

Air Quality Dispersion Modeling Summary for Permit No. 3295-M1

Project: Mesa Verde Crusher

Township: 15S Range: 10E Section: 27 County: Otero

UTM Coordinates: 409865 m East 3649418 m North Zone: 13 Datum: NAD83 Elevation 4225 feet

Brief:

Mesa Verde Enterprises desires to modify the current permit for its Mesa Verde Crushing Plant near La Luz in Otero County, NM. The purpose of the modification is to add new equipment and remove the setback distance requirement from the permit conditions by classifying the facility as permanently located. The new equipment consists of a diesel crusher engine, three mine conveyors, a feeder with under-conveyor (dry plant), and three dewatering screens (wet plant). In addition to the new equipment the facility is proposing to increase allowable wet plant operating days to 7 days per week (daylight hours only) and increase the facility maximum transport rate from 4,000 tons per day to 6,000 tons per day.

Modeling Assumptions:

NONE

Permit Conditions:

Operating hours are to be from 7:00 AM to 5:00 PM, daylight hours only.

Conclusion:

This modeling analysis demonstrates that normal operation of the facility does not cause or significantly contribute to any exceedances of applicable air quality standard. The standards relevant at this facility are NMAAQs for CO, SO₂, NO₂, and TSP and NAAQS for SO₂, PM 2.5 and PM10.

Action:

The permit can be issued based on this modeling analysis.

Modeling submitted by Golder Associates Inc., dated May 3rd, 2011. The air quality analysis does demonstrate compliance with applicable regulatory requirements.

Model(s)

AERMOD was used in all model runs.

Note: Complete modeling input and output files can be made available and are located on the computer Magneto in the directory ModelingArchives\3295-M1_Mesa Verde_Crushing Plant in the files AQB.zip and Cons.zip.

Number of Model

A total of eleven (11) model runs were made for this facility. There were six (6) ROI runs and five (5) cumulative runs.

Facility Sources

Table 1a: Table of Point Emissions and Stack Parameters:

Source ID	Description	UTMH (m)	UTMV (m)	Elevation (m)	Height	Temp (K)	ExitVel	Dia (m)	TSP (lbs/hr)	PM10 (lbs/hr)	PM25 (lbs/hr)	NOx (lbs/hr)	SO2 (lbs/hr)	CO (lbs/hr)
EG1		410080	3649610	1408.84	6.02	765.928	27.2735	0.305	5.3969	5.3969	3.7223	18.4765	0.3095	4.2382
NG2		409946	3649856	1405.84	4.4	779.15	71.339	0.152	0.1429	0.1190	0.0952	2.8334	0.8730	2.4762

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Table 1c: Table of Volume Emissions and Stack Parameters:

Source ID	Description	UTMH (m)	UTMV (m)	Elevation (m)	RelHgt (m)	Hor. σ (m)	Vert. σ (m)	TSP (lbs/hr)	PM10 (lbs/hr)	PM25 (lbs/hr)	H2S (lbs/hr)
ESC1		410046	3649615	1408.00	5.12	1.16	4.76	0.08730	0.02381	0.00794	
ESC1A		410043	3649614	1408.00	5.12	0.47	2.38	0.08730	0.02381	0.00794	
ESC1B		410042	3649614	1408.00	1.50	0.47	0.70	0.08730	0.02381	0.00794	
ESC1C		410053	3649615	1408.00	0.36	0.47	0.17	0.08730	0.02381	0.00794	
EC1		410051	3649614	1408.00	0.94	0.47	0.44	0.08730	0.02381	0.00794	
EC2		410076	3649635	1409.00	2.59	0.47	1.20	0.08730	0.02381	0.00794	
EC4		410082	3649617	1409.00	6.76	0.47	3.14	0.08730	0.02381	0.00794	
ECR1		410082	3649617	1409.00	6.76	1.16	6.29	0.72223	0.32540	0.06032	
ECR1A		410082	3649617	1409.00	6.76	0.47	3.14	0.08730	0.02381	0.00794	
ECR2		409942	3649855	1406.00	4.11	1.16	3.83	0.72223	0.32540	0.06032	
EC5		410082	3649633	1409.00	5.28	0.47	2.45	0.08730	0.02381	0.00794	
EC6		410085	3649634	1409.00	1.66	0.47	0.77	0.08730	0.02381	0.00794	
EC7		410073	3649634	1409.00	1.59	0.47	0.74	0.08730	0.02381	0.00794	
EC7A		410085	3649634	1409.00	6.32	0.47	2.94	0.08730	0.02381	0.00794	
EC8		410073	3649617	1409.00	5.71	0.47	2.66	0.08730	0.02381	0.00794	
EC9		410063	3649633	1408.00	5.10	0.47	2.37	0.08730	0.02381	0.00794	
ESC2		410082	3649633	1409.00	5.28	1.16	4.91	0.08730	0.02381	0.00794	
ESC2A		410085	3649634	1409.00	1.66	0.47	0.77	0.08730	0.02381	0.00794	
EMC1		410044	3649616	1408.00	6.29	0.47	2.93	0.08730	0.02381	0.00794	
EMC2		410043	3649646	1408.00	6.53	0.47	3.04	0.08730	0.02381	0.00794	
EMC3		410041	3649675	1408.00	8.10	0.47	3.77	0.08730	0.02381	0.00794	
EMC4		410040	3649704	1408.00	1.95	0.47	0.91	0.08730	0.02381	0.00794	
EMC5		410039	3649734	1408.00	2.68	0.47	1.25	0.08730	0.02381	0.00794	
EMC6		410038	3649763	1408.00	2.60	0.47	1.21	0.08730	0.02381	0.00794	
EMC7		410037	3649793	1408.00	2.70	0.47	1.25	0.08730	0.02381	0.00794	
EMC8		410036	3649822	1408.00	2.57	0.47	1.20	0.08730	0.02381	0.00794	
EMC9		410086	3649656	1409.00	2.43	0.47	1.13	0.08730	0.02381	0.00794	
EMC10		410040	3649630	1408.00	1.46	0.47	0.68	0.08730	0.02381	0.00794	
EMC10A		410042	3649615	1408.00	1.51	0.47	0.70	0.08730	0.02381	0.00794	
EFEED2		410035	3649851	1408.00	1.78	1.16	0.83	0.08730	0.02381	0.00794	
EFEED1		410029	3649616	1407.00	1.37	1.16	0.64	0.08730	0.02381	0.00794	
EC3		410011	3649615	1407.00	6.52	0.47	3.03	0.08730	0.02381	0.00794	
PILEM9		410112	3649668	1410.00	8.90	0.47	4.14	1.30955	0.63493	0.07937	
PILEC2		410071	3649652	1409.00	5.64	0.47	2.62	1.30955	0.63493	0.07937	

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Table 1c: Table of Volume Emissions and Stack Parameters:

Source ID	Description	UTMH (m)	UTMV (m)	Elevation (m)	RelHgt (m)	Hor. σ (m)	Vert. σ (m)	TSP (lbs/hr)	PM10 (lbs/hr)	PM25 (lbs/hr)	H2S (lbs/hr)
PILEM10		410040	3649633	1408.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
NFEED3		410089	3649638	1409.00	1.66	1.16	0.77	0.08730	0.02381	0.00794	
NMC11		409943	3649854	1406.00	2.44	0.47	1.13	0.08730	0.02381	0.00794	
NMC12		409974	3649855	1406.00	2.44	0.47	1.13	0.08730	0.02381	0.00794	
NMC13		410004	3649855	1407.00	2.08	0.47	0.97	0.08730	0.02381	0.00794	
Haul Rd 4-44 (each)		409853	3649063	1403.00	4.00	6.51	3.72	0.18073	0.04610	0.00463	
PILE1		410017	3649525	1407.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE2		410509	3649291	1418.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE3		410472	3649482	1417.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE4		410208	3649462	1412.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE5		410311	3649616	1414.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE6		410527	3649649	1418.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE7		410174	3649776	1411.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
PILE8		410470	3649835	1417.00	9.00	0.47	4.19	1.30955	0.63493	0.07937	
ECR2A		409942	3649855	1406.00	4.11	0.47	1.91	0.08730	0.02381	0.00794	
ECR2B		409943	3649854	1406.00	2.44	0.47	1.13	0.08730	0.02381	0.00794	
NFEED3A		410089	3649638	1409.00	1.66	1.16	0.77	0.08730	0.02381	0.00794	

