DOCKETED

Docket Number:	12-AFC-02C
Project Title:	Huntington Beach Energy Project - Compliance
TN #:	214374
Document Title:	Determination of Compliance Revisions
Description:	Proposed revisions based on voluntary reduction of CO emission rate for combined-cycle gas turbines
Filer:	Elyse Engel
Organization:	CH2M
Submitter Role:	Applicant Consultant
Submission Date:	11/4/2016 3:52:25 PM
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CH2M
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833
O +1 916 920 0300
F +1 916 920 8463
www.ch2m.com

Mr. Chris Perri
Air Quality Engineer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

November 4, 2016

Subject: Huntington Beach Energy Project Determination of Compliance Revisions (Facility ID 115389)

Dear Mr. Perri,

AES Huntington Beach Energy, LLC (AES) appreciates the efforts by the South Coast Air Quality Management District (SCAQMD) in preparing the Huntington Beach Energy Project's (HBEP) Final Determination of Compliance (FDOC). As the draft FDOC is being finalized, AES would like to voluntarily propose revisions to the carbon monoxide (CO) emissions for the General Electric 7FA.05 combined-cycle gas turbines (CCGT). In the Petition to Amend (PTA), AES proposed a CCGT CO emission limit of 2 parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen. AES requests reducing the proposed CCGT CO emission limit to 1.5 ppmvd, corrected to 15 percent oxygen. Lowering the CO emission limit for the CCGTs has the effect of lowering CO emissions from the entire HBEP; therefore, the conclusions made in the PTA regarding significance should remain unchanged or improve and air dispersion modeling of the lower CO emissions should not be required. In addition, the reduction in the CCGT CO emission rate will not alter the CCGT start-up and shutdown emission rates.

To facilitate your incorporation of this change into the FDOC, AES has identified text and calculations within the Determination of Compliance that will require revision. The proposed revisions are provided below for your consideration and use.

Page 2, Section H – The CO emission limit presented in the 5th column for Gas Turbine, Unit No. 1 should be listed as 1.5 ppm instead of 2.0 ppm.

Page 3, Section H – The CO emission limit presented in the 5th column for Gas Turbine, Unit No. 2 should be listed as 1.5 ppm instead of 2.0 ppm.

Page 15, 2nd Paragraph – This paragraph should be revised as follows:

> Oxidation Catalyst System – The units will employ a palladium-type oxidation catalyst designed to reduce exhaust gas CO by about 70-85% to ~~2.0~~**1.5** ppm or less at 15% O2, and VOC by 50-60% to 2.0 ppm at 15% O2 (1 hour average).

Page 15, Table 2.4 – The specification reported for Outlet CO should be 1.5 ppmvd at 15% O2 (1 hour average) instead of 2.0 ppmvd at 15% O2 (1 hour average).

Page 24, Table 3.5 – This table should be revised as follows:

Table 3.5 Hourly Emissions During Normal Operation

Pollutant	Combined Cycle Turbine, lbs/hr	Simple Cycle Turbine, lbs/hr	Auxiliary Boiler, lbs/hr
NOx	16.8	8.2	0.42
CO	~~10.2~~**7.64**	7.9	2.83
VOC	5.8	2.3	0.37
PM10	8.5	6.24	0.51
SOx	4.6	1.80	0.14

Page 25, Table 3.7 – This table should be revised as follows:

Table 3.7 Combined Cycle Turbines Daily Emissions (Maximum)

Pollutant	Operating Scenario	Controlled Daily Emissions 1 Turbine
NOx	1 cold start + 1 hot start + 2 shutdowns + 20.5 hrs normal	442.4
CO	1 cold start + 1 hot start + 2 shutdowns + 20.5 hrs normal	~~937.1~~**884.6**
VOC	24 hrs normal (no start ups or shutdowns)	243.9
PM10	24 hrs normal (no start ups or shutdowns)	204
SOx	24 hrs normal (no start ups or shutdowns)	110.4
NH3	24 hrs normal (no start ups or shutdowns)	317.8

