RACT Evaluation Report – Constellation Energy Resources Generation II, LLC

UTAH $PM_{2.5}$ SIP RACT

Salt Lake City Nonattainment Area

Utah Division of Air Quality

Major New Source Review Section

October 1, 2014

Company: West Valley Power Holdings, LL
Site ID: 12495
Project: PM10 SIP
Date: 3/17/2015

County FIPS	Category NAICS	NAICS	SIC	Site ID
35	3	221112	4911	12495
35	3	221112	4911	12495
35	3	221112	4911	12495
35	3	221112	4911	12495
35	3	221112	4911	12495

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35	3	221112	4911	12495
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35	3	221112	4911	12495

County	Category			

FIPS	NAICS	NAICS	SIC	Site ID
35	3	221112	4911	12495
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C. - West Valley Power Plant

Site Name	Comp ID	Process ID	Process Code
CER Generation II, LLC- West Valley Power Plant	171808	1	a
CER Generation II, LLC- West Valley Power Plant	171809	1	a
CER Generation II, LLC- West Valley Power Plant	171810	1	a
CER Generation II, LLC- West Valley Power Plant	171811	1	a
CER Generation II, LLC- West Valley Power Plant	172763	1	a

Site Name	Comp ID	Process ID	Process Code
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Component Description	Material or Fuel	Component SCC			
			ID	Height	Diameter
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20546	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20547	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20548	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20549	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20690	81	12

Component Description	Material or Fuel	Component SCC			
			ID	Height	Diameter
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20546	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20547	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20548	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20549	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20690	81	12

Component	Material or	Component	

Description	Fuel	SCC	ID	Height	Diameter
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20546	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20547	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20548	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20549	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20690	81	12

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GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20548	81	12
GE LM6000 PC Sprint NG Turbine	Natural Gas	20100201	20549	81	12
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Stack				Location				
Temp	Flow	Area	Velocity	Lat	Long	Hrs/Day	Days/Wk	Wks/Yr
830	10044	113.0973	88.81	40.66459	-112.0313	24	7	52
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830	10044	113.0973	88.81	40.66459	-112.0313	24	7	52

Temporal Operating Information								
Hrs/Yr	% Jan	% Feb	% Mar	% Apr	% May	% Jun	% Jul	% Aug
1981	6.61	8.11	8.51	14.11	14.23	5.88	9.42	11.22
1641	5.67	6.01	6.58	10.03	11.5	4.49	8.56	10.85
1670	8.28	8.13	4.39	12.68	14.22	6.36	9.52	11.7
1666	4.96	5.08	5.02	9.18	10.09	4.86	10.11	12.6
1527	5.4	5.36	2.97	7.2	11.9	6	11.4	12.78

Condensa

Temporal Operating Information								
Hrs/Yr	% Jan	% Feb	% Mar	% Apr	% May	% Jun	% Jul	% Aug
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33

Temporal Operating Information

Hrs/Yr	% Jan	% Feb	% Mar	% Apr	% May	% Jun	% Jul	% Aug
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33

Temporal Operating Information								
Hrs/Yr	% Jan	% Feb	% Mar	% Apr	% May	% Jun	% Jul	% Aug
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33

Temporal Operating Information								
Hrs/Yr	% Jan	% Feb	% Mar	% Apr	% May	% Jun	% Jul	% Aug
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33

Temporal Operating Information								
Hrs/Yr	**% Jan**	**% Feb**	**% Mar**	**% Apr**	**% May**	**% Jun**	**% Jul**	**% Aug**
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
8760	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33

			201
PM10	PM2.5	SO2	NOx
6.566	6.566	0.500	20.370

				Permit				2(
% Sep	% Oct	% Nov	% Dec	Status	PM10	PM2.5	SO2	NOx
8.87	10.37	1.84	0.83	Yes	1.584	1.584	0.100	4.561
10.2	14	8.25	3.85	Yes	1.241	1.241	0.100	3.949
9.1	10.88	2.49	2.24	Yes	1.294	1.294	0.100	4.117
11.18	15.86	7.55	3.52	Yes	1.294	1.294	0.100	3.724
10.34	14.48	7.9	4.27	Yes	1.153	1.153	0.100	4.019

