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July 31, 2015

Mr. Keith Winstead
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Redondo Beach Energy Project (12-AFC-03)
Data Response Set 1E – Responses to CEC Staff Data Requests 13

Dear Mr. Winstead:

Attached please find the Redondo Beach Energy Project's Data Response Set 1E, including responses to Data Requests 13. This Data Response Set was prepared in response to California Energy Commission Staff Data Requests 1 through 47 for the Application for Certification for the Redondo Beach Energy Project (12-AFC-03) dated October 15, 2013.

Also provided is five electronic copies of Attachment DR13 on CD-ROM. Additional electronic copies are available upon request. If you have any questions about this matter, please contact me at (916) 286-0207.

Sincerely,

CH2M HILL

Jerry Salamy
AFC Project Manager

Attachment
cc: S. O'Kane, AES
G. Wheatland, ESH
C. Salazar, CH2M HILL

Redondo Beach Energy Project

(12-AFC-03)

Data Responses, Set 1E

(Revised Responses to Data Request 13)

Submitted to

California Energy Commission

Prepared by

AES Southland Development, LLC

With Assistance from

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2485 Natomas Park Drive
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July 31, 2015

Contents

Attachments (provided at the end of their respective sections)

Introduction

Attached are AES Southland Development, LLC's (AES or the Applicant) revised responses to the California Energy Commission (CEC) Data Request, Set 1E (number 13) regarding the Redondo Beach Energy Project (RBEP) Application for Certification (AFC; 12-AFC-03). Note that the preliminary data responses were submitted to the CEC on November 12, 2013, with follow-up responses submitted on June 19, 2015.

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request number (13).

New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 13 would be numbered Table DR13-1. The first figure used in response to Data Request 13 would be numbered Figure DR13-1, and so on. Figures or tables from the RBEP AFC or subsequent submissions that have been revised have "R" following the original number, indicating a revision.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, standalone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Air Quality (13)

Cumulative Impacts: Background

Section 5.1.7 and Appendix 5.1 F, Section 8, of the AFC, describe the methodology for the cumulative effects analysis, but the AFC does not include the analysis because a project list had not been provided by the District at the time the AFC was prepared. The cumulative analysis should include all reasonably foreseeable projects within a six mile radius, i.e. projects that have received construction permits but are not yet operational, and those that are in the permitting process or can be reasonably expected to be in permitting in the near future. A complete impacts analysis should identify all existing and planned stationary sources that affect the baseline conditions and consider them in the modeling effort.

DATA REQUEST

13. Upon approval of the list of sources to be included in the cumulative air quality impact analysis, please provide the cumulative modeling and impact analysis.

Response: On June 19, 2015, the Applicant submitted a list of sources proposed for inclusion in the cumulative air quality impact analysis. Refer to Attachment DR12-1R Table 4 of Data Request 12 (TN #205093) for the proposed list of sources and associated modeling parameters, as well as the source of data collected and relevant assumptions. The CEC approved this facility and source inventory on July 2, 2015. The modeling methodology, parameters, and results of the cumulative air quality impact analysis are discussed below.

Modeling Methodology

The RBEP cumulative air quality impact analysis was conducted using the model settings and receptor grid approach outlined in AFC Section 5.1.6.3.1, with the following exceptions:

- Receptors within the cumulative facility fence lines were removed from the model setup as they would not be representative of ambient conditions.
- The 1-hour nitrogen dioxide (NO_2) concentrations for the cumulative impacts were modeled using the Ambient Ratio Method default conversion factor of 0.8 (U.S. Environmental Protection Agency [EPA], 2011). Additionally, the 1-hour NO_2 design values were obtained by combining the high 8th high modeled impacts with the three-year (2008-2010) average seasonal hourly background NO_2 concentrations.
- The annual particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) impacts were compared to the revised National Ambient Air Quality Standards (NAAQS) of 12 micrograms per cubic meter (µg/m³), rather than the 15 µg/m³ NAAQS presented in the AFC.

The facilities included in the RBEP cumulative modeling assessment are listed below. Detailed explanations justifying the inclusion of these facilities in the modeling assessment are available in Attachment DR12-1R of Data Request 12 (TN #205093).

- Nissin Foods USA Co., Inc. (Facility ID 15794)
- Boeing Satellite Systems, Inc. (Facility ID 115241)
- El Segundo Power, LLC (Facility ID 115663)
- T5 Los Angeles, LLC (Facility ID 169168)
- Chevron Products Co. (Facility ID 800030)
- L.A. City, DWP Scattergood Generating Station (Facility ID 800075)
- ExxonMobil Oil Company (Facility ID 800089)
- L.A. City, Sanitation Bureau (HTP) (Facility ID 800214)

Modeling Parameters

The RBEP source parameters and emission rates modeled were selected according to the operating scenario, which includes start-up and shutdown emissions, resulting in the maximum predicted impacts presented in AFC Table 5.1-29. Modeled emission rates and source parameters for each of the cumulative sources were taken from Attachment DR12-1R Table 4 of Data Request 12 (TN #205093). The emission rates and exhaust parameters used to estimate cumulative impacts are presented in Table DR13-1.