Page 26, Table 3.10 – This table should be revised as follows:

Table 3.10 Combined Cycle Turbine Monthly Total and 30-Day Average Emissions (Per Turbine)

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	15 cold starts+12 warm starts+35 hot starts+62 shutdowns+674.5 hrs normal	13,665.6	455.5
CO	15 cold starts+12 warm starts+35 hot starts+62 shutdowns+674.5 hrs normal	~~26,439.9~~**24,713.2**	~~881.3~~**823.8**
VOC	15 cold starts+12 warm starts+35 hot starts+62 shutdowns+674.5 hrs normal	7,611.1	253.7
PM10	744 hrs normal (no start ups or shutdowns)	6,324	210.8
SOx	744 hrs normal (no start ups or shutdowns)	3,422.4	114.1

Page 27, Table 3.13 – This table should be revised as follows:

Table 3.13 Facility Monthly Total and 30-Day Average Emissions (Not Including Commissioning)

Equipment	NOx	CO	VOC	PM10	SOx
CCTG 1	13,665.6	~~26,439.9~~**24,713.2**	7,611.1	6,324	3,422.4
CCTG 2	13,665.6	~~26,439.9~~**24,713.2**	7,611.1	6,324	3,422.4
SCTG 1	6,959.4	8,273.4	1,972.4	4,642.6	1,339.3
SCTG 2	6,959.4	8,273.4	1,972.4	4,642.6	1,339.3
Aux Boiler	112.7	649.5	87.1	120.0	32.9
OWS 1	0	0	14.3	0	0
OWS 2	0	0	1.8	0	0
Total, lbs/month	41,362.7	~~70,076.1~~**66,622.7**	19,270.2	22,053.2	9,556.3
30 Day Average, lbs/day	1378.8	~~2335.9~~**2220.8**	642.3	735.1	318.5

Page 28, Table 3.15 – This table should be revised as follows:

Table 3.15 Combined Cycle Turbine Annual Emissions

Pollutant	Operating Scenario	Total Annual Emissions, lbs
NOx	80 cold starts+88 warm starts + 332 hot starts + 500 shutdowns + 6100 hrs normal	119,500
CO	80 cold starts+88 warm starts + 332 hot starts + 500 shutdowns + 6100 hrs normal	~~212,260~~**196,644**
VOC	80 cold starts+88 warm starts + 332 hot starts + 500 shutdowns + 6100 hrs normal	64,760
PM10	80 cold starts+88 warm starts + 332 hot starts + 500 shutdowns + 6100 hrs normal	56,440
SOx	80 cold starts+88 warm starts + 332 hot starts + 500 shutdowns + 6100 hrs normal	9,960
NH3	80 cold starts+88 warm starts + 332 hot starts + 500 shutdowns + 6100 hrs normal	94,550

Page 29, Table 3.18 – This table should be revised as follows:

Table 3.18 Facility Annual Total Emissions (Not Including Commissioning)

Equipment	NOx	CO	VOC	PM10	SOx	NH3
CCTG 1	119,500	~~212,260~~**196,644**	64,760	56,440	9,960	94,550
CCTG 2	119,500	~~212,260~~**196,644**	64,760	56,440	9,960	94,550
SCTG 1	21,252	29,330	6,076	12,485	1201	10,500
SCTG 2	21,252	29,330	6,076	12,485	1201	10,500
Aux Boiler	1,313	7,522	1,010	1,392	382	412
OWS 1	0	0	171	0	0	0
OWS 2	0	0	22	0	0	0
Total, lbs/yr	282,817	~~490,702~~**459,470**	142,875	139,242	22,704	210,512

Page 30, Table 3.19 – This table should be revised as follows:

Table 3.19 Facility Annual Total Emissions (Including Commissioning)

