



## Washington Electric Cooperative, Inc.

P.O. Box 8, 75 Vermont Route 14N  
East Montpelier, Vermont 05651

Telephone: 802-223-5245; Fax: 802-223-6780  
www.washingtonelectric.coop

March 22, 2006

ISO New England  
Attn: Dave Forrest  
1 Sullivan Road  
Holyoke, MA 01040-2841

Dear Mr. Forrest:

Enclosed please find a Generator Notification Form for Units or Changes of 5 MW or Less. Washington Electric Cooperative (WEC) will be adding generation capacity to an operating renewable energy facility in order to make use of increasing methane gas supply and to increase the output of the facility.

Washington Electric Cooperative completed construction and commenced operations of its Landfill Gas to Energy (LFGTE) Facility in Coventry, VT in July 2005. The facility includes three (3) Caterpillar engine-generator sets each rated at 1,600 kW for a total current installed gross generating capacity of 4.8 MW. The CAT G3520C engine-generator set installed at the Coventry LFGTE plant is the latest and most technically sophisticated incarnation of their landfill gas fueled electric generating units with a very favorable heat rate and low emissions. The generator's electrical output is routed through the plant's switchgear and substation where the power is stepped up from 4160 Volts to 46 kV for export to the Vermont Electric Company grid, the statewide transmission system which delivers the energy to WEC's distribution system. The plant is currently generating upwards of 4.3 MW on a continuous basis, supplying more than one-third of the Co-op's energy needs. This addition of a fourth CAT G3520C engine-generator will raise the facility's capacity to 6.4 MW.

Please note that this change results in an increase in capacity of 1.6 MW. The existing building, switchgear and substation were sized to accommodate a fourth unit. In addition, the gas recovery and treatment systems as well as the plant's substation already have the installed capacity to handle the gas flow and power export, respectively, for the expansion.

We appreciate your willingness to work with us in an effort to expedite ISONE's review of this application. If you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Avram Patt", written in a cursive style.

Avram Patt  
General Manager

Enclosures

cc: Dean LaForest, VELCO

**ISO NEW ENGLAND**  
**GENERATOR NOTIFICATION FORM**  
**FOR UNITS OR CHANGES OF 5 MW OR LESS**

Applicant: Washington Electric Cooperative, Inc.

Date: March 21, 2006

Generation Owner (if different than Applicant) \_\_\_\_\_

Contact Person: Avram Patt

Phone # (802)-223-5245

Fax # (802)-223-6780

E-mail: avram.patt@washingtonco-op.com

1. Station Name: Coventry LFGTE

a. Location/Interconnection Point (Indicate point of coupling with utility system by specifying distribution feeder or transmission line name(s) or substation name. Distribution facilities should include the transmission facility substation(s) that the distribution facilities are supplied from.)  
 VELCO Irasburg Substation, H17 48kV Circuit

b. Address of Plant (Town or City, County, State and Zip Code)

Street Address: 184 Landfill Lane

Town or City: Coventry

County: Orleans

State: Vermont

Zip Code: 05825

c. Unit/Aggregate Generation Asset Identification \_\_\_\_\_

Net ratings entered in d., e. and f. below should reflect the netting of auxiliary loads from the gross unit rating(s) that are directly related to the operation of the unit/aggregate generation.

d. Ratings at 20 degrees F ambient and at 90 degrees F ambient.

	Winter (20 Deg F)	Summer (90 Deg F)
Gross Unit Rating (MW)	1.60	1.60
Net Unit Rating (MW)	1.55	1.52
Unit Rating (Lagging MVAR)	1.43	1.43
Unit Rating (Leading MVAR)	1.43	1.43

e. The maximum gross unit rating is at 77 degrees F ambient. (Must be at 0 degrees F or greater.)

Maximum Gross Unit Rating (MW)	1.60
Net Unit Rating (MW)	1.54
Unit Rating (Lagging MVAR)	1.43
Unit Rating (Leading MVAR)	1.43

f. The maximum net unit rating is at 32 degrees F ambient. (Must be at 50 degrees F or greater.)

