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Addendum to Revised Final Determination of Compliance (FDOC) for
El Segundo Power Facility Modification (ESPFM) Project dated July 1, 2015

Appendix I

Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units

Background

On January 8th, 2014 EPA released final New Source Performance Standards (NSPS) under the Clean Air Act section 111 to limit CO2 emissions for newly constructed fossil fuel-fired electric utility steam generating units and newly constructed natural gas-fired stationary combustion turbines. On August 3rd, 2015 EPA submitted modified final new source performance standards under the Clean Air Act 111(b) based on review of comments and feedback received regarding the initial proposal from January 8th, 2014. These standards apply to all fossil-fueled fired electrical generating units that commenced construction on or after the January 8th, 2014 proposed standards. Therefore these standards apply to all the electrical generating units of the ESPFM project.

In a separate action under Clean Air Act section 111(d), the EPA issued final emission guidelines for states to use in developing plans (Clean Power Plan) to limit CO_2 emissions from existing fossil fuel-fired Electrical Generating Units. However because the state of California has until September of 2016 to submit its final Clean Power Plan, final applicability and requirements of this rule cannot be determined for the ESPFM project at this time.

This addendum will focus on the new source performance standards established in the August 3rd final rule determination of the Clean Air Act section 111(b).

Emission Standards

The emission standards established in the final rule are based on different categorizations of combustion turbines. The finalized standards include two categories for natural gas-fired combustion turbines. These categories are defined as:

Base load natural gas-fired units: Units which burn over 90 percent natural gas and have net-electric sales of electricity in excess of their design efficiency (not to exceed 50 percent) multiplied by their potential electric output.

Non-base load natural gas-fired units: Units which burn over 90 percent natural gas and have net-electric sales of equal to or below their design efficiency (not to exceed 50 percent) multiplied by their potential electric output.

For base load natural gas-fired units the emission standard is finalized as 1,000 lbs CO2/gross MWh or optionally 1,030 lbs CO2/net MWh calculated on a 12 operating month rolling average.

For non-base load natural gas-fired units the emission standard is finalized as 120 lbs CO2/MMBtu calculated on a 12 operating month rolling average.

Combined Cycle Generating System

The Unit 9 General Electric Combined Cycle Generator has expected CO2 emissions between 877-967 lbs CO2/net MWh as calculated in Appendix E. For this reason the unit will meet the base load unit emission standard of 1,000 lbs CO2/gross MWh (1,030 lbs CO2/net MWh). Should the unit operate as non base load unit, rule compliance with the 120 lbs CO2/MMBtu is shown by the use of natural gas which has EPA established emissions of 117 lbs CO2/MMBtu. Permit conditions will be applied to Unit 9 to establish emission standards based on the net-electric sales of Unit 9.

Simple Cycle Generating System

The expected emissions for the Unit 11 & 12 Trent Simple Cycle Generators are expected to be between 1,113-1,502 lbs CO2/net MWh as calculated in Appendix E. The Trent Simple Cycle Generator units cannot meet the base load emissions standard. The Trent Simple Cycle Generators will be run on exclusively on natural gas which has EPA established emissions of 117 lbs CO2/MMBtu. Therefore the Trent units will meet the non-base load natural gas-fired emission standard. Permit condition E448.2 will be revised to limit the net-electric sales of Units 11 & 12 to assure compliance with the final performance standards.

Electrical Output Categorization Thresholds

Combined Cycle Generating System

Design Efficiency for GE Model 7FA = 56%* (not to exceed 50% per definition of Non-base load natural gas-fired units)
Gross Output of System = 334 MWh

Therefore, the annual net sales threshold is 1,462,920 MWh for base load operations.

Simple Cycle Generating Systems

Design Efficiency for Rolls Royce Trent 60 Gas Turbine = 42%*
Gross Output of System = 57.4 MWh

Therefore, the annual net sales threshold is 211,186 MWh for base load operations.

*Design Efficiencies as published by 2009 Gas Turbine World. Applicant to provide finalized specifications.