Operating Mode	Hours	Emissions, lbs			
		NOx	CO	VOC	SOx
Commissioning CCTG 1	996	27,593	101,326	14,681	4,843
Commissioning CCTG 2	996	27,593	101,326	14,681	4,843
Post Commissioning Operation CCTG 1	6640	119,500	~~212,260~~**196,644**	64,760	9,960
Post Commissioning Operation CCTG 2	6640	119,500	~~212,260~~**196,644**	64,760	9,960
Auxiliary Boiler	2573.3	1,313	7,522	1,010	382
Total Emissions		295,499	~~634,694~~**603,462**	159,892	29,988

Page 36, Rule 407 – The Rule 407 analysis should be revised as follows:

This rule limits CO emissions to 2000 ppmv. The SO2 portion of the rule does not apply as the natural gas fired in the turbines and auxiliary boiler will be subject to the sulfur limit in Rule 431.1. The CO emissions from the combined cycle turbines will be controlled by an oxidation catalyst to ~~2.0~~**1.5** ppmvd at 15% O2. The CO emissions from the simple cycle turbines will be controlled by an oxidation catalyst to 4.0 ppmvd at 15% O2, and the CO emissions from the boiler will be maintained at 50 ppm at 3% O2. Therefore, compliance with this rule is expected.

Page 41, Table 4.5 – This table should be revised as follows:

TABLE 4.5 – Proposed Control Levels for the HBEP Combined Cycle Turbines

NOX	CO	VOC	PM10	SOX	NH3
2.0 ppmvd @ 15% O2, 1 hour average	~~2.0~~**1.5** ppmvd @ 15% O2, 1 hour average	2.0 ppmvd @ 15% O2, 1 hour average	Exclusive use of natural gas fuel, PM10 emissions of 8.5 lbs/hr	Exclusive use of natural gas fuel*	5.0 ppmvd @ 15% O2, 1 hour average

**Natural gas provided by the Gas Company is limited to 16 ppm in the South Coast by Rule 431.1. Generally, the actual sulfur content is about 4 ppm (4 ppm corresponds to 0.25 gr/100 scf)*

Page 74, Condition A63.7 – This condition should be revised as follows:

A63.7 The operator shall limit emission from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
PM10	6,324 LBS IN ANY ONE MONTH
CO	~~26,440~~**24,713** LBS IN ANY ONE MONTH
VOC	7,611 LBS IN ANY ONE MONTH

The above limits apply after the equipment is commissioned. The above limits apply to each turbine.

The operator shall calculate compliance with the emission limit(s) by using fuel use data and the following emission factors: VOC: 2.66 lbs/mmcf, PM10: 3.94 lbs/mmcf.

The operator shall calculate compliance with the emission limits for CO after the CO CEMS certification based upon readings from the SCAQMD certified CEMS.

Page 75, Condition A195.7 – This condition should be revised as follows:

> The ~~2.0~~**1.5** PPMV CO emission limit(s) is averaged over 60 minutes at 15 percent O2, dry. This limit shall not apply during commissioning, turbine start ups and turbine shutdowns.

Page 108, Table A.1 – The guarantee reported for CO should be 1.5 ppm @ 15% instead of 2.0 ppm @ 15%.

Page 109, Table A.2 – The CO portion of this table should be revised as follows:

Table A.2 Combined Cycle Gas Turbine Performance Data

Ambient Conditions	110°F, 8% RH	65.8°F, 58% RH	32°F, 87% RH
Turbine Heat Input, mmbtu/hr (HHV)	2,123	2,248	2,273
Turbine Fuel Use, mmscf/hr	2.03	2.15	2.16
	CO		
Concentration, ppmv @ 15% O2	~~2.0~~**1.5**	~~2.0~~**1.5**	~~2.0~~**1.5**
Hourly Emissions, lb/hr	~~9.42~~**7.07**	~~9.98~~**7.48**	~~10.03~~**7.52**
Daily Emissions, lb/day	~~226.1~~**169.7**	~~239.5~~**179.5**	~~240.7~~**180.5**
lbs/mmcf	~~4.64~~**3.48**	~~4.64~~**3.48**	~~4.64~~**3.48**
lbs/mmbtu	~~0.0044~~**0.0033**	~~0.0044~~**0.0033**	~~0.0044~~**0.0033**

