DOCKETED

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Appendix 5.11A
Soil Loss Calculations

Table 5.11-4. Estimate of Total Suspended Particulates (TSP) Emitted from Grading and Wind Erosion

Table 5.11-3. Estimate of Total Suspended Particulates (TSP) Emitted from Grading and Wind Erosion				
Emission Source	**Acreage**	**Duration (months)**	**Unmitigated TSP (tons)**	**Mitigated TSP (tons)**
Grading Dust:				
Project Site	9.79	6	1.01	0.35
Project Site Laydown Area	2.89	0	0.00	0.00
Transmission Line (Pole Holes)	0.025	12	0.005	0.002
Natural Gas Pipeline (4 ft wide trench)	1.16	6	0.12	0.04
Process Water Supply Line (4 ft wide trench)	0.83	6	0.09	0.03
Wind Blown Dust:				
Project Site	9.79	18	4.18	1.46
Project Site Laydown Area	2.89	24	0.00	0.00
Transmission Line (Corridor)	4.3	18	2.46	0.86
Natural Gas Pipeline (Corridor)	10.91	12	4.15	1.45
Process Water Supply Line (Corridor)	7.74	12	2.94	1.03
Estimated Total		**24**	**14.9**	**5.2**

Notes:
All linear feature impacts noted above are for portions outside of the project areas footprints.

Project Assumptions:
Grading for the project site will be completed in an 6 month period and construction will extend an additional 18 months.
75% of the project site will have bare soil exposure during the length of the construction period.
The project site laydown area will not be graded. It is assumed that the project site laydown area is currently covered with asphalt and will remain that way for the duration of project construction.
Excavation of transmission line pole holes will take 12 months followed by an 18 month construction period.
The transmission poles will have a 4 by 4 foot area for a total impact permanent area of 0.025 acre.
The natural gas line and process water supply line will be installed in a 4-ft trench with a 75-ft construction corridor.
The natural gas and process water supply trenches will be 100% exposed during the excavation period, with permenant vegetation restored after installation.
The 75-ft construction corridors will remain in natural vegetation, with approximately 10% bare soil exposed.

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)

Project: Mission Rock Energy Center Updated 10/08/2015 JLK

Dust from Wind Erosion - With and Without Mitigation

Grading		MRI factor of 0.011 tons/acre/month is based on 168 hours per month of construction activity.
PM10 Emission Factor (ton/acre/month)[a]	0.011	Fact Sheet, 4/26/2007.
Project Site		
Duration (months):	6	Assumes 6 months of grading before project construction.
Site Acreage:	9.79	
PM10 Emitted (tons):	0.65	
TSP Emitted (tons)[b]:	**1.009**	assume TSP is 64% PM10
Mitigated TSP Emitted (tons):	**0.353**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Project Site Laydown Area		
Duration (months):	0	Assumes site is already level and covered with asphalt. No project grading required.
Site Acreage:	0.00	
PM10 Emitted (tons):	0.00	
TSP Emitted (tons)[b]:	**0.000**	assume TSP is 64% PM10
Mitigated TSP Emitted (tons):	**0.000**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Transmission Line Pole Holes		
Duration (months):	12	Assumes pole holes unprotected until pole installed.
Site Acreage:	0.0250	
PM10 Emitted (tons):	0.0033	
TSP Emitted (tons)[b]:	**0.0052**	assume TSP is 64% PM10
Mitigated TSP Emitted (tons):	**0.0018**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Natural Gas Pipeline Trench		
Duration (months):	6	Assumes trench unprotected until pipe installed.
Site Acreage:	1.16	
PM10 Emitted (tons):	0.08	
TSP Emitted (tons)[b]:	**0.120**	assume TSP is 64% PM10
Mitigated TSP Emitted (tons):	**0.042**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Process Water Supply Line Trench		
Duration (months):	6	Assumes trench unprotected until pipe installed.
Site Acreage:	0.83	
PM10 Emitted (tons):	0.05	
TSP Emitted (tons)[b]:	**0.085**	assume TSP is 64% PM10
Mitigated TSP Emitted (tons):	**0.030**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Total Unmitigated TSP Emitted (tons):	**1.220**	
Total Mitigated TSP Emitted (tons):	**0.427**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4

[a]Emission Factor Source: Midwest Research Institute, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure

[b] Conversion Factor Source: Bay Area Air Quality Management District (BAAQMD) BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans. December 1999

