Appendix 5.11A
Soil Loss Estimates

Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

Redondo Beach Energy Project

			Estimates Using Revised Universal Soil Loss Equation*		
Feature (acreage)	**Activity**	**Duration (months)**	**Soil Loss (tons) without BMPs**	**Soil Loss (tons) with BMPs**	**Soil Loss (tons/yr) No Project**
RBGS Demolition (20.2 acres)	Demolition	36	1.089	0.031	0.0109
RBEP Site (10.5 acres)	Grading	2	1.742	0.023	0.0282
	Construction	34	6.662	0.192	0.0141
Onsite Laydown Areas (16.8 acres total)	Grading	2	2.800	0.036	0.0454
Project Soil Loss Estimates	All activities listed above	60	**12.292**	**0.283**	---

Notes:

*Soil losses (tons/acre/year) are estimated using RUSLE2 software available on line [http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm].

- The soil characteristics were estimated using a generic sand soil profile in RUSLE2 that corresponded roughly to the Delhi sand series description.
- Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the nearest National Weather Service station to the RBEP site [on line at http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html].
- Estimates of actual soil losses use the RUSLE2 soil loss times the duration and the affected area. The No Project Alternative estimate does not have a specific duration so loss is given as tons/year.

Other Project Assumptions as follows:

- Of the entire 50-acre property, only the RBEP site and the onsite laydown areas will be graded (27.3 acres total)
- Assumes only 50 percent of the RBEP site is exposed during construction and only 20 percent of RBGS is exposed during demolition.
- The RBGS demolition will take 36 months to complete. The soil loss estimate only includes the demolition of the structures to their foundations.
- The 2.23-acre switchyard will remain as it is currently with no land disturbance.
- The onsite laydown areas will be immediately covered with gravel after grading and so further soil losses are considered to be negligible.

RUSLE2 Assumptions as follows:

100-ft slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class.

Construction soil losses assume the following inputs: Management - Bare ground; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Grading soil losses assume the following inputs: Management - Bare ground/rough surface; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Construction with BMP soil losses assume the following inputs: Management - Silt fence; Contouring - Perfect, no row grade; Diversion/terracing - None; Strips and Barriers - 2 fences, 1 at end of RUSLE slope.

No Project soil losses assume the following inputs: Management - Dense grass, not harvested; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Soil Loss Estimates Using RUSLE2 software (tons/ac/year)

Redondo Beach Energy Project

Soil Type	Acreage	Slope	Grading	Construction w/o BMPs	Construction with BMPs	No Project
RBEP Site	10.5	0.5	1.0	0.45	0.013	0.0027
			10.4500	4.7025	0.1359	0.0282
Laydown Areas	16.8	0.5	1.0	0.45	0.013	0.0027
			16.8000	None	0.2184	0.0454
Demolition Area	20.2	0.5	1.0	0.45	0.013	0.0027
			None	1.8144	0.0524	0.0544
subtotal			**27.250**	**6.517**	**0.188**	**0.128**

Assumptions:

Assumes a 0.5 percent slope overall

- Of the entire 50-acre property, only the RBEP site and the onsite laydown areas will be graded (27.3 acres total)
- The RBGS demolition will take 36 months to complete. The soil loss estimate only includes the demolition of the structures to their foundations.
- The 2.23-acre switchyard will remain as it is currently with no land disturbance.
- The onsite laydown areas will be immediately covered with gravel after grading and so further soil losses are considered to be negligible

RUSLE2 Assumptions as follows:

100-ft slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class.

Construction soil losses assume the following inputs: Management - Bare ground; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Grading soil losses assume the following inputs: Management - Bare ground/rough surface; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Construction with BMP soil losses assume the following inputs: Management - Silt fence; Contouring - Perfect, no row grade; Diversion/terracing - None; Strips and Barriers - 2 fences, 1 at end of RUSLE slope.

No Project soil losses assume the following inputs: Management - Dense grass, not harvested; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Estimate of Total Suspended Particulates (TSP) Emitted from Grading and Wind Erosion

Redondo Beach Energy Project

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
Project Site	10.5	2	4.598	1.609
Laydown Areas	16.8	2	7.392	2.587
RBGS Demolition	20.2	0	0.000	0.000
Wind Blown Dust:				
Project Site	5.2	34	5.626	1.969
Laydown Areas	16.8	0	0.000	0.000
RBGS Demolition	4.0	36	4.596	1.609
Estimated Total			22.212	7.774

Notes:

Wind blown dust estimates are based on assumption of 50 percent exposed soils for RBEP site and 20 percent exposed soils for RBGS demolition.

Project Assumptions:

- Of the entire 50-acre property, only the RBEP site and the onsite laydown areas will be graded (27.3 acres total)
- Assumes only 50 percent of the RBEP site is exposed during construction and only 20 percent of RBGS is exposed during demolition.
- The RBGS demolition will take 36 months to complete. The soil loss estimate only includes the demolition of the structures to their foundations.
- The 2.23-acre switchyard will remain as it is currently with no land disturbance.
- The onsite laydown areas will be immediately covered with gravel after grading and so further soil losses are considered to be negligible.