Modeling Parameters:

All regulatory default options in AERMOD were used for these model runs. The use of stack-tip downwash, the calms and missing data processing routines, and default wind profile exponents were used. Building downwash produced by buildings at the facility was not considered. The rural dispersion land use option was used.

Complex Terrain

Both simple and complex types of terrain were used to model the facility. Elevations of receptors and surrounding sources were obtained from the National Elevation Dataset available from the USGS website.

Receptor Grid:

A nested Cartesian grid was used in all modeling for the facility. For ROI modeling the grid starts at the fenceline with 50m spacing continuing with 100m spacing out to 1000m, 250m spacing out to 3km, 500m spacing out to 5km, and ending with 1000m spacing out to 10km. Pollutants with impacts greater than significance were remodeled with surrounding sources using only those receptors above the ROI significance level.

MET Data:

The Holman Road MET dataset collected by AQB in 1997 was used for all modeling. HOLMANRD_97

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Adjacent Sources:

Sixty five (65) surrounding sources were used in the cumulative model runs.

Modeling Procedures:

First all pollutants were modeled for the facility alone to determine the ROI for each one. NO₂, PM_{2.5}, PM₁₀, and TSP were above significance levels so were then modeled with surrounding sources for cumulative NMAAQs and NAAQS. NO₂ and PM₁₀ were then modeled for Class I and Class II PSD analysis.

NAAQS and

Compliance with the annual and 24-hr NO₂, TSP, PM₁₀, and PM_{2.5}, 1-hr and 8hr CO, and 3-hr, 24-hr, and annual SO₂ standards have been demonstrated as detailed in Table 2.

PSD Class I

The nearest PSD Class I area is White Mountain Wilderness, which is located just over 49km from the facility. The facility was modeled with surrounding sources and found to meet Class I standards for NO₂ and PM₁₀ as detailed in table 2.

PSD Class II increment:

Minor source baseline dates have been triggered in AQCR 153 so PSD Class II modeling is required if pollutants are above significance levels. The pollutants subject to PSD Class II increment analysis at this facility are NO₂ and PM₁₀ and they were found to be below Class II standards as detailed in table 2.

Results /

The analysis demonstrates that ambient impacts do not exceed applicable state and federal standards for annual and 24hr NO₂, TSP, PM₁₀, and PM_{2.5}, 1hr and 8hr CO, and 3hr, 24hr, and annual SO₂ standards. Results are detailed in Table 2.

Setback Distance:

NA

Table 2: Ambient Impact from Emissions

Pollutant	Contributing Sources	Avg'ing Period	Concentration (ug/m3)	Receptor Elevation (m)	UTMH (m)	UTMV (m)	Distance From Site (m)	Radius of Impact (km)	Applicable Standard	Value of Standard	Units of Standard	Percentage of Standard
CO	Alone	1-hour	34.39	1403.9	409854	3650087	669	0.00	Significance	2000.00	ug/m3	1.7
CO	Alone	8-hour	9.64	1410.9	410150	3649286	314	0.00	Significance	500.00	ug/m3	1.9
SO ₂	Alone	3-hour	5.98	1405.1	409950	3650086	673	0.00	Significance	25.00	ug/m3	23.9
SO ₂	Alone	24-hour	1.00	1401.8	409709	3649901	508	0.00	Significance	5.00	ug/m3	20.0
SO ₂	Alone	annual	0.22	1406.0	410046	3650085	691	0.00	Significance	1.00	ug/m3	22.5
NO ₂	Alone	24-hour	6.31	1410.9	410150	3649286	314	0.79	NMAAQs	160.77	ug/m3	3.9
NO ₂	Alone	annual	1.39	1410.9	410150	3649286	314	0.79	NMAAQs	80.39	ug/m3	1.7
NO ₂	ALL	24-hour	19.51	1412.1	410287	3650082	787	0.79	NMAAQs	160.75	ug/m3	12.1
NO ₂	ALL	annual	7.96	1409.1	410191	3650083	741	0.79	NMAAQs	80.40	ug/m3	9.9

