TCEQ Interoffice Memorandum

To: Mechanical/Coatings Section

From: Dan Jamieson
Permit Support Section

Date: February 24, 2023

Subject: Concrete Batch Plant Standard Permit Protectiveness Review

1. Project Identification Information

An air quality analysis (AQA) was performed in support of the concrete batch plant standard permit protectiveness review. The AQA included dispersion modeling of a model concrete batch plant at multiple maximum hourly production rates: 30 cubic yards per hour (yd^3/hr), 100 yd^3/hr, 150 yd^3/hr, 200 yd^3/hr, 250 yd^3/hr, and 300 yd^3/hr. For the 30 yd^3/hr maximum hourly production rate case, the AQA included modeling for an annual production rate of 131,400 cubic yards per year (yd^3/yr). For all other maximum hourly production rate cases, the AQA included modeling for an annual production rate of 650,000 (yd^3/yr). The emission generating facilities or activities included in the AQA are material handling operations, truck loading, stockpiles, cement silos, and an internal combustion engine to generate power for equipment at the site. For all production rates, except for the 30 yd^3/hr case, the AQA also included modeling for two different control scenarios: partial enclosure of the truck loading activities and no partial enclosure of the truck loading activities. The pollutants evaluated were carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter of 10 microns or less (PM_{10}), particulate matter of 2.5 microns or less ($PM_{2.5}$), nickel (Ni) particulate, formaldehyde (CHOH), and silica (SiO_2).

2. Report Summary

The modeling results are in Tables 1a and 1b. The predicted concentrations for criteria pollutants were initially compared to de minimis levels. The predicted concentrations for CO and SO_2 were less than the de minimis levels at all distances. For criteria pollutants with predicted concentrations greater than de minimis levels (NO_2, PM_{10}, and $PM_{2.5}$), background concentrations were added to the predicted concentrations for comparison with the National Ambient Air Quality Standards (NAAQS). The predicted concentrations of SO_2 were less than the state property line standard listed at 30 Texas Administrative Code § 112.3 at all distances. The predicted concentrations of Ni, CHOH, and SiO_2 were less than their effects screening levels (ESLs) at all distances.

The following de minimis levels (CO and SO_2) and NAAQS (NO_2, PM_{10} and $PM_{2.5}$) were used in the analysis to demonstrate compliance:

CO

- 2,000 micrograms per cubic meter (µg/m^3) for 1-hr and
- 500 µg/m^3 for 8-hr

NO_2

- 188 µg/m^3 for 1-hr and
- 100 µg/m^3 for annual

PM_{10}

- 150 µg/m^3 for 24-hr

$PM_{2.5}$

- 35 µg/m^3 for 24-hr and
- 12 µg/m^3 for annual

SO_2

- 7.8 µg/m^3 for 1-hr and
- 25 µg/m^3 for 3-hr

The following state property line standard was used in the analysis to demonstrate compliance:

SO_2

- 715 µg/m^3 for 30-minute

The following ESLs were used in the analysis to demonstrate compliance:

Ni

- 0.33 µg/m^3 for 1-hr and
- 0.059 µg/m^3 for annual

CHOH

- 15 µg/m^3 for 1-hr and
- 3.3 µg/m^3 for annual

SiO_2

- 14 µg/m^3 for 1-hr and
- 0.27 µg/m^3 for annual

Table 1a. Summary of Modeling Results for No Partial Enclosure

Production Rate	Pollutant	Averaging Time	µg/m³ at 100 feet	µg/m³ at 200 feet	µg/m³ at 300 feet	µg/m³ at 400 feet	µg/m³ at 500 feet	µg/m³ at 600 feet	µg/m³ at 700 feet	µg/m³ at 800 feet	µg/m³ at 900 feet	µg/m³ at 1000 feet
30 yd^3/hr	Ni	1-hr	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001
30 yd^3/hr	Ni	Annual	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
30 yd^3/hr	SiO_2	1-hr	3.7	3.8	3.8	3.9	3.8	3.6	3.3	3	2.7	2.5
30 yd^3/hr	SiO_2	Annual	0.03	0.02	0.01	0.008	0.007	0.006	0.005	0.004	0.004	0.003
30 yd^3/hr	PM_{10}	24-hr	44	34	25	20	19	18	16	15	13	12
30 yd^3/hr	$PM_{2.5}$	24-hr	3.6	2.5	1.9	1.6	1.5	1.4	1.2	1.1	1	0.9
30 yd^3/hr	$PM_{2.5}$	Annual	0.7	0.4	0.3	0.2	0.2	0.1	0.1	0.09	0.08	0.07
100 yd^3/hr	PM_{10}	24-hr	29	19	16	14	13	12	10	9.5	8.7	8
100 yd^3/hr	$PM_{2.5}$	24-hr	4	3.1	2.3	1.9	1.7	1.6	1.5	1.4	1.3	1.2
150 yd^3/hr	PM_{10}	24-hr	44	27	23	21	19	17	15	14	13	12
150 yd^3/hr	$PM_{2.5}$	24-hr	5.9	4.1	3	2.6	2.4	2.2	2	1.9	1.7	1.6
200 yd^3/hr	PM_{10}	24-hr	58	36	31	27	25	22	20	19	17	16
200 yd^3/hr	$PM_{2.5}$	24-hr	7.9	5.3	3.9	3.5	3.2	2.9	2.7	2.5	2.3	2.1
250 yd^3/hr	PM_{10}	24-hr	72	45	38	34	31	28	25	23	21	19
250 yd^3/hr	$PM_{2.5}$	24-hr	9.5	6.3	4.7	4.2	3.8	3.5	3.2	2.9	2.7	2.5