The following assumptions were made in developing the emission rates, exhaust parameters, and modeling scenarios:

- Sources for which pollutant emissions would not increase were removed from the model.
- Sources listed as emergency equipment were not modeled for the 1-hour pollutant averaging times, as the testing times for these sources are unlikely to coincide with a start-up of all three RBEP turbines.
- If specific locations were not available for cumulative emission sources, the sources were modeled as though they were located at the center of the facility.
- Because emission rates for $PM_{2.5}$ were not available for the cumulative sources, it was conservatively assumed that $PM_{2.5}$ emission rates were equal to those of particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}).

TABLE DR13-1
Summary of Modeled Emission Rates and Source Parameters

Source Description [a]	Easting (m)	Northing (m)	Base Elevation (m)	Stack Height (ft)	Temperature (°F)	Exit Velocity (ft/s)	Stack Diameter (ft)	Emissions (lb/hr)							Emissions (tpy)	
								1-hour NO_X	1-hour CO	1-hour SO_2	3-hour SO_2	8-hour CO	24-hour SO_2	24-hour $PM_{10}/PM_{2.5}$	Annual NO_X	Annual $PM_{10}/PM_{2.5}$
Nissin Foods USA Co., Inc. (Facility ID 15794)																
Boilers (12) [b]	378,555	3,752,176	16.0	15.0	450	11.8	2.17	1.31	6.66	0.058	0.058	6.66	0.058	0.65	5.71	2.85
Boeing Satellite Systems, Inc. (Facility ID 115241)																
Boilers (16) [b]	372,020	3,755,247	31.0	17.0	280	16.7	1.33	0.46	1.45	0.076	0.076	1.45	0.076	0.30	2.00	1.33
El Segundo Power, LLC (Facility ID 115663)																
CTG 5	368,192	3,753,220	6.1	210	334	46.7	20.0	18.3	11.1	1.76	1.76	11.1	1.76	15.0	76.5	52.4
CTG 7	368,224	3,753,149	6.1	210	334	46.7	20.0	18.3	11.1	1.76	1.76	11.1	1.76	15.0	76.5	52.4
SC 11	368,301	3,753,008	6.1	150	737	88.3	11.2	4.78	4.65	0.30	0.30	4.65	0.30	5.00	18.9	12.0
SC 12	368,304	3,753,002	6.1	150	737	88.3	11.2	4.78	4.65	0.30	0.30	4.65	0.30	5.00	18.9	12.0
CC 9	368,283	3,753,053	6.1	210	209	40.7	20.0	19.7	12.0	1.42	1.42	12.0	1.42	11.3	58.9	30.7
Aux. Boiler	368,295	3,753,105	6.1	15.0	300	37.4	1.67	0.06	0.34	0.005	0.005	0.34	0.005	0.078	0.26	0.35
T5 Los Angeles, LLC (Facility ID 169168)																
EICEs (8) [b]	371,854	3,754,346	32.0	16.4	915	185	1.50	-	-	-	0.10	6.09	0.013	0.13	5.93	0.076
EICE	371,854	3,754,346	32.0	16.4	942	183	0.67	-	-	-	0.003	0.39	0.0003	0.007	0.12	0.004
Chevron Products Co. (Facility ID 800030)																
Turbine	369,589	3,753,105	31.0	87.5	238	45.1	10.5	7.34	2.98	10.5	10.5	2.98	10.5	N/A	32.6	N/A
Incinerator	369,589	3,753,105	31.0	151	227	14.7	8.30	5.56	12.7	5.80	5.80	12.7	5.80	0.24	24.4	1.04
Flare	369,589	3,753,105	31.0	60	1,720	27.3	21.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.51	0.060
L.A. City, DWP Scattergood Generating Station (Facility ID 800075)																
Unit 4	368,054	3,754,130	11.3	213	200	63.8	19.0	15.3	9.32	1.23	1.23	9.32	1.23	10.0	83.6	43.5
Unit 6	368,145	3,754,122	31.7	100	731	94.3	13.5	8.28	8.06	0.53	0.53	8.06	0.53	5.70	34.6	15.1
Unit 7	368,194	3,754,004	31.7	100	731	94.3	13.5	8.28	8.06	0.53	0.53	8.06	0.53	5.70	34.6	15.1
EICE	368,000	3,754,111	11.3	18.0	922	146	1.67	-	-	-	0.013	0.67	0.002	0.002	0.74	0.002
ExxonMobil Oil Company (Facility ID 800089)																
Boiler 1	376,737	3,746,705	20.0	50.0	302	4.34	21.4	16.5	N/A	N/A	N/A	N/A	N/A	N/A	1.45	N/A
Boiler 2	376,737	3,746,705	20.0	50.0	302	4.34	21.4	16.5	N/A	N/A	N/A	N/A	N/A	N/A	1.45	N/A
Boiler 3	376,737	3,746,705	20.0	50.0	302	4.77	19.4	7.63	12.8	8.94	8.94	12.8	8.94	11.9	33.4	52.0
Afterburner	376,737	3,746,705	20.0	24.0	1,200	3.72	4.00	0.31	N/A	N/A	N/A	N/A	N/A	0.050	1.35	0.22
Heater	376,737	3,746,705	20.0	50.0	700	37.1	6.08	2.32	3.90	2.72	2.72	3.90	2.72	3.61	10.2	15.8
EICE	376,737	3,746,705	20.0	10.0	1,058	377	0.33	-	-	-	0.035	0.13	0.004	0.004	0.039	0.002
L.A. City, Sanitation Bureau (HTP) (Facility ID 800214)																

