Appendix 5.1C
Dispersion Modeling and Climate Information

APPENDIX 5.1C

Dispersion Modeling and Climate Information

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Redondo Beach Energy Project
Table 5.1C.1
Commissioning Source Parameters for AERMOD Input
November 2012

Point Sources

Scenario	Building Name	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	NO_2 (g/s)	NO_2 (lb/hr)	CO (g/s)	CO (lb/hr)
5% Load	Stack 1	371060	3746515	4.4	42.7	500	10.1	5.49	6.11	48.5	215.4	1709
	Stack 2	371096	3746520	4.4	42.7	500	10.1	5.49	6.11	48.5	215.4	1709
	Stack 3	371132	3746525	4.4	42.7	500	10.1	5.49	6.11	48.5	215.4	1709
40% Load	Stack 1	371060	3746515	4.4	42.7	473	9.9	5.49	3.27	26.0	172.9	1373
	Stack 2	371096	3746520	4.4	42.7	473	9.9	5.49	3.27	26.0	172.9	1373
	Stack 3	371132	3746525	4.4	42.7	473	9.9	5.49	3.27	26.0	172.9	1373
50% Load	Stack 1	371060	3746515	4.4	42.7	466	9.9	5.49	13.82	109.7	399.3	3169
	Stack 2	371096	3746520	4.4	42.7	466	9.9	5.49	13.82	109.7	399.3	3169
	Stack 3	371132	3746525	4.4	42.7	466	9.9	5.49	13.82	109.7	399.3	3169
100% Load	Stack 1	371060	3746515	4.4	42.7	472	22.7	5.49	5.29	42.0	3.57	28.4
	Stack 2	371096	3746520	4.4	42.7	472	22.7	5.49	5.29	42.0	3.57	28.4
	Stack 3	371132	3746525	4.4	42.7	472	22.7	5.49	5.29	42.0	3.57	28.4

Redondo Beach Energy Project
Table 5.1C.2
Commissioning Building Parameters for AERMOD Input
November 2012

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)
offsite1	1	1	7	6	8	371099	3746803	371114	3746808	371121	3746790	371136	3746748	371136	3746731	371122	3746730
offsite2	1	1	7	6	4	371125	3746705	371142	3746707	371177	3746474	371162	3746472				
offsite3	1	1	10	12	23	371178	3746442	371211	3746443	371211	3746431	371220	3746430	371226	3746361	371212	3746360
STG	1	1	4	12	4	371105	3746567	371114	3746548	371133	3746557	371124	3746575				
acc	1	1	4	25	4	371033	3746607	371054	3746560	371110	3746585	371089	3746633				
FGComp	1	1	4	8	4	370960	3746582	370975	3746547	370993	3746555	370978	3746589				
CTGBLDG	2	1	4	18	4	371038	3746510	371140	3746525	371150	3746460	371048	3746445				
CTGBLDG	*	2	*	25	4	371038	3746510	371140	3746525	371144	3746495	371043	3746481				
finfan	1	1	4	5	4	371078	3746564	371104	3746568	371106	3746553	371080	3746549				
Trans1	1	1	4	9	4	371049	3746430	371061	3746432	371064	3746417	371052	3746415				
Trans2	1	1	4	9	4	371085	3746436	371097	3746438	371100	3746423	371088	3746421				
Trans3	1	1	4	9	4	371121	3746442	371133	3746443	371135	3746428	371123	3746426				

Redondo Beach Ener
Table 5.1C.2
Commissioning Build
November 2012

Building Name	Corner 7 East (X) (m)	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)	Corner 10 East (X) (m)	Corner 10 North (Y) (m)	Corner 11 East (X) (m)	Corner 11 North (Y) (m)	Corner 12 East (X) (m)	Corner 12 North (Y) (m)	Corner 13 East (X) (m)	Corner 13 North (Y) (m)	Corner 14 East (X) (m)	Corner 14 North (Y) (m)	Corner 15 East (X) (m)	Corner 15 North (Y) (m)
offsite1	371120	3746746	371107	3746784														
offsite2																		
offsite3	371217	3746295	371207	3746295	371212	3746288	371215	3746282	371216	3746275	371212	3746270	371207	3746264	371197	3746263	371190.47	3746265
STG																		
acc																		
FGComp																		
CTGBLDG																		
CTGBLDG																		
finfan																		
Trans1																		
Trans2																		
Trans3																		

Redondo Beach Ener
Table 5.1C.2
Commissioning Build
November 2012

Building Name	Corner 16 East (X) (m)	Corner 16 North (Y) (m)	Corner 17 East (X) (m)	Corner 17 North (Y) (m)	Corner 18 East (X) (m)	Corner 18 North (Y) (m)	Corner 19 East (X) (m)	Corner 19 North (Y) (m)	Corner 20 East (X) (m)	Corner 20 North (Y) (m)	Corner 21 East (X) (m)	Corner 21 North (Y) (m)	Corner 22 East (X) (m)	Corner 22 North (Y) (m)	Corner 23 East (X) (m)	Corner 23 North (Y) (m)
offsite1																
offsite2																
offsite3	371183.58	3746273	371184.72	3746281.1	371187.6	3746289.1	371187.6	3746293.1	371174.39	3746436.1	371178.41	3746437.3	371177.83	3746440.7	371177.83	3746440.7
STG																
acc																
FGComp																
CTGBLDG																
CTGBLDG																
finfan																
Trans1																
Trans2																
Trans3																

Redondo Beach Energy Project
Table 5.1C.3
Commissioning Modeling Results Summary
November 2012

Scenario	Year	NO_2 (µg/m^3)	CO (µg/m^3)	
		1-hr	1-hr	8-hr
5% Load	2005	46.4	3,073	1,299
	2006	50.0	3,297	1,465
	2007	51.2	3,413	1,395
	2008	41.0	2,747	1,022
	2009	48.4	3,184	1,366
40% Load	2005	26.0	2,586	1,168
	2006	27.5	2,720	1,241
	2007	27.8	2,776	1,191
	2008	23.5	2,331	883
	2009	27.1	2,674	1,231
50% Load	2005	111	6,027	2,810
	2006	117	6,335	2,929
	2007	118	6,439	2,831
	2008	101	5,446	2,066
	2009	118	6,346	2,944
100% Load	2005	14.1	15.9	8.28
	2006	17.5	21.8	7.32
	2007	21.5	27.5	6.59
	2008	22.3	25.8	6.76
	2009	12.5	13.8	6.89

Redondo Beach Energy Project
Table 5.1C.4
Operational Modeling Parameters - Stack Parameters
November 2012

Point Sources

Scenario	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
1	Stack 1	371060	3746515	4.4	42.7	476	24.1	5.49
	Stack 2	371096	3746520	4.4	42.7	476	24.1	5.49
	Stack 3	371132	3746525	4.4	42.7	476	24.1	5.49
2	Stack 1	371060	3746515	4.4	42.7	479	24.1	5.49
	Stack 2	371096	3746520	4.4	42.7	479	24.1	5.49
	Stack 3	371132	3746525	4.4	42.7	479	24.1	5.49
3	Stack 1	371060	3746515	4.4	42.7	474	21.6	5.49
	Stack 2	371096	3746520	4.4	42.7	474	21.6	5.49
	Stack 3	371132	3746525	4.4	42.7	474	21.6	5.49
4	Stack 1	371060	3746515	4.4	42.7	469	19.1	5.49
	Stack 2	371096	3746520	4.4	42.7	469	19.1	5.49
	Stack 3	371132	3746525	4.4	42.7	469	19.1	5.49
5	Stack 1	371060	3746515	4.4	42.7	463	16.7	5.49
	Stack 2	371096	3746520	4.4	42.7	463	16.7	5.49
	Stack 3	371132	3746525	4.4	42.7	463	16.7	5.49
6	Stack 1	371060	3746515	4.4	42.7	475	22.8	5.49
	Stack 2	371096	3746520	4.4	42.7	475	22.8	5.49
	Stack 3	371132	3746525	4.4	42.7	475	22.8	5.49
7	Stack 1	371060	3746515	4.4	42.7	477	22.8	5.49
	Stack 2	371096	3746520	4.4	42.7	477	22.8	5.49
	Stack 3	371132	3746525	4.4	42.7	477	22.8	5.49
8	Stack 1	371060	3746515	4.4	42.7	472	20.4	5.49
	Stack 2	371096	3746520	4.4	42.7	472	20.4	5.49
	Stack 3	371132	3746525	4.4	42.7	472	20.4	5.49

Redondo Beach Energy Project
Table 5.1C.4
Operational Modeling Parameters - Stack Parameters
November 2012

Point Sources

Scenario	Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
9	Stack 1	371060	3746515	4.4	42.7	467	18.2	5.49
	Stack 2	371096	3746520	4.4	42.7	467	18.2	5.49
	Stack 3	371132	3746525	4.4	42.7	467	18.2	5.49
10	Stack 1	371060	3746515	4.4	42.7	462	16.0	5.49
	Stack 2	371096	3746520	4.4	42.7	462	16.0	5.49
	Stack 3	371132	3746525	4.4	42.7	462	16.0	5.49
11	Stack 1	371060	3746515	4.4	42.7	486	22.7	5.49
	Stack 2	371096	3746520	4.4	42.7	486	22.7	5.49
	Stack 3	371132	3746525	4.4	42.7	486	22.7	5.49
12	Stack 1	371060	3746515	4.4	42.7	481	22.3	5.49
	Stack 2	371096	3746520	4.4	42.7	481	22.3	5.49
	Stack 3	371132	3746525	4.4	42.7	481	22.3	5.49
13	Stack 1	371060	3746515	4.4	42.7	471	18.8	5.49
	Stack 2	371096	3746520	4.4	42.7	471	18.8	5.49
	Stack 3	371132	3746525	4.4	42.7	471	18.8	5.49
14	Stack 1	371060	3746515	4.4	42.7	467	17.0	5.49
	Stack 2	371096	3746520	4.4	42.7	467	17.0	5.49
	Stack 3	371132	3746525	4.4	42.7	467	17.0	5.49
15	Stack 1	371060	3746515	4.4	42.7	463	15.1	5.49
	Stack 2	371096	3746520	4.4	42.7	463	15.1	5.49
	Stack 3	371132	3746525	4.4	42.7	463	15.1	5.49

Redondo Beach Energy Project
Table 5.1C.5
Operational Modeling Parameters - Emission Rates
November 2012