			2019
PM10	PM2.5	SO2	NOx
58.413	58.413	12.100	162.050

bles included

Does the 2019 True-Up Include Gro

				Permit				20
% Sep	% Oct	% Nov	% Dec	Status	PM10	PM2.5	SO2	NOx
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41

			2019
PM10	PM2.5	SO2	NOx
58.413	58.413	12.100	162.050

	Permit	201

% Sep	% Oct	% Nov	% Dec	Status	PM10	PM2.5	SO2	NOx
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41

2024			
PM10	PM2.5	SO2	NOx
58.413	58.413	12.100	162.050

				Permit	202			
% Sep	% Oct	% Nov	% Dec	Status	PM10	PM2.5	SO2	NOx
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41
8.33	8.33	8.33	8.33	Yes	11.6825	11.6825	2.42	32.41

2028			
PM10	PM2.5	SO2	NOx
59.858	59.858	12.399	166.059

				Permit	202			
% Sep	% Oct	% Nov	% Dec	Status	PM10	PM2.5	SO2	NOx
8.33	8.33	8.33	8.33	Yes	11.97155	11.97155	2.479876	33.2119
8.33	8.33	8.33	8.33	Yes	11.97155	11.97155	2.479876	33.2119
8.33	8.33	8.33	8.33	Yes	11.97155	11.97155	2.479876	33.2119
8.33	8.33	8.33	8.33	Yes	11.97155	11.97155	2.479876	33.2119
8.33	8.33	8.33	8.33	Yes	11.97155	11.97155	2.479876	33.2119

2030			
PM10	PM2.5	SO2	NOx

61.337	61.337	12.706	170.163

				Permit	203			
% Sep	% Oct	% Nov	% Dec	Status	PM10	PM2.5	SO2	NOx
8.33	8.33	8.33	8.33	Yes	12.26737	12.26737	2.541154	34.03256
8.33	8.33	8.33	8.33	Yes	12.26737	12.26737	2.541154	34.03256
8.33	8.33	8.33	8.33	Yes	12.26737	12.26737	2.541154	34.03256
8.33	8.33	8.33	8.33	Yes	12.26737	12.26737	2.541154	34.03256
8.33	8.33	8.33	8.33	Yes	12.26737	12.26737	2.541154	34.03256

1 Actual Emissions (tons/yr)					
VOC	CO	NH3	Benzene	Chlorine	HCl
2.089	21.072	0.000	0.022	0.000	0.000

011 Actual Emissions						
VOC	CO	NH3	Benzene	Chlorine	HCl	
0.504	5.071	0.000	0.004			0.000
0.395	3.889	0.000	0.004			0.000
0.412	3.231	0.000	0.005			0.000
0.412	4.673	0.000	0.005			0.000
0.367	4.207	0.000	0.004			0.000

True-Up Emissions (tons/yr)					
VOC	CO	NH3	Benzene	Chlorine	HCl
12.100	191.650	0.000	0.000	0.000	0.000

wth?	No

This is a PTE validation - all projection years should be held flat

19 True-Up Emissions						
VOC	CO	NH3	Benzene	Chlorine	HCl	
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000

Projected Emissions (tons/yr)					
VOC	CO	NH3	Benzene	Chlorine	HCl
12.100	191.650	0.000	0.000	0.000	0.000

.9 Projected Emissions

VOC	CO	NH3	Benzene	Chlorine	HCl	
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000

Projected Emissions (tons/yr)					
VOC	CO	NH3	Benzene	Chlorine	HCl
12.100	191.650	0.000	0.000	0.000	0.000

24 Projected Emissions						
VOC	CO	NH3	Benzene	Chlorine	HCl	
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000
2.42	38.33	0	0	0	0	0.000

Projected Emissions (tons/yr)					
VOC	CO	NH3	Benzene	Chlorine	HCl
12.399	196.392	0.000	0.000	0.000	0.000

28 Projected Emissions						
VOC	CO	NH3	Benzene	Chlorine	HCl	
2.479876	39.27837	0	0	0	0	0.000
2.479876	39.27837	0	0	0	0	0.000
2.479876	39.27837	0	0	0	0	0.000
2.479876	39.27837	0	0	0	0	0.000
2.479876	39.27837	0	0	0	0	0.000