Gross Unit Rating (MW)	1.60
Maximum Net Unit Rating (MW)	1.55
Unit Rating (Lagging MVAR)	1.43
Unit Rating (Leading MVAR)	1.43

g. What is the maximum net power injection at the point of interconnection? 6.20 MW

h. Is there load reduced by operating this generation? (Check  yes or no)  Yes  No

If "Yes":

By how much is the load reduced? \_\_\_\_\_

Where is the load located? \_\_\_\_\_

2. Type of Application (Check  one)

Construction  Capacity Change  Deactivated Reserve  Retirement  Reactivation

3. Effective Date: November 1, 2006

**IF THIS IS FOR RETIREMENT OR DEACTIVATION, SKIP TO #13.**

4. Indicate whether the unit or generation aggregate capability is affected by steam host requirements.

(Check  yes or no)  Yes  No

If "Yes", define these requirements.

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5. Is the unit equipped with under-frequency protection? (Check  yes or no)  Yes  No

If "Yes":

a. Has the host utility reviewed the settings?  Yes  No

b. Will the unit be tripped for under-frequency conditions in the area above the curve in Figure 1 of NPCC Document A-3?  Yes  No

c. Will the unit be tripped in conjunction with dropping low voltage feeder during load shedding?  Yes  No

d. If "Yes" to b or c: Has additional automatic load shedding been provided equivalent to the amount of generation to be tripped?  Yes  No

If "Yes", describe using an attachment.

6. On a separate sheet, provide the following information:

a. Prime mover code for the units (from "Generator Unit/Technology Types" listed on page 4);

b. Number of units;

c. Manufacturer and model number of the energy conversion unit(s);

d. Manufacturer and model number of the exciter(s) for synchronous unit(s); and

e. Manufacturer and model number of the voltage regulator(s) for synchronous unit(s).

7. On a separate sheet, provide estimates of SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub> emissions rates. Also include rate estimates for other regulated atmospheric emissions in the format of pounds per MMBTU and pounds per MWH. Attach a list of all restrictions on generation due to environmental or other constraints (such as limited hours of operation, max. output) on the unit. Define conditions under which these restrictions can be lifted.

The attached Table 2 contains emissions data for engine #1 at the Coventry LFGTG plant. All four engines are identical. Compliance testing for the Air Quality permit did not require SO<sub>2</sub> analysis due to the characteristic of LFG being a very low sulfur containing fuel as compared to oil or some other fossil fuels. There are no restrictions on generation due to environmental or other constraints.

8. Will the operation of this unit impact other generating units or interconnections in the vicinity?

(Check  yes or no)  Yes  No

If "Yes", describe, using an attachment if necessary.

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9. Provide the following information on fuel used by the unit.
- a. List the unit's primary energy source code (from "Energy Sources" listed on page 4). LFG
  - b. List the unit's secondary energy source code (from "Energy Sources" listed on page 4). none
  - c. How is the fuel being transported to the site? (from "Mode of Transportation" listed on page 4). n/a
  - d. Does energy source (fuel) availability vary with the season? (Check  yes or no)  Yes  No  
If "Yes", describe. \_\_\_\_\_
  - e. What contingency plans are there to cover energy source shortages?  
none
  - f. Specify number of days of energy source storage. zero
  - g. What alternate form(s) of fuel transportation are available to the unit for primary energy source?  
Not applicable
  - h. What alternate form(s) of fuel transportation are available to the unit for secondary energy source?  
Not applicable
10. Will the unit have black start capability? (Check  yes or no)  Yes  No  
If "Yes", can it be operated on its own auxiliaries prior to synchronization with the system?  Yes  No
11. At what voltage level is the unit connected? 48kV  
(Check  the appropriate box and provide appropriate diagram(s))
- The unit is connected to the power system at transmission voltage. Provide an electrical one line diagram showing all essential devices including GSU impedance, station arrangements, station service and connections to the bulk power system, including the voltage levels.
  - The unit is connected to the distribution system. Provide one line diagram(s) showing the unit connection and where the distribution network connects to the bulk power system.
12. Is a Transmission Proposed Plan Application required? (Check  yes or no)  Yes  No
- a. If "Yes", identify the Transmission Applications associated with this Application, the Participant responsible for filing and the date the Application was/will be submitted.  
\_\_\_\_\_
  - b. If "No", are thermal, stability, or other reliability analyses required for this application?  
(Check  yes or no)  Yes  No
13. System Reliability Studies (Check  the appropriate information)
- |               |                                    |                                  |                                                |
|---------------|------------------------------------|----------------------------------|------------------------------------------------|
| Load Flow     | <input type="checkbox"/> Completed | <input type="checkbox"/> Planned | <input checked="" type="checkbox"/> Not Needed |
| Stability     | <input type="checkbox"/> Completed | <input type="checkbox"/> Planned | <input checked="" type="checkbox"/> Not Needed |
| Short Circuit | <input type="checkbox"/> Completed | <input type="checkbox"/> Planned | <input checked="" type="checkbox"/> Not Needed |
| Other _____   | <input type="checkbox"/> Completed | <input type="checkbox"/> Planned | <input checked="" type="checkbox"/> Not Needed |
14. Do any of the above studies indicate problem areas? (Check  yes or no)  Yes  No  
If "Yes", attach description.