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Table 2: Ambient Impact from Emissions

Pollutant	Contributing Sources	Avg'ing Period	Concentration (ug/m3)	Receptor Elevation (m)	UTMH (m)	UTMV (m)	Distance From Site (m)	Radius of Impact (km)	Applicable Standard	Value of Standard	Units of Standard	Percentage of Standard
NO2	PSD	annual	7.96	1409.1	410191	3650083	741	0.79	PSD Class II	25.00	ug/m3	31.8
NO2	PSD	annual	0.03	2118.1	442000	3705700	64770	0.00	PSD Class I	2.50	ug/m3	1.1
PM2.5	Alone	24-hour	3.26	1410.9	410150	3649286	314	0.90	NAAQS	35.00	ug/m3	9.3
PM2.5	Alone	annual	0.84	1417.9	410528	3649661	706	0.90	NAAQS	15.00	ug/m3	5.6
PM2.5	ALL	24-hour 1st	22.13	1407.0	410094	3650084	704	0.90	NAAQS	35.00	ug/m3	63.2
PM2.5	ALL	annual	9.09	1406.0	410046	3650085	691	0.90	NAAQS	15.00	ug/m3	60.6
PM10	Alone	24-hour 1st	28.24	1417.6	410517	3649284	666	1.81	NAAQS	150.00	ug/m3	18.8
PM10	Alone	24-hour 2nd	25.45	1417.6	410517	3649284	666	1.81	NAAQS	150.00	ug/m3	17.0
PM10	Alone	annual	5.48	1417.9	410528	3649661	706	1.81	NAAQS	50.00	ug/m3	11.0
PM10	ALL	24-hour 1st	69.99	1407.6	410220	3648528	958	1.81	NAAQS	150.00	ug/m3	46.7
PM10	ALL	annual	27.70	1403.9	410020	3648528	903	1.81	NAAQS	50.00	ug/m3	55.4
PM10	PSD	24-hour 2nd	29.30	1404.5	410020	3650528	1121	1.81	PSD Class II	30.00	ug/m3	97.7
PM10	PSD	annual	6.58	1417.9	410528	3649661	706	1.81	PSD Class II	17.00	ug/m3	38.7
PM10	PSD	24-hour 1st	0.11	2467.1	431900	3695800	51316	0.00	PSD Class I	8.00	ug/m3	1.3
PM10	PSD	annual	0.01	2118.1	442000	3705700	64770	0.00	PSD Class I	4.00	ug/m3	0.3
TSP	Alone	24-hour	80.12	1409.7	410118	3649216	324	4.12	NMAAQs	150.00	ug/m3	53.4
TSP	Alone	month	20.84	1410.9	410150	3649286	314	4.12	NMAAQs	90.00	ug/m3	23.2
TSP	Alone	annual	11.85	1410.9	410150	3649286	314	4.12	NMAAQs	60.00	ug/m3	19.7
TSP	ALL	24-hour	124.69	1407.6	410220	3648528	958	4.12	NMAAQs	150.00	ug/m3	83.1
TSP	ALL	month	51.10	1410.9	410150	3649286	314	4.12	NMAAQs	90.00	ug/m3	56.8
TSP	ALL	annual	41.75	1410.9	410150	3649286	314	4.12	NMAAQs	60.00	ug/m3	69.6

Background concentrations of 7.3 ug/m3 for PM 2.5, 20 ug/m3 for PM10, and 26.6 ug/m3 for TSP have been added to calculate final cumulative concentrations for both 24hr and annual time periods.

75% annual conversion of NOX to NO2 from EPA's Ambient Ratio Method (ARM) applied to calculate concentration.
 NMED's 40% 24-hour conversion of NOX to NO2 applied to calculate concentration.