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 **[Certificate Number 11-SWE-MI-GATS-0084 effective January 19, 2011]**

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.

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):

X has a placed-in-service date on or after January 1, 1998; (month/day/year): **April 1, 2012**

__ 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.

__ Not yet online; projected in-service date (month/day/year):

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	**62 (gross)** ~~55~~	**488,808** ~~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: **X** Yes __ 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: **NON47567**
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. Model ION7550, Part #S75500A0C0B6E0N0A**
~~Power Measurement, Inc. Model 8300 – two meters TB1 and TB2~~
Serial Number: **LI-1302A873-03** ~~PS 05A1036-01 and PS 050A1038-01~~
Type: **Multi-function revenue-class gross generation power meter, ION7550V371e**
Date of Last Certification: **February 26, 2013, see attached certification report.**
~~Meter TB-1 – 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 photo taken on November 4, 2013** ~~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): **6.15 kWh delivered**
~~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.

Version: October 08, 2009

FIL

Ohio | Public Utilities Commission

Certificate for Renewable Energy Resource Generating Facility

Facility:
Michigan South Central Power Agency Endicott
720 Herring Rd
Litchfield, MI 49252

Certificate Number:
11-SWE-MI-GATS-0084

Issued Pursuant to Case Number:
09-1060-EL-REN

Effective, January 19, 2011, the above-referenced facility is hereby certified as an Ohio Renewable Energy Resource Generating Facility, consistent with Sections 4928.64 and 4928.65 of the Ohio Revised Code. This certificate is issued to:

Michigan South Central Power Agency
720 Herring Rd
Litchfield, MI 49252

This Certificate is issued subject to all terms and conditions set forth in the Commission's order granting this certificate in the aforementioned case(s), and may be revoked if all such terms and conditions are not met. This certificate is also subject to all rules and regulations of the Commission, now existing or hereafter promulgated.

Witness the seal of the Commission affixed at Columbus, Ohio, this 21st day of January, 2011.

By Order of the
PUBLIC UTILITIES COMMISSION OF OHIO

Renee' J. Jenkins, Secretary
Betty McCauley, Acting Secretary
Tanowa M. Troupe, Acting Secretary

180 East Broad Street
Columbus, Ohio 43215-3793

(614) 466-4095
www.puc.ohio.gov

Automatic Case Action Form
Certification of Renewable Energy Resource Generating Facility

Issue Certificate Number: 11-SWE-MI-GATS-0084

PUCO Case Number: 09-1060-EL-REN

Facility Name: Michigan South Central Power Agency Endicott

Facility Location: 720 Herring Road

Litchfield, MI 49252

Effective Date of Certificate/Date Commission Order Signed: 1-19-11

Issued to: Michigan South Central Power Agency

Send to: Michigan South Central Power Agency

Attn: Glen E. White

720 Herring Road

Litchfield, MI 49252

CASE NUMBER: 09-1060-EL-REN
CASE DESCRIPTION: MICHIGAN SOUTH CENTRAL POWER AGENCY
DATE OF SERVICE: 1/20/2011
DOCUMENT SIGNED ON: 1/31/2011

Sign Here: pdc | mm

APPLICANT

PARTY OF RECORD	ATTORNEY
MICHIGAN SOUTH CENTRAL POWER AGENCY LORNA NENCIARINI, DIRECTOR OF FINANCE 720 HERRING ROAD LITCHFIELD,MI 49252-9510 Phone:(517) 542-2346 Fax:(517) 542-3049 Email:www.mscpa.net	NONE

ATTORNEY

PARTY OF RECORD	ATTORNEY
none	*White, Glen E Mr. Michigan South Central Power Agency 720 Herring Road Litchfield,MI 49252 Phone:(517)542-2346 Fax:(517)542-3049 Email:whiteg@mscpa.net

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

AMENDED Addendum to Section G. Certification Criteria 1 and 2

Michigan South Central Power Agency (MSCPA) received Certificate No. 11-SWE-MI-GATS-0084 effective January 19, 2011 as a certified Ohio Renewable Energy Resource Generating Facility. MSCPA is submitting this amended application to change the definition of electrical output from measurement of Net kiloWatt-hours to measurement of Gross kiloWatt-hours. The amended application also describes the replacement of fuel oil fired burners used for boiler startup and flame stabilization with natural gas burners.