Changes to Permit Wording

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
PROCESS 1 – INTERNAL COMBUSTION					

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
GAS TURBINE, UNIT NO. 9, NATURAL GAS, GENERAL ELECTRIC, MODEL 7FA.05, FAST-START, COMBINED CYCLE, WITH DRY LOW-NOX BURNERS, 2,168 MMBTU/HR HHV @ 41°F, WITH: A/N: 548594 HEAT RECOVERY STEAM GENERATOR (HRSG) GENERATOR, SERVING UNIT NO. 9, 222 GROSS MW @ 41°F STEAM TURBINE, GENERAL ELECTRIC, MODEL SC GENERATOR, SERVING STEAM TURBINE, 112 GROSS MW @ 41°F.	D90	D95, C96	NOx: MAJOR SOURCE	**NOx**: 2.0 PPMV (4) [RULE 2005, RULE 1703-PSD-BACT]; **NOx:** 30.88 LB/MMSCF COMMISSIONING (1) [RULE 2012]; **NOx:** 9.42 LB/MMSCF INTERIM (1) [RULE 2012]; **NOx:** 15 PPMV (8) NATURAL GAS [40 CFR 60 SUBPART KKKK]; **CO**: 2.0 PPMV (4) [RULE 1703 PSD-BACT]; **CO:** 2,000 PPMV (5) [RULE 407]; **CO2:** 120 LBS/MMBTU NATURAL GAS (8A)[40 CFR 60 SUBPART TTTT] **CO2**: 1,000 LBS/GROSS MWH (8)[40 CFR 60 SUBPART TTTT]; **CO2:** 1,100 LBS/NET MWH (CCR TITLE 20) **VOC**: 2.0 PPMV (4) [RULE 1303-BACT]; **PM10**: 9.5 LB/HR (4) [RULE 1303]; **PM:** 0.1 GR/SCF (5) [RULE 409]; **PM:** 11 LBS/HR (5) [RULE 475]; **PM:** 0.01 GR/SCF (5A) [RULE 475]; **SO_2**: 0.06 lb/MMBTU (8)[40 CFR 60 SUBPART KKKK]; **SO_2:** (9)[40 CFR 72 – ACID RAIN]; **CH2O:** 0.091 PPMV (8) 40 CFR 63 SUBPART YYYY	A63.3, A99.12, A99.13, A195.12, A195.13, A195.14, A195.18, A195.22, A195.23 A327.1, B61.2, C1.7, D29.10, D29.11, D29.12, D82.6, D82.7, E193.2, E193.5, E193.6, E448.3 I297.3, K40.5, K67.6
BURNER, DUCT, NATURAL GAS, 268 MMBTU/HR HHV @ 41°F, LOCATED IN THE HRSG OF GAS TURBINE NO. 9 WITH A/N 548594	D95	D90	NOX: MAJOR SOURCE	**NOx**: 2.0 PPMV (4) [RULE 2005, RULE 1703-PSD-BACT]; **NOx:** 30.88 LB/MMSCF COMMISSIONING (1) [RULE 2012]; **NOx:** 9.42 LB/MMSCF INTERIM (1A) [RULE 2012]; **NOx:** 15	A99.12, A99.13, A195.12, A195.13, A195.14, A195.22, A195.23, A327.1,

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
				PPMV (8) NATURAL GAS [40 CFR 60 SUBPART KKKK]; **CO2:** 120 LBS/MMBTU NATURAL GAS (8A)[40 CFR 60 SUBPART TTTT] **CO2**: 1,000 LBS/GROSS MWH (8)[40 CFR 60 SUBPART TTTT]; **CO2:** 1,100 LBS/NET MWH (CCR TITLE 20) **CO**: 2.0 PPMV (4) [RULE 1703 PSD-BACT]; **CO:** 2,000 PPMV (5) [RULE 407]; **VOC**: 2.0 PPMV (4) [RULE 1303-BACT]; **PM10**: 1.76 LB/HR (5) [RULE 1303]; **PM:** 0.1 GR/SCF (5B) [RULE 409]; **PM:** 11 LBS/HR (5A) [RULE 475]; **PM:** 0.01 GR/SCF (5C) [RULE 475]; **SO_2**: 0.06 lb/MMBTU (8)[40CFR 60 SUBPART KKKK]; **SO_2:** (9)[40 CFR 72 – ACID RAIN]; **CH2O:** 0.091 PPMV (8) 40 CFR 63 SUBPART YYYY	B61.2, C1.7, D29.10, D29.11, D29.12, D82.6, D82.7, E193.2, E193.5, I297.7, K40.5, K67.6
CO OXIDATION CATALYST, UNIT NO. 9, BASF, CATALYST VOLUME: 290 FT^3; WITH: A/N: 548591	C96	C97, D90			
SELECTIVE CATALYTIC REDUCTION, UNIT NO. 9, CORMETECH, CATALYST VOLUME: 2,050 FT^3; WIDTH: 29 FT ~~10~~ 8 IN; HEIGHT: ~~6~~ 70 FT ~~4~~ 5 IN; LENGTH: 1 FT 9 IN;	C97	C96, S99		**NH_3:** 5 PPMV (4) [RULE 1303-BACT]	D12.14, D12.15, D12.16, E179.7, E179.8, E193.2,