Projected Emissions (tons/yr)					
VOC	CO	NH3	Benzene	Chlorine	HCl

12.706	201.245	0.000	0.000	0.000	0.000

30 Projected Emissions						
VOC	**CO**	**NH3**	**Benzene**	**Chlorine**	**HCl**	
2.541154	40.24893	0	0	0	0	0.000
2.541154	40.24893	0	0	0	0	0.000
2.541154	40.24893	0	0	0	0	0.000
2.541154	40.24893	0	0	0	0	0.000
2.541154	40.24893	0	0	0	0	0.000

t, with no growth.

Utah!
Where ideas connect
Department of Environmental Quality
Division of Air Quality

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
Richard W. Sprott
Director

150 North 1950 West
P.O. Box 144820
Salt Lake City, Utah 84114-4820
(801) 536-4099 Fax
(801) 536-4414 T.D.D.
www.deq.utah.gov

DAQE-282-02

April 18, 2002

Terry Millgate
PacifiCorp Power Marketing
5935 West 4700 South
West Valley City, Utah 84170

Dear Mr. Millgate:

Re: Approval Order: Modification to DAQE-440-01 for Adding One Turbine Generator Set at West Valley Natural Gas Fired Power Generating Facility, Salt Lake County, CDS-A, Title V, Title IV
Project Code: N2495-002

The attached document is the Approval Order (AO) for the above-referenced project.

Future correspondence on this Approval Order should include the engineer's name as well as the DAQE number as shown on the upper right-hand corner of this letter. Please direct any technical questions you may have on this project to Ms. Milka M. Radulovic. She may be reached at (801) 536-4232.

Sincerely,

Richard W. Sprott, Executive Secretary
Utah Air Quality Board

RWS:MR:jc

cc: Salt Lake Valley Health Department
Miek Owens, EPA Region VIII

STATE OF UTAH

Department of Environmental Quality

Division of Air Quality

APPROVAL ORDER: MODIFICATION TO DAQE-440-01 FOR ADDING ONE TURBINE GENERATOR SET AT WEST VALLEY NATURAL GAS FIRED POWER GENERATING FACILITY

Prepared By: Milka M. Radulovic, Engineer
(801) 536-4232
Email: mradulov@deq.state.ut.us

APPROVAL ORDER NUMBER

DAQE-282-02

Date: April 18, 2002

PacifiCorp Power Marketing
Source Contact
Terry Millgate
(801) 967-4556/ext.221

Richard W. Sprott
Executive Secretary
Utah Air Quality Board

Abstract

PacifiCorp Power Marketing (PPM) has submitted a Notice of Intent to modify AO DAQE-440-01 by installing one additional 43.5 MW natural gas-fueled simple cycle turbine (SCGT) engine generator set at their power generation facility located at 5935 West 4700 South, West Valley, Salt Lake County. The new turbine is General Electric model LM6000 and is proposed with a combination of water injection and selective catalytic reduction (SCR) controls for NO_x and CO catalysts. Emission rates after the water injection will be 25 ppmvd for NO_x and after the SCR control will be 5 ppmvd for NO_x. CO emission rate will be 10 ppmvd after catalyst oxidation. In addition, PPM proposes to use continuous emission monitoring system for compliance demonstration with NO_x and CO emissions limits for the new and four existing units.

Title IV and Title V of the 1990 Clean Air Act apply to this source. The proposed project was not a major modification as defined in UAC R307-401-2.

Modeling of the new turbine and existing turbines emissions indicates no violations of the National Ambient Air Quality Standards.

UAC R307-403-5 required offsets for NO_x, SO_2, and PM_{10} for this project.

New Source Performance Standards (NSPS) 40 CFR 60, Subpart GG (New Source Performance Standards for Stationary Gas Turbines) applies to the proposed turbine. National Emission Standards for Hazardous Air Pollutants regulations, 40 CFR 63 do not apply to the turbine at this time. Since the turbine serves one generator with total capacity that is greater than 25 MW, this unit will be affected under the Acid Rain Program regulations.

