

Air Dispersion Modeling Summary for Permit No. 9720

Report Date: 11/21/2022

NMED/AQB Modeler: Angela Raso

Facility Identification:

Project: MSCI HMA #3 Company: Mountain States Constructors, Inc

Permit number: 9720 TEMPO ID: 40605

Location Information:

The facility is located 5.4 miles east-southeast of Moriarty, in Tarrant County. The facility is located 7.9 miles northeast of McIntosh.

UTM Coordinates: 411,810 m East, 3,869,800 m North, zone 13, Datum: NAD83

Elevation = 6310 feet

Air Quality Control Region (AQCR): 154

Airshed: Cc

Project Description:

Brief: Mountain States Constructors, Inc has applied to the New Mexico Air Quality Bureau for a New Source Review air quality permit for the construction of the MSCI HMA #3 facility (the facility). The facility is an asphalt plant.

The following types of emission sources are included in the project: Engines, Feeder, Conveyors, Screens, Conveyor Drops, Heater, Loading, Unloading, Baghouse Stack, Transfer, Haul Roads, Plant Generator, Standby Generator, Pug Mill, Storage Pile Handling, Feeder/Hopper, Raw Material Source, Vertical Impact Crusher, and Waste Conveyor. The emission units used in the modeling are described in the tables below.

For this permit, modeling was required for the following pollutants: Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Particulate Matter 2.5 micrometers or less in aerodynamic diameter (PM_{2.5}), Particulate Matter 10 micrometers or less (PM₁₀), and Sulfur Dioxide (SO₂).

Table 1: Table of Total Facility Emissions

NO ₂ Rate (lbs/hr)	CO Rate (lbs/hr)	SO ₂ Rate (lbs/hr)	PM _{2.5} Rate (lbs/hr)	PM ₁₀ Rate (lbs/hr)
43.285	66.906	24.073	12.070	20.896

Air Dispersion Modeling Summary for Permit No. 9720

Table 2: Table of Point Sources

Modeling ID	Application ID	Description	Stack Height (ft)	Diameter (ft)	Velocity (ft/s)	Temp. (°F)	NO ₂ Rate (lbs/hr)	CO Rate (lbs/hr)	SO ₂ Rate (lbs/hr)	PM2.5 Rate (lbs/hr)	PM10 Rate (lbs/hr)
HMASTK	14	HMA Baghouse Stack	23.3	4.2	92.4	270	22.000	51.999	23.200	9.200	9.200
HMAGEN	17	HMA Plant Generator	13.0	1.0	175.5	855	16.755	9.645	0.621	0.551	0.551
HMASGEN	18	HMA Plant Standby Generator	13.0	1.6	8.5	800	0.295	0.364	0.011	0.002	0.002
DRUMUNL	15	HMA Asphalt Silo Loading	13.1	3.3	0.0	350	0	0.884	0	0.323	0.323
HMASILO	16	HMA Asphalt Silo Unloading	19.7	3.3	0.0	350	0	1.011	0	0.328	0.328

Table 3: Table of PointHor Sources

Modeling ID	Application ID	Description	Stack Height (ft)	Diameter (ft)	Velocity (ft/s)	Temp. (°F)	NO ₂ Rate (lbs/hr)	CO Rate (lbs/hr)	SO ₂ Rate (lbs/hr)	PM2.5 Rate (lbs/hr)	PM10 Rate (lbs/hr)
RAPENG	36	RAP Plant Engine	10.0	0.4	308.0	855	3.170	2.200	0.147	0.180	0.180
FNGENG	45	Fold-N-Go Plant Engine	10.0	0.3	200.0	900	0.878	0.616	0.028	0.049	0.049
HMAFILL	13	HMA Mineral Filler Silo Loading	65.0	1.0	10.6	-460	0	0	0	0.006	0.028

Table 4: Table of PointCap Sources

Modeling ID	Application ID	Description	Stack Height (ft)	Diameter (ft)	Velocity (ft/s)	Temp. (°F)	NO ₂ Rate (lbs/hr)	CO Rate (lbs/hr)	SO ₂ Rate (lbs/hr)	PM2.5 Rate (lbs/hr)	PM10 Rate (lbs/hr)
HMAHEAT	19	HMA Asphalt Cement Heater	10.0	1.0	30.0	600	0.187	0.047	0.067	0.019	0.019

