

DOCKETED

Docket Number:	12-AFC-02C
Project Title:	Huntington Beach Energy Project - Compliance
TN #:	206938
Document Title:	SCAQMD Emissions Response
Description:	N/A
Filer:	Cindy Salazar
Organization:	CH2M HILL
Submitter Role:	Applicant Consultant
Submission Date:	12/11/2015 3:21:38 PM
Docketed Date:	12/11/2015

Salazar, Cindy/SCO

Subject: FW: Toxic Emissions
Attachments: HBEP_Attachment 1_Table 4_Revised.pdf; HBEP_Attachment 1_Table 7_Revised.pdf

From: Salamy, Jerry/SAC
Sent: Friday, December 11, 2015 9:36 AM
To: Chris Perri <CPerri@aqmd.gov>
Cc: John Yee <JYee@aqmd.gov>; Stephen O'Kane (stephen.okane@AES.com) <stephen.okane@AES.com>; Engel, Elyse/SJC <Elyse.Engel@ch2m.com>; Mason, Robert/SCO <Robert.Mason@CH2M.com>
Subject: RE: Toxic Emissions

Hi Chris,

SO2 emissions for all three SO2 modeling scenarios (1-, 3-, and 24-Hour) were based on 0.25 grain of Sulfur/100 scf. The 1-hour and 3-hour SO2 emission rates are based on full load operation (71 MMBtu/hr * 0.00068 lb SO2/MMBtu). The modeled 24-hour SO2 emission rate is different as the auxiliary boiler is not expected to operate continuously at full load for 24 hours. Instead, the 24-hour SO2 emission rate is based on the monthly maximum fuel input to the auxiliary boiler of 26,327 MMBtu/month. Therefore, the modeled 24-hour SO2 emission rate was calculated as follows: 0.00068 lb SO2/MMBtu * 26,327 MMBtu/month / 30 days/month / 24 hours/day = 0.025 lb/hr.

Also attached is a revised Attachment 1, Table 4, which shows the stack parameters and emission rates used in the 24-hour PM10 Class II SIL and Increment analysis.

Regarding your ammonia calculation question, we calculated the annual GE FA ammonia emissions using the following equation: 15.1679 lb/hr (Case 4 – the maximum ammonia emission rate from the annual average ambient conditions in Table 5.1B.3) * 6612 hours/year = 100,290 lb/year.

Per your request, attached is a revised Attachment 1, Table 7.

Please let me know if you have any additional questions.

Jerry Salamy
Principal Project Manager
CH2M HILL
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833
Office Phone: 916.286.0207
Cell Phone: 916.769.8919

From: Chris Perri [<mailto:CPerri@aqmd.gov>]
Sent: Thursday, December 10, 2015 3:25 PM
To: Salamy, Jerry/SAC <Jerry.Salamy@CH2M.com>
Cc: John Yee <JYee@aqmd.gov>
Subject: Toxic Emissions

Hi Jerry,

During the review of the memo we're preparing for our planning staff, a question came up as to how the ammonia emissions were calculated in Attachment 1, Table 6. I cannot come up with the annual numbers in your table. For the calculations, here's what I get:

Annual

$$8710 * 2248 * 3.54 * 5 \text{ ppm} * 17 / 380E6 \times 6100 \text{ hrs/yr} = 94576 \text{ lbs/hr}$$

If I assume 6612 hrs/yr (includes start ups/shutdown) I get 102, 515

Your number is 100,290

The second number is closer, but it doesn't make sense to include start/shutdown. Either way, the number doesn't match. Can you provide your methodology?

Also, can you please update Attachment 1, Table 7 for the simple cycle units since the annual hours have changed.

Chris Perri

Air Quality Engineer

South Coast Air Quality Management District

(909) 396-2696

Huntington Beach Energy Project
Attachment 1, Table 4
24-hour PM₁₀ Class II SIL and Increment Details
December 2015

Modeling Scenario A: Stack Parameters, Emission Rates, and Results ^a

Exhaust Scenario		CC07		CC06	SC07		AB
Source ID		GE 7FA.05-01	GE 7FA.05-02	GE 7FA.05-02	GE LMS 100PB-01	GE LMS 100PB-02	Auxiliary Boiler
Parameter	Units	Values per Emission Unit					
Stack Parameters							
Easting (X)	m	409449	409474	409474	409149	409185	409438
Northing (Y)	m	3723146	3723182	3723182	3723193	3723168	3723236
Base Elevation	m	3.66	3.66	3.66	3.66	3.66	3.66
Load	%	44	44	75	50	50	N/A
Ambient Temperature	°F	65.8	65.8	65.8	65.8	65.8	N/A
Stack Height	m	45.7	45.7	45.7	24.4	24.4	24.4
Temperature	K	350	350	353	748	748	432
Exit Velocity	m/s	11.8	11.8	14.9	23.6	23.6	21.2
Stack Diameter	m	6.10	6.10	6.10	4.11	4.11	0.91
Emission Rates							
24-hour PM ₁₀	g/s	1.07	0.89	0.18	0.79	0.79	0.020
	lb/day	204	170	34.0	150	150	3.77
Facility-wide Results							
Maximum Modeled Impact ^b	µg/m ³	4.82					