The project has been evaluated and found to be consistent with the requirements of the Utah Administrative Code Rule 307 (UAC R307). A public comment period was held in accordance with UAC R307-401-4 and comments were received. The comments were evaluated in accordance with UAC R307-401-6 and were not found to have any effect on the conditions proposed in the Intent to Approve. This air quality Approval Order (AO) reflects those conditions and authorizes the project with the following conditions. Failure to comply with any of the conditions may constitute a violation of this order.

General Conditions:

1. This Approval Order (AO) applies to the following company:

Site Office	Corporate Office Location
West Valley Generation	PacifiCorp Power Marketing
5935 West 4700 South	650 NE Holladay Suite #700
West Valley City, Utah 84118	Portland, Oregon 97232
Phone Number: (801) 967-4556/x221	(503) 813-5651
Fax Number: (801) 840-8136	(503) 813-5722

The equipment listed in this AO shall be operated at the following location:

PLANT LOCATION:

4700 South 5935 West, West Valley City, Salt Lake County

Universal Transverse Mercator (UTM) Coordinate System:
4,502.036 kilometers Northing, 412.828 kilometers Easting, Zone 12
UTM Datum: NAD27

2. All definitions, terms, abbreviations, and references used in this AO conform to those used in the Utah Administrative Code (UAC) Rule 307 (R307), and Title 40 of the Code of Federal Regulations (40 CFR). Unless noted otherwise, references cited in these AO conditions refer to those rules.

3. The limits set forth in this AO shall not be exceeded without prior approval in accordance with R307-401.

4. Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be approved in accordance with R307-401-1.

5. All records referenced in this AO or in applicable NSPS, which are required to be kept by the owner/operator, shall be made available to the Executive Secretary or Executive Secretary=s representative upon request, and the records shall include the two-year period prior to the date of the request. Records shall be kept for the following minimum periods:

A.	Emission inventories	Five years from the due date of each emission statement or until the next inventory is due, whichever is longer.
B.	All other records	Five years.

6. PacifiCorp Marketing shall install and operate the new GE LM6000 natural gas fired turbine engine generator set and shall conduct its operations of the existing power plant in accordance with the terms and conditions of this AO, which was written pursuant to PacifiCorp Marketing=s Notice of Intent submitted to the Division of Air Quality (DAQ) on December 3, 2001 and additional information submitted to the DAQ on February 8, 2002.

7. The approved installations shall consist of the following equipment or equivalent*:

   A. Five (5) GE LM6000 PC Sprint natural gas simple cycle turbines (Turbine #1, #2, #3, #4, and #5) each with water injection, evaporative spray mist inlet air cooling, Selective Catalytic Reduction (SCR) catalyst and CO oxidation catalyst.

Each engine characteristics:

Site rated output at baseload, 20^0F:	43.4 MW
Heat rate at baseload, 20^0F:	8,393 Btu/kW-hr (natural gas LHV of 935.34 Btu/scf)
Maximum firing rate:	389,186 scf/hr (at 20^0F)
Stack exit height:	81 feet
Stack exit diameter:	12 feet

* Equivalency shall be determined by the Executive Secretary.

8. This AO shall replace the AO dated June 15, 2001 (DAQE-440-01).

9. PacifiCorp Marketing shall notify the Executive Secretary in writing when the installation of the new GE LM6000 natural gas fired Turbine #5 engine generator set listed in Condition #7 has been completed and is operational, as an initial compliance inspection is required. To insure proper credit when notifying the Executive Secretary, send your correspondence to the Executive Secretary, attn: Compliance Section.

   If construction and/or installation has not been completed within eighteen months from the date of this AO, the Executive Secretary shall be notified in writing on the status of the construction and/or installation. At that time, the Executive Secretary shall require documentation of the continuous construction and/or installation of the operation and may revoke the AO in accordance with R307-401-11.