Air Dispersion Modeling Summary for Permit No. 9720

Table 5: Table of Volume Sources

Modeling Source ID	Application ID	Description	Release Height (ft)	Horizontal Dimension (ft)	Vertical Dimension (ft)	CO Rate (lbs/hr)	PM2.5 Rate (lbs/hr)	PM10 Rate (lbs/hr)
HMABIN	1	HMA Bin Loading	19.7	3.8	7.6	0	0.081	0.534
HMATP1	2	HMA Bin Unloading	6.6	1.5	3.1	0	0.003	0.01
HMASCR	3	HMA Scalping Screen	13.1	3.8	7.6	0	0.01	0.155
HMATP2	4	HMA Scalping Screen Unloading	6.6	1.5	3.1	0	0.003	0.01
HMAPUG	5	HMA Pug Mill	13.1	3.8	7.6	0	0.003	0.01
HMATP3	6	HMA Pug Mill Unloading	6.6	1.5	3.1	0	0.003	0.01
HMATP4	7	HMA Conveyor Transfer to Drum Conveyor	6.6	1.5	3.1	0	0.003	0.01
RAPBIN	8	HMA RAP Bin Loading	19.7	3.8	7.6	0	0.062	0.407
RAPTP1	9	HMA RAP Bin Unloading	6.6	1.5	3.1	0	0.002	0.007
HMARAPSCR	10	HMA RAP Screen	13.1	3.8	7.6	0	0.008	0.118
RAPTP2	11	HMA RAP Screen Unloading	6.6	1.5	3.1	0	0.002	0.007
RAPTP3	12	HMA RAP Transfer Point	6.6	1.5	3.1	0	0.002	0.007
RAPFEED	21	RAP Feeder/Hopper	19.7	3.8	7.6	0	0.046	0.305
RAPCRSH	22	RAP Vertical Impact Crusher	19.7	3.8	7.6	0	0.1	0.54
RAPCONV1	23	RAP Crusher Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPCONV2	24	RAP Recycle Conveyor #2	6.6	1.5	3.1	0	0.02	0.132
RAPCONV3	25	RAP Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPCONV4	26	RAP Screen Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPSCR	27	RAP 2-Deck Screen	13.1	3.8	7.6	0	0.158	1.044
RAPCONV5	28	RAP Screen Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPCONV6	29	RAP Screen Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPCONV7	30	RAP Screen Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPCONV8	31	RAP Recycle Conveyor #1	6.6	1.5	3.1	0	0.02	0.132
RAPCONV9	32	RAP Waste Conveyor	6.6	1.5	3.1	0	0.02	0.132
RAPCONV10	33	RAP Product Conveyor	6.6	1.5	3.1	0	0.02	0.132

Air Dispersion Modeling Summary for Permit No. 9720

Modeling Source ID	Application ID	Description	Release Height (ft)	Horizontal Dimension (ft)	Vertical Dimension (ft)	CO Rate (lbs/hr)	PM2.5 Rate (lbs/hr)	PM10 Rate (lbs/hr)
RAPSTK1 - RAPSTK2	34	RAP Stacker Conveyor Drop to Pile1	13.1	1.5	3.1	0	0.046	0.305
RAPPILE2	35	RAP Product Storage Pile	8	23.5	7.4	0	0.046	0.305
FNGFEED	37	Fold-N-Go Plant Feeder	19.7	3.8	7.6	0	0.023	0.153
FNGCONV1	38	Fold-N-Go Plant Feeder Conveyor	6.6	1.5	3.1	0	0.01	0.066
FNGSCR	39	Fold-N-Go Plant Screen	13.1	3.8	7.6	0	0.079	0.522
FNGCONV2	40	Fold-N-Go Plant Screen Conveyor	6.6	1.5	3.1	0	0.01	0.066
FNGSTK1	41	Fold-N-Go Plant Stacker Conveyor	6.6	1.5	3.1	0	0.01	0.066
FNGCONV3	42	Fold-N-Go Plant Screen Conveyor	6.6	1.5	3.1	0	0.01	0.066
FNGSTK2	43	Fold-N-Go Plant Stacker Conveyor	6.6	1.5	3.1	0	0.01	0.066
FNGP1 - FNGP2	44	Fold-N-Go Plant Stacker Conveyor Drop to Pile	13.1	1.5	3.1	0	0.024	0.152
HMAPILE1 - HMAPILE6	AGGPPILE	HMA Storage Pile Handling (Total)	8	23.5	7.4	0	0.144	0.942
RAPPILE1	RAPPILE	RAP Raw Material Source	8	23.5	7.4	0	0.046	0.305
HR_0001 - HR_0069	TRCK & YARD	HMA Haul Road Volumes (Total)	11.2	19.8	10.4	0.15	0.276	2.691

Air Dispersion Modeling Summary for Permit No. 9720

Permit Conditions:

The HMA plant may operate 8am-6pm in December and January. The HMA plant may operate a maximum of 12 hours in any 24-hour period February through November. The RAP plants may operate during daylight hours year around.