Per Turbine Emission Rates for 1-hr, 3-hr, 8-hr, and 24-hr Modeling

Exhaust	1-hr NO_2		1-hr CO		8-hr CO		1-hr SO_2		3-hr SO_2		24-hr SO_2		24-hr PM_{10}		24-hr $PM_{2.5}$	
Scenario	(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)
Scenario 1	3.21	25.4	14.35	114	6.09	48.3	0.33	2.63	0.33	2.63	0.33	2.63	1.20	9.50	1.20	9.50
Scenario 2	3.21	25.4	14.35	114	5.91	46.9	0.25	1.96	0.25	1.96	0.25	1.96	0.57	4.50	0.57	4.50
Scenario 3	3.21	25.4	14.35	114	5.86	46.5	0.22	1.78	0.22	1.78	0.22	1.78	0.57	4.50	0.57	4.50
Scenario 4	3.21	25.4	14.35	114	5.82	46.2	0.20	1.60	0.20	1.60	0.20	1.60	0.57	4.50	0.57	4.50
Scenario 5	3.21	25.4	14.35	114	5.78	45.8	0.18	1.44	0.18	1.44	0.18	1.44	0.57	4.50	0.57	4.50
Scenario 6	3.21	25.4	14.35	114	6.06	48.1	0.32	2.51	0.32	2.51	0.32	2.51	1.20	9.50	1.20	9.50
Scenario 7	3.21	25.4	14.35	114	5.88	46.7	0.23	1.84	0.23	1.84	0.23	1.84	0.57	4.50	0.57	4.50
Scenario 8	3.21	25.4	14.35	114	5.83	46.3	0.21	1.66	0.21	1.66	0.21	1.66	0.57	4.50	0.57	4.50
Scenario 9	3.21	25.4	14.35	114	5.79	46.0	0.19	1.50	0.19	1.50	0.19	1.50	0.57	4.50	0.57	4.50
Scenario 10	3.21	25.4	14.35	114	5.75	45.7	0.17	1.35	0.17	1.35	0.17	1.35	0.57	4.50	0.57	4.50
Scenario 11	3.21	25.4	14.35	114	6.04	47.9	0.31	2.45	0.31	2.45	0.31	2.45	1.20	9.50	1.20	9.50
Scenario 12	3.21	25.4	14.35	114	5.87	46.6	0.22	1.78	0.22	1.78	0.22	1.78	0.57	4.50	0.57	4.50
Scenario 13	3.21	25.4	14.35	114	5.79	45.9	0.19	1.48	0.19	1.48	0.19	1.48	0.57	4.50	0.57	4.50
Scenario 14	3.21	25.4	14.35	114	5.75	45.7	0.17	1.35	0.17	1.35	0.17	1.35	0.57	4.50	0.57	4.50
Scenario 15	3.21	25.4	14.35	114	5.72	45.4	0.15	1.22	0.15	1.22	0.15	1.22	0.57	4.50	0.57	4.50

Per Turbine Emission Rates for Annual Modeling

Source ID	Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
Scenario 1	-	-	-	-	-	-
Scenario 2	-	-	-	-	-	-
Scenario 3	-	-	-	-	-	-
Scenario 4	-	-	-	-	-	-
Scenario 5	-	-	-	-	-	-
Scenario 6	-	-	-	-	-	-
Scenario 7	1.16	9.244922	0.48	3.779395	0.48	3.779395
Scenario 8	1.08	8.552771	0.48	3.779395	0.48	3.779395
Scenario 9	1.00	7.961579	0.48	3.779395	0.48	3.779395
Scenario 10	0.94	7.430422	0.48	3.779395	0.48	3.779395
Scenario 11	-	-	-	-	-	-
Scenario 12	-	-	-	-	-	-
Scenario 13	-	-	-	-	-	-
Scenario 14	-	-	-	-	-	-
Scenario 15	-	-	-	-	-	-

Redondo Beach Energy Project
Table 5.1C.6
Operational Building Parameters for AERMOD Input
November 2012

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)	Corner 7 East (X) (m)
offsite1	1	1	7.00	6.10	8	371099	3746803	371114	3746808	371121	3746790	371136	3746748	371136	3746731	371122	3746730	371120
offsite2	1	1	7.22	6.10	4	371125	3746705	371142	3746707	371177	3746474	371162	3746472					
offsite3	1	1	9.91	12.19	23	371178	3746442	371211	3746443	371211	3746431	371220	3746430	371226	3746361	371212	3746360	371217
STG	1	1	4.42	12.19	4	371105	3746567	371114	3746548	371133	3746557	371124	3746575					
acc	1	1	4.42	25.30	4	371033	3746607	371054	3746560	371110	3746585	371089	3746633					
Admin	1	1	4.42	5.79	4	370986	3746523	371004	3746484	371024	3746493	371006	3746531					
FGComp	1	1	4.42	7.62	4	370960	3746582	370975	3746547	370993	3746555	370978	3746589					
CTGBLDG	2	1	4.42	18.44	4	371038	3746510	371140	3746525	371150	3746460	371048	3746445					
CTGBLDG	*	2	*	25.45	4	371038	3746510	371140	3746525	371144	3746495	371043	3746481					
wail	1	1	4.42	27.13	8	371000	3746612	370958	3746580	371037	3746405	371071	3746410	371072	3746409	371036	3746404	370956
finfan	1	1	4.42	4.57	4	371078	3746564	371104	3746568	371106	3746553	371080	3746549					
Trans1	1	1	4.42	9.14	4	371049	3746430	371061	3746432	371064	3746417	371052	3746415					
Trans2	1	1	4.42	9.14	4	371085	3746436	371097	3746438	371100	3746423	371088	3746421					
Trans3	1	1	4.42	9.14	4	371121	3746442	371133	3746443	371135	3746428	371123	3746426					

Redondo Beach Ener
Table 5.1C.6
Operational Building
November 2012

Building Name	Corner 7 North (Y) (m)	Corner 8 East (X) (m)	Corner 8 North (Y) (m)	Corner 9 East (X) (m)	Corner 9 North (Y) (m)	Corner 10 East (X) (m)	Corner 10 North (Y) (m)	Corner 11 East (X) (m)	Corner 11 North (Y) (m)	Corner 12 East (X) (m)	Corner 12 North (Y) (m)	Corner 13 East (X) (m)	Corner 13 North (Y) (m)	Corner 14 East (X) (m)	Corner 14 North (Y) (m)	Corner 15 East (X) (m)	Corner 15 North (Y) (m)	Corner 16 East (X) (m)
offsite1	3746746	371107	3746784															
offsite2																		
offsite3	3746295	371207	3746295	371212	3746288	371215	3746282	371216	3746275	371212	3746270	371207	3746264	371197	3746263	371190	3746265	371184
STG																		
acc																		
Admin																		
FGComp																		
CTGBLDG																		
CTGBLDG																		
wail	3746580	370999	3746613															
finfan																		
Trans1																		
Trans2																		
Trans3																		

Redondo Beach Ener
Table 5.1C.6
Operational Building
November 2012

Building Name	Corner 16 North (Y) (m)	Corner 17 East (X) (m)	Corner 17 North (Y) (m)	Corner 18 East (X) (m)	Corner 18 North (Y) (m)	Corner 19 East (X) (m)	Corner 19 North (Y) (m)	Corner 20 East (X) (m)	Corner 20 North (Y) (m)	Corner 21 East (X) (m)	Corner 21 North (Y) (m)	Corner 22 East (X) (m)	Corner 22 North (Y) (m)	Corner 23 East (X) (m)	Corner 23 North (Y) (m)
offsite1															
offsite2															
offsite3	3746273	371184.724	3746281.08	371187.599	3746289.12	371187.599	3746293.14	371174.388	3746436.13	371178.411	3746437.28	371177.833	3746440.73	371177.833	3746440.73
STG															
acc															
Admin															
FGComp															
CTGBLDG															
CTGBLDG															
wail															
finfan															
Trans1															
Trans2															
Trans3															

Redondo Beach Energy Project
Table 5.1C.7a
Operational Modeling Results Summary
November 2012

Case 1: 33°F, 100% Load with Duct Burner Firing

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	20.8	-	92.9	15.2	2.15	1.21	0.310	1.12	-	1.12	-
2006	18.8	-	84.2	15.6	1.94	1.28	0.361	1.30	-	1.30	-
2007	17.1	-	76.4	18.8	1.76	1.50	0.348	1.26	-	1.26	-
2008	33.0	-	147.8	11.1	3.41	1.49	0.239	0.863	-	0.863	-
2009	16.4	-	73.4	15.8	1.70	1.25	0.292	1.06	-	1.06	-

Case 2: 33°F, 100% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	20.7	-	92.6	14.7	1.60	0.898	0.220	0.504	-	0.504	-
2006	18.8	-	84.0	15.0	1.45	0.939	0.267	0.611	-	0.611	-
2007	17.0	-	76.1	18.2	1.31	1.11	0.258	0.592	-	0.592	-
2008	33.0	-	147.8	10.7	2.55	1.11	0.177	0.406	-	0.406	-
2009	16.3	-	72.9	15.1	1.26	0.929	0.216	0.495	-	0.495	-

Case 3: 33°F, 90% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	23.2	-	103.8	16.2	1.62	0.99	0.246	0.621	-	0.621	-
2006	20.9	-	93.5	22.4	1.46	1.14	0.348	0.878	-	0.878	-
2007	19.5	-	87.2	22.2	1.36	1.10	0.305	0.769	-	0.769	-
2008	34.7	-	155.2	12.1	2.43	1.06	0.184	0.465	-	0.465	-
2009	18.1	-	80.8	17.1	1.26	0.921	0.224	0.565	-	0.565	-

Case 4: 33°F, 80% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	26.6	-	119.1	17.3	1.67	0.97	0.253	0.713	-	0.713	-
2006	23.1	-	103.5	29.5	1.45	1.30	0.452	1.27	-	1.27	-
2007	22.2	-	99.3	24.1	1.39	1.08	0.301	0.848	-	0.848	-
2008	36.7	-	164.2	14.3	2.30	1.01	0.191	0.537	-	0.537	-
2009	24.0	-	107.5	18.7	1.51	0.905	0.229	0.645	-	0.645	-

Case 5: 33°F, 70% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	30.8	-	137.9	24.9	1.74	1.16	0.282	0.882	-	0.882	-
2006	32.1	-	143.5	34.3	1.81	1.37	0.503	1.573	-	1.57	-
2007	27.8	-	124.4	28.7	1.57	1.21	0.324	1.016	-	1.02	-
2008	38.9	-	174.0	18.6	2.20	1.07	0.210	0.658	-	0.658	-
2009	26.2	-	117.4	20.7	1.48	1.15	0.229	0.717	-	0.717	-