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	7.34	Assumes 75% unprotected during project construction because of asphalt removal and raising of project site via imported fill.
Duration (months)	18	
TSP Emitted for Site (tons):	**4.184**	
Mitigated TSP Emitted (tons):	**1.464**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Project Site Laydown Area		
Acres exposed	0.0	Assumes laydown area is covered in asphalt and will remain that way for the duration of use.
Duration (months)	24	
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
Transmission Line Corridor		
Acres exposed	4.31	Assumes construction will occur in phases, therefore only 10% of the construction corridor will be unprotected at any one time.
Duration (months)	18	
TSP Emitted for Site (tons):	**2.456**	
Mitigated TSP Emitted (tons):	**0.860**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Natural Gas Pipeline Corridor		
Acres exposed	10.91	Assumes 1/2 of construction corridor is unprotected (based on current land use and construction).
Duration (months):	12	
TSP Emitted (tons)[b]:	**4.146**	
Mitigated TSP Emitted (tons):	**1.451**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Process Water Supply Line Corridor		
Acres exposed	7.742	Assumes 1/2 of construction corridor is unprotected (based on current land use and construction).
Duration (months):	12	
TSP Emitted (tons)[b]:	**2.942**	
Mitigated TSP Emitted (tons):	**1.030**	Assume 65% reduction in TSP with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4
Total Wind Blown Dust (tons) without mitig	**13.728**	
Total WBD (tons) with mitigation	**4.805**	Assume 65% reduction in PM10 with watering thrice daily per SCAQMD CEQA Handbook (1993) Table 11-4

Project total without mitigation	**14.947**
Project total with mitigation	**5.232**

Table 5.11-3. Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

Table 5.11-2. Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

Feature (acreage)[2]	Activity	Duration (months)	Estimates Using Revised Universal Soil Loss Equation[1]		
			Soil Loss (tons) without BMPs	Soil Loss (tons) with BMPs	Soil Loss (tons/yr) No Project
Site (9.79 acres)	Grading	6	16.6	0.15	0.0017
	Construction	18	16.1	0.45	---
Site Laydown Area (2.89 acres)	Grading	0	0.0	0.0	0.0000
	Construction	24	0.0	0.0	---
Transmission Line (43.1 acre construction corridor; 0.03 acre for pole footprints)	Grading	12	5.0	12.1	0.0001
	Construction	18	640.3	18.1	---
Natural Gas Pipeline (1.2 acre trench; 21.8 acre construction corridor)	Grading	6	6.5	0.8	0.0006
	Construction	12	56.4	1.6	---
Process Water Supply Line (0.83 acre trench; 15.5 acre construction corridor)	Grading	6	1.1	0.1	0.0002
	Construction	12	8.7	0.2	---
Project Soil Loss Estimates	**Construction Period**	**24**	**750.6**	**33.6**	**0.0027**

Notes:

1. Soil losses (tons/acre/year) are estimated using RUSLE2 software available online [http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm].
   -The soil characteristics were estimated using RUSLE2 soil profiles corresponding to the mapped NRCS soil unit.
   -Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the MREC project site found at [http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ca].
   -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.
2. Transmission line acreages assume a 50 ft wide construction corridor. The transmission line pole holes each have a 4 ft by 4 ft excavation footprint.
3. Pipeline acreages assume a 75 ft wide corridor with a 4 ft wide trench.

Other Project Assumptions as follows:

-It is assumed that 100% of the MREC project site will be exposed during grading, and approximately 75% of the site will be bare soil during construction.
-It is assumed that the project site laydown area is completely covered with asphalt, and will remain as such for the duration of the project.
-It is assumed that grading the project site will take 6 months and construction will take an additional 18 months.
-It is assumed that grading/excavation of the natural gas pipeline will take 6 months and construction will take a total of 12 months.
-It is assumed that grading/excavation of the process water supply line will take 6 months and construction will take a total of 12 months.
-It is assumed that the grading/excavation for the transmission line pole holes will take 12 months, and the entire installation will be completed within 18 months.
-It is assumed that the transmission line will be completed in ten segments, each of which shall be stabilized with erosion protection measures upon completion.