Michigan South Central Power Agency (MSCPA) can 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 62 ~~55~~ MW (gross) electric generating unit fired primarily on coal and petroleum coke (pet coke) with the capability to also fire natural gas ~~distillate fuel oil~~ during boiler startups and for flame stabilization. Project 1 was modified beginning the first quarter 2010 to equip the boiler with two wall burners to fire the alternative fuel-rich gas stream. ~~Project 1 has been modified to equip the boiler with two wall burners to fire the alternative fuel-rich gas stream beginning in the second quarter 2010 with startup anticipated in the second quarter 2011.~~ The placed-in-service date for the tire fractionation process for REC generation was April 1, 2012. 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 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 been issued a patent for an ENERGY AND STEEL RECOVERY SYSTEM Number 10/908,525 and has applied for a second patent – U.S. patent pending: ENERGY AND STEEL RECOVERY SYSTEM, Number 11/850,148.

Four separate modifications were made to the boiler to accommodate the tire fractionation process:

- The first change was the replacement of two of the eight burners by Babcock and Wilcox with ones of a dual fuel/annular design. When the facility is using the fractionated tire fuel, it is introduced into the boiler through the center of the new burners. When the tire fractionation unit is off line, coal/pet coke will be introduced through the outer annulus and combustion air will be directed through the inner annulus.
- The second change was the addition of a high temperature, low oxygen slip stream gas take-off in the superheater zone of the boiler. This slip stream is ducted into the bottom of the fractionation column and is used as the motive force to distill the tires.

- The third change was the addition of a low temperature, low oxygen slip stream gas take-off after the combustion air heater and before the ESP. This stream is ducted into the high temperature slip stream and modulated in order to temper the gases entering the bottom of the column.
- The fourth change was the addition of a mid-temperature, low oxygen slip stream gas take-off downstream of the high-temperature duct and upstream of the low-temperature duct. This stream provides a medium gas temperature stream upstream of the air heater and is used along with the high- and low-temperature take-offs to allow better control of the process gas temperature.

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 (tire beads and 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 900°F) is taken from the boiler after 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 gasify forming a high-Btu fuel-rich gas stream comprised of carbon solids and combustible gas.

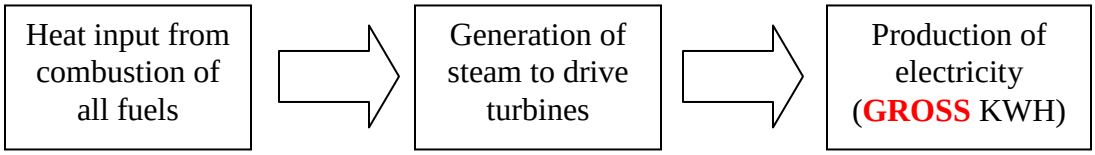
The process of tire fractionation involves the heating of the scrap tires using a slip stream of high temperature flue gas from the onsite boiler. This heating drives off, or distills, all of the volatile organic matter from the tires while also producing both fixed carbon particle and recoverable steel fractions. The steel is removed from the bottom airlock of the column unit. The vaporous organic constituents and the carbon particle fraction, which combined have the total energy value, or heat content, found in the original tires, are transported via the slip stream gas through the top of the fractionation column unit and into the burn zone of the boiler for combustion. There is no combustion of the two-phased fuel within the fractionation column itself – thus, 100 percent of the energy value (Btu’s) contained in the tires is consumed within the boiler. Any heat losses through the column’s skin or ductwork is negligible and is energy originally introduced into the system through the slip stream of hot boiler gases and not produced by the organics and fixed carbon in the tire based fuel. This accounts for the fact that the slip stream is introduced into the bottom of the column at 900°F and exits the unit at 550°F. There is no supplemental fuel firing or combustion in the fractionation column.