Upon relocation, all emission units except the haul road shall be at least 207 meters from the western fenceline, 96 meters from the southern fenceline, 82 meters from the eastern fenceline, and 113 meters from the northern fenceline.

Conclusion:

This modeling analysis demonstrates that operation of the facility described in this report neither causes nor contributes to any exceedances of applicable air quality standards. The standards relevant at this facility are NAAQS for CO, NO₂, PM_{2.5}, PM₁₀, and SO₂; and NMAAQs for CO, NO₂, and SO₂.

Action:

The permit can be issued based on this modeling analysis. Modeling report submitted by Paul Wade (dated 9/2/2022). The air quality analysis demonstrates compliance with applicable regulatory requirements. AERMOD version 21112 was used to run the modeling analysis.

Note:

Complete modeling input and output files can be made available and are located in the Modeling Archives in the folder, "9720_Mountain States Constructors_MSCI HMA No3".

Modeling Parameters:

The AERMOD regulatory default parameters were included in assumptions made by the model. All volume sources were modeled in flat terrain mode. Building downwash was not modeled because the facility contains no buildings.

Complex Terrain Data:

Elevations of receptors, facility sources, and nearby sources were obtained from USGS GeoTIFF files using AERMAP. Both simple and complex types of terrain were used to model the facility.

Receptor Grid: The following grids were used to evaluate impacts for each pollutant.

Table 6: Table of Receptors

Grid Type	Description	Shape	Spacing	Radius or Length
Very Fine	Cartesian	Border	50 Meters	500 Meters
Very Fine	Cartesian	Round	100 Meters	1 Kilometers
Fine	Cartesian	Round	250 Meters	3 Kilometers
Course	Cartesian	Round	500 Meters	10 Kilometers
Course	Cartesian	Round	1000 Meters	20 Kilometers
Very Course	Cartesian	Round	2500 Meters	50 Kilometers

Air Dispersion Modeling Summary for Permit No. 9720

Receptors outside of the radii of impact were discarded for the surrounding source runs.

Meteorological Data:

AERMOD – Albuquerque 2014-2018. These meteorological input files are prepared by the Albuquerque-Bernalillo County Air Quality Program.

Adjacent Sources:

The Division 's Modeling Guidance was used to select surrounding sources within 50 km of the facility. The facility is 1.7 km from Moriarty Station. The facility is 6.3 km from Concrete Batch Plant, GCP5-3607. The facility is 20.2 km from MSC1 - 500TPH Crusher NSR-2190. The facility is 20.2 km from MSC1 - 500TPH Crusher NSR-2190. The facility is 69.1 km from Intel - Rio Rancho Facility. The facility is 76.0 km from Mountainair No7 Compressor Station.

PSD Increment Information:

The facility is a minor source (for PSD purposes) located in AQCR 154. The minor source baseline dates here are not yet established.

The facility is 83.6 km from the Class I area Pecos Wilderness Area. Class I area impacts are negligible for minor sources over 50 km from a Class I area. PSD modeling is not required.

Results Discussion:

CO Analysis:

The 1-hour CO concentration was below the significance level. No cumulative analysis is required. The maximum source alone 1-hour CO concentration was 357.412 $\mu\text{g}/\text{m}^3$. This was 17.9% of the significance level.

The 8-hour CO concentration was below the significance level. No cumulative analysis is required. The maximum source alone 8-hour CO concentration was 165.081 $\mu\text{g}/\text{m}^3$. This was 33.0% of the significance level NMAAQs.

NO₂ Analysis:

Review of the modeling used ARM2 with default options (0.5 minimum ratio, 0.9 maximum ratio) to determine the conversion of NO_x to NO₂. Original modeling used PVMRM. The hourly ozone background file for PVMRM was supplied by the Albuquerque-Bernalillo County Air Quality Program.