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 Type	Acreage		Soil Loss Estimates Using RUSLE2 software (tons/ac/year)			
		Slope	Grading	Construction w/o BMPs	Construction with BMPs	No Project
Project Site						
MeA	5.40	1.0	3.7	1.6	0.045	0.000041
MfA	2.99	1.0	3.7	1.6	0.045	0.00041
PcA	1.40	1.0	1.5	0.65	0.019	0.00018
		Subtotal (tons)	**33.14**	**10.75**	**0.30**	**0.00170**
Site Laydown Area						
PcA	0.95	1.0	1.5	0.65	0.019	0.00018
MfA	1.94	1.0	3.7	1.6	0.045	0.00041
		Subtotal	**0.0**	**0.0**	**0.0**	**0.0**
Transmission Line						
AcC	0.0003	5.5	21	8.8	0.25	0.00078
AsF	0.0011	30	16	7.5	0.21	0.00025
AuC2	0.0008	5.5	37	16	0.45	0.0016
AuD	0.0004	12	94	44	1.2	0.0029
CfF2	0.0038	40	450	220	6.2	0.0069
CfG2	0.0002	58	620	300	8.6	0.0088
GaC	0.0008	5.5	37	16	0.45	0.0016
GxG	0.0038	58	530	250	7.2	0.0099
MeA	0.0010	1.0	3.7	1.6	0.045	0.000041
MoA	0.0021	1.0	4.1	1.8	0.051	0.00053
MoC	0.0003	5.5	28	12	0.34	0.0012
MrC	0.0004	5.5	28	12	0.34	0.0012
MsA	0.0007	1.0	3.4	1.5	0.043	0.00044
MsB	0.0003	3.5	14	6.0	0.17	0.00089
PcA	0.0035	1.0	1.5	0.65	0.019	0.00018
ScE2	0.0010	23	130	63	1.8	0.0036
ScF2	0.0017	40	240	120	3.3	0.0055
SvF2	0.0011	40	290	140	3.9	0.0058
SwC	0.0005	5.5	28	12	0.34	0.0012
SxC	0.0006	5.5	32	14	0.39	0.0013
TeF	0.0005	12	94	44	1.2	0.0029
		Subtotal	**5.0**	**426.9**	**12.1**	**0.00010**
Natural Gas Line						
GxG	0.02	58	530	250	7.2	0.0099
MoA	0.45	1.0	4.1	1.8	0.051	0.00053
MrC	0.01	5.5	28	12	0.34	0.0012
MsA	0.39	1.0	3.4	1.5	0.043	0.00044
PcA	0.30	1.0	1.5	0.65	0.019	0.00018
	1.16	**Subtotal**	**13.0**	**56.41**	**1.62**	**0.00064**
Process Water Supply						
MeA	0.13	1.0	3.7	1.6	0.045	0.000041
MoA	0.21	1.0	4.1	1.8	0.051	0.00053
MsA	0.03	1.0	3.4	1.5	0.043	0.00044
PcA	0.45	1.0	1.5	0.65	0.019	0.00018
		Subtotal	**2.13**	**8.71**	**0.25**	**0.00021**

Assumptions:
Slope used in the soil loss calculations is the midpoint of the NRCS slope class.
Project site will be 100% bare soil during grading (due to the addition of fill soil).
Project site laydown area is at the property directly to the northeast of the MREC site.
Project site laydown area is completely covered with asphalt, and will remain as such for the duration of project use.
Project site will be 75% bare soil during the duration of construction.
100% of transmission line pole holes will be bare soil during grading/excavation.
100% of pipeline trenches will be bare soil during grading/excavation.
T-line construction will occur in phases, therefore only 10% of the construction corridors will be bare at any one time.

Variable map units do not have soil loss estimates in RUSLE2. The following assumptions were used for those map units -
Assumed the Balcom component of CfG2 is an adequate substitute for the GxG soil loss estimates (Balcom is a minor component of GxG).
Assumed AuD is an adequate substitute for the TeF soil loss estimates (Azule is a minor component in TeF).

Project: Mission Rock Energy Center **Information Compiled By: Jenny Krenz** **Last updated: 10/08/2015**