Because the tire-derived fuel-rich gas stream is two phased; i.e., vaporous organic compounds and fixed carbon particles, and its concentration is ever changing, attempting to meter the gaseous volume while simultaneously analyzing the vapor and solid phases for heat content is not technically possible. For this reason, MSCPA calculates the amount of heat input produced and contributed by the tire fractionation column using a heat and mass balance approach described below.

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 62 ~~55~~ MW gross 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 950ºF. 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~~ measures and verifies the total electrical output from Project 1 and determine the amount attributable to the combustion of the renewable energy resource; i.e., the tire-derived fuel-rich gas stream, using a heat and mass balance approach and through a combination of metering systems and other instrumentation. The basic algorithm for this determination relies on monthly measurement of total electricity output and total amount of steam produced by the boiler, and the following basic relationship:



In overall terms, the determination of electrical output generated from the renewable energy source will be completed on a monthly basis as follows:

- MSCPA will measure the total electrical output from Project 1 (GROSS ~~NET~~ KWH).
- MSCPA will measure the total amount of superheated steam produced by the boiler (pounds).
- Calculate the total heat input from all fuels burned necessary to produce the amount of steam recorded (Btu_x).
- Calculate the amount of heat input contributed from combustion of coal and pet coke, and natural gas ~~distillate fuel oil~~ (Btu_y).
- Calculate the amount of heat input contributed from combustion of the tire-derived fuel-rich gas stream ($Btu_z = Btu_x - Btu_y$).

The final calculation is then:

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

MSCPA will determine the amount of electricity output (GROSS ~~NET~~ KWH) produced by Project 1 from combustion of the tire-derived fuel-rich gas stream on a monthly basis. Each month, the total amount of electricity output in Gross ~~Net~~ kiloWatt-hours (GROSS ~~NET~~ KWH) generated by Project 1 will be accessed from the main station power meter. For the Endicott Generating Station the term "main station power meter" refers to the Endicott Gross Generation Meter and represents the total Station output. The total amount of gross electrical output produced by the Endicott Generating Station is the reading from the Endicott Gross Generation Meter; i.e., = KWH_{Total}

~~is actually both Meters TB1 andTB2, where the sum of the electrical output readings from Meters TB1 and represents the total Station output. Meters TB1 and TB2 are net generation meters. Meter TB1 and meter TB2 display and record the energy output for the Station. Each meter records a partial amount of the total energy – the total Station output is the sum of Meters TB1 and TB2. Meter TB1 generating bus tie meter displays and records the amount of electrical output in KWH produced and distributed to the Coldwater Tie line. Meter TB2 generating bus tie meter displays and records the amount of electrical output in KWH produced and distributed to the Moore Road Tie line.~~

~~The total amount of electrical output produced by the Endicott Generating Station is the sum of the readings from Meters TB1 and TB2; i.e., $KWH_{Total} = KWH_{TB1} + KWH_{TB2}$~~

MSCPA continuously measures and integrates the total amount of superheated steam produced by the boiler, and records steam production on an hourly basis. At the end of each month the hourly steam production records are further integrated to a monthly total steam production rate and recorded in pounds.

As described above, the percentage of total boiler heat input generated from combustion of the renewable energy resource will be determined on a monthly basis. The percentage of boiler heat input attributable to burning the tire-derived fuel-rich gas stream will be calculated by knowing the total boiler heat input and the heat inputs from other fuel stream combusted during that given month.

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

Total Boiler Heat Input –

The total monthly boiler heat input from all fuels will be determined using a site-specific correlation between boiler heat input and the amount of steam produced – given in terms of pounds of steam produced per Btu input to the boiler. The numeric value for this correlation is unique and independent of boiler load, and was derived for this particular boiler using actual measured fuels and steam produced data recorded from July 2009 through November 2010. As summarized by the attached table, the standard conversion of heat input to steam output, which is analogous to boiler efficiency, was an average of 1,266,904 Btu input required per pound of steam output over that time period.

MSCPA ~~proposes to~~ uses this correlation factor along with the measured monthly steam production records to determine the total boiler heat input each month.

