VARS REC: 9169703		AS FOUND VARS DEL: 804221.875	
AS LEFT WATTS REC: 4955141.500		AS LEFT WATTS DEL: 3238870.750	
AS LEFT VARS REC: 911.9724		AS LEFT VARS DEL: 804221.875	
METER PHYSICAL LOCATION: Relay House Pad #2			
NOTIFIED BALANCING AUTHORITY: ☒	TIME: 1505	CONTACT: Terry Bair	
NOTIFIED OTHER ENTITY: ☒	TIME: 1500	CONTACT: Lewis Rochford Mugu	
WITNESS:		COMPANY:	
WITNESS:		COMPANY:	
SIGNATURE(S):			
TEST RESULTS: ELECTRONIC COPY ☐	HARD COPY ☐	CERTIFICATE OF CALIBRATION ☐	DATE:

NOTES:

Process # 705 140 7007 Seal # 0307808, 059,387, 059,307, 059,349