Case 6: 63.3°F, 100% Load with Duct Burner Firing

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	22.0	-	98.4	16.3	2.17	1.20	0.309	1.17	-	1.17	-
2006	19.7	-	88.4	21.6	1.95	1.51	0.455	1.72	-	1.72	-
2007	18.8	-	84.3	22.0	1.85	1.49	0.410	1.55	-	1.55	-
2008	33.7	-	151.0	12.1	3.32	1.45	0.243	0.921	-	0.921	-
2009	17.5	-	78.1	16.9	1.72	1.24	0.300	1.14	-	1.14	-

Case 7: 63.3°F, 100% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	21.9	0.36	98.2	15.7	1.59	0.875	0.226	0.552	0.146	0.552	0.146
2006	19.7	0.32	88.2	20.9	1.42	1.10	0.333	0.813	0.130	0.813	0.130
2007	18.8	0.32	84.0	21.3	1.36	1.09	0.299	0.732	0.131	0.732	0.131
2008	33.7	0.34	151.0	11.9	2.44	1.06	0.177	0.434	0.138	0.434	0.138
2009	17.3	0.34	77.6	16.3	1.25	0.908	0.220	0.537	0.140	0.537	0.140

Case 8: 63.3°F, 90% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	24.7	0.38	110.5	16.6	1.61	0.948	0.245	0.663	0.166	0.663	0.166
2006	22.1	0.33	98.8	28.2	1.44	1.29	0.415	1.123	0.147	1.123	0.147
2007	21.2	0.34	94.9	23.1	1.38	1.07	0.297	0.805	0.149	0.805	0.149
2008	35.6	0.35	159.5	12.9	2.33	1.02	0.183	0.496	0.156	0.496	0.156
2009	20.6	0.36	92.4	17.8	1.35	0.893	0.227	0.614	0.158	0.614	0.158

Redondo Beach Energy Project
Table 5.1C.7a
Operational Modeling Results Summary
November 2012

Case 9: 63.3°F, 80% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	28.0	0.40	125.2	21.9	1.65	1.05	0.250	0.752	0.189	0.752	0.189
2006	26.9	0.36	120.3	30.5	1.58	1.27	0.443	1.33	0.170	1.33	0.170
2007	22.9	0.36	102.3	25.1	1.35	1.05	0.295	0.887	0.169	0.887	0.169
2008	37.3	0.37	166.9	16.2	2.19	0.99	0.191	0.573	0.176	0.573	0.176
2009	24.7	0.38	110.7	19.4	1.46	0.880	0.223	0.670	0.179	0.670	0.179

Case 10: 63.3°F, 70% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	32.3	0.43	144.4	25.9	1.71	1.13	0.278	0.923	0.218	0.923	0.218
2006	33.8	0.39	151.2	36.9	1.80	1.39	0.506	1.68	0.197	1.68	0.197
2007	31.1	0.38	139.1	30.6	1.65	1.26	0.327	1.09	0.196	1.09	0.196
2008	39.4	0.40	176.3	20.6	2.09	1.04	0.219	0.729	0.203	0.729	0.203
2009	26.9	0.40	120.4	21.3	1.43	1.14	0.222	0.739	0.205	0.739	0.205

Case 11: 106°F, 100% Load with Duct Burner Firing

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	21.4	-	95.7	15.7	2.06	1.15	0.291	1.13	-	1.13	-
2006	19.5	-	87.4	19.0	1.88	1.33	0.398	1.55	-	1.55	-
2007	17.6	-	78.8	19.6	1.69	1.42	0.359	1.39	-	1.39	-
2008	33.8	-	151.2	11.9	3.25	1.42	0.231	0.897	-	0.897	-
2009	17.0	-	76.2	16.5	1.64	1.19	0.287	1.11	-	1.11	-

Case 12: 106°F, 100% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	22.0	-	98.7	15.6	1.54	0.852	0.219	0.554	-	0.554	-
2006	19.8	-	88.7	21.6	1.39	1.10	0.333	0.841	-	0.841	-
2007	18.9	-	84.7	21.3	1.32	1.06	0.291	0.737	-	0.737	-
2008	34.2	-	153.3	11.8	2.40	1.05	0.174	0.439	-	0.439	-
2009	17.5	-	78.1	16.4	1.22	0.885	0.214	0.541	-	0.541	-

Case 13: 106°F, 90% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	26.7	-	119.7	20.5	1.55	0.949	0.236	0.718	-	0.718	-
2006	23.8	-	106.5	29.5	1.38	1.21	0.421	1.28	-	1.28	-
2007	22.3	-	99.7	24.1	1.29	1.00	0.280	0.853	-	0.853	-
2008	36.9	-	165.1	15.0	2.14	0.940	0.178	0.542	-	0.542	-
2009	24.1	-	108.0	18.7	1.40	0.842	0.213	0.650	-	0.650	-

Case 14: 106°F, 80% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	29.6	-	132.4	24.1	1.56	1.06	0.257	0.859	-	0.859	-
2006	30.7	-	137.4	32.6	1.62	1.22	0.440	1.47	-	1.47	-
2007	25.5	-	114.1	27.1	1.35	1.04	0.288	0.965	-	0.965	-
2008	38.6	-	172.9	16.8	2.04	0.97	0.182	0.608	-	0.608	-
2009	25.7	-	115.2	20.1	1.36	0.99	0.209	0.699	-	0.699	-

Case 15: 106°F, 70% Load

Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
2005	33.9	-	151.7	27.9	1.63	1.11	0.267	0.983	-	0.98	-
2006	35.4	-	158.4	40.4	1.70	1.42	0.500	1.84	-	1.84	-
2007	33.7	-	150.9	32.2	1.62	1.23	0.313	1.15	-	1.15	-
2008	40.0	-	179.2	22.8	1.92	1.00	0.220	0.812	-	0.812	-
2009	29.4	-	131.5	21.9	1.41	1.12	0.210	0.773	-	0.773	-

Redondo Beach Energy Project
Table 5.1C.7b
SCAQMD Rule 2005 NO2 Modeling Results Summary
November 2012

Stack 1

Year	1-hr Concentration (µg/m³)	Annual Concentration (µg/m³)
2005	19.8	0.114
2006	14.5	0.103
2007	13.2	0.103
2008	18.0	0.107
2009	14.0	0.108

Stack 2

Year	1-hr Concentration (µg/m³)	Annual Concentration (µg/m³)
2005	12.2	0.105
2006	11.8	0.095
2007	10.8	0.094
2008	13.3	0.098
2009	10.6	0.099

Stack 3

Year	1-hr Concentration (µg/m³)	Annual Concentration (µg/m³)
2005	8.42	0.104
2006	8.79	0.094
2007	7.60	0.093
2008	10.2	0.097
2009	4.99	0.098

Redondo Beach Energy Project
Table 5.1C.7c
Class I SIL and Increment Modeling Results
November 2012

Annual NO2 Concentrations at 50 km Receptor Ring

Year	2005	2006	2007	2008	2009
All	0.0082	0.0080	0.0083	0.0086	0.0086
Stack 1	0.0027	0.0027	0.0028	0.0029	0.0029
Stack 2	0.0027	0.0027	0.0028	0.0029	0.0029
Stack 3	0.0027	0.0027	0.0028	0.0029	0.0029

Redondo Beach Energy Project
Table 5.1C.8
Construction Source Parameters for AERMOD Input
November 2012

Area Sources

Source ID	Base Elevation (m)	Release Height (m)	Number of Vertices	Vertical Dimension (m)	Easting (X11) (m)	Northing (Y11) (m)	Easting (X12) (m)	Northing (Y12) (m)	Easting (X13) (m)	Northing (Y13) (m)	Easting (X14) (m)	Northing (Y14) (m)	Easting (X15) (m)	Northing (Y15) (m)	Easting (X16) (m)	Northing (Y16) (m)	Easting (X17) (m)	Northing (Y17) (m)	Easting (X18) (m)	Northing (Y18) (m)	Easting (X19) (m)	Northing (Y19) (m)
FUG	4.4	1.0	20.0	0.93	370931	3746690	370951	3746699	370994	3746691	371026	3746623	371125	3746665	371157	3746435	371172.65	3746320.6	371178.31	3746255.54	371179.25	3746127.29

Source ID	Easting (X10) (m)	Northing (Y10) (m)	Easting (X11) (m)	Northing (Y11) (m)	Easting (X12) (m)	Northing (Y12) (m)	Easting (X13) (m)	Northing (Y13) (m)	Easting (X14) (m)	Northing (Y14) (m)	Easting (X15) (m)	Northing (Y15) (m)	Easting (X16) (m)	Northing (Y16) (m)	Easting (X17) (m)	Northing (Y17) (m)	Easting (X18) (m)	Northing (Y18) (m)	Easting (X19) (m)	Northing (Y19) (m)	Easting (X20) (m)	Northing (Y20) (m)
FUG	371143.42	3746077.31	371118.9	3746122.58	371083.07	3746106.55	371004.8	3746161.24	370991.6	3746192.36	371075.52	3746229.14	371059.5	3746420.56	371036.86	3746418.68	370935.02	3746642.17	370867.12	3746612.93	370845.29	3746653.98