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
WITH: AMMONIA INJECTION, AQUEOUS AMMONIA A/N: 548591					E193.7
STACK, SERVING UNIT NO. 9, DIAMETER: 20 FT, HEIGHT: 210 FT, WITH: A/N: 548594	S99	C97			
GAS TURBINE, UNIT NO. 11, NATURAL GAS, ROLLS ROYCE , MODEL TRENT 60, SIMPLE CYCLE, WITH WATER INJECTION, 516 MMBTU/HR @ 78°F, WITH: A/N: 548589 GENERATOR, 57.4 GROSS MW @ 78°F	D100	C106	NOX: MAJOR SOURCE	**NOx**: 2.5 PPMV (4) [RULE 2005, RULE 1703-PSD-BACT]; **NOx:** 96.58 LB/MMSCF COMMISSIONING (1) [RULE 2012]; **NOx:** 16.16 LB/MMSCF INTERIM (1A) [RULE 2012];**NOx:** 25 PPMV (8) NATURAL GAS [40 CFR 60 SUBPART KKKK]; **CO2:** 120 LBS/MMBTU NATURAL GAS (8A)[40 CFR 60 SUBPART TTTT]; **CO**: 4.0 PPMV (4) [RULE 1703 PSD-BACT]; **CO:** 2,000 PPMV (5) [RULE 407]; **VOC**: 2.0 PPMV (4) [RULE 1303-BACT]; **PM10**: 5 LB/HR (5) [RULE 1303]; **PM:** 0.1 GR/SCF (5A [RULE 409]; **PM:** 11 LBS/HR (5B) [RULE 475]; **PM:** 0.01 GR/SCF (5C) [RULE 475]; **SO_2**: 0.06 lb/MMBTU (8)[40CFR 60 SUBPART KKKK]; **SO_2:** (9)[40 CFR 72 – ACID RAIN]; **CH2O:** 0.091 PPMV (8) 40 CFR 63 SUBPART YYYY	A63.4, A99.14, A99.15, A195.15, A195.16, A195.17, A195.24, A327.1, B61.2, C1.8, D29.10, D29.11, D29.12, D82.6, D82.7, E193.2, E193.5, E193.8, E448.2 E448.3 I297.5, K40.5, K67.6
CO OXIDATION CATALYST,	C102	C100,			

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
UNIT NO. 11, PEERLESS, CATALYST VOLUME: 420 FT^3; WITH: A/N: 548588		D103			
SELECTIVE CATALYTIC REDUCTION, UNIT NO. 11, PEERLESS, CATALYST VOLUME: 1,272 FT^3; WIDTH: 19 FT 6 IN; HEIGHT: 33 FT 0 IN; LENGTH: 2 FT 6 IN; WITH: AMMONIA INJECTION AQUEOUS AMMONIA A/N: 548588	C103	C102, S105		**NH3:** 5 PPMV (4) [RULE 1303-BACT]	D12.17, D12.18, D12.19, E179.9, E179.10, E193.2, E193.7
STACK, SERVING UNIT NO. 11, DIAMETER: 11.1 FT, HEIGHT: 150 FT, WITH: A/N: 548589	S105	C103			
GAS TURBINE, UNIT NO. 12, NATURAL GAS, ROLLS ROYCE, MODEL TRENT 60, SIMPLE CYCLE, WITH WATER INJECTION, 516 MMBTU/HR @ 78°F, WITH: A/N: 548589 GENERATOR, 57.4 GROSS MW @ 78°F	D106	C108	NOX: MAJOR SOURCE	**NOx**: 2.5 PPMV (4) [RULE 2005, RULE 1703-PSD-BACT]; **NOx:** 96.58 LB/MMSCF COMMISSIONING (1) [RULE 2012]; **NOx:** 16.16 LB/MMSCF INTERIM (1A) [RULE 2012];**NOx:** 25 PPMV (8) NATURAL GAS [40CFR60 SUBPART KKKK]; **CO2:** 120 LBS/MMBTU NATURAL GAS (8A)[40 CFR 60 SUBPART TTTT] **CO**: 4.0 PPMV (4) [RULE 1703 PSD-BACT]; **CO:** 2,000 PPMV (5) [RULE 407]; **VOC**: 2.0 PPMV (4) [RULE 1303-BACT]; **PM10**: 5 LB/HR (5) [RULE 1303]; **PM:** 0.1 GR/SCF	A63.4, A99.14, A99.15, A195.15, A195.16, A195.17, A195.24, A327.1, B61.2, C1.8, D29.10, D29.11, D29.12, D82.6, D82.7, E193.2, E193.5, E193.8, E448.2 E448.3 I297.4, K40.5, K67.6