The maximum source alone 1-hour NO₂ concentration was 128.637 $\mu\text{g}/\text{m}^3$. The facility was modeled with surrounding sources. The maximum total 1-hour NO₂ concentration was 128.678 $\mu\text{g}/\text{m}^3$. This was 68.4% of the NAAQS.

Compliance with 1-hour NO₂ NAAQS demonstrates compliance with 24-hour NMAAQs.

Compliance with annual NO₂ NAAQS demonstrates compliance with annual NMAAQs.

Air Dispersion Modeling Summary for Permit No. 9720

The maximum source alone annual NO₂ concentration was 7.581 µg/m³. The facility was modeled with surrounding sources. The maximum total annual NO₂ concentration was 8.161 µg/m³. This was 8.7% of the NMAAQs.

PM2.5 Analysis:

Results from all 24-hour modeling scenarios are in table 7. Highest impacts were seen during modeling of scenario 10, with operations from 6pm-6am. The maximum source alone 24-hour PM2.5 concentration was 15.718 µg/m³. The facility was modeled with surrounding sources. The maximum 24-hour PM2.5 concentration with surrounding sources was 15.736 µg/m³. Formation of 0.230 µg/m³ of secondary PM2.5 was included in the analysis. See the modeling protocol for calculation of secondary PM2.5 impacts. A background concentration of 9.450 µg/m³ was added from the monitor 3HM, at Santa Fe-Runnels Building 1190 St Francis. The maximum total 24-hour PM2.5 concentration was 25.416 µg/m³. This was 72.6% of the NAAQS.

Table 7: Table of 24-hour PM2.5 Modeling Results for all Scenarios

Scenario PM2.5 24-Hour	Facility 8 th high	NAAQS 8 th high
S1 (12am-12pm)	13.232	13.253
S2 (2am-2pm)	12.789	12.822
S3 (4am-4pm)	11.087	11.175
S4 (6am-6pm)	10.669	10.679
S5 (8am-8pm)	10.271	9.964
S6 (10am-10pm)	9.933	10.150
S7 (12pm-12am)	10.655	10.825
S8 (2pm-2am)	11.184	11.290
S9 (4pm-4am)	12.073	12.218
S10 (6pm-6am)	15.718	15.736
S11 (8pm-8am)	15.341	15.461
S12 (10pm-10am)	13.232	13.253

Results from all annual modeling scenarios are in table 8. Highest impacts were seen during modeling of scenario 10, with operations from 6pm-6am. The maximum source alone annual PM2.5 concentration was 2.944 µg/m³. The facility was modeled with surrounding sources. The maximum annual PM2.5 concentration with surrounding sources was 3.077 µg/m³. Formation of 0.230 µg/m³ of secondary PM2.5 was included in the analysis. See the modeling protocol for calculation of secondary PM2.5 impacts. A background concentration of 4.320 µg/m³ was added from the monitor 3HM, at Santa Fe-Runnels Building 1190 St Francis. The maximum total annual PM2.5 concentration was 7.271 µg/m³. This was 60.6% of the NAAQS.

Table 8: Table of Annual hour PM2.5 Modeling Results for all Scenarios

Scenario PM2.5 Annual	Facility	NAAQS
S1 (12am-12pm)	2.793	2.916
S2 (2am-2pm)	2.659	2.782
S3 (4am-4pm)	2.480	2.603
S4 (6am-6pm)	2.268	2.391
S5 (8am-8pm)	2.178	2.301
S6 (10am-10pm)	2.197	2.319
S7 (12pm-12am)	2.286	2.408

Air Dispersion Modeling Summary for Permit No. 9720

Scenario PM2.5 Annual	Facility	NAAQS
S8 (2pm-2am)	2.420	2.543
S9 (4pm-4am)	2.610	2.742
S10 (6pm-6am)	2.944	3.077
S11 (8pm-8am)	2.882	3.005
S12 (10pm-10am)	2.793	2.916

PM10 Analysis:

Highest impacts were seen during modeling of scenario 9, with operations from 4pm-4am. Results from all scenarios are in table 9. The maximum source alone 24-hour PM10 concentration was 100.558 $\mu\text{g}/\text{m}^3$. The facility was modeled with surrounding sources. The maximum 24-hour PM10 concentration with surrounding sources was 100.625 $\mu\text{g}/\text{m}^3$. A background concentration of 20.700 $\mu\text{g}/\text{m}^3$ was added from the monitor 3HM, at Santa Fe-Runnels Building 1190 St Francis. The maximum total 24-hour PM10 concentration was 121.325 $\mu\text{g}/\text{m}^3$. This was 80.9% of the NAAQS.