Volume Sources

Source ID	Easting (X1) (m)	Northing (Y1) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)
EXH01	370968	3746667	4.42	4.60	23.3	4.28
EXH02	370989	3746622	4.42	4.60	23.3	4.28
EXH03	371010	3746577	4.42	4.60	23.3	4.28
EXH04	371031	3746531	4.42	4.60	23.3	4.28
EXH05	371052	3746486	4.42	4.60	23.3	4.28
EXH06	371072	3746440	4.42	4.60	23.3	4.28
EXH07	371080	3746619	4.42	4.60	23.3	4.28
EXH08	371086	3746570	4.42	4.60	23.3	4.28
EXH09	371091	3746520	4.42	4.60	23.3	4.28
EXH10	371096	3746470	4.42	4.60	23.3	4.28
EXH11	371102	3746420	4.42	4.60	23.3	4.28
EXH12	371107	3746371	4.42	4.60	23.3	4.28
EXH13	371113	3746321	4.42	4.60	23.3	4.28
EXH14	371118	3746271	4.42	4.60	23.3	4.28
EXH15	371124	3746222	4.42	4.60	23.3	4.28
EXH16	371129	3746172	4.42	4.60	23.3	4.28
EXH17	371076	3746173	4.42	4.60	23.3	4.28
EXH18	370875	3746474	4.42	4.60	23.3	4.28
EXH19	370897	3746429	4.42	4.60	23.3	4.28
EXH20	370920	3746384	4.42	4.60	23.3	4.28
EXH21	370942	3746339	4.42	4.60	23.3	4.28
EXH22	370964	3746294	4.42	4.60	23.3	4.28
EXH23	370986	3746249	4.42	4.60	23.3	4.28
EXH24	370949	3746511	4.42	4.60	23.3	4.28
EXH25	370970	3746465	4.42	4.60	23.3	4.28
EXH26	370990	3746419	4.42	4.60	23.3	4.28
EXH27	371010	3746373	4.42	4.60	23.3	4.28
EXH28	371030	3746328	4.42	4.60	23.3	4.28
EXH29	371050	3746282	4.42	4.60	23.3	4.28

Redondo Beach Energy Project
Table 5.1C.9
Construction Modeling Parameters - Emission Rates
November 2012

Emission Rates for 1-hr, 3-hr, 8-hr, and 24-hr Modeling

Source ID	1-hr NO_2		1-hr CO		8-hr CO		1-hr SO_2		3-hr SO_2		24-hr SO_2		24-hr PM_{10}		24-hr $PM_{2.5}$	
	(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)
CONSFUG	-	-	-	-	-	-	-	-	-	-	-	-	0.363	2.88	0.077	0.609
EXH01	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH02	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH03	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH04	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH05	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH06	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH07	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH08	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH09	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH10	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH11	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH12	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH13	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH14	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH15	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH16	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH17	0.03	0.25631	0.047	0.3697686	0.047	0.3697686	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	1.22E-03	9.69E-03	1.22E-03	9.69E-03
EXH18	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH19	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH20	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH21	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH22	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH23	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH24	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH25	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH26	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH27	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH28	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-
EXH29	0.03	0.25631	-	-	-	-	6.94E-05	5.50E-04	6.94E-05	5.50E-04	2.89E-05	2.29E-04	-	-	-	-

Rates for Annual Modeling

Source ID	Annual NO_2		Annual PM_{10}		Annual $PM_{2.5}$	
	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
CONSFUG	-	-	0.203	1.61	0.042	0.333
EXH01	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH02	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH03	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH04	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH05	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH06	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH07	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH08	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH09	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH10	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH11	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH12	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH13	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH14	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH15	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH16	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH17	0.010	0.07558	8.20E-04	6.51E-03	8.20E-04	6.51E-03
EXH18	0.010	0.07558	-	-	-	-
EXH19	0.010	0.07558	-	-	-	-
EXH20	0.010	0.07558	-	-	-	-
EXH21	0.010	0.07558	-	-	-	-
EXH22	0.010	0.07558	-	-	-	-
EXH23	0.010	0.07558	-	-	-	-
EXH24	0.010	0.07558	-	-	-	-
EXH25	0.010	0.07558	-	-	-	-
EXH26	0.010	0.07558	-	-	-	-
EXH27	0.010	0.07558	-	-	-	-
EXH28	0.010	0.07558	-	-	-	-
EXH29	0.010	0.07558	-	-	-	-

Redondo Beach Energy Project
Table 5.1C.10
Construction Modeling Results
November 2012

Source	Year	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)			PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
		1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	Annual	24-hr	Annual
ALL		40.6	9.17	204	98.2	0.338	0.299	0.061	68.0	17.2	15.8	4.2
EXH	2005	-	9.17	204	98.2	0.338	0.299	0.061	1.88	0.79	1.88	0.79
FUG		-	-	-	-	-	-	-	66.3	16.5	14.0	3.41
ALL		40.7	8.94	202	101	0.344	0.316	0.063	71.8	16.0	16.2	3.88
EXH	2006	-	8.94	202	101	0.344	0.316	0.063	1.86	0.77	1.86	0.77
FUG		-	-	-	-	-	-	-	70.5	15.2	14.9	3.14
ALL		40.8	9.35	205	113	0.344	0.315	0.060	78.5	18.1	17.8	4.36
EXH	2007	-	9.35	205	113	0.344	0.315	0.060	1.88	0.81	1.88	0.81
FUG		-	-	-	-	-	-	-	77.0	17.4	16.3	3.59
ALL		41.1	9.55	207	106	0.344	0.304	0.057	65.4	18.7	15.0	4.48
EXH	2008	-	9.55	207	106	0.344	0.304	0.057	1.73	0.82	1.73	0.82
FUG		-	-	-	-	-	-	-	63.9	17.9	13.5	3.69
ALL		40.3	9.57	206	110	0.345	0.298	0.057	71.7	18.3	16.5	4.40
EXH	2009	-	9.57	206	110	0.345	0.298	0.057	1.80	0.82	1.80	0.82
FUG		-	-	-	-	-	-	-	70.0	17.5	14.8	3.62

Redondo Beach Energy Project
Table 5.1C.11a
First Quarter Wind Table
November 2012

Frequency Distribution (Hours)
Date Range: Jan 1 - Mar 31 (2005-2009)

Wind Speed (m/s) Wind Direction (from)	0.5 -2.1	2.1 -3.6	3.6 -5.7	5.7 -8.8	8.8 - 11.1	>= 11.1	Total
N	144	65	47	7	0	0	263
NNE	367	200	26	1	0	0	594
NE	1117	152	12	0	0	0	1281
ENE	1278	150	32	0	0	0	1460
E	584	138	17	0	0	0	739
ESE	264	53	4	0	0	0	321
SE	141	76	25	3	0	0	245
SSE	144	45	39	7	0	0	235
S	208	104	89	31	2	0	434
SSW	220	210	232	39	0	0	701
SW	327	528	471	15	0	0	1341
WSW	281	620	611	71	0	0	1583
W	173	224	139	16	0	0	552
WNW	120	56	17	0	0	0	193
NW	107	22	11	0	0	0	140
NNW	124	53	43	2	0	0	222
Total	5599	2696	1815	192	2	0	10304

Frequency of Calm Winds: 407

Redondo Beach Energy Project
Table 5.1C.11b
Second Quarter Wind Table
November 2012

Frequency Distribution (Hours)
Date Range: Apr 1 - Jun 30 (2005-2009)

Wind Speed (m/s)	0.5 -2.1	2.1 -3.6	3.6 -5.7	5.7 -8.8	8.8 - 11.1	>= 11.1	Total
Wind Direction (from)							
N	110	24	45	3	0	0	182
NNE	150	19	2	0	0	0	171
NE	406	14	0	0	0	0	420
ENE	550	20	2	0	0	0	572
E	319	36	2	0	0	0	357
ESE	183	15	3	0	0	0	201
SE	157	30	3	0	0	0	190
SSE	146	38	4	0	0	0	188
S	214	114	30	2	0	0	360
SSW	275	255	241	21	0	0	792
SW	457	729	1167	32	0	0	2385
WSW	545	950	1616	75	0	0	3186
W	375	216	172	13	0	0	776
WNW	219	32	8	0	0	0	259
NW	112	7	2	0	0	0	121
NNW	81	8	9	2	0	0	100
Total	4299	2507	3306	148	0	0	10260

Frequency of Calm Winds: 485

Redondo Beach Energy Project
Table 5.1C.11c
Third Quarter Wind Table
November 2012

Frequency Distribution (Hours)
Date Range: Jul 1 - Sep 30 (2005-2009)

Wind Speed (m/s)	0.5 -2.1	2.1 -3.6	3.6 -5.7	5.7 -8.8	8.8 - 11.1	>= 11.1	Total
Wind Direction (from)							
N	82	19	17	0	0	0	118
NNE	99	10	0	0	0	0	109
NE	331	2	0	0	0	0	333
ENE	419	11	1	0	0	0	431
E	213	11	0	0	0	0	224
ESE	136	14	2	0	0	0	152
SE	119	14	3	0	0	1	137
SSE	179	38	3	0	0	0	220
S	288	157	24	3	0	1	473
SSW	383	292	146	3	0	1	825
SW	595	927	1005	4	0	0	2531
WSW	659	1080	1846	10	0	0	3595
W	391	191	87	0	0	0	669
WNW	199	23	2	0	0	0	224
NW	134	3	0	0	0	0	137
NNW	91	1	0	0	0	0	92
Total	4318	2793	3136	20	0	3	10270

Frequency of Calm Winds: 731

Redondo Beach Energy Project
Table 5.1C.11d
Fourth Quarter Wind Table
November 2012

Frequency Distribution (Hours)
Date Range: Oct 1 - Dec 31 (2005-2009)

Wind Speed (m/s)	0.5 -2.1	2.1 -3.6	3.6 -5.7	5.7 -8.8	8.8 - 11.1	>= 11.1	Total
Wind Direction (from)							
N	142	62	62	24	0	0	290
NNE	409	211	21	3	0	0	644
NE	1359	121	4	0	0	0	1484
ENE	1597	88	1	0	0	0	1686
E	664	90	5	0	0	0	759
ESE	229	25	2	0	0	0	256
SE	159	38	4	0	0	0	201
SSE	162	38	11	0	0	0	211
S	183	76	58	5	0	0	322
SSW	213	221	166	11	1	0	612
SW	381	675	317	8	0	0	1381
WSW	429	727	369	28	0	1	1554
W	237	204	75	12	0	0	528
WNW	119	36	6	1	0	0	162
NW	83	24	9	0	0	0	116
NNW	123	48	30	3	0	0	204
Total	6489	2684	1140	95	1	1	10410

Frequency of Calm Winds: 569

Redondo Beach Energy Project
Table 5.1C.12
November 2012
Ambient Air Quality Standards Summary

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		53 ppb (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Redondo Beach Energy Project
Table 5.1C.13a
November 2012
Climatic Summary for Los Angeles International Airport, CA

LOS ANGELES WSO ARPT, CALIFORNIA (045114)

Period of Record Monthly Climate Summary

Period of Record : 8/ 1/1944 to 9/30/2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	65.2	65.3	65.3	67.4	69.1	71.9	75.1	76.3	76.0	73.6	70.2	65.9	70.1
Average Min. Temperature (F)	47.5	48.9	50.5	53.0	56.4	59.7	62.9	63.8	62.6	58.5	52.3	47.9	55.3
Average Total Precipitation (in.)	2.65	2.67	1.85	0.77	0.17	0.05	0.02	0.07	0.16	0.39	1.40	1.82	12.02
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 99% Min. Temp.: 99.6% Precipitation: 99.9% Snowfall: 93.5% Snow Depth: 97.1%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