Production Rate	Pollutant	Averaging Time	µg/m³ at 100 feet	µg/m³ at 200 feet	µg/m³ at 300 feet	µg/m³ at 400 feet	µg/m³ at 500 feet	µg/m³ at 600 feet	µg/m³ at 700 feet	µg/m³ at 800 feet	µg/m³ at 900 feet	µg/m³ at 1000 feet
300 yd^3/hr	Ni	1-hr	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.003
300 yd^3/hr	Ni	Annual	0.0005	0.0003	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001
300 yd^3/hr	SiO_2	1-hr	8.3	8.6	7.9	8.1	7.8	7.5	7.2	6.7	6.2	5.7
300 yd^3/hr	SiO_2	Annual	0.1	0.06	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02
300 yd^3/hr	PM_{10}	24-hr	86	54	46	40	37	33	30	28	25	23
300 yd^3/hr	$PM_{2.5}$	24-hr	11.6	7.5	5.7	5.1	4.6	4.2	3.8	3.5	3.2	3
650,000 yd^3/yr	$PM_{2.5}$	Annual	1.2	0.8	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.2
All	CHOH	1-hr	0.25	0.32	0.28	0.22	0.19	0.21	0.21	0.2	0.19	0.18
All	CHOH	Annual	0.002	0.011	0.013	0.012	0.01	0.008	0.007	0.006	0.006	0.005
All	CO	1-hr	556	728	629	484	431	469	470	451	424	394
All	CO	8-hr	377	380	299	251	234	232	221	204	186	175
All	NO_2	1-hr	36	66	51	41	44	43	40	37	35	32
All	NO_2	Annual	1.2	7.6	9	8	6.8	5.8	5	4.4	3.9	3.5
All	SO_2	1-hr	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
All	SO_2	3-hr	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1

For pollutants only emitted from the internal combustion engine, “All” is listed under the Production Rate column since the use of the internal combustion engine would apply to all maximum hourly production rate scenarios.

For Ni and SiO_2, the emission rates for the 100 yd^3/hr, 150 yd^3/hr, 200 yd^3/hr, and 250 yd^3/hr maximum hourly production rate scenarios are proportional with respect to the 300 yd^3/hr maximum hourly production rate scenario. Since these two pollutants have modeling results associated with the 300 yd^3/hr maximum hourly production rate scenario that are less than their ESLs, the results for the maximum hourly production rates scenarios of 100 yd^3/hr, 150 yd^3/hr, 200 yd^3/hr, and 250 yd^3/hr would also be less than their ESLs.