Page 111, Table A.3 – This table should be revised as follows:

Table A.3 Maximum Hourly Emissions CCTG

Pollutant	Concentration	Mass Emission Rate
	ppm	lbs/hr
NOx(1)	9.0/2.0	75.4/16.8
CO(1)	10.0/~~2.0~~**1.5**	51.0/~~10.2~~**7.64**
VOC	2.0	5.8
PM10	////////	8.5
SOx	0.75 gr/100 scf fuel	4.6
NH3	5.0	15.5

(1) with DLN only/DLN + SCR & CO Catalyst

Page 114, Table A.8 – This table should be revised as follows:

Table A.8 Maximum Emission Rates (1 CCTG)

	NOx	CO	VOC	PM10	SOx	NH3
Normal Operations Controlled (lbs/hr)	16.8	~~10.2~~**7.64**	5.8	8.5	4.6	15.5
Normal Operations Uncontrolled (lbs/hr)	75.4	51.0	5.8	8.5	4.6	0
Cold Start (total lbs)	61.0	325.0	36.0	8.5	4.6	0
Warm Start (total lbs)	17.0	137.0	25.0	4.25	2.3	0
Hot Start (total lbs)	17.0	137.0	25.0	4.25	2.3	0
Shutdown (total lbs)	10.0	133.0	32.0	4.25	2.3	0

Uncontrolled emission rates based on DLN without SCR, NOx=9 ppm, CO=10 ppm, VOC=2ppm

Page 114, Table A.9 – This table should be revised as follows:

Table A.9 Controlled Daily Emissions (1 CCTG)

	Duration	Emissions, lbs					
		NOx	CO	VOC	PM10	SOx	NH3
Scenario 1							
Cold Start	1	61.0	325.0	36.0	8.5	4.6	0
Normal Operation	20.5	344.4	~~209.1~~**156.6**	118.9	174.25	94.3	317.75
Shutdown (2)	1	20.0	266.0	64.0	8.5	4.6	0
Downtime	1	0	0	0	0	0	0
Hot Start (1)	0.5	17.0	137.0	25.0	4.25	2.3	0
TOTAL	24	442.4	~~937.1~~**884.6**	243.9	195.5	105.8	317.75
Scenario 2							
Normal Operation	24	403.2	~~244.8~~**183.4**	139.2	204	110.4	317.75

Page 115, Table A.11 – This table should be revised as follows:

Table A.11 Maximum Controlled/Uncontrolled Daily Emissions (1 CCTG)

Pollutant	Operating Scenario	Uncontrolled Daily Emissions	Controlled Daily Emissions
NOx	See Below	1809.6	442.4
CO	1 cold, 1 hot, 2 shutdowns, 20.5 hours normal	1773.5	~~937.1~~**884.6**
VOC	24 hr normal	243.9	243.9
PM10	24 hr normal	204	204
SOx	24 hr normal	110.4	110.4
NH3	24 hr normal	///////	317.8

For NOx, the maximum uncontrolled emissions result from the 24 hr normal operation scenario, while the maximum controlled emissions result from the 1 cold, 1 hot, 2 shutdown scenario.

Page 116, Table A.13 – This table should be revised as follows:

Table A.13 Emission Factors for 30 Day Calculation CCTG

Event	Lbs/hr or lbs/event					
	NOx	CO	VOC	PM10	SOx	NH3
Cold Start	61.0	325.0	36.0	8.5	4.6	0
Warm Start	17.0	137.0	25.0	4.25	2.3	0
Hot Start	17.0	137.0	25.0	4.25	2.3	0
Shutdown	10.0	133.0	32.0	4.25	2.3	0
Normal @ 65.8 deg	16.8	~~10.2~~**7.64**	5.8	8.5	4.6	15.5

Page 116, Table A.14 – This table should be revised as follows:

Table A.14 30 Day Emissions /Scenario 1/ Start Ups and Shut Downs (1 CCTG)