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
				(5A) [RULE 409]; **PM:** 11 LBS/HR (5B) [RULE 475]; **PM:** 0.01 GR/SCF (5C) [RULE 475]; **SO_2**: 0.06 lb/MMBTU (8)[40CFR 60 SUBPART KKKK]; **SO_2:** (9)[40CFR 72 – ACID RAIN]; **CH2O:** 0.091 PPMV (8) 40 CFR 63 SUBPART YYYY	
CO OXIDATION CATALYST, UNIT NO. 12, PEERLESS, CATALYST VOLUME: 420 FT^3; WITH: A/N: 548588	C108	C106, D109			
SELECTIVE CATALYTIC REDUCTION, UNIT NO. 12, PEERLESS, CATALYST VOLUME: 1,272 FT^3; WIDTH: 19 FT 6 IN; HEIGHT: 33 FT 0 IN; LENGTH: 2 FT 6 IN; WITH: A/N: 548588 AMMONIA INJECTION AQUEOUS AMMONIA	C109	C108, S111		**NH3:** 5 PPMV (4) [RULE 1303-BACT]	D12.17, D12.18, D12.19, E179.9, E179.10, E193.2, E193.7
STACK, SERVING UNIT 12, DIAMETER: 11 FT, HEIGHT: 150 FT, WITH: A/N: 548589	S111	C109			

Recommended Permit Condition Additions & Revisions

A195.22 The 1,000 lbs/MW-hr CO2 emission limit(s) is averaged over a 12 operating month rolling average. The limit shall only apply if this turbine supplies more than 1,462,920 MWh net electrical output to a utility distribution system on a 12 operating month rolling average and on 3 year rolling average basis.

[40CFR 60 Subpart TTTT, 8-3-2015]
[Devices subject to this condition: D90, D95]

A195.23 The 120 lbs/MMBTU CO2 emission limit(s) is averaged over a 12 operating month rolling average. The limit shall only apply if this turbine supplies equal to or less than 1,462,920 MWh net electrical output to a utility distribution system on a 12 operating month rolling average and on 3 year rolling average basis.

[40CFR 60 Subpart TTTT, 8-3-2015]
[Devices subject to this condition: D90, D95]

A195.24 The 120 lbs/MMBTU CO2 emission limit(s) is averaged over a 12 operating month rolling average.

[40CFR 60 Subpart TTTT, 8-3-2015]
Devices subject to this condition: D100, D106]

E448.2 The operator shall comply with the following requirements:

This equipment shall not supply more than 42 percent of its potential electrical output or more than 211,186 MWh net electrical output to a utility distribution system on a 12 operating month rolling average and a 3 year rolling average basis.

The operator shall record and maintain written records of the amount of electricity supplied to the utility distribution system expressed as a percentage of the total potential electrical output of the turbine, and shall provide such records to the Executive Officer upon request.

The operator shall record and maintain written records of the gross electrical output of the turbine supplied to the utility distribution system expressed in net MWh, and shall provide such records to the Executive Officer upon request.

[40CFR 60 Subpart TTTT, 8-3-2015]
Devices subject to this condition: D100, D106]