Table 1b. Summary of Modeling Results with a Partial Enclosure

Production Rate	Pollutant	Averaging Time	µg/m³ at 100 feet	µg/m³ at 200 feet	µg/m³ at 300 feet	µg/m³ at 400 feet	µg/m³ at 500 feet	µg/m³ at 600 feet	µg/m³ at 700 feet	µg/m³ at 800 feet	µg/m³ at 900 feet	µg/m³ at 1000 feet
100 yd^3/hr	PM_{10}	24-hr	17	12	9.2	8.2	7.5	7.1	6.6	6.1	5.7	5.4
100 yd^3/hr	$PM_{2.5}$	24-hr	2.3	2.3	2	1.5	1.2	1.1	1.1	1	1	0.9
150 yd^3/hr	PM_{10}	24-hr	25	17	13	12	11	10	9.6	9	8.4	7.9
150 yd^3/hr	$PM_{2.5}$	24-hr	3.3	2.9	2.4	1.8	1.6	1.5	1.4	1.3	1.2	1.2
200 yd^3/hr	PM_{10}	24-hr	34	23	18	16	15	14	13	12	11	10
200 yd^3/hr	$PM_{2.5}$	24-hr	4.3	3.6	2.9	2.2	2	1.9	1.8	1.6	1.5	1.4
250 yd^3/hr	PM_{10}	24-hr	42	29	22	20	18	17	16	15	14	13
250 yd^3/hr	$PM_{2.5}$	24-hr	5.4	4.3	3.3	2.6	2.4	2.3	2.1	2	1.8	1.7
300 yd^3/hr	PM_{10}	24-hr	50	34	26	23	21	20	19	18	16	15
300 yd^3/hr	$PM_{2.5}$	24-hr	6.4	5	3.8	3	2.9	2.7	2.5	2.3	2.1	2
650,000 yd^3/yr	$PM_{2.5}$	Annual	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2

Modeling for the partial enclosure scenario was performed for PM_{10} and $PM_{2.5}$. Further discussion is provided below in Section 3.

A. Background Concentrations

Background concentrations of PM_{10}, $PM_{2.5}$, and NO_2 were determined for different TCEQ Regions. Below is a discussion for each pollutant:

PM_{10}

- Regions 1, 2, 3, 4, and 5 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 481130061 located at 3434 Bickers, Dallas, Dallas County. The high, fourth high (H4H) 24-hr concentration from 2019-2021 was used for the 24-hr value (56 µg/m^3). This value represents the highest, H4H 24-hr concentration in and near TCEQ Regions 1, 2, 3, 4, and 5 and it was selected for a conservative analysis.

- Region 6 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 481410057 located at 320 Old Hueco Tanks Rd., El Paso, El Paso County. After identification and removal from consideration an exceptionally high 24-hr background concentration during a high wind event in 2020, the H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (90 µg/m^3). This value represents the highest, H4H 24-hr concentration from representative monitors in TCEQ Region 6 and it was selected for a conservative analysis.

- Regions 7 and 13 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 480290060 located at 401 South Frio St., San Antonio, Bexar County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (80 µg/m^3). This value represents the highest, H4H 24-hr concentration in and near TCEQ Regions 7 and 13 and it was selected for a conservative analysis.

- Regions 8, 9, and 11 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 484530021 located at 2600b Webberville Rd., Austin, Travis County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (91 µg/m^3). This value represents the highest, H4H 24-hr concentration in and near TCEQ Regions 8, 9, and 11 and it was selected for a conservative analysis.

- Region 10 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 481670004 located at 2516 Texas Ave., Texas City, Galveston County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (68 µg/m^3). Except for one monitor located in Harris County, which would be overly conservative for the counties of TCEQ Region 10, this value represents the highest, H4H 24-hr concentration near TCEQ Region 10 and it was selected for a conservative analysis.

- Region 12 - For Harris County and the adjacent counites of Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller, background concentrations for PM_{10} were obtained from the EPA AIRS monitor 482011035 located at 9525 1/2 Clinton Dr., Houston, Harris County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (101 µg/m^3). This value represents the highest, H4H 24-hr concentration in TCEQ Region 12 and it was selected for a conservative analysis.

For the other five counties in TCEQ Region 12 (Austin, Colorado, Matagorda, Walker, and Wharton), background concentrations for PM_{10} were obtained from the EPA AIRS monitor 481670004 located at 2516 Texas Ave., Texas City, Galveston County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (68 µg/m^3). Except for one monitor located in an industrialized area of Harris County, which would be overly conservative for these five counties, this value represents the highest, H4H 24-hr concentration in TCEQ Region 12 and it was selected for a conservative analysis.

- Region 14 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 483550034 located at 5707 Up River Rd., Corpus Christi, Nueces County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (64 µg/m^3). This monitor is located in an industrial area of the Corpus Christi ship channel and is reasonable to use for TCEQ Region 14.
- Region 15 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 482150043 located at 2300 North Glasscock, Mission, Hidalgo County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (56 µg/m^3). This value represents the highest, H4H 24-hr concentration in TCEQ Region 15 and it was selected for a conservative analysis.
- Region 16 - Background concentrations for PM_{10} were obtained from the EPA AIRS monitor 484790016 located at 2020 Vidaurri Ave., Laredo, Webb County. The H4H 24-hr concentration from 2019-2021 was used for the 24-hr value (71 µg/m^3). This value represents the highest, H4H 24-hr concentration in TCEQ Region 16 and it was selected for a conservative analysis.