0.64

OBJECTID	AREASYMBOL	Length (ft)	Area (sq. ft)	Acres	Total Affected Acreage	
Mission Rock Site	MeA			5.40	5.40	Updated acreage to match plan acreage - per Doug Urry's 10/7/2015 email
	MfA			2.99	2.99	Acres from Karen Mino (email dated 9/15/2015)
	PcA			1.40	1.40	Acres from Karen Mino (email dated 9/15/2015)
					9.79	
					7.34	Assumes 75% bare soil during construction due to removal of asphalt and raising of the project site.
Site Laydown Area	MfA			1.94	**1.94**	Acres from Karen Mino (email dated 10/5/2015)
	PcA			0.95	**0.95**	Acres from Karen Mino (email dated 10/5/2015)
				2.89	**0.00**	Assumes the laydown area is currently covered in asphalt, and will remain that way for the duration of use.
Access to Site	NA			0.00	0.00	Assumes access is via existing paved and graveled roads to the site
Access to Laydown Area	NA			0.00	0.00	Assumes access to laydown area will be via existing paved and graveled roads on the site
			# of poles	**Pole Holes**	**Construction Corridor**	
Transmission Line	AcC	344.80	1	0.0003	**0.554**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length, and 100x100 ft construction corr
	AsF	1496.69	3	0.0011	**2.405**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length, and 100x100 ft construction corr
	AuC2	1023.36	2	0.0008	**1.645**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length, and 100x100 ft construction corr
	AuD	513.63	1	0.0004	**0.825**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length, and 100x100 ft construction corr
	CfF2	5232.42	10	0.0038	**8.408**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length, and 100x100 ft construction corr
	CfG2	246.26	0	0.0002	**0.283**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	GaC	1065.84	2	0.0008	**1.223**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	GxG	5155.48	10	0.0038	**5.918**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	MeA	1391.25	3	0.0010	**1.597**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	MoA	2874.20	6	0.0021	**3.299**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	MoC	452.85	1	0.0003	**0.520**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	MrC	568.07	1	0.0004	**0.652**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	MsA	997.09	2	0.0007	**1.145**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	MsB	418.97	1	0.0003	**0.481**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	PcA	4823.17	10	0.0035	**5.536**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	ScE2	1406.00	3	0.0010	**1.614**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	ScF2	2374.73	5	0.0017	**2.726**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	SvF2	1446.17	3	0.0011	**1.660**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	SwC	730.70	1	0.0005	**0.839**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	SxC	868.27	2	0.0006	**0.997**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
	TeF	665.20	1	0.0005	**0.764**	Assumes 16 sq ft (4 feet x 4 feet) hole for each pole spaced at 500 ft. Assumes 50 ft construction corridor along length. Spacing assumed from previous
		subtotal	**68**	**0.03**	**43.09**	Assumes pole hole footprint unprotected until pole installed
					4.31	Assumes construction will be completed in segments, therefore only 10% of the corridor will be unprotected at any one time during construction

Project Site

Feature	Soil Map Unit	Acres
Project Site	MeA	4.77
Project Site	PcA	1.40
Project Site	MfA	2.99
Project Laydown Area	PcA	0.95
Project Laydown Area	MfA	1.94

updated 10/5 per Karen Mir

Linear Features

Feature	Soil Map Unit	Length (ft)
Generator Tie-Line	AcC	344.80
Generator Tie-Line	AsF	1496.69
Generator Tie-Line	AuC2	1023.36
Generator Tie-Line	AuD	513.63
Generator Tie-Line	CfF2	5232.42
Generator Tie-Line	CfG2	246.26
Generator Tie-Line	GaC	1065.84
Generator Tie-Line	GxG	5155.48
Generator Tie-Line	MeA	1391.25
Generator Tie-Line	MoA	2874.20
Generator Tie-Line	MoC	452.85
Generator Tie-Line	MrC	568.07
Generator Tie-Line	MsA	997.09
Generator Tie-Line	MsB	418.97
Generator Tie-Line	PcA	4823.17
Generator Tie-Line	ScE2	1406.00
Generator Tie-Line	ScF2	2374.73
Generator Tie-Line	SvF2	1446.17
Generator Tie-Line	SwC	730.70
Generator Tie-Line	SxC	868.27
Generator Tie-Line	TeF	665.20

Feature	Soil Map Unit	Length (ft)
Natural Gas Pipeline	GxG	188.83
Natural Gas Pipeline	MoA	4900.68
Natural Gas Pipeline	MrC	82.95
Natural Gas Pipeline	MsA	4259.79
Natural Gas Pipeline	PcA	3240.74

Updated route/acreage 10/7/2015 per Karen Mino

12672.99 2.400187

Feature	Soil Map Unit	Length (ft)
Process Water Supply Line	MeA	1391.25
Process Water Supply Line	MoA	2301.84
Process Water Supply Line	MsA	351.08
Process Water Supply Line	PcA	4948.42

List of Map Units	
AcC	x
AsF	x
AuC2	x
AuD	x
Cd	x
CfF2	x
CfG2	x
GaC	x
GxG	NA
MeA	x
MfA	x
MoA	x
MoC	x
MrC	x
MsA	x
MsB	x
PcA	x
ScE2	x
ScF2	x
SvF2	x
SwC	x
SxC	x
TeF	NA

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Slope Class	Midpoint				
2-9%	5.5	30-50%	40	15-30%	22.5
9-50%	29.5	50-65%	57.5		
9-15%	12	2-5%	3.5		