**NOTE: APPLICATIONS FOR HYDRO UNITS MUST INCLUDE COMPLETED PPS-1 ATTACHMENT 2**

### GENERATOR UNIT/TECHNOLOGY TYPES

CODE	PRIME MOVER (UNIT TYPE)
ST	Steam Turbine, including nuclear, geothermal and solar steam (does not include Combined Cycle)
GT	Combustion (Gas) Turbine (does not include Combined Cycle)
IC	Internal Combustion (diesel, piston) Engine
CC	Combined Cycle - Represents the total unit/plant/asset. Also used for combustion turbine units that are in the planning stage, for which specific generator details cannot be provided. (Includes EIA Codes CA, CT, and CS.)
HD	Hydro (Conventional Daily)
HW	Hydro (Conventional Weekly) - Stations may be considered as operated on a weekly or seasonal draw-down cycle (HW) provided there is on-site Energy storage between normal operating elevations equivalent to at least ten (10) times Claimed Capability Ratings, assuming zero (0) inflow from natural run-off and upstream station water discharge. Otherwise, stations will be considered as operated on a daily cycle (HD).
PS	Hydro (Pump Storage)
PV	Photovoltaic
WT	Wind Turbine
CE	Compressed Air Energy Storage
FC	Fuel Cell
OT	Other

### MODE OF TRANSPORTATION

CODE	TRANSPORTATION (DESCRIPTION)
CV	Conveyor
PL	Pipeline
RR	Railroad
TK	Truck
WA	Water Transportation

### ENERGY SOURCES

CODE	TYPE (FUEL)
AB	Agricultural Crop Byproducts/Straw/Energy Crops
BFG	Blast-Furnace Gas
BIT	Bituminous Coal
BLQ	Black Liquor
DFO	Distillate Fuel Oil (includes all Diesel and No. 1, No. 2 and No. 4 Fuel Oils)
GEO	Geothermal
JF	Jet Fuel
KER	Kerosene
LIG	Lignite Coal
LFG	Landfill Gas
MSW	Municipal Solid Waste
NG	Natural Gas
NUC	Nuclear (Uranium, Plutonium, Thorium)
PC	Petroleum Coke
PG	Propane
OBG	Other Biomass Gases (Digester Gas, Methane and other biomass gases)
OBL	Other Biomass Liquids (Ethanol, Fish Oil, Liquid Acetonitrile Waste, Medical Waste, Tall Oil, Waste Alcohol and other biomass liquids not specified)
OBS	Other Biomass Solids (Animal Manure and Waste, Solid Byproducts and other solid biomass not specified)
OG	Other Gas (Butane, Coal Processes, Coke-Oven, Refinery and other processes)
OTH	Other (Batteries, Chemicals, Coke Breeze, Hydrogen, Pitch, Sulfur, Tar Coal and miscellaneous technologies)
RFO	Residual Fuel Oil (includes No. 5 and No. 6 Fuel Oils and Bunker C Fuel Oil)
SC	Coal-based Synfuel, including briquettes, pellets or extrusions, which are formed by binding materials and processes that recycle material
SLW	Sludge Waste
SUB	Sub-bituminous Coal
SUN	Solar (Photovoltaic, Thermal)
TDF	Tires
WAT	Water (Conventional, Pumped Storage)
WC	Waste/Other Coal (Anthracite Coal, Anthracite Culm, Bituminous Gob, Fine Coal, Lignite Waste, Waste Coal)
WDL	Wood Waste Liquids
WDS	Wood/Wood Waste Solids (Paper Pellets, Railroad Ties, Utility Poles, Wood Chips and other wood solids)
WND	Wind
WO	Oil - Other and Waste Oil (Butane (Liquid), Crude Oil, Liquid Byproducts, Oil Waste, Propane (Liquid), Re-refined Motor Oil, Sludge Oil, Tar Oil)