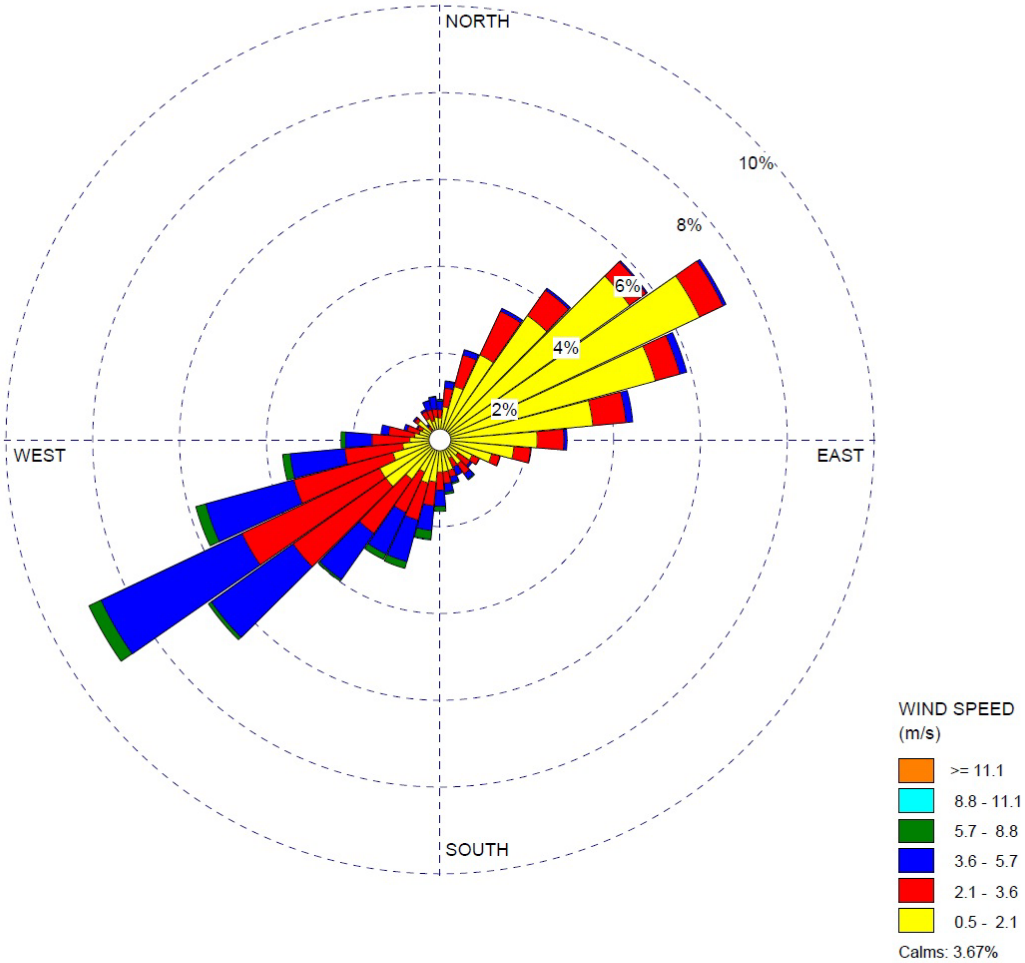
Redondo Beach Energy Project
Figure 5.1C-1a - November 2012
First Quarter Wind Rose
Date Range: January 1 – March 31

WIND ROSE PLOT:

SCAQMD Meteorology Data
Los Angeles International Airport Station

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2005 - 00:00 **End Date: 3/31/2009 - 23:00**	MODELER:	
	CALM WINDS: **3.67%**	TOTAL COUNT: **10711 hrs.**	
	AVG. WIND SPEED: **2.16 m/s**	DATE: **11/13/2012**	PROJECT NO.:

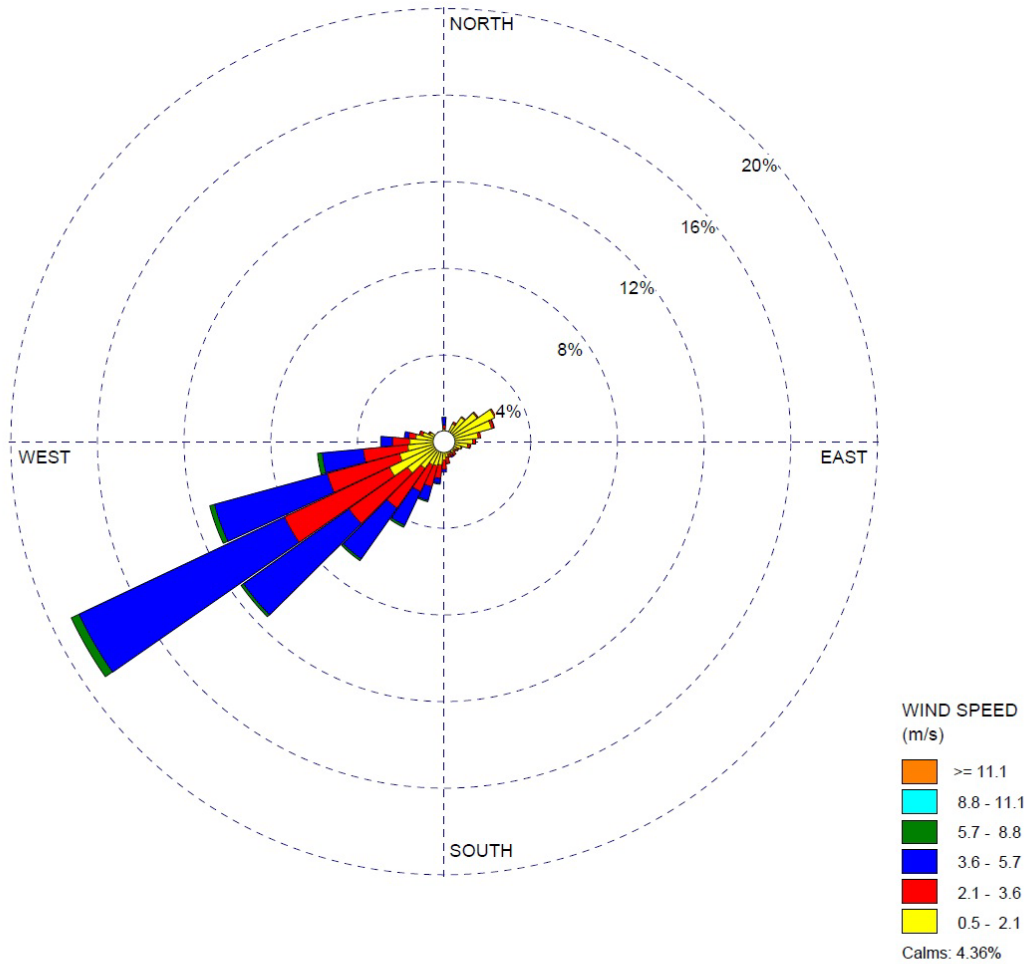
Redondo Beach Energy Project
Figure 5.1C-1b - November 2012
Second Quarter Wind Rose
Date Range: April 1 – June 30

WIND ROSE PLOT:

SCAQMD Meteorology Data
Los Angeles International Airport Station

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 4/1/2005 - 00:00 **End Date: 6/30/2009 - 23:00**	MODELER:	
	CALM WINDS: **4.36%**	TOTAL COUNT: **10745 hrs.**	
	AVG. WIND SPEED: **2.51 m/s**	DATE: **11/13/2012**	PROJECT NO.:

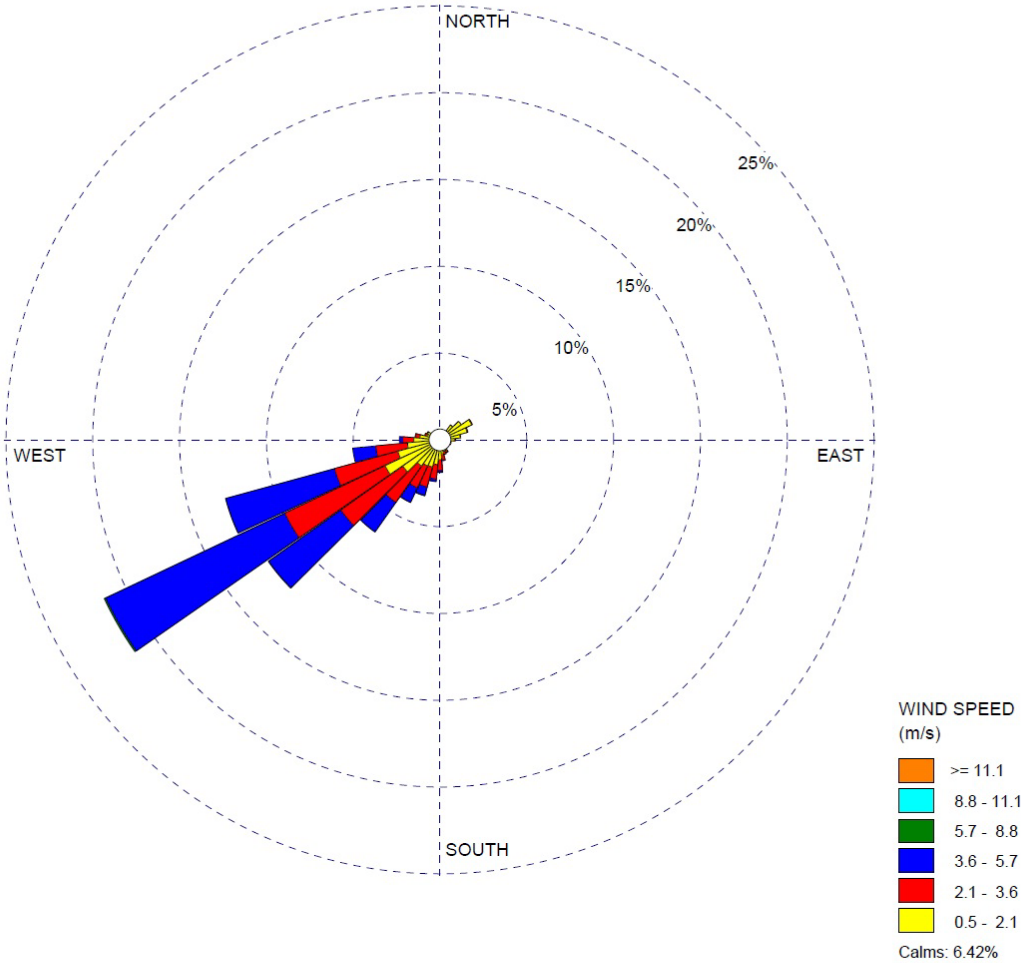
Redondo Beach Energy Project
Figure 5.1C-1c - November 2012
Third Quarter Wind Rose
Date Range: July 1 – September 30