Modeling Scenario B: Stack Parameters, Emission Rates, and Results ^a

Exhaust Scenario B		CC07		CC06	SC07		AB
Source ID		GE 7FA.05-01	GE 7FA.05-02	GE 7FA.05-01	GE LMS 100PB-01	GE LMS 100PB-02	Auxiliary Boiler
Parameter	Units	Values per Emission Unit					
Stack Parameters							
Easting (X)	m	409449	409474	409449	409149	409185	409438
Northing (Y)	m	3723146	3723182	3723146	3723193	3723168	3723236
Base Elevation	m	3.66	3.66	3.66	3.66	3.66	3.66
Load	%	44	44	75	50	50	N/A
Ambient Temperature	°F	65.8	65.8	65.8	65.8	65.8	N/A
Stack Height	m	45.7	45.7	45.7	24.4	24.4	24.4
Temperature	K	350	350	353	748	748	432
Exit Velocity	m/s	11.8	11.8	14.9	23.6	23.6	21.2
Stack Diameter	m	6.10	6.10	6.10	4.11	4.11	0.91
Emission Rates							
24-hour PM ₁₀	g/s	0.89	1.07	0.18	0.79	0.79	0.020
	lb/day	170	204	34.0	150	150	3.77
Facility-wide Results							
Maximum Modeled Impact ^{b, c}	µg/m ³	4.97					

Notes:

N/A = Not applicable

^a To comply with the Class II SILs and Increments, two modeling scenarios were considered:

Modeling Scenario A: GE 7FA.05-01 was assumed to operate 24 hours per day in exhaust scenario CC07 while GE 7FA.05-02 was assumed to operate 20 hours per day in exhaust scenario CC07 and 4 hours per day in exhaust scenario CC06.

Modeling Scenario B: GE 7FA.05-02 was assumed to operate 24 hours per day in exhaust scenario CC07 while GE 7FA.05-01 was assumed to operate 20 hours per day in exhaust scenario CC07 and 4 hours per day in exhaust scenario CC06.

^b Background concentrations are not used in the comparison to Class II SILs and Increments and are not, therefore, presented here.

^c Modeling Scenario B results in the maximum modeled impact and is, therefore, conservatively used to demonstrate compliance with the 24-hour PM₁₀ Class II SILs and Increments.

Huntington Beach Energy Project
Attachment 1, Table 7
Simple Cycle: Summary of Operation Emissions – Air Toxics
December 2015

Assumptions:

Maximum Heat Input Case:	Base load operation	
Total Operations (per turbine - includes startup and shutdown hours):	2,001	hrs/yr
Gas Heat Content:	1,050	MMBtu/MMscf
Maximum Hourly Heat Input (per turbine):	885	MMBtu/hr (HHV)
Average Annual Heat Input (per turbine):	885	MMBtu/hr (HHV)
Number of Turbines:	2	

Proposed Project Compound	Emission Factors		Emissions (per Turbine)			Emissions (Facility Total)		
	lb/MMcf ^a	lb/MMBtu ^a	lb/hr	lb/yr	tpy	lb/hr	lb/yr	tpy
Ammonia ^b	5 ppm	-	6.14	12,277	6.14	12.3	24,553	12.3
1,3-Butadiene	4.39E-04	4.18E-07	0.00037	0.74	0.00037	0.00074	1.48	0.00074
Acetaldehyde ^c	1.80E-01	1.71E-04	0.15	304	0.15	0.30	607	0.30
Acrolein ^c	3.69E-03	3.51E-06	0.0031	6.22	0.0031	0.0062	12.4	0.0062
Benzene ^c	3.33E-03	3.17E-06	0.0028	5.62	0.0028	0.0056	11.2	0.0056
Ethylbenzene	3.26E-02	3.10E-05	0.027	55.0	0.027	0.055	110	0.055
Formaldehyde ^c	3.67E-01	3.50E-04	0.31	619	0.31	0.62	1,238	0.62
Naphthalene	1.33E-03	1.27E-06	0.0011	2.24	0.0011	0.0022	4.49	0.0022
PAHs ^d	9.18E-04	8.74E-07	0.00039	0.77	0.00039	0.00077	1.55	0.00077
Propylene Oxide	2.96E-02	2.82E-05	0.025	49.9	0.025	0.050	99.9	0.050
Toluene	1.33E-01	1.27E-04	0.11	224	0.11	0.22	449	0.22
Xylene	6.53E-02	6.22E-05	0.055	110	0.055	0.11	220	0.110
TOTAL HAPs				1,378	0.69		2,756	1.38
TOTAL TACs				625	0.31		1,251	0.63

Notes:

^a Provided by SCAQMD via e-mail correspondence on 11/3/2015, with the exception of ammonia. Units of lb/MMBtu calculated by dividing lb/MMscf by the gas heat content.

^b Based on the operating exhaust NH₃ limit of 5 ppmv @ 15% O₂ and an F-factor of 8,710.

^c Emission factors account for the use of an oxidation catalyst, as provided by SCAQMD via e-mail correspondence on 11/3/2015.

^d Per Section 3.1.4.3 of AP-42 (EPA, 2000), PAH emissions were assumed to be controlled up to 50% through the use of an oxidation catalyst.