Limitations and Tests Procedures

10. Emissions to the atmosphere from the indicated emission points shall not exceed the following rates and concentrations:

Source: Each LM6000 Turbine Exhaust Stack

Pollutant	lb/hr* (15% O_2 dry) (30-day rolling average)	ppmdv** (15% O_2 dry) (30-day rolling average)	ppmdv*** (15% O_2 dry)
NO_x	37	5	100
CO	43.75	10	NA

* Total emissions for all five turbines under steady state operation not including startups and shutdowns
** Emissions from an individual turbine under steady state operation not including startups and shutdowns
*** Emissions from an individual turbine (in accordance with 40 CFR 60 Subpart GG requirements)

11. Stack testing to show compliance with the emission limitations stated in the above condition shall be performed as specified below:

A.

Emissions Point	Pollutant	Testing Status	Test Frequency
Turbine #1 to #4 Exhaust Stack	NO_x	*, **	CEMs
	CO	*,**	CEMs
Turbine #5 Exhaust Stack	NO_x	**	CEMs
	CO		CEMs

B. Testing Status (To be applied above)

* The initial testing has already been performed on turbines #3 and #4.

** Initial compliance testing for NO_x for turbines #1, #2, and #5 shall be performed in accordance with the 40 CFR 60 Subpart GG. Initial compliance testing shall be performed within 60 days after achieving the maximum production rate at which the affected facility will be operated and in no case later than 180 days after the start up of a new emission source.

C. Notification

The Executive Secretary shall be notified at least 45 days prior to conducting any required emission testing. A source test protocol shall be submitted to DAQ when the testing notification is submitted to the Executive Secretary.

The source test protocol shall be approved by the Executive Secretary prior to performing the test(s). The source test protocol shall outline the proposed test methodologies, stack to be tested, and binder sampling procedures to be used. A pretest conference shall be held, if directed by the Executive Secretary.

D. Sample Location

The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other methods as approved by the Executive Secretary. An Occupational Safety and Health Administration (OSHA) or Mine Safety and Health Administration (MSHA) approved access shall be provided to the test location

E. Volumetric Flow Rate

40 CFR 60, Appendix A, Method 2

F. Nitrogen Oxides (NO_x)

40 CFR 60, Appendix A, Method 7, 7A, 7B, 7C, 7D, 7E or Method 20

12. NO_x emissions in lb/hr shall be calculated from the ppmvd CEMs recorded data using 40 CFR 60App. A, Method 19. CO emissions in lb/hr shall be calculated from the ppmvd CEMs recorded based on 40 CFR 60 App. A, Method 19.

13. Visible emissions from the following emission points shall not exceed the following values:

All natural gas combustion exhausts - 10% opacity

Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9.

Fuels

14. The owner/operator shall use only pipe line quality natural gas as a fuel in the turbines.

Federal Limitations and Requirements

15. In addition to the requirements of this AO, all applicable provisions of 40 CFR 60, New Source Performance Standards (NSPS) Subpart A, 40 CFR 60.1 to 60.18 and Subpart GG, 40 CFR 60.330 to 60.334 (Standards of Performance for Stationary Gas Turbines) apply to this installation.

Sulfur monitoring can be waived for pipeline quality natural gas [40 CFR 72.7.(d).(1)].

Nitrogen monitoring can be waived for pipeline quality natural gas, since there is no fuel-bound nitrogen and since the fuel nitrogen does not contribute appreciably to NO_x emissions [USEPA Memo, August 14, 1987].

16. In addition to the requirements of this AO, all applicable provisions of 40 CFR Part 72, 73, 75, 76, 77, and 78 - Federal regulations for the Acid Rain Program under Clean Air Act Title IV apply to this installation.

Monitoring - Continuous Emissions Monitoring

17. The owner/operator shall install, calibrate, maintain, and operate a continuous monitoring system for measuring nitrogen oxides and carbon monoxide emissions discharged to the atmosphere from each turbine stack and record the output of the system. The monitoring system shall be used for measuring and determining compliance. The continuous monitoring system shall comply with applicable provisions of UAC, R307-170 and applicable Federal

regulations for the Acid Rain Program under Clean Air Act Title IV.

18. PacifiCorp shall submit for review and Executive Secretary approval CEMs monitoring plan 45 days before the turbine become operational. The plan shall address the number of monitors to be used, the method of measuring the rate in tons per hour, and the method of calculating emissions during the CEMs breakdowns.