TABLE DR13-1
Summary of Modeled Emission Rates and Source Parameters

								Emissions (lb/hr)								Emissions (tpy)	
Source Description [a]	**Easting (m)**	**Northing (m)**	**Base Elevation (m)**	**Stack Height (ft)**	**Temperature (°F)**	**Exit Velocity (ft/s)**	**Stack Diameter (ft)**	**1-hour NO_X**	**1-hour CO**	**1-hour SO_2**	**3-hour SO_2**	**8-hour CO**	**24-hour SO_2**	**24-hour $PM_{10}/PM_{2.5}$**	**Annual NO_X**	**Annual $PM_{10}/PM_{2.5}$**
Turbines (3) [b]	367,791	3,754,824	11.0	127	210	17.3	10.0	35.0	50.0	2.00	2.00	50.0	2.00	4.40	151	19.0
Boiler 1	367,791	3,754,824	11.0	125	550	80.6	3.59	6.84	13.9	12.7	12.7	13.9	12.7	0.44	29.9	1.94
Boiler 2	367,791	3,754,824	11.0	15.0	320	37.4	1.67	3.18	6.44	5.89	5.89	6.44	5.89	0.21	13.9	0.90
EICE	367,791	3,754,824	11.0	16.4	942	183	0.67	-	-	-	0.10	0.25	0.013	0.039	0.17	0.023

[a] Sources identified as emergency diesel internal combustion engines (ICEs) are permitted for 50 hours per year of maintenance and testing. These sources were not modeled for the 1-hour pollutant averaging times, as the testing times for these sources are unlikely to coincide with a start-up of all three RBEP turbines.
[b] Emissions for like sources are presented as totals for each source type.

°F = degrees Fahrenheit
CO = carbon monoxide
ft = feet
ft/s = feet per second
lb/hr = pound(s) per hour
m = meter(s)
N/A = Not applicable (i.e., emissions for these sources are not expected to increase)
NO_X = oxides of nitrogen
SO_2 = sulfur dioxide
tpy = ton(s) per year

Modeling Results

The highest modeled concentrations were used to demonstrate compliance with the Ambient Air Quality Standards (AAQS). Table DR13-2 presents a comparison of the maximum RBEP cumulative impacts to the AAQS. As shown, the maximum modeled cumulative NO_2, carbon monoxide (CO), sulfur dioxide (SO_2), and 24-hour PM_{10} concentrations combined with the background concentrations do not exceed the AAQS.

For $PM_{2.5}$ and annual PM_{10}, the background concentrations exceed the AAQS without the cumulative sources. As a result, the maximum modeled cumulative concentrations combined with the background concentrations also exceed the AAQS and the operation of the cumulative sources would further contribute to an existing violation of the AAQS absent mitigation. As discussed in AFC Section 5.1.8.2.2, RBEP emissions will be fully offset consistent with South Coast Air Quality Management District (SCAQMD) Rules 1303 and 1304 using the SCAQMD internal offset bank. Therefore, the impacts will be mitigated to a less-than-significant level.

A summary of the dispersion modeling input files, as well as the modeling results, are presented in Attachment DR13-1. The AERMOD input and output files have been separately prepared and are included with this submission on compact disc.

TABLE DR13-2
Cumulative Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³)	Background Concentration (µg/m³) [a]	Total Predicted Concentration (µg/m³)	State Standard (µg/m³)	Federal Standard (µg/m³)
NO_2 [b]	1-hour	34.0	184	218	339	-
	Federal 1-hour [c]	-	-	128	-	188
	Annual	6.20	25.2	31.4	57	100
SO_2	1-hour	41.3	30.1	71.4	655	-
	Federal 1-hour [d]	37.6	17.0	54.6	-	196
	3-hour	35.2	38.7	73.9	-	1,300
	24-hour	15.9	5.24	21.1	105	365
CO	1-hour	190	3,550	3,740	23,000	40,000
	8-hour	52.2	2,863	2,915	10,000	10,000
PM_{10}	24-hour	2.98	41.0	44.0	50	150
	Annual	0.92	21.7	22.6	20	-
$PM_{2.5}$	24-hour [e]	1.64	38.0	39.6	-	35
	Annual	0.92	24.3	25.2	12	12

[a] Background concentrations were the highest concentrations monitored during 2011 through 2013 with the exception of the 3-hour SO_2 averaging period, which was taken as the highest concentration monitored during 2008 through 2010.
[b] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 (EPA, 2011) and 0.75 (EPA, 2005), respectively.
[c] Total predicted concentration for the federal 1-hour NO_2 standard is the five-year average high 8th high modeled concentration combined with the seasonal hourly three-year average of 98th percentile background concentrations provided by SCAQMD.
[d] Total predicted concentration for the federal 1-hour SO_2 standard is the five-year average high 4th high modeled concentration combined with the three-year average of 99th percentile background concentrations.
[e] Total predicted concentration for the 24-hour $PM_{2.5}$ standard is the five-year average high 8th high modeled concentration combined with the three-year average of 98th percentile background concentrations.