Event	Duration, hrs/month	# of events	Emissions, lbs					
			NOx	CO	VOC	PM10	SOx	NH3
Cold	15	15	915	4875	540	127.5	69	0
Warm	6	12	204	1644	300	51	27.6	0
Hot	17.5	35	595	4795	875	148.8	80.5	0
Shutdown	31	62	620	8246	1984	263.5	142.6	0
Normal @ 65.8 deg	674.5	////////	11331.6	~~6879.9~~**5153.2**	3912.1	5733.3	3102.7	10454.8
Total, lbs/month			13665.6	~~26439.9~~**24713.2**	7611.1	6324	3422.4	10454.75
Average lbs/day			455.5	~~881.3~~**823.8**	253.7	210.8	114.1	348.5

Page 116, Table A.15 – This table should be revised as follows:

Table A.15 30 Day Emissions /Scenario 2/ No Starts (1 CCTG)

Event	Duration, hrs/month	# of events	Emissions					
			NOx	CO	VOC	PM10	SOx	NH3
Normal @ 65.8 deg	744	////////	12499.2	~~7588.8~~**5684.2**	4315.2	6324	3422.4	11532
Total, lbs/month			12499.2	~~7588.8~~**5684.2**	4315.2	6324	3422.4	11532
Average lbs/day			416.6	~~253.0~~**189.5**	143.8	210.8	114.1	384.4

Page 117, Table A.16 – This table should be revised as follows:

Table A.16 30 Day Emissions (1 CCTG)

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	15 cold starts+12 warm starts+35 hot starts+62 shutdowns+674.5 hrs normal	13,665.6	455.5
CO	15 cold starts+12 warm starts+35 hot starts+62 shutdowns+674.5 hrs normal	~~26,439.9~~**24,713.2**	~~881.3~~**823.8**
VOC	15 cold starts+12 warm starts+35 hot starts+62 shutdowns+674.5 hrs normal	7,611.1	253.7
PM10	744 hrs normal	6,324	210.8
SOx	744 hrs normal	3,422.4	114.1

Page 117, Table A.18 – This table should be revised as follows:

Table A.18 Combined Cycle Emission Rates (annual basis)

	NOx	CO	VOC	PM10	SOx	NH3
Normal Operations Controlled (lbs/hr)	16.8	~~10.2~~**7.64**	5.8	8.5	1.5	15.5
Cold Start (total lbs)	61.0	325.0	36.0	8.5	1.5	0
Warm Start (total lbs)	17.0	137.0	25.0	4.25	0.75	0
Hot Start (total lbs)	17.0	137.0	25.0	4.25	0.75	0
Shutdown (total lbs)	10.0	133.0	32.0	4.25	0.75	0

Page 118, Table A.19 – This table should be revised as follows:

Table A.19 Combined Cycle Annual Emissions, Non-Commissioning Year

Operating Mode	NOx	CO	VOC	PM10	SOx	NH3
Cold Starts	4880	26000	2880	680	120	0
Warm Starts	1496	12056	2200	374	66	0
Hot Starts	5644	45484	8300	1411	249	0
Shutdowns	5000	66500	16000	2125	375	0
Normal Operation	102480	~~622204~~**46604**	35380	51850	9150	94550
TOTAL 1 TURBINE	119500	~~212260~~**196644**	64760	56440	9960	94550
TOTAL 2 TURBINES	239000	~~424520~~**393288**	129520	112880	19920	189100

Page 134, Table C.6 – This table should be revised as follows:

Table C.6 Total Plant Annual Emissions, Combined Cycle Commissioning Year

Operating Mode	Hours	Emissions, lbs				
		NOx	CO	VOC	PM10	SOx
Commissioning CCTG 1	996	27,593	101,326	14,681	8,466	4,843
Commissioning CCTG 2	996	27,593	101,326	14,681	8,466	4,843
Post Commissioning Operation CCTG 1	6640	119,500	~~212,260~~**196,644**	64,760	56,440	9,960
Post Commissioning Operation CCTG 2	6640	119,500	~~212,260~~**196,644**	64,760	56,440	9,960
Auxiliary Boiler	2573.3	1,313	7,522	1,010	1,392	382
TOTAL EMISSIONS		195,499	~~634,694~~**603,462**	159,892	131,204	29,988