Records & Miscellaneous

19. At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this Approval Order including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Executive Secretary which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded, and the records shall be maintained.

20. The owner/operator shall comply with UAC, R307-150 Series. Inventories, Testing and Monitoring.

21. The owner/operator shall comply with UAC R307-107. General Requirements: Unavoidable Breakdowns.

22. The owner/operator shall submit to the Executive Secretary an emergency plan revision within 60 days of the date of this AO. The plan shall identify what control/production measures the owner/operator shall implement when an emergency episode is declared by the Executive Director of the Department of Environmental Quality. Specific emission reduction measures shall be outlined for all three levels (Alert, Warning, Emergency). The values for the various levels are listed in R307-105, UAC. Also see 40 CFR, Part 51, Subpart H (40 CFR 51.150 to 153) and Appendix L. The emergency plan shall be approved by the Executive Secretary. The Alert Level actions to be taken should be curtailment of all unnecessary activities causing air pollution. The other two levels of actions should be a progressive curtailment of production and activities causing pollution, to the point of complete shutdown of operations.

The Executive Secretary shall be notified in writing if the company is sold or changes its name.

This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including UAC R307.

A copy of the rules, regulations and/or attachments addressed in this AO may be obtained by contacting the Division of Air Quality. The Utah Administrative Code R307 rules used by DAQ, the Notice of Intent (NOI) guide, and other air quality documents and forms may also be obtained on the Internet at the following web site: http://www.eq.state.ut.us/eqair/aq_home.htm.

The annual emission estimations below include point source and do not include fugitive emissions, fugitive dust, road dust, tail pipe emissions, grandfathered emissions etc. These emissions are for the purpose of determining the applicability of Prevention of Significant Deterioration, nonattainment area, maintenance area, and Title V source requirements of the UAC R307. They are not to be used for determining compliance.

The Potential To Emit (PTE) emissions for the entire plant are currently calculated at the following values:

Pollutant	Tons/yr
PM_{10}	58.41
SO_2	12.09
NO_x	162.06
CO	191.63
VOC	12.09
HAPs (mainly formaldehyde)	
Formaldehyde	4.09
Total HAPs	5.91

Emission offsets for this project were used from the PacifiCorp Marketing banked emissions in the State of Utah Banked Emission Register for Salt Lake County at the following amounts:

11.68 tons of PM_{10}
2.42 tons of SO_2
32.41 tons of NO_x

Leaving the balance of

4.62 tons of PM_{10}
17.48 tons of SO_2
53.11 tons of NO_x
9.10 tons of CO
1.5 tons of VOC

Approved By:

Richard W. Sprott, Executive Secretary
Utah Air Quality Board

RACT EVALUATION REPORT
Constellation Energy Resources Generation II, LLC

1.0 INTRODUCTION AND FACILITY DESCRIPTION

1.1 Facility Identification

Name: Constellation Energy Resources Generation II, LLC
Address: 5935 West 4700 South, West Valley City, Utah, Salt Lake County
Owner/Operator: Exelon Generation
UTM coordinates: 4,502,036 Northing, 412,828 Easting, Zone 12

1.2 Facility Process Summary

Constellation Energy Resources Generation II, LLC (CER) is a natural gas-fired electric generating plant consisting of five (5) simple cycle turbines. Each turbine has a power output rating of 43.4 MW. The plant is located in Salt Lake County, which is part of the Salt Lake City $PM_{2.5}$ nonattainment area.

The turbines are fired on pipeline quality natural gas, have water injection and evaporative mist inlet air cooling. The plant is a Phase II acid rain source and a major source for both NOx and CO emissions. The plant was permitted in 2002 as a PSD major source and a PM_{10} nonattainment area major source for NOx emissions, and ozone maintenance area major source (again for NOx emissions). Therefore, analysis of LAER was required for PM_{10}, NOx, SO_2 and VOC emissions; analysis of BACT was required for all other emissions.