TABLE DR13-2

Cumulative Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$) [a]	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)

References

U.S. Environmental Protection Agency (EPA). 2005. Guideline on Air Quality Models, 40 Code of Federal Regulations (CFR), Part 51, Appendix W. November.

U.S. Environmental Protection Agency (EPA). 2011. Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2, National Ambient Air Quality Standard. March.

Attachment DR13-1
Supporting Documentation for Cumulative Air Quality Impact Analysis

Redondo Beach Energy Project
Attachment DR13-1 Table 1
Cumulative Modeling Parameters - Stack Parameters
July 2015

Point Sources

Facility	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
RBEP (1-hour NO_2, CO, 24-hour PM_{10}, 24-hour $PM_{2.5}$)	Stack 1	371060	3746515	4.42	42.7	463	15.1	5.49
	Stack 2	371096	3746520	4.42	42.7	463	15.1	5.49
	Stack 3	371132	3746525	4.42	42.7	463	15.1	5.49
RBEP (1-hour SO_2, 3-hour SO_2)	Stack 1	371060	3746515	4.42	42.7	476	24.1	5.49
	Stack 2	371096	3746520	4.42	42.7	476	24.1	5.49
	Stack 3	371132	3746525	4.42	42.7	476	24.1	5.49
RBEP (24-hour SO_2, annual NO_2, annual PM_{10}, annual $PM_{2.5}$)	Stack 1	371060	3746515	4.42	42.7	462	16.0	5.49
	Stack 2	371096	3746520	4.42	42.7	462	16.0	5.49
	Stack 3	371132	3746525	4.42	42.7	462	16.0	5.49
NISSIN	15794_01	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_02	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_03	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_04	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_05	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_06	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_07	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_08	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_09	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_10	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_11	378555	3752176	16.0	4.57	505	3.60	0.66
	15794_12	378555	3752176	16.0	4.57	505	3.60	0.66
Boeing	115241_01	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_02	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_03	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_04	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_05	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_06	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_07	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_08	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_09	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_10	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_11	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_12	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_13	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_14	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_15	372020	3755247	31.0	5.18	411	5.09	0.41
	115241_16	372020	3755247	31.0	5.18	411	5.09	0.41

Redondo Beach Energy Project
Attachment DR13-1 Table 1
Cumulative Modeling Parameters - Stack Parameters
July 2015

Point Sources

Facility	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
El Segundo Power	115663_01	368192	3753220	6.10	64.0	441	14.2	6.10
	115663_02	368224	3753149	6.10	64.0	441	14.2	6.10
	115663_03	368301	3753008	6.10	45.7	665	26.9	3.41
	115663_04	368304	3753002	6.10	45.7	665	26.9	3.41
	115663_05	368295	3753105	6.10	4.57	422	11.4	0.51
	115663_06	368283	3753053	6.10	64.0	371	12.4	6.10
T5	169168_01	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_02	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_03	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_04	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_05	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_06	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_07	371854	3754346	32.0	5.00	764	56.4	0.46
	169168_08	371854	3754346	32.0	5.00	779	55.8	0.20
	169168_09	371854	3754346	32.0	5.00	764	56.4	0.46
Chevron	800030_01	369589	3753105	31.0	26.7	388	13.7	3.20
	800030_02	369589	3753105	31.0	46.0	381	4.48	2.53
	800030_03	369589	3753105	31.0	18.3	1,211	8.32	6.40
LADWP	800075_01	368054	3754130	11.3	64.9	366	19.4	5.79
	800075_02	368000	3754111	11.3	5.49	768	44.5	0.51
	800075_03	368145	3754122	31.7	30.5	661	28.7	4.11
	800075_04	368194	3754004	31.7	30.5	661	28.7	4.11
Exxon	800089_01	376737	3746705	20.0	15.2	423	1.32	6.52
	800089_02	376737	3746705	20.0	15.2	423	1.32	6.52
	800089_03	376737	3746705	20.0	7.32	922	1.13	1.22
	800089_04	376737	3746705	20.0	15.2	644	11.3	1.85
	800089_05	376737	3746705	20.0	3.05	843	115	0.10
	800089_06	376737	3746705	20.0	15.2	423	1.45	5.91
LASCB	800214_01	367791	3754824	11.0	5.00	779	55.8	0.20
	800214_02	367791	3754824	11.0	38.7	372	5.27	3.05
	800214_03	367791	3754824	11.0	38.7	372	5.27	3.05
	800214_04	367791	3754824	11.0	38.7	372	5.27	3.05
	800214_05	367791	3754824	11.0	38.1	561	24.6	1.09
	800214_06	367791	3754824	11.0	4.57	433	11.4	0.51

Redondo Beach Energy Project
Attachment DR13-1 Table 2
Cumulative Modeling Parameters - Emission Rates
July 2015