Total Heat Input$_{\text{all fuels}}$, Btu/month = Steam Production, lbs/month x 1,266,904 Btu/lb steam

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:

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

Natural Gas –

MSCPA will include in the heat input equations the contribution of natural gas used during startups and for flame stabilization.

The monthly heat input from natural gas is calculated as follows:

Heat Input$_{\text{natural gas}}$, Btu/month = Billed Heat Input$_{\text{natural gas}}$, decatherms/month x 1,000,000 Btu/decatherm

MSCPA is supplied pipeline-quality natural gas by SEMCO ENERGY Gas Company. SEMCO owns and operates several gas meters at MSCPA, including a single meter dedicated to the natural gas supply line to the boiler ignitors. MSCPA is billed monthly by SEMCO for the amount of heat input delivered in decatherms (one decatherm = one million Btu). SEMCO calculates the amount of delivered heat input, in decatherms, by multiplying the amount of natural gas that passed the meter (ft^3/month) by the monthly average heat content value (Btu/ft^3), and then dividing by 1,000,000 Btu/decatherm.

~~***Distillate Fuel Oil –***~~

~~MSCPA will include in the heat input equations the contribution of fuel oil used during startups and for flame stabilization.~~

~~The monthly heat input from fuel oil is calculated as follows:~~

~~Heat Input$_{\text{fuel oil}}$, Btu/month = Quantity Fired$_{\text{fuel oil}}$, gal/month x Heat Content$_{\text{fuel oil}}$, Btu/gal~~

~~MSCPA stores all fuel oil consumed at the Endicott Generating Station in two 12,000 gallon tanks. MSCPA operates three fuel oil metering stations. Combustion equipment-specific usage~~

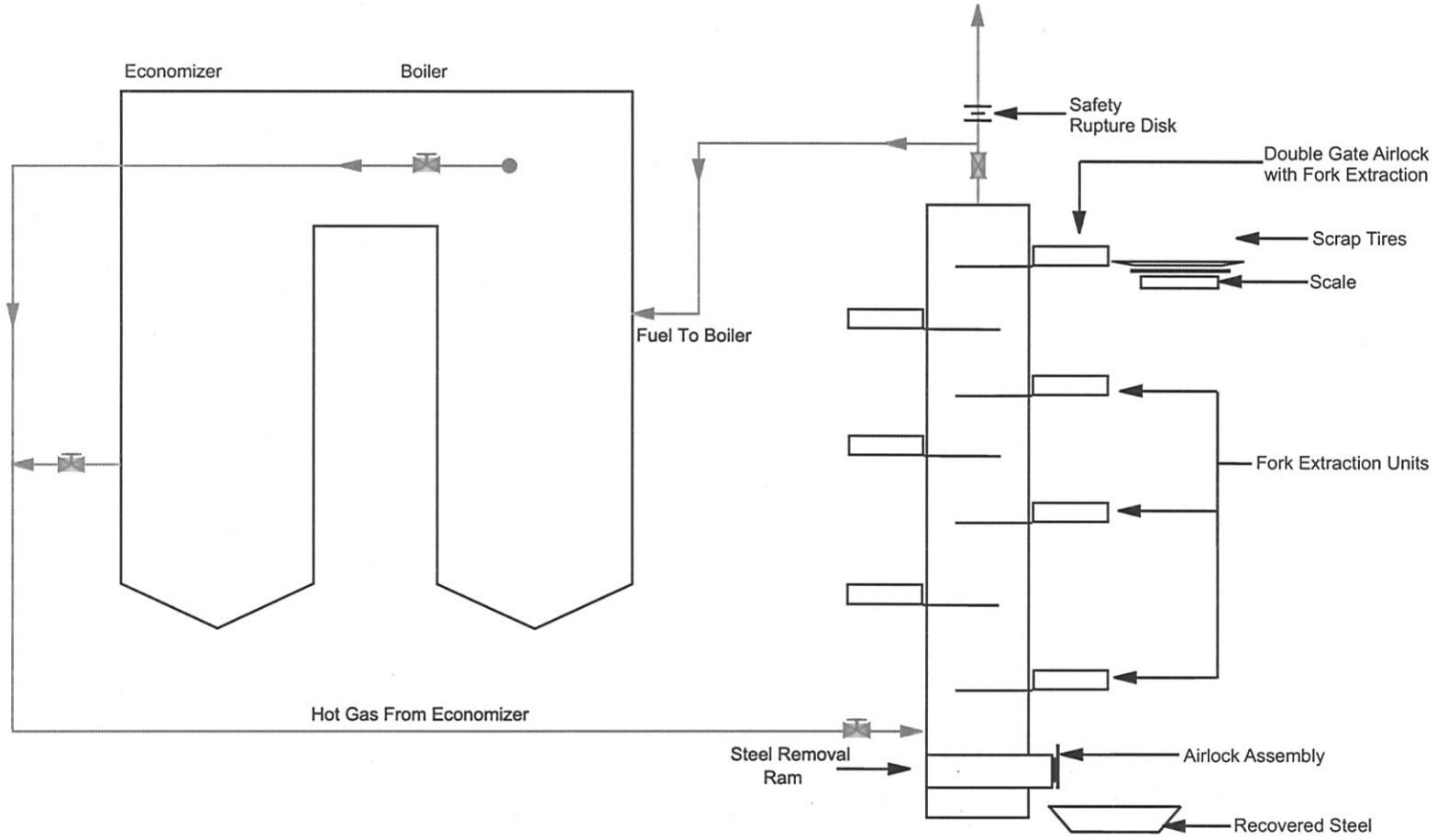
~~volumes are determined on a daily basis using these three meters. First, there is a master meter located at the fuel storage tanks. Second, there is a meter for fuel used by our diesel-engine powered equipment. Third, there is a meter for fuel oil used by our auxiliary boiler. Meter readings are taken daily – the volume in gallons used for main boiler startups and flame stabilization is calculated by subtracting the vehicle and auxiliary boiler fuel usage from the master fuel meter reading. The meters are read and the volumes are recorded daily. At the end of each month, the daily volume readings are summed and recorded for a total fuel oil consumption amount for that month.~~