WIND ROSE PLOT:

SCAQMD Meteorology Data
Los Angeles International Airport Station

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 7/1/2005 - 00:00 **End Date: 9/30/2009 - 23:00**	MODELER:	
	CALM WINDS: **6.42%**	TOTAL COUNT: **11001 hrs.**	
	AVG. WIND SPEED: **2.36 m/s**	DATE: **11/13/2012**	PROJECT NO.:

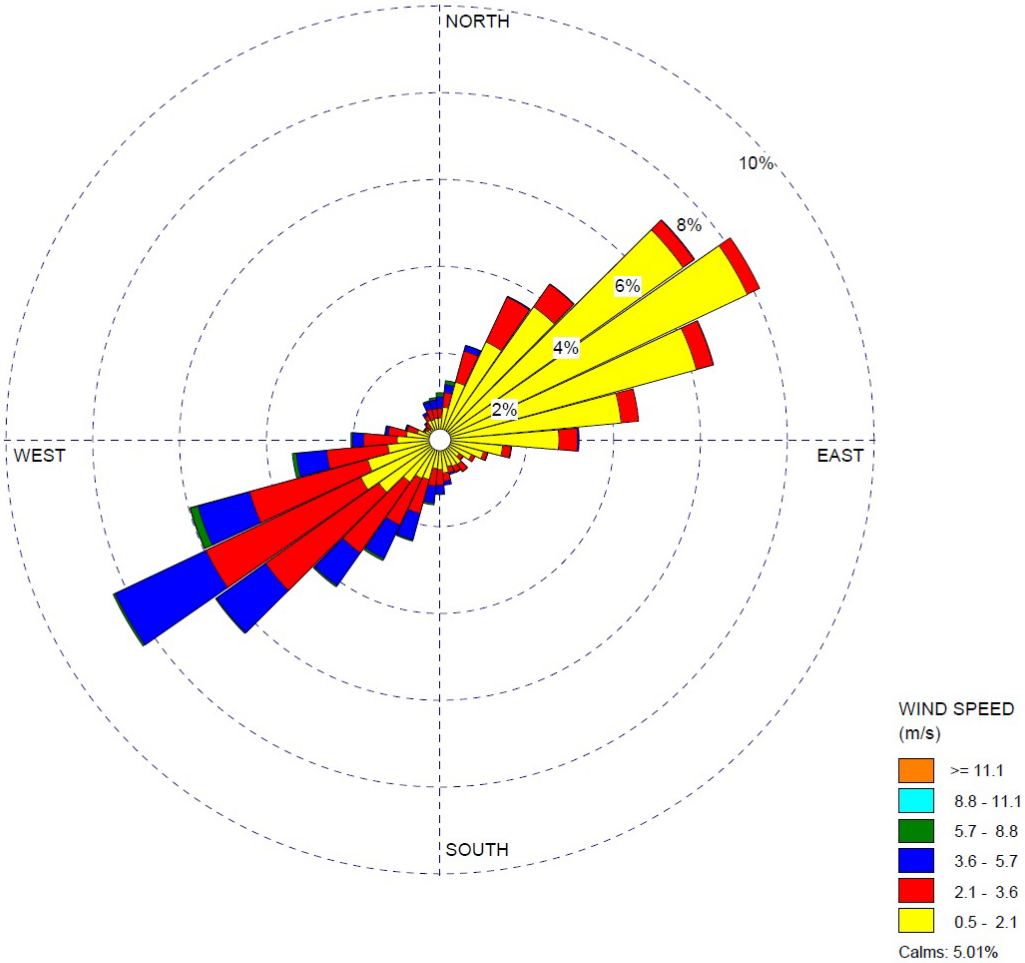
Redondo Beach Energy Project
Figure 5.1C-1d - November 2012
Fourth Quarter Wind Rose
Date Range: October 1 – December 31

WIND ROSE PLOT:

SCAQMD Meteorology Data
Los Angeles International Airport Station

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/1/2005 - 00:00 **End Date: 12/31/2009 - 23:00**	MODELER:	
	CALM WINDS: **5.01%**	TOTAL COUNT: **10979 hrs.**	
	AVG. WIND SPEED: **1.86 m/s**	DATE: **11/13/2012**	PROJECT NO.:

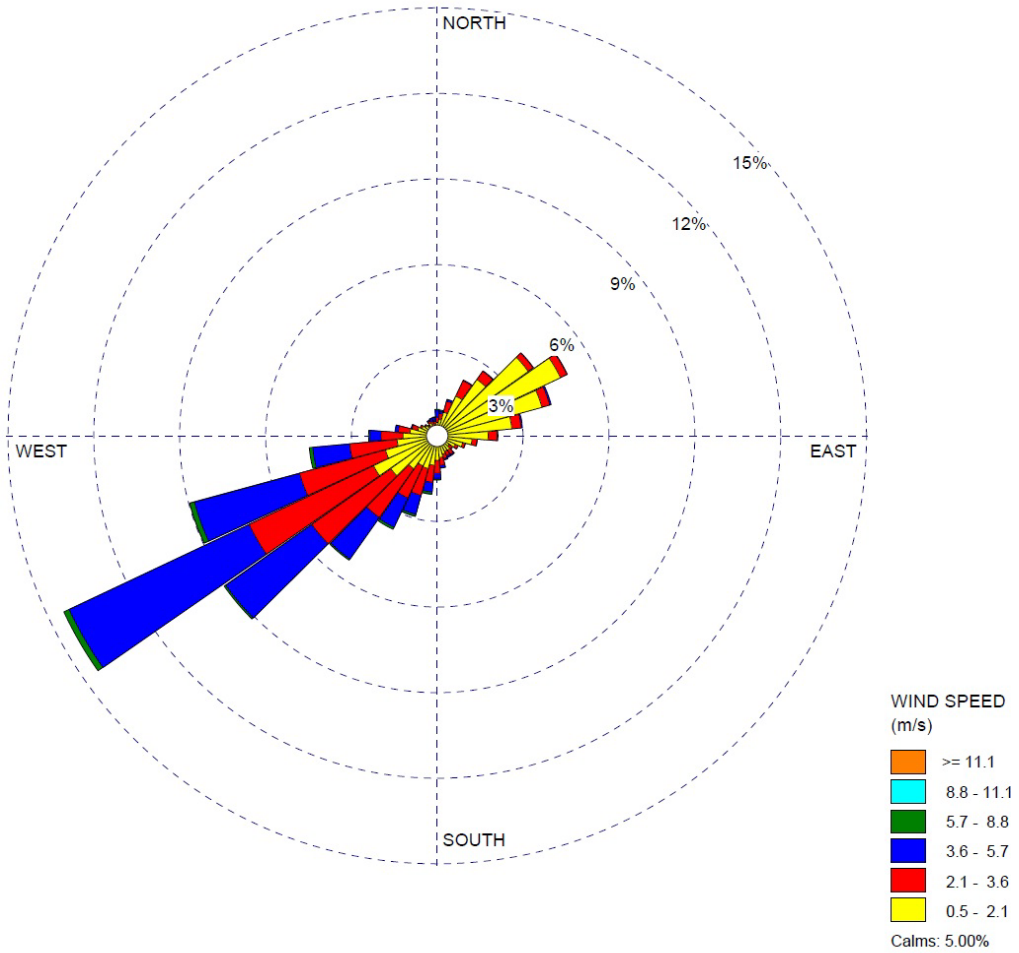
Redondo Beach Energy Project
Figure 5.1C-1e - November 2012
Annual Wind Rose

WIND ROSE PLOT:

SCAQMD Meteorology Data
Los Angeles International Airport Station

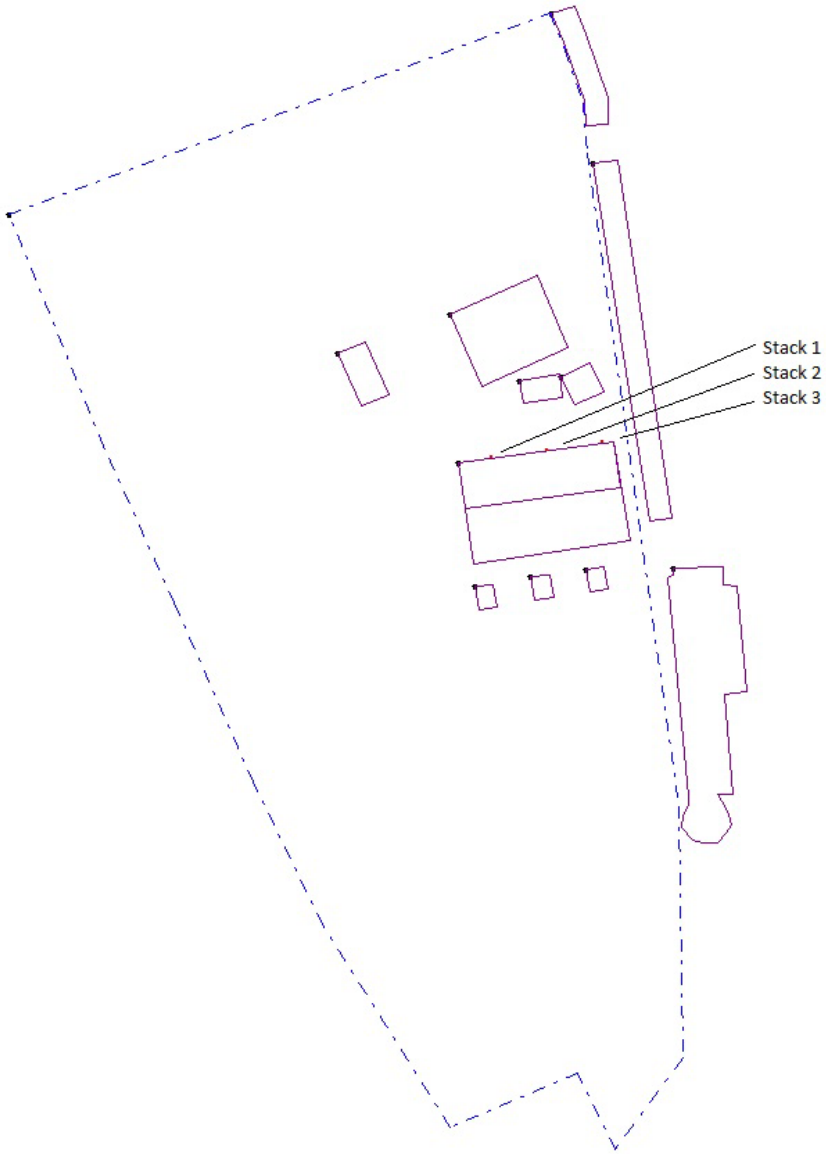
DISPLAY:

Wind Speed
Direction (blowing from)

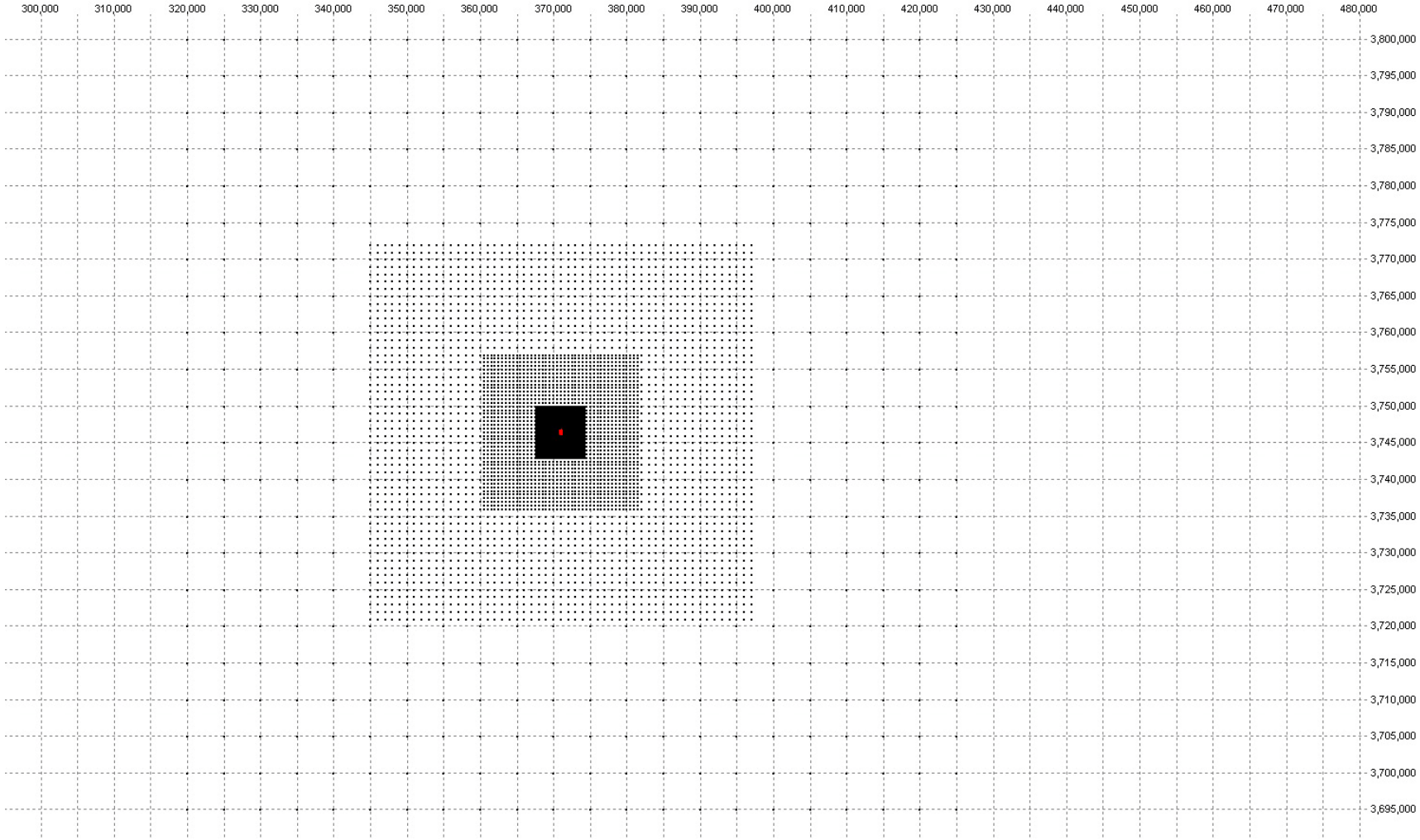


COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2005 - 00:00 **End Date: 12/31/2009 - 23:00**	MODELER:	
	CALM WINDS: **5.00%**	TOTAL COUNT: **43436 hrs.**	
	AVG. WIND SPEED: **2.22 m/s**	DATE: **11/13/2012**	PROJECT NO.:

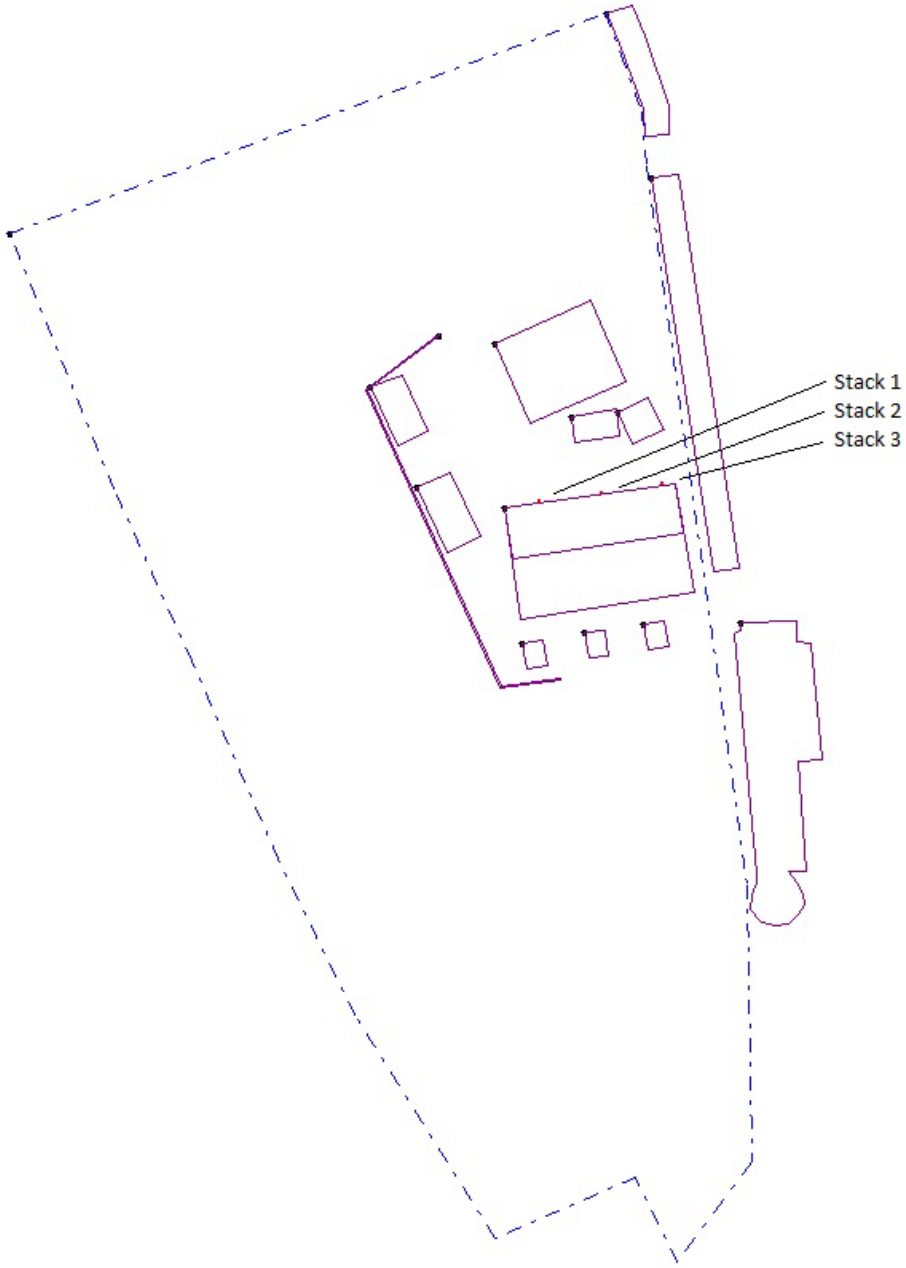
Redondo Beach Energy Project
Figure 5.1C-2
November 2012
Commissioning Model Setup