Emission Rates for Cumulative Modeling

		1-hour NO_2		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$		Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Source ID	Source Description	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)
Stack 1	RBEP Stack 1	3.21	25.5	14.4	114	5.72	45.4	0.33	2.63	0.33	2.63	0.17	1.35	0.57	4.50	0.57	4.50	0.94	32.54	0.48	16.6	0.48	16.6
Stack 2	RBEP Stack 2	3.21	25.5	14.4	114	5.72	45.4	0.33	2.63	0.33	2.63	0.17	1.35	0.57	4.50	0.57	4.50	0.94	32.54	0.48	16.6	0.48	16.6
Stack 3	RBEP Stack 3	3.21	25.5	14.4	114	5.72	45.4	0.33	2.63	0.33	2.63	0.17	1.35	0.57	4.50	0.57	4.50	0.94	32.54	0.48	16.6	0.48	16.6
15794_01	Nissin Boiler 01	0.015	0.12	0.076	0.61	0.076	0.61	0.001	0.005	0.001	0.005	0.001	0.005	0.007	0.059	0.007	0.059	0.015	0.52	0.007	0.26	0.007	0.26
15794_02	Nissin Boiler 02	0.015	0.12	0.076	0.61	0.076	0.61	0.001	0.005	0.001	0.005	0.001	0.005	0.007	0.059	0.007	0.059	0.015	0.52	0.007	0.26	0.007	0.26
15794_03	Nissin Boiler 03	0.014	0.11	0.073	0.58	0.073	0.58	0.001	0.005	0.001	0.005	0.001	0.005	0.007	0.056	0.007	0.056	0.014	0.49	0.007	0.25	0.007	0.25
15794_04	Nissin Boiler 04	0.014	0.11	0.073	0.58	0.073	0.58	0.001	0.005	0.001	0.005	0.001	0.005	0.007	0.056	0.007	0.056	0.014	0.49	0.007	0.25	0.007	0.25
15794_05	Nissin Boiler 05	0.014	0.11	0.073	0.58	0.073	0.58	0.001	0.005	0.001	0.005	0.001	0.005	0.007	0.056	0.007	0.056	0.014	0.49	0.007	0.25	0.007	0.25
15794_06	Nissin Boiler 06	0.014	0.11	0.073	0.58	0.073	0.58	0.001	0.005	0.001	0.005	0.001	0.005	0.007	0.056	0.007	0.056	0.014	0.49	0.007	0.25	0.007	0.25
15794_07	Nissin Boiler 07	0.013	0.10	0.066	0.52	0.066	0.52	0.001	0.005	0.001	0.005	0.001	0.005	0.006	0.051	0.006	0.051	0.013	0.45	0.006	0.22	0.006	0.22
15794_08	Nissin Boiler 08	0.013	0.10	0.066	0.52	0.066	0.52	0.001	0.005	0.001	0.005	0.001	0.005	0.006	0.051	0.006	0.051	0.013	0.45	0.006	0.22	0.006	0.22
15794_09	Nissin Boiler 09	0.013	0.10	0.066	0.52	0.066	0.52	0.001	0.005	0.001	0.005	0.001	0.005	0.006	0.051	0.006	0.051	0.013	0.45	0.006	0.22	0.006	0.22
15794_10	Nissin Boiler 10	0.013	0.10	0.066	0.52	0.066	0.52	0.001	0.005	0.001	0.005	0.001	0.005	0.006	0.051	0.006	0.051	0.013	0.45	0.006	0.22	0.006	0.22
15794_11	Nissin Boiler 11	0.013	0.10	0.066	0.52	0.066	0.52	0.001	0.005	0.001	0.005	0.001	0.005	0.006	0.051	0.006	0.051	0.013	0.45	0.006	0.22	0.006	0.22
15794_12	Nissin Boiler 12	0.013	0.10	0.066	0.52	0.066	0.52	0.001	0.005	0.001	0.005	0.001	0.005	0.006	0.051	0.006	0.051	0.013	0.45	0.006	0.22	0.006	0.22
115241_01	Boeing Boiler 01	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_02	Boeing Boiler 02	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_03	Boeing Boiler 03	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_04	Boeing Boiler 04	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_05	Boeing Boiler 05	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_06	Boeing Boiler 06	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_07	Boeing Boiler 07	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_08	Boeing Boiler 08	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_09	Boeing Boiler 09	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_10	Boeing Boiler 10	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_11	Boeing Boiler 11	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_12	Boeing Boiler 12	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_13	Boeing Boiler 13	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_14	Boeing Boiler 14	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_15	Boeing Boiler 15	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115241_16	Boeing Boiler 16	0.004	0.029	0.011	0.090	0.011	0.090	0.001	0.005	0.001	0.005	0.001	0.005	0.002	0.019	0.002	0.019	0.004	0.12	0.002	0.083	0.002	0.083
115663_01	El Segundo Turbine 01	2.30	18.3	1.40	11.1	1.40	11.1	0.22	1.76	0.22	1.76	0.22	1.76	1.89	15.0	1.89	15.0	2.20	76.5	1.51	52.4	1.51	52.4
115663_02	El Segundo Turbine 02	2.30	18.3	1.40	11.1	1.40	11.1	0.22	1.76	0.22	1.76	0.22	1.76	1.89	15.0	1.89	15.0	2.20	76.5	1.51	52.4	1.51	52.4
115663_03	El Segundo Turbine 03	0.60	4.78	0.59	4.65	0.59	4.65	0.038	0.30	0.038	0.30	0.038	0.30	0.63	5.00	0.63	5.00	0.54	18.9	0.35	12.0	0.35	12.0
115663_04	El Segundo Turbine 04	0.60	4.78	0.59	4.65	0.59	4.65	0.038	0.30	0.038	0.30	0.038	0.30	0.63	5.00	0.63	5.00	0.54	18.9	0.35	12.0	0.35	12.0
115663_05	El Segundo Boiler	0.007	0.059	0.043	0.34	0.04	0.34	0.001	0.005	0.001	0.005	0.001	0.005	0.010	0.078	0.010	0.078	0.007	0.26	0.010	0.35	0.010	0.35
115663_06	El Segundo Turbine 05	2.48	19.7	1.51	12.0	1.51	12.0	0.18	1.42	0.18	1.42	0.18	1.42	1.42	11.3	1.42	11.3	1.69	58.9	0.88	30.7	0.88	30.7