1.3 Facility Criteria Air Pollutant Emissions Sources

The source consists of five (5) GE LM6000PC Sprint simple cycle natural gas-fired combustion turbines. Emissions are presently controlled using a combination of exclusive firing of pipeline quality natural gas, selective catalytic reduction (SCR), oxidation catalysts and water injection. Rather than using the actual emissions from 2008, potential to emit values (permitted emissions) are used for establishment of a baseline for RACT evaluation. Those permitted emissions in tons per year are as follows:
PM_{10} = 15.12, $PM_{2.5}$ = 15.12, SO_2 = 2.36, NOx = 38.0, VOC = 4.81

1.4 RACT Cut-off Threshold

A RACT cut-off threshold was established generally for all facilities based on Utah DAQ's existing small source exemption rule R307-401-9. This rule exempts sources of pollution with emissions less than 5.0 tpy from permitting requirements. Therefore, sources with baseline actual emissions which fall below this threshold could be exempted from evaluation under this general establishment.

However, CER operates only the five combustion turbines as emitting sources at this facility. These combustion turbines have the potential to emit more than 5 tons per year of NOx. Therefore no sources were removed due to the RACT cut-off threshold.

2.0 RACT Evaluation

2.1 LM6000PC Sprint Combustion Turbines

Each combustion turbine is a simple cycle turbine fired exclusively on pipeline quality natural gas. Because it operates in simple cycle mode, there is no heat recovery steam generator and no associated duct firing emissions.

$PM_{2.5}$

Available Control Technology

No additional add-on control technology has been identified by DAQ that can further reduce direct particulate emissions from natural gas combustion in a turbine generator. All particulate generated from natural gas combustion is considered to be $PM_{2.5}$. Typical add-on control devices – such as fabric filtration, electrostatic precipitation, or cyclonic separation – have extremely limited effectiveness in such an environment.

Since no additional available controls have been identified for the control of particulate emissions, the only remaining control is the default "no control" option of exclusive firing on pipeline quality natural gas.

Technically Infeasible RACT Controls

N/A – no additional controls identified.

Evaluation and Ranking of Technically Feasible RACT Controls

N/A – no additional controls identified.

Selection of RACT controls

No additional control required. Combustion of pipeline quality natural gas as fuel for control of particulate emissions is recommended as RACT.

SO_2

Available Control Technology

Similarly, no additional add-on control technology has been identified by DAQ that can further reduce emissions of SO_2 from combustion turbines. Pipeline quality natural gas is

inherently low in sulfur. Total potential annual emissions from all three combustion turbines are less than 2 tpy of SO_2.

Most sulfur control technologies require the use of some sort of acid reducing agent such as lime slurry or limestone injection. This leads to residual solid or liquid waste which requires subsequent disposal. The remaining control techniques rely on reducing emissions of particulates and allowing any residual sulfur to be captured with the particulate. With so little SO_2 (or particulate) being generated in the first place, further reductions of SO_2 using either active or passive control techniques are therefore next to impossible.

Technically Infeasible RACT Controls

N/A – no additional controls identified.

Evaluation and Ranking of Technically Feasible RACT Controls

N/A – no additional controls identified.

Selection of RACT Controls

No additional control required. Combustion of pipeline quality natural gas as fuel for control of SO_2 emissions is recommended as RACT.

<u>VOC</u>

Available Control Technology

Only one add-on control technology has been identified by DAQ to reduce emissions of VOC from combustion turbines – the use of oxidation catalysts. An oxidation catalyst is similar in design and operation to a catalytic control system on a passenger vehicle, in that an inline, self-regenerating, catalyst system is placed within the exhaust stream prior to the final stack, so that emissions of CO and VOC can be further oxidized to CO_2 and water. Oxidation of VOC can approach efficiencies of 70%, depending on initial concentrations and stack characteristics.

All of the turbines at the CER facility have oxidation catalysts installed as these were required as CO BACT as part of the requirements of the 2002 AO to construct and operate the facility.

Technically Infeasible RACT Controls

N/A – oxidation catalysts are technically feasible; therefore this section does not apply.

Evaluation and Ranking of Technically Feasible RACT Controls

The oxidation catalysts installed on the turbines bring the CO emission rate down to 10 ppm per turbine and 45 lbs/hr for all turbines combined (both limits on a 30 day average). While VOC emissions are not specifically limited, it is assumed that VOC emissions on a ppm basis are similar to CO emissions.