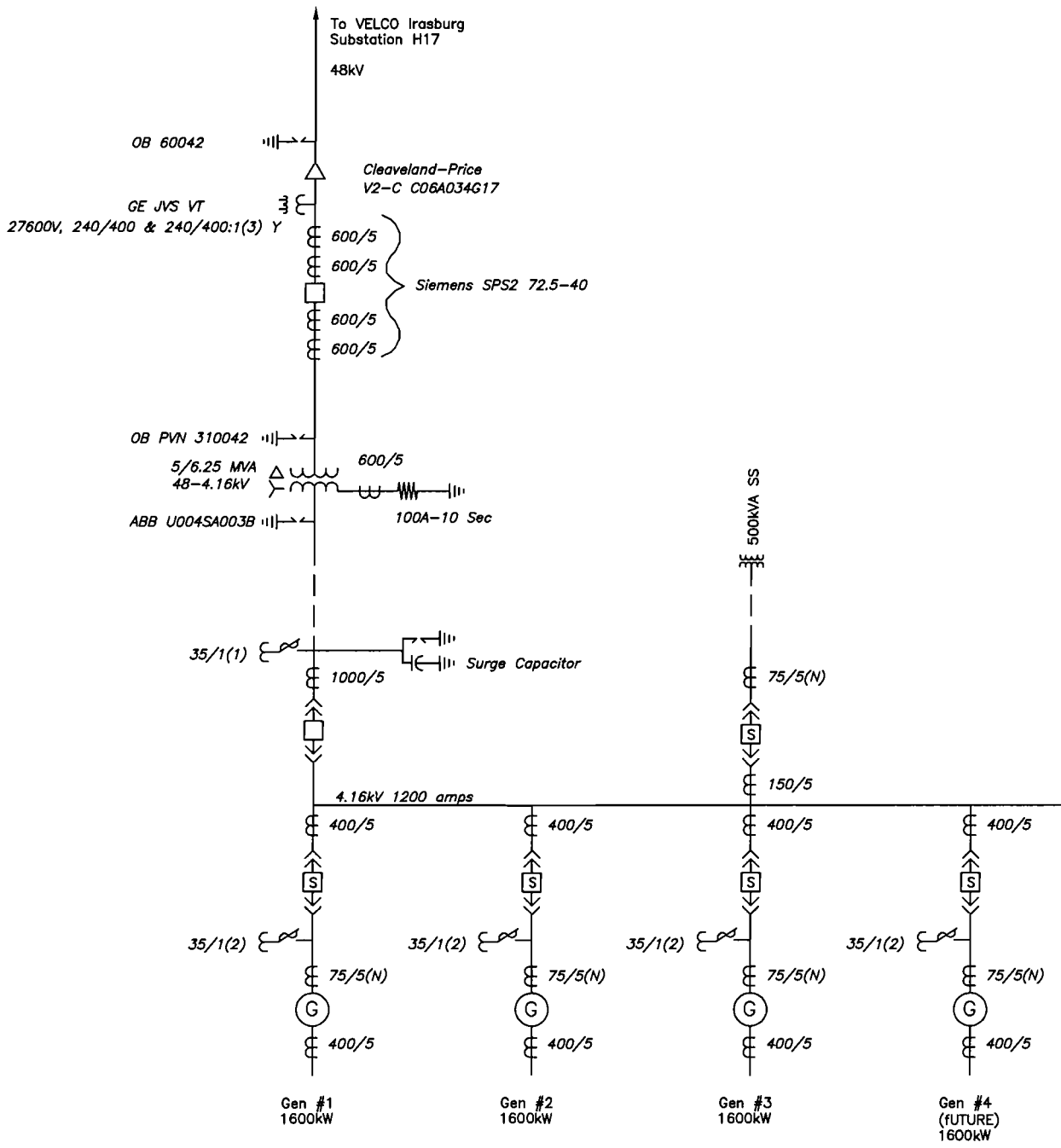
6. Supplemental

- a. IC
- b. 4 Units
- c. Caterpillar G3520C
- d. Exciter internal to machine windings. No specific model # available
- e. Cat CDVR

Attachments: Compliance Emission Testing Data  
One-line diagram of plant and substation

Table 2: Emissions Data						
Engine #1						
9/22/2005						
Parameter	UNITS				AVERAGE	
Test#		Run#1	Run#2	Run#3		
Start Time	hr:min	10:05	11:32	12:55		
End Time	hr:min	11:05	12:32	13:55		
Sample Volume	DSCF	21.817	21.295	21.178		
Stack Flow Rate (Q)	DSCFM	4732	4572	4334		4546
Stack Flow Rate (Q)	WetSCFM	5398	5222	4897		5172
Stack Temp	degF	788	796	793		792
Moisture	%	12.3	12.4	11.5		12.1
CO <sub>2</sub>	%	11.1	11	10.9		11
O <sub>2</sub>	%	8.6	8.5	8.7		8.6
Power Output	KW	1627	1639	1627		1631
Parameter	UNITS				AVERAGE	
CO concentration	ppm	581.28	592.3	603.7		592.472
CO emissions	lb/hour	12.003	11.817	11.419		11.474
	gms/BHP-hour	2.398	2.343	2.281		2.341
Parameter	UNITS				AVERAGE	
NOx Concentration	ppm	67.01	70.4	75.1		70.837
NOx Emissions	lb/hour	2.273	2.307	2.333		2.305
NOx Emissions	gms/BHP-hour	0.454	0.458	0.466		0.459
Parameter	UNITS				AVERAGE	
NMOC Concentration	ppm	8.65	9.1	8.8		8.85