Redondo Beach Energy Project
Attachment DR13-1 Table 2
Cumulative Modeling Parameters - Emission Rates
July 2015

Emission Rates for Cumulative Modeling

		1-hour NO_2		1-hour CO		8-hour CO		1-hour SO_2		3-hour SO_2		24-hour SO_2		24-hour PM_{10}		24-hour $PM_{2.5}$		Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
Source ID	Source Description	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)
169168_01	T5 EICE 01	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_02	T5 EICE 02	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_03	T5 EICE 03	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_04	T5 EICE 04	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_05	T5 EICE 05	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_06	T5 EICE 06	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_07	T5 EICE 07	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
169168_08	T5 EICE 08	-	-	-	-	0.049	0.39	-	-	0.000	0.003	0.0000	0.000	0.001	0.007	0.001	0.007	0.004	0.12	0.0001	0.004	0.0001	0.004
169168_09	T5 EICE 09	-	-	-	-	0.096	0.76	-	-	0.002	0.013	0.0002	0.002	0.002	0.016	0.002	0.016	0.021	0.74	0.0003	0.010	0.0003	0.010
800030_01	Chevron Turbine	0.92	7.34	0.38	2.98	0.38	2.98	1.33	10.5	1.33	10.5	1.33	10.5	-	-	-	-	0.94	32.6	-	-	-	-
800030_02	Chevron Incinerator	0.70	5.56	1.60	12.7	1.60	12.7	0.73	5.80	0.73	5.80	0.73	5.80	0.030	0.24	0.030	0.24	0.70	24.4	0.030	1.04	0.03	1.04
800030_03	Chevron Flare	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.043	1.51	0.002	0.060	0.002	0.060
800075_01	LADWP Turbine 01	1.93	15.3	1.17	9.32	1.17	9.32	0.15	1.23	0.15	1.23	0.15	1.23	1.26	10.0	1.26	10.0	2.40	83.6	1.25	43.5	1.25	43.5
800075_02	LADWP EICE	-	-	-	-	0.08	0.67	-	-	0.002	0.013	0.0002	0.002	0.0003	0.002	0.0003	0.002	0.021	0.74	0.0001	0.002	0.0001	0.002
800075_03	LADWP Turbine 02	1.04	8.28	1.02	8.06	1.02	8.06	0.067	0.53	0.067	0.53	0.067	0.53	0.72	5.70	0.72	5.70	1.00	34.6	0.43	15.1	0.43	15.1
800075_04	LADWP Turbine 03	1.04	8.28	1.02	8.06	1.02	8.06	0.067	0.53	0.067	0.53	0.067	0.53	0.72	5.70	0.72	5.70	1.00	34.6	0.43	15.1	0.43	15.1
800089_01	Exxon Boiler 01	2.08	16.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.042	1.45	-	-	-	-
800089_02	Exxon Boiler 02	2.08	16.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.042	1.45	-	-	-	-
800089_03	Exxon Afterburner	0.039	0.31	-	-	-	-	-	-	-	-	-	-	0.006	0.050	0.006	0.050	0.039	1.35	0.006	0.22	0.006	0.22
800089_04	Exxon Heater	0.29	2.32	0.49	3.90	0.49	3.90	0.34	2.72	0.34	2.72	0.34	2.72	0.45	3.61	0.45	3.61	0.29	10.2	0.45	15.8	0.45	15.8
800089_05	Exxon EICE	-	-	-	-	0.02	0.13	-	-	0.004	0.035	0.001	0.004	0.0004	0.004	0.0004	0.004	0.001	0.039	0.0001	0.002	0.0001	0.002
800089_06	Exxon Boiler 03	0.96	7.63	1.62	12.8	1.62	12.8	1.13	8.94	1.13	8.94	1.13	8.94	1.50	11.9	1.50	11.9	0.96	33.4	1.50	52.0	1.50	52.0
800214_01	LACSB EICE	-	-	-	-	0.03	0.25	-	-	0.013	0.10	0.002	0.013	0.005	0.04	0.005	0.039	0.005	0.17	0.001	0.023	0.001	0.023
800214_02	LACSB Turbine 01	1.47	11.7	2.10	16.7	2.10	16.7	0.084	0.67	0.084	0.67	0.084	0.67	0.18	1.47	0.18	1.47	1.45	50.3	0.18	6.33	0.18	6.33
800214_03	LACSB Turbine 02	1.47	11.7	2.10	16.7	2.10	16.7	0.084	0.67	0.084	0.67	0.084	0.67	0.18	1.47	0.18	1.47	1.45	50.3	0.18	6.33	0.18	6.33
800214_04	LACSB Turbine 03	1.47	11.7	2.10	16.7	2.10	16.7	0.084	0.67	0.084	0.67	0.084	0.67	0.18	1.47	0.18	1.47	1.45	50.3	0.18	6.33	0.18	6.33
800214_05	LACSB Boiler 01	0.86	6.84	1.75	13.9	1.75	13.9	1.60	12.7	1.60	12.68	1.60	12.68	0.056	0.44	0.056	0.44	0.86	29.9	0.056	1.94	0.056	1.94
800214_06	LACSB Boiler 02	0.40	3.18	0.81	6.44	0.81	6.44	0.74	5.89	0.74	5.89	0.74	5.89	0.026	0.21	0.026	0.21	0.40	13.9	0.026	0.90	0.026	0.90