~~MSCPA receives an independent certified fuel oil analysis from its suppliers with each shipment received at the station. The certified analyses include the heat content in Btu/gal as determined by ASTM Method D240-09 or an equivalent method. The heat content of fuel oil burned on a monthly basis is calculated as the volume-weighted heat content of all shipments received in a given month.~~

Renewable Energy Resource --

The monthly heat input rate contributed from the tire fractionation process will be the balance between total boiler heat input and the heat inputs from coal and pet coke, natural gas, and distillate fuel oil.

$$\text{Heat Input}_{\text{renewable fuel}} = \text{Total Heat Input}_{\text{all fuels}} - [\text{Heat Input}_{\text{coal/pet coke}} + \text{Heat Input}_{\text{natural gas}} + \sout{\text{Heat Input}_{\text{fueloil}}}]$$



MSCPA

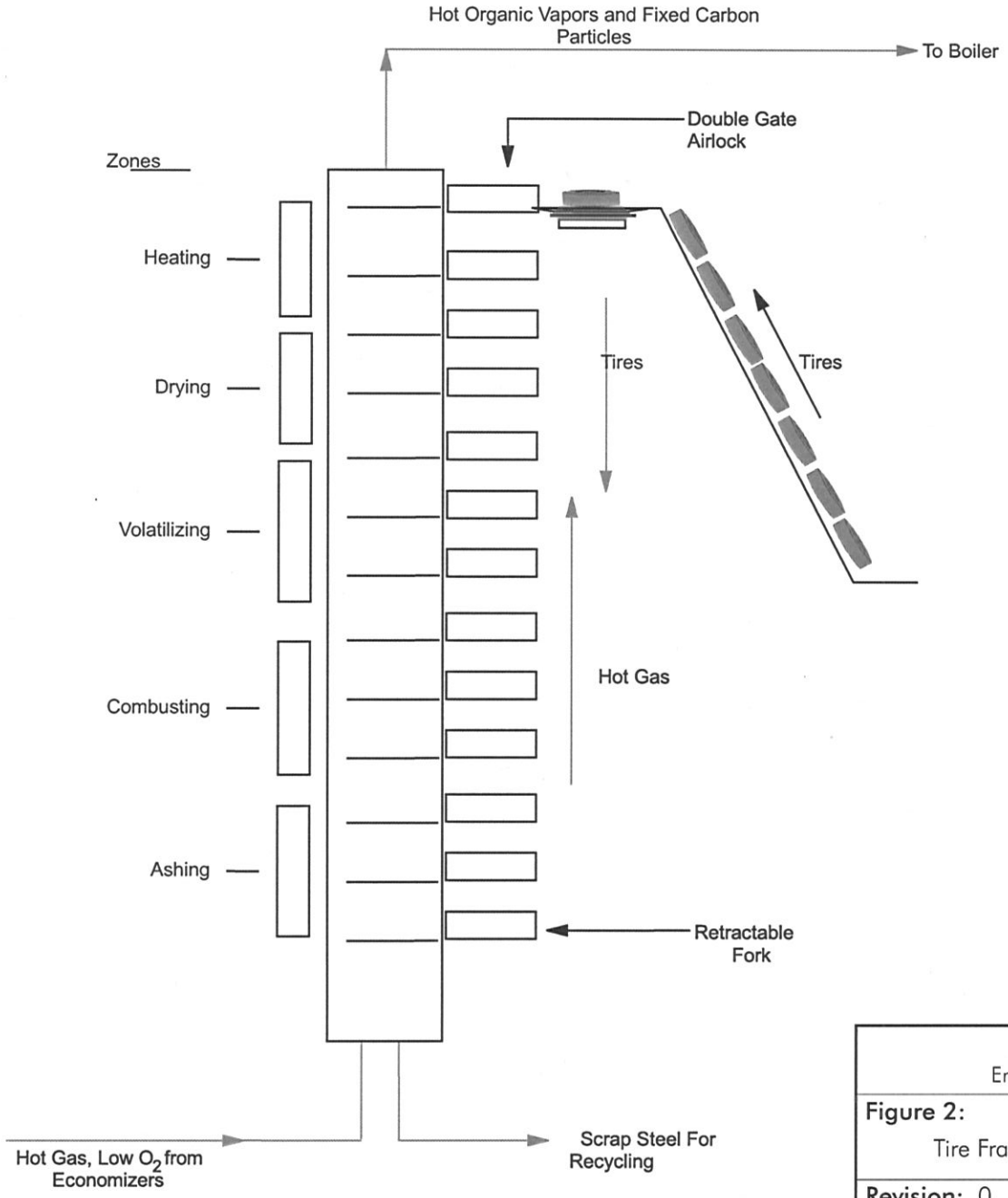
Endicott Generating Station

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

MSCPA ENDICOTT GENERATING STATION
SUMMARY OF OPERATING DATA JULY 2009 THROUGH NOVEMBER 2010

Month	Lighter Fuel Oil, Gallons	Coal and Pet Coke, Tons	Gross kWh	Net kWh	# Steam	BTU from Carbon	BTU from Fuel Oil	Total BTU	BTU per # Steam	Gross kWh per # Steam	Net kWh per # Steam
Jul-09	4,769.0	14,313.90	29,010,457	25,446,166	264,259	329,601,904,200	660,506,500	330,262,410,700	1,249,766	109.78	96.29
Aug-09	1,808.0	15,991.40	31,847,772	27,690,119	289,333	366,508,136,600	250,408,000	366,758,544,600	1,267,601	110.07	95.70
Sep-09	1,809.0	14,857.25	30,919,078	26,899,312	268,905	350,479,232,100	250,546,500	350,729,778,600	1,304,289	114.98	100.03
Oct-09	1,237.0	15,336.20	31,975,357	27,944,512	287,013	363,367,854,600	171,324,500	363,539,179,100	1,266,629	111.41	97.36
Nov-09	7,220.0	11,018.25	23,071,961	20,265,180	206,801	264,531,480,200	999,970,000	265,531,450,200	1,283,997	111.57	97.99
Dec-09	1,841.0	0	0	0	0	0	254,978,500	254,978,500	#DIV/0!	#DIV/0!	#DIV/0!
Jan-10	7,200.0	5,564.25	11,382,462	9,921,339	103,614	132,465,923,600	997,200,000	133,463,123,600	1,288,084	109.85	95.75
Feb-10	5,070.0	14,309.70	29,252,908	25,502,068	265,778	331,701,974,500	702,195,000	332,404,169,500	1,250,682	110.07	95.95
Mar-10	3,186.7	15,952.40	32,698,721	28,717,619	295,658	375,913,039,700	441,357,950	376,354,397,650	1,272,939	110.60	97.13
Apr-10	5,188.0	13,346.30	28,362,168	24,870,199	255,174	321,569,733,200	718,538,000	322,288,271,200	1,263,015	111.15	97.46
May-10	5,902.6	14,016.35	30,277,561	26,495,725	273,211	341,744,011,200	817,510,100	342,561,521,300	1,253,834	110.82	96.98