To determine if a greater level of control is possible, DAQ investigated the current level of VOC control available with oxidation catalysts in this turbine size range. New turbines can achieve as low as 2 ppm VOC emissions, but these are large mainline baseload units with much higher temperatures and specifically designed oxidation catalyst systems and greater inlet loading. For turbines in this size range, CO oxidation catalysts typically reduce CO emissions to the range of 10 ppm. VOC emissions roughly match CO emissions, but oxidation catalysts for a turbine of this size are designed for a CO emission rate rather than a VOC emission rate. Aiming for a lower CO emission rate of perhaps 5 ppm requires a higher stack temperature. This will require the burning of more fuel.

Increased heat requires that the turbines be operated more often, or requires that some supplemental heating is supplied to the oxidation catalyst to increase oxidation efficiency. Increased fuel burning to reduce VOC emissions is counter-productive. Attempting to reduce VOC emissions below 10 ppm is environmentally infeasible.

Selection of RACT controls

Retention of the existing oxidation catalyst systems for control of VOC emissions is recommended as RACT.

<u>NOx</u>

Available Control Technology

The following technologies have been identified as potential control methodologies for control of NOx emissions: good combustion practices (GCP – no additional controls, but proper operation of existing equipment); low emission combustion (LEC); selective non-catalytic reduction (SNCR); and selective catalytic reduction as potential NOx emission control technologies.

The LM6000PC Sprint turbine is an inherently low-NOx burner design. Water injection and water mist cooling of inlet air enable the turbine to achieve greater power output for a given fuel input by cooling flame temperature and densifying combustion air. This results in less thermal NOx generation and a higher mass flow against the turbine blades generating higher power output for the same amount of fuel.

Technically Infeasible RACT Controls

N/A – the turbines are LEC by design, Selective non-catalytic reduction is the simple injection of ammonia into the exhaust stream. This is technically feasible.

Selective catalytic reduction is the same, although with the addition of a catalyst bed to facilitate reduction at a lower exhaust stream temperature. This is also technically feasible.

Evaluation and Ranking of Technically Feasible RACT Controls

As the turbines are already LEC by design, the remaining three controls would ordinarily then be ranked by control effectiveness. However, the CER turbines also have SCR systems installed. They were installed as LAER as part of the requirements for the 2002 AO to construct and operate. SCR systems have long been acknowledged as achieving the greatest degree of control of NOx on natural gas-fired turbine sources.

The NOx emissions from CER are limited by the AO to 5 ppm for each turbine and 37 lbs/hr for all turbines combined (both limits on a 30 day average). While some newer SCR systems have been able to achieve NOx emission rates as low as 2 ppm on a 30 day average, these are found only in larger combined cycle turbines with much higher inlet loadings. For turbines in this size range, 5 ppm is appropriate.

Selection of RACT Controls

Retention of the existing SCR systems at CER for control of NOx emissions is recommended as RACT.

3.0 Conclusion- Emissions Reduction through RACT implementation

The summary of all the above RACT evaluations is that no changes to the existing control methodologies at CER are recommended. No reductions in actual or potential emissions are expected.

4.0 Startup / Shutdown

In order to minimize emissions generated during startup and shutdown of the combustion turbines, CER has a defined emission minimization plan. The plan consists of two main components: defining the periods which constitute startup and shutdown, and limiting the total duration of those periods on a daily basis.

The turbines at CER are controlled with SCR systems which require a minimum operating temperature before becoming effective. Limiting the total duration of startup insures that the turbine controls are in service promptly under the majority of operational conditions, by requiring that the turbines are brought up to temperature as expeditiously as possible.

5.0 Implementation Schedule

The turbines at CER are already installed and operational with all control systems in place. No implementation schedule is required.

4.0 References

Exelon Generation $PM_{2.5}$ SIP Major Point Source RACT Documentation – West Valley Power Plant
Exelon Generation $PM_{2.5}$ SIP Process Next Steps Information Request – dated May 7, 2014

RACT Evaluation Report – Constellation Energy Resources Generation II, LLC

UTAH $PM_{2.5}$ SIP RACT

Salt Lake City Nonattainment Area

Supporting Information