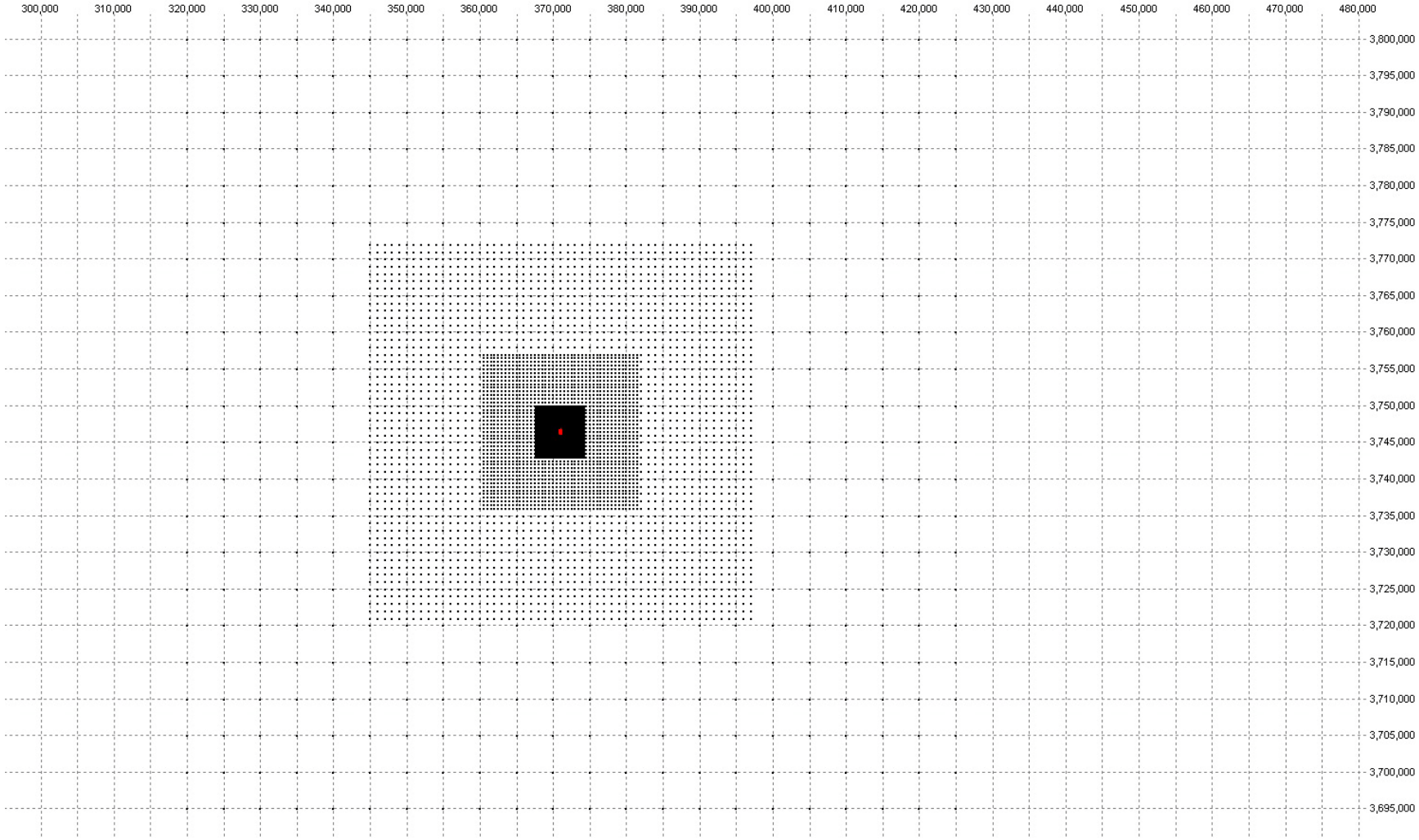
Redondo Beach Energy Project
Figure 5.1C-3
November 2012
Commissioning Coarse and Refined Receptor Grids



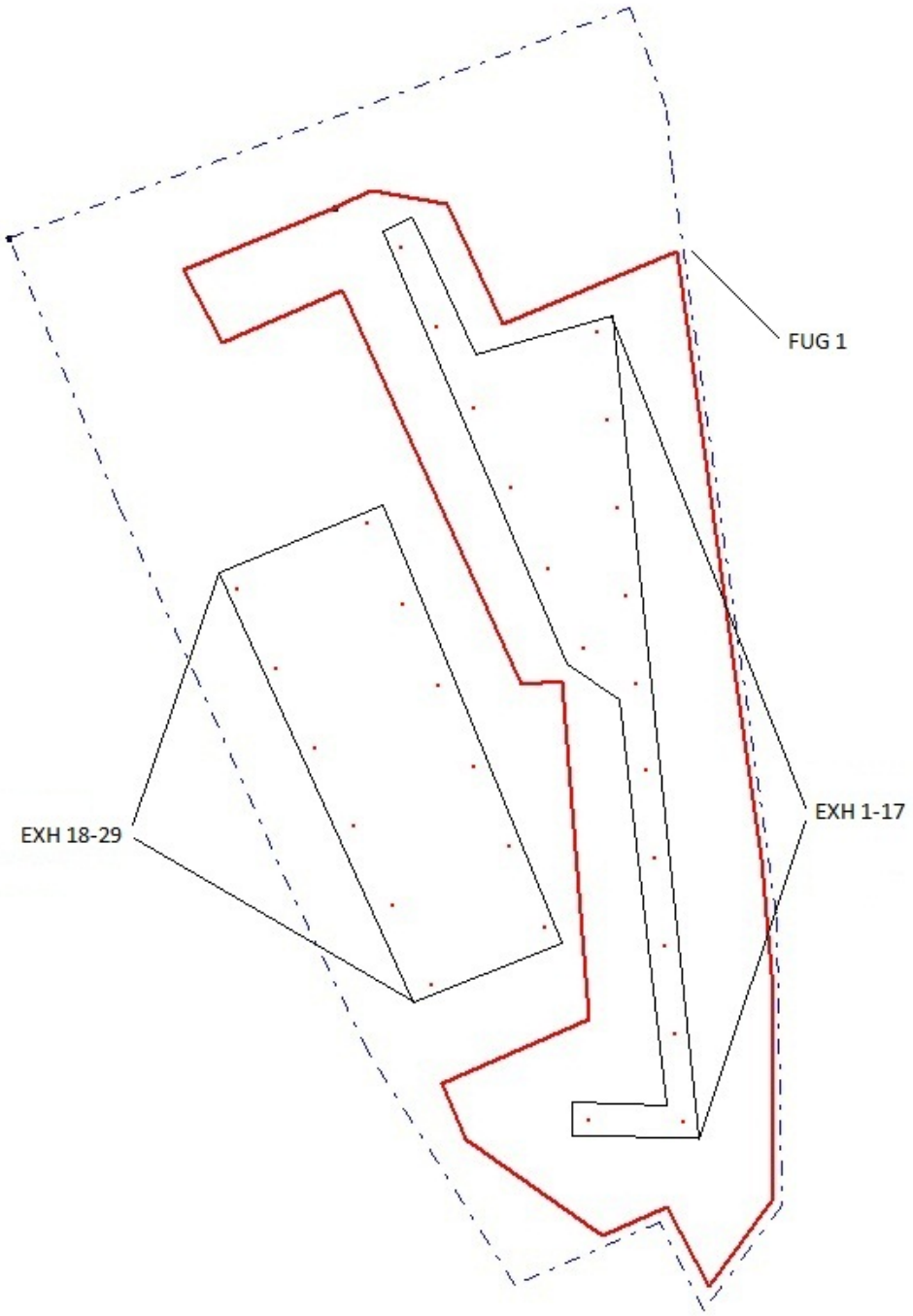
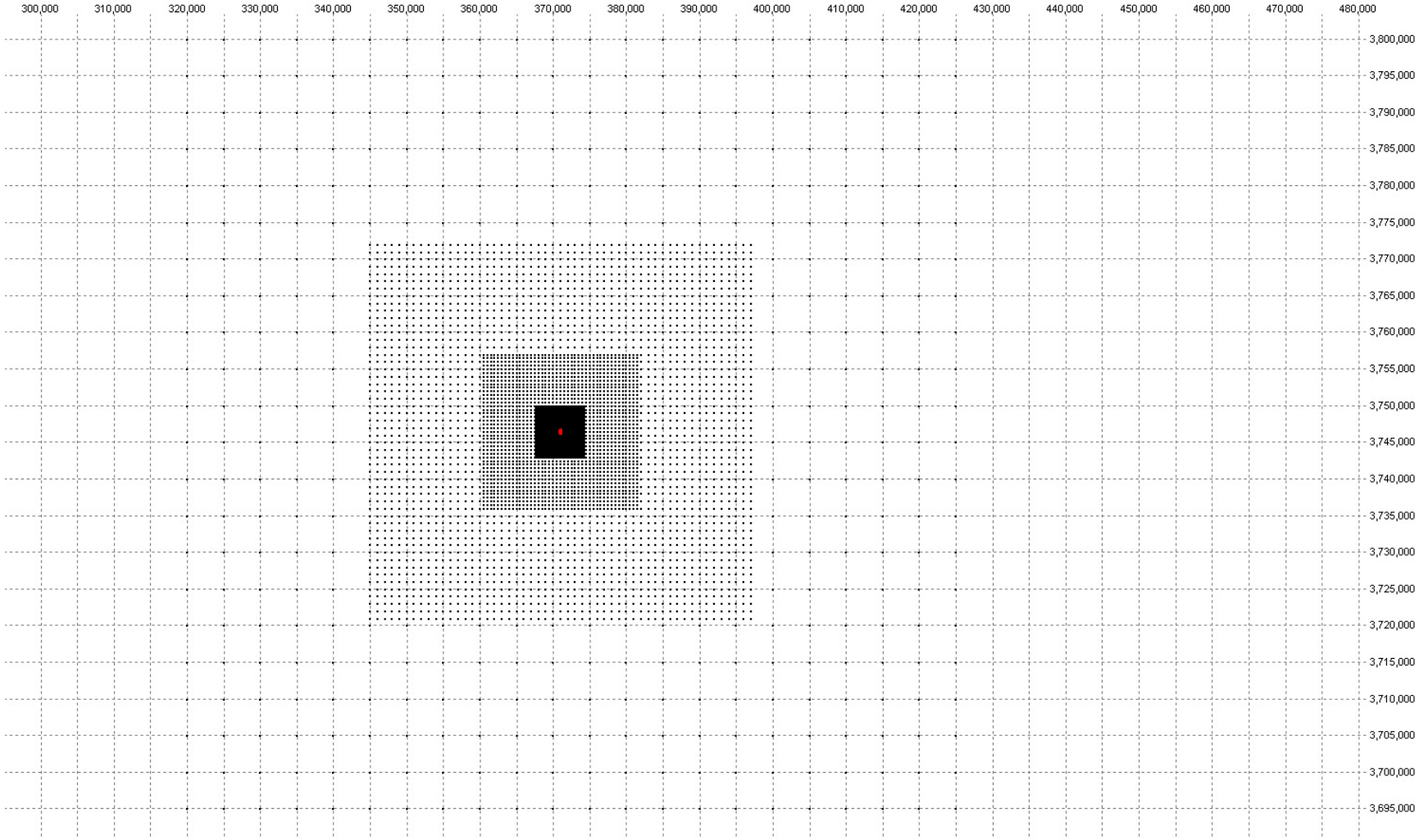
Redondo Beach Energy Project
Figure 5.1C-4
November 2012
Operational Model Setup



Huntington Beach Energy Project
Figure 5.1C-5
June 2012
Operational Coarse and Refined Receptor Grids



Redondo Beach Energy Project
Figure 5.1C-6
November 2012
Construction Model Setup



Redondo Beach Energy Project
Figure 5.1C-7
November 2012
Construction Coarse and Refined Receptor Grids