Data Sources:

[a]Emission Factor Source: Jones and Stokes Associates, 2007. URBEMIS2007, available at http://www.urbemis.com/software/download.html.

[b] Conversion Factor Source: Southern California Air Quality Management District (SCAQMD). 1993. CEQA Guidelines, Estimating Emissions from Wind Erosion of Storage Piles (Table A9-9-E)

[c] Emission Control Efficiency Source: SCAQMD. 1993. CEQA Guidelines (Table 11-4)

Dust from Wind Erosion - With and Without Mitigation
Redondo Beach Energy Project

Grading		
PM10 Emission Factor (ton/acre/month)[a]	0.11	PM10 emission factor from URBEMIS2007 per email on 5/31/12 from Elyse Engel/SJC. MRI factor of 0.011 tons/acre/month is based on 168 hours per month of construction activity.
Project Site		
Duration (months):	2	Assumes 2 months of active grading in the project site area.
Site Acreage:	10.45	
PM10 Emitted (tons):	2.30	
TSP Emitted (tons)[b]:	**4.598**	Assume TSP is 50% PM10 as per 5/31/12 email from Elyse Engel/SJC. Source: SCAQMD CEQA Handbook (1993) Table A9-9-E, Factor
Mitigated TSP Emitted (tons):	**1.609**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Laydown Areas (Northern and Southeastern)		
Duration (months):	2	Assumes two months to grade
Site Acreage:	16.80	
PM10 Emitted (tons):	3.70	
TSP Emitted (tons)[b]:	**7.392**	Assume TSP is 50% PM10 as per 5/31/12 email from Elyse Engel/SJC. Source: SCAQMD CEQA Handbook (1993) Table A9-9-E, Factor
Mitigated TSP Emitted (tons):	**2.587**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
RBGS Demolition		
Duration (months):	0.0	Assumes no grading as part of demolition
Site Acreage:	4.03	Assumes no more than 20% of total area is exposed at any time
PM10 Emitted (tons):	0.000	
TSP Emitted (tons)[b]:	**0.000**	assume TSP is 50% PM10 as per 5/31/12 email from Elyse Engel/SJC. Source: SCAQMD CEQA Handbook (1993) Table A9-9-E, Factor
Mitigated TSP Emitted (tons):	**0.000**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Total Unmitigated TSP Emitted (tons):	**11.990**	
Total Mitigated TSP Emitted (tons):	**4.197**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4

[a]Emission Factor Source: Jones and Stokes Associates, 2007. URBEMIS2007, available at http://www.urbemis.com/software/download.html

[b] Conversion Factor Source: Southern California Air Quality Management District (SCAQMD). 1993. CEQA Guidelines, Estimating Emissions from Wind Erosion of Storage Piles (Table A9-9-E

[c] Emission Control Efficiency Source: SCAQMD. 1993 CEQA Guidelines (Table 11-4

Wind Blown Dust		
TSP Emission Factor (ton/acre/year)	0.38	Emission Factor Source: AP-42, Section 11.9 Western Surface Coal Mining Table 11.9-4, January 1995
Project Site		
Acres exposed	5.225	Assumes 50 percent of the site is bare soil during the entire 30 month construction period
Duration (months)	34	Assumes 34 months of construction for the Project site area after 2 months of grading. Total construction window of 36 months begininning 1 quarter of 2017 to last quarter of
TSP Emitted for Site (tons):	**5.626**	
Mitigated TSP Emitted (tons):	**1.969**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Laydown Areas (Northern and Southeastern)		
Acres exposed	16.800	
Duration (months)	0	Assumes the laydown areas are covered with gravel immediately after grading so wind erosion will be considered near zero
TSP Emitted for Site (tons):	**0.000**	
Mitigated TSP Emitted (tons):	**0.000**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
RBGS Demolition		
Duration (months):	36	Assumes 36 months of demolition as follows: Units 1-4 January 2016 thru Dec 2016; Units 5-6 Jan 2019 thru Dec 202
Site Acreage:	4.032	Assumes no more than 20 percent of the site is exposed at any one time during demolition
TSP Emitted (tons)[b]:	**4.596**	
Mitigated TSP Emitted (tons):	**1.609**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Total (tons) without mitigation	**10.222**	
Total (tons) with mitigation	**3.578**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4

Project: RBEP: S.Long Updated areas on 10/29/12 as per email from Sarah Madams

Linear Features Revised by Steve Long as per measurements given by Source: Acreage calculations.pdf by Gary Perdew dated 4/16/2012;
later revised by Karen Mino in figure dated October 25, 2012

OBJECTID	Description	MUSYM	MUNAME	Acreage	Description	Approximate acreage used for calc (as per direction from slm on 5/29/12)
1	RBEP Site	S1028	Urban Land-Delhi	6.55	Northern laydown	On 10/29, Sarah confirmed it was OK to use the acreages and significant figures as reported in tl
				2.23	Switch yard (no changes)	
				10.45	Project Site	10.45
				20.16	Demolition Area	20.16
				10.25	SE Laydown	
				49.64	total	
				27.25	total for grading	
				27.25	round up	
				16.8	laydown areas only	16.8