NMOC Concentration	ppm @3% O <sub>2</sub>	12.5	13.2	12.9		12.9
Equations						
CO Emissions (lbs/hour)		$\text{ppm} * 15.58e-8 * \text{DSCFM} * \text{MW}$				
CO Emissions (gms/BHP-hour)		$\text{bs/hr} * 454 \text{ gr/lb} * (0.96\text{KW}) * 0.7457\text{KW/bhp}$				
NOx Emissions (lb/hr)		$\text{ppm} * 15.58e-8 * \text{DSCFM} * \text{MW}$				
NOx Emissions (gms/BHP-hour)		$\text{bs/hr} * 454 \text{ gr/lb} * (0.96\text{KW}) * 0.7457\text{KW/bhp}$				
NMOC ppm@3%O <sub>2</sub>		$\text{ppm} * ((20.9 - 3) / (20.9 - \text{O}_2))$				

Table 3: Emissions Compliance Summary				
Engine #1				
9/22/2005				
Parameter	Units	Emission Rate	Emission Limit	Within Compliance?
CO Emissions	gms/BHP-hour	2.341	2.75	Yes
NOx Emissions	gms/BHP-hour	0.459	0.5	Yes
NMOC Emissions	ppm @3% O <sub>2</sub>	12.9	20	Yes



WASHINGTON ELECTRIC COOPERATIVE  
EAST MONTPELIER, VERMONT

COVENTRY LANDFILL  
SUBSTATION  
SINGLE LINE

PREPARED BY:



Engineering & Environmental Consulting, LLC  
7 Green Mountain Drive, Suite #2, Montpelier, VT 05602

CONTRACT DWG NO.

PROJECT

DRAWN: DRC

DWG. No. COVENTRY LANDFILL SUB

LOCATION: COVENTRY, VERMONT

CHECKED:

APPROVED:

SCALE: NONE

DATE: 6/9/05

SHEET 1 OF 1