Jun-10	7,737.7	15,176.60	32,571,725	28,583,216	297,997	365,854,690,100	1,071,671,450	366,926,361,550	1,231,308	109.30	95.92
Jul-10	4,647.0	15,940.85	33,347,011	29,231,774	307,349	378,703,743,400	643,609,500	379,347,352,900	1,234,255	108.50	95.11
Aug-10	7,221.0	15,851.45	33,433,803	29,353,489	309,138	379,942,071,800	1,000,108,500	380,942,180,300	1,232,272	108.15	94.95
Sep-10	6,199.8	13,951.20	29,632,728	25,970,422	270,656	334,863,098,000	858,672,300	335,721,770,300	1,240,402	109.49	95.95
Oct-10	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!
Nov-10	8,179.7	4,647.75	9,617,433	8,334,696	85,836	115,989,249,000	1,132,888,450	117,122,137,450	1,364,487	112.04	97.10

AVERAGE	1,266,904
MINIMUM	1,231,308
MAXIMUM	1,364,487

PowerLogic™

70052-0224-05

Certificate of Compliance and Verification

Model **ION7550**

Part # **S7550A0C0B6E0N0A**

Serial # **LI-1302A873-03**

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 ***Schneider Electric'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	99.987	120.00	120.00	120.00	120	240	0.250	0.250	0.250	0	120	240
2	99.972	120.00	120.00	120.00	120	240	2.500	2.500	2.500	0	120	240
3	99.998	120.00	120.00	120.00	120	240	2.500	2.500	2.500	60	180	300
4	100.003	120.00	120.00	120.00	120	240	5.000	5.000	5.000	0	120	240
5	100.016	120.00	120.00	120.00	120	240	5.000	5.000	5.000	60	180	300
6	99.997	120.00	120.00	120.00	120	240	10.000	10.000	10.000	0	120	240
7	100.017	120.00	120.00	120.00	120	240	10.000	10.000	10.000	60	180	300
8	100.015	120.00	120.00	120.00	120	240	15.000	15.000	15.000	60	180	300
9	100.011	120.00	120.00	120.00	120	240	20.000	20.000	20.000	60	180	300

Quality System
Certified to ISO 9001

Schneider Electric

PowerLogic™

70052-0225-07

Certificate of Compliance and Calibration

Schneider Electric certifies that the PowerLogic 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
ION7550	**S7550A0C0B6E0N0A**	**LI-1302A873-03**	**26-Feb-2013**

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 (if applicable)
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 (If Applicable)

Model	Serial #	Test Equipment Calibration Due Date
3458A	**2823A09029**	**15-Nov-2013**
Rotek 8000 BC	**112BC**	**14-Jul-2013**
Rotek 8000 A	**112**	**14-Jul-2013**

Elan Taylor
Quality Manager

Geoff Hyatt
Production Manager

Quality System
Certified to ISO 9001

Schneider Electric

Summary: Response Red-Lined version of Amended Application for Case 09-1060-EL-REN filed 11-6-13. electronically filed by Mr. Glen E White on behalf of White, Glen E. Mr.