Redondo Beach Energy Project
Attachment DR13-1 Table 3
Cumulative Modeling Results Summary
July 2015

		NO_2 ($\mu g/m^3$)			CO ($\mu g/m^3$)		SO_2 ($\mu g/m^3$)				PM_{10} ($\mu g/m^3$)		$PM_{2.5}$ ($\mu g/m^3$)	
Source Group	Year	1-hour [a]	Federal 1-hour [b]	Annual [a]	1-hour	8-hour	1-hour	Federal 1-hour [c]	3-hour	24-hour	24-hour	Annual	24-hour [d]	Annual
ALL	2007	29.7	127	5.80	144	49.2	40.5	38.7	32.3	14.7	2.56	0.87	1.62	0.87
	2008	30.1	127	6.12	160	49.7	41.3	39.5	35.2	14.6	1.95	0.92	1.67	0.92
	2009	29.9	128	6.20	120	52.2	38.3	36.5	32.3	15.9	2.11	0.92	1.71	0.92
	2010	33.2	128	5.08	186	45.7	40.3	38.3	29.1	14.5	1.97	0.79	1.57	0.79
	2011	34.0	129	5.27	190	50.5	39.7	34.8	30.2	13.0	2.98	0.84	1.62	0.84
BOEING	2007	4.56	4.29	0.30	17.7	11.3	0.98	0.94	0.86	0.32	1.21	0.26	0.88	0.26
	2008	4.45	4.32	0.32	17.3	11.0	0.96	0.94	0.93	0.30	1.12	0.29	0.66	0.29
	2009	4.42	4.23	0.29	17.1	9.0	0.95	0.92	0.86	0.32	1.21	0.26	0.61	0.26
	2010	4.47	4.21	0.28	17.4	10.0	0.96	0.95	0.76	0.33	1.26	0.25	0.71	0.25
	2011	4.71	4.19	0.28	18.3	9.2	1.01	0.94	0.83	0.28	1.06	0.25	0.70	0.25
CHEVRON	2007	2.02	1.67	0.16	3.67	1.9	3.10	2.77	2.48	0.82	0.015	0.005	0.009	0.005
	2008	2.64	1.64	0.17	3.85	1.7	4.21	3.06	3.07	0.73	0.015	0.005	0.010	0.005
	2009	2.04	1.65	0.18	3.65	1.7	3.18	2.62	2.54	0.65	0.012	0.005	0.010	0.005
	2010	2.41	1.70	0.16	3.44	1.6	3.85	3.30	2.41	0.68	0.012	0.005	0.010	0.005
	2011	1.78	1.43	0.17	3.13	1.7	2.83	2.41	2.11	1.03	0.020	0.005	0.010	0.005
EL SEGUNDO	2007	4.95	3.24	0.32	4.20	1.6	0.51	0.40	0.31	0.10	0.95	0.28	0.74	0.28
	2008	3.81	3.31	0.33	3.35	1.8	0.39	0.37	0.33	0.10	0.87	0.29	0.77	0.29
	2009	5.06	3.17	0.34	4.28	2.1	0.53	0.36	0.33	0.11	0.97	0.29	0.81	0.29
	2010	5.49	3.41	0.31	4.67	2.5	0.57	0.40	0.30	0.10	0.95	0.27	0.69	0.27
	2011	4.48	3.24	0.35	3.95	1.7	0.46	0.41	0.31	0.09	0.87	0.30	0.76	0.30
EXXON	2007	26.9	13.6	0.22	11.8	8.0	8.26	7.31	7.60	1.89	2.53	0.36	0.69	0.36
	2008	23.9	15.0	0.23	10.5	4.3	7.33	5.91	5.53	1.33	1.78	0.38	0.78	0.38
	2009	23.0	15.5	0.24	10.1	5.8	7.05	6.16	6.07	1.58	2.10	0.39	0.76	0.39
	2010	25.0	15.0	0.19	11.0	3.5	7.71	4.84	3.75	1.37	1.84	0.31	0.68	0.31
	2011	24.2	15.3	0.19	10.9	5.5	7.59	6.55	6.39	2.19	2.93	0.32	0.60	0.32
LACSB	2007	29.7	28.6	5.62	59.8	49.2	40.5	38.7	32.3	14.7	1.60	0.75	1.45	0.75
	2008	30.0	29.1	5.91	60.2	49.7	41.3	39.5	35.2	14.6	1.75	0.78	1.49	0.78
	2009	29.9	29.1	6.00	60.1	52.1	38.3	36.5	32.3	15.9	1.68	0.79	1.61	0.79
	2010	29.4	28.5	4.87	58.9	45.7	40.3	38.3	29.1	14.5	1.56	0.65	1.41	0.65
	2011	30.1	28.7	5.02	60.4	50.4	39.7	34.8	30.2	13.0	1.70	0.67	1.36	0.67