Table 7: Table of PM10 Modeling Results for all Scenarios

Scenario PM10	Facility 2 nd high	NAAQS 2 nd high
S1 (12am-12pm)	91.439	91.859
S2 (2am-2pm)	90.806	90.875
S3 (4am-4pm)	89.146	89.215
S4 (6am-6pm)	94.804	94.873
S5 (8am-8pm)	92.473	92.543
S6 (10am-10pm)	93.830	93.899
S7 (12pm-12am)	97.058	97.246
S8 (2pm-2am)	98.753	98.820
S9 (4pm-4am)	100.558	100.625
S10 (6pm-6am)	97.981	98.353
S11 (8pm-8am)	99.949	100.321
S12 (10pm-10am)	95.810	95.877

SO₂ Analysis:

The maximum source alone 1-hour SO₂ concentration was 94.216 $\mu\text{g}/\text{m}^3$. The facility was modeled with surrounding sources. The maximum total 1-hour SO₂ concentration was 94.218 $\mu\text{g}/\text{m}^3$. This was 48.0% of the NAAQS.

Compliance with 1-hour SO₂ NAAQS automatically demonstrates compliance with 3-hour SO₂ NAAQS, 24-hour SO₂ NMAAQs, and annual SO₂ NMAAQs.

Setback Analysis:

Setback distances were determined by placing a 675 meter by 675 meter grid of receptors with 25 meter spacing on the facility. The pollutants determining minimum setback distance were NO₂ to the West, South, and North, and PM10 to the East. NO₂ setback modeling was done using refined background concentrations as described in the modeling protocol. The setback distances determined are 207 meters to the west, 96 meters to the south, 82 meters to the east, and 113 meters to the north.

Air Dispersion Modeling Summary for Permit No. 9720

Table 10: Table of Ambient Impact from Emissions

Pollutant, Time Period, and Standard	Facility Alone Concentration (µg/m³)	Concentration with Surrounding Sources (µg/m³)	Secondary Formation (µg/m³)	Background Concentration (µg/m³)	Cumulative Concentration (µg/m³)	Percent of Standard	Location		
							UTM E (m)	UTM N (m)	Elev. (ft)
CO 1-hour Significance Level	357.412 (1 st high)	-	-	-	357.412	17.9	411,646	3,869,954	6,302
CO 8-hour Significance Level	165.081 (1 st high)	-	-	-	165.081	33.0	411,871	3,869,552	6,320
NO ₂ 1-hour NAAQS	128.637 (8 th high)	128.678 (8 th high)	-	-	128.678	68.4	411,871	3,869,552	6,320
NO ₂ 24-hour NMAAQs	Demonstrated by compliance with NO ₂ 1-hour NAAQS								
NO ₂ Annual NAAQS	Demonstrated by compliance with NO ₂ Annual NMAAQs								
NO ₂ Annual NMAAQs	7.581	8.161	-	-	8.161	8.7	411,871	3,869,552	6,320
PM _{2.5} 24-hour NAAQS	15.718 (Scenario 10, 8 th high)	15.736 (Scenario 10, 8 th high)	0.230	9.450 (3HM)	25.416	72.6	411,846	3,869,552	6,318
PM _{2.5} Annual NAAQS	2.944 (Scenario 10)	3.077 (Scenario 10)	0.007	4.320 (3HM)	7.271	60.6	411,846	3,869,552	6,318
PM ₁₀ 24-hour NAAQS	100.558 (2 nd high)	100.625 (2 nd high)	-	20.700 (3HM)	121.325	80.9	411,846	3,869,552	6,318
SO ₂ 1-hour NAAQS	94.216 (4 th high)	94.218 9 (4 th high)	-	-	94.218	48.0	411,646	3,869,954	6,302
SO ₂ 3-hour NAAQS	Demonstrated by compliance with SO ₂ 1-hour NAAQS								
SO ₂ 24-hour NMAAQs	Demonstrated by compliance with SO ₂ 1-hour NAAQS								
SO ₂ Annual NMAAQs	Demonstrated by compliance with SO ₂ 1-hour NAAQS								