Page 135, Table C.7 – This table should be revised as follows:

Table C.7 Total Plant Annual Emissions, Simple Cycle Commissioning Year

Operating Mode	Hours	Emissions, lbs				
		NOx	CO	VOC	PM10	SOx
Commissioning SCTG 1	280	5,718	25,449	836	1,747	459
Commissioning SCTG 2	280	5,718	25,449	836	1,747	459
Post Commissioning Operation SCTG 1	2001	21,252	29,330	6,076	12,484.5	1,200.5
Post Commissioning Operation SCTG 2	2001	21,252	29,330	6,076	12,484.5	1,200.5
CCTG 1	6640	119,500	~~212,260~~**196,644**	64,760	56,440	9,960
CCTG 2	6640	119,500	~~212,260~~**196,644**	64,760	56,440	9,960
Auxiliary Boiler	2573.3	1,313	7,522	1,010	1,392	382
TOTAL EMISSIONS		294,253	~~541,600~~**510,368**	144,354	142,735	23,621

Page 137, Table C.9 – This table should be revised as follows:

Table C.9 Estimated 30 Day Emissions SCTG Commissioning Month

Pollutant	SCTG 1 Commissioning, lbs/month[1]	SCTG 2 Commissioning, lbs/month[1]	CCTG 1, lbs/month[2]	CCTG 2, lbs/month[2]	Aux Boiler, lbs/month[3]	Total Facility Emissions, lbs/month	30-Day Average Emissions, lbs/day
NOx	5718	5718	13666	13666	175	38943	1298.1
CO	25449	25449	~~26440~~ **24713**	~~26440~~ **24713**	1070	~~104848~~ **101394**	~~3494.9~~ **3379.8**
VOC	836	836	7611	7611	142	17036	567.9
PM10	459	459	6324	6324	196	13762	458.7
SOx	1747	1747	3244	3422	54	10392	346.4

1 Refer to Table C.5, 2 Refer to Table A.16, 3 Refer to Table D.6

Page 182, Table O.2 – This table should be revised as follows:

Table O.2 New Facility Major Source Determination (PTE)

Pollutant	PTE, tpy				Major Source?
	CCTG 1&2	SCTG 1&2	Aux Boiler	Total	
NOx	119.5	21.3	0.7	141.5	Y
CO	~~212.3~~**196.6**	29.3	3.8	~~245.4~~**229.7**	Y
VOC	64.8	6.1	0.5	71.4	N
PM10	56.44	12.5	0.7	69.6	N
PM2.5	56.44	12.5	0.7	69.6	N[1]
SOx	9.96	1.20	0.2	11.36	N
CO2e	1,747,873	207,368	11,076	1,966,317	Y

1 The major source threshold for PM2.5 under Rule 1325/40CFR 51 Appendix S is 70 tpy for areas of severe non-attainment

Page 183, Table O.3 – This table should be revised as follows:

Table O.3 New Facility Significant Increase Determination (PTE vs Past Actual)

	NOx, tpy	CO, tpy	CO2e
HBEP PTE	141.5	~~245.4~~**229.7**	1,965,939
HB Boilers 1&2 Past Actual	42.6	1,221	521,524
Net Increase	98.9	0	1,444,415

Past actuals from Appendix G for years 2014 and 2015

Should you have any questions regarding these proposed revisions, please do not hesitate to call me at 916-286-0207. We appreciate your attention to this matter and look forward to receipt of the draft FDOC issued by the SCAQMD.

Regards,

Jerry Salamy
Program Manager
CH2M HILL Engineers, Inc.

cc: Stephen O'Kane/AES
Melissa Foster/Stoel Rives
John Heiser/CEC