Redondo Beach Energy Project
Attachment DR13-1 Table 3
Cumulative Modeling Results Summary
July 2015

		NO_2 ($\mu g/m^3$)			CO ($\mu g/m^3$)		SO_2 ($\mu g/m^3$)				PM_{10} ($\mu g/m^3$)		$PM_{2.5}$ ($\mu g/m^3$)	
Source Group	Year	1-hour [a]	Federal 1-hour [b]	Annual [a]	1-hour	8-hour	1-hour	Federal 1-hour [c]	3-hour	24-hour	24-hour	Annual	24-hour [d]	Annual
LADWP	2007	2.29	2.08	0.30	2.28	1.72	0.21	0.19	0.19	0.06	0.53	0.19	0.48	0.19
	2008	2.44	2.07	0.32	2.44	1.65	0.22	0.20	0.18	0.06	0.54	0.20	0.49	0.20
	2009	2.35	2.11	0.32	2.40	1.75	0.21	0.20	0.18	0.06	0.55	0.20	0.50	0.20
	2010	2.37	2.03	0.27	2.36	1.77	0.21	0.19	0.18	0.06	0.53	0.17	0.42	0.17
	2011	2.47	2.11	0.30	2.57	1.57	0.22	0.21	0.19	0.06	0.55	0.19	0.48	0.19
NISSIN	2007	9.63	7.12	0.49	61.3	35.9	0.55	0.49	0.46	0.13	1.38	0.33	1.03	0.33
	2008	9.70	8.04	0.52	61.8	31.5	0.56	0.52	0.44	0.10	1.12	0.35	0.77	0.35
	2009	9.06	4.07	0.53	57.7	32.9	0.52	0.43	0.38	0.14	1.50	0.35	0.73	0.35
	2010	9.32	6.85	0.46	59.3	36.7	0.53	0.47	0.37	0.18	1.90	0.30	0.74	0.30
	2011	8.78	6.59	0.44	55.9	33.8	0.50	0.49	0.43	0.17	1.78	0.29	0.74	0.29
RBEP	2007	25.8	17.4	0.28	144	31.4	1.73	1.51	1.47	0.32	1.13	0.19	0.51	0.19
	2008	28.7	17.0	0.29	160	21.2	2.73	1.46	1.25	0.19	0.76	0.20	0.52	0.20
	2009	21.4	17.2	0.30	120	21.3	1.59	1.27	1.21	0.23	0.80	0.20	0.55	0.20
	2010	33.2	19.6	0.27	186	34.9	2.76	1.50	1.30	0.37	1.34	0.19	0.72	0.19
	2011	34.0	20.8	0.31	190	22.0	3.46	1.56	1.15	0.33	1.18	0.21	0.74	0.21
T5	2007	-	-	0.25	-	12.8	-	-	0.36	0.011	0.10	0.005	0.07	0.005
	2008	-	-	0.26	-	9.38	-	-	0.18	0.008	0.07	0.005	0.07	0.005
	2009	-	-	0.26	-	9.22	-	-	0.17	0.009	0.08	0.005	0.07	0.005
	2010	-	-	0.21	-	18.0	-	-	0.30	0.017	0.15	0.004	0.06	0.004
	2011	-	-	0.21	-	8.31	-	-	0.17	0.008	0.08	0.004	0.06	0.004

[a] The maximum 1-hour and annual NO_2 concentrations include ambient NO_2 ratios of 0.80 and 0.75, respectively.

[b] Total predicted concentration for the Federal 1-hour NO_2 standard (source ALL) is the high 8th high modeled concentration paired with the three-year average of 98th percentile seasonal hourly background concentrations, as provided by the SCAQMD. All other results presented for the Federal 1-hour NO_2 standard are the high 8th high modeled concentrations.

[c] Results presented for the Federal 1-hour SO_2 standard are the high 4th high modeled concentrations.

[d] Results presented for the Federal 24-hour $PM_{2.5}$ standard are the high 8th high modeled concentrations.