$PM_{2.5}$

- Region 1 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 483750320 located at 6500 Amarillo Blvd. West, Amarillo, Potter County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (14 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (5.6 µg/m^3). This monitor is located in Amarillo and is reasonable to use for TCEQ Region 1.
- Region 2 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 483031028 located at 3901 East 12th St., Lubbock, Lubbock County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (16 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (6 µg/m^3). This monitor is located in Lubbock and is reasonable to use for TCEQ Region 2.

- Regions 3 and 4 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 484391002 located at 3317 Ross Ave., Fort Worth, Tarrant County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (21 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (9.2 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in and near TCEQ Regions 3 and 4 and were selected for a conservative analysis.
- Region 5 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480371031 located at 2700 New Boston Rd., Texarkana, Bowie County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (21 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (9.6 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in TCEQ Region 5 and were selected for a conservative analysis.
- Region 6 - Background concentrations for 24-hr $PM_{2.5}$ were obtained from the EPA AIRS monitor 481410037 located at 250 Rim Rd., El Paso, El Paso County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (26 µg/m^3). This value represents the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations in TCEQ Region 6 and was selected for a conservative analysis. Background concentrations for annual $PM_{2.5}$ were obtained from the EPA AIRS monitor 481410044 located at 800 S San Marcial St., El Paso, El Paso County. The three-year average (2019-2021) of the annual concentrations was used for the annual value (8.9 µg/m^3). This value represents the highest three-year average of the annual concentrations in TCEQ Region 6 and was selected for a conservative analysis.
- Region 7 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 481351014 located at 2700 Disney, Odessa, Ector County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (18 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (7.4 µg/m^3). This monitor is located in Odessa and is reasonable to use for TCEQ Region 7.
- Regions 8 and 9 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480411086 located at 3670 Finfeather Rd., College Station, Brazos County. The two-year average (2020-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (21 µg/m^3). The two-year average (2020-2021) of the annual concentrations was used for the annual value (8 µg/m^3). The design values, based on two years of data, are greater than the design values based on three years of data from the other monitor located in and near TCEQ Regions 8 and 9 and were selected for a conservative analysis.

- Region 10 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 482450021 located at 2200 Jefferson Dr., Port Arthur, Jefferson County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (20 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (8.3 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in TCEQ Region 10 and were selected for a conservative analysis.
- Region 11 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 484530021 located at 2600b Webberville Rd., Austin, Travis County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (22 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (9.5 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in TCEQ Region 11 and were selected for a conservative analysis.
- Region 12 - For Harris County and the adjacent counites of Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller, background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 482011052 located at 822 North Loop, Houston, Harris County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (26 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (11.1 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in TCEQ Region 12 and were selected for a conservative analysis.

  For the other five counties in TCEQ Region 12 (Austin, Colorado, Matagorda, Walker, and Wharton), background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480411086 located at 3670 Finfeather Rd., College Station, Brazos County. The two-year average (2020-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (21 µg/m^3). The two-year average (2020-2021) of the annual concentrations was used for the annual value (8 µg/m^3). The design values, based on two years of data, are greater than the design values based on three years of data from the other monitor located in TCEQ Region 9 and were selected for a conservative analysis. The monitors from TCEQ Region 9 were considered for these five counties given their proximity, reported emissions, and greater populations (which is related to mobile emissions).

- Region 13 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480131090 located at 17534 North State Highway 16, Lytle, Atascosa County. The two-year average (2020-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (23 µg/m^3). The two-year average (2020-2021) of the annual concentrations was used for the annual value (9.1 µg/m^3). The design values, based on two years of data, are greater than the design values based on three years of data from the other monitor located in TCEQ Region 13 and were selected for a conservative analysis.
- Region 14 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 482730314 located at 20420 Park Rd., Corpus Christi, Kleberg County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (27 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (9.6 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in TCEQ Region 14 and were selected for a conservative analysis.
- Region 15 - For Cameron and Hidalgo Counties, background concentrations for 24-hr $PM_{2.5}$ were obtained from the EPA AIRS monitor 482151046 located at 1491 East Freddy Gonzales Dr., Edinburg, Hidalgo County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (30 µg/m^3). This value represents the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations in TCEQ Region 15 and was selected for a conservative analysis. Background concentrations for annual $PM_{2.5}$ were obtained from the EPA AIRS monitor 482150043 located at 2300 North Glasscock, Mission, Hidalgo County. The three-year average (2019-2021) of the annual concentrations was used for the annual value (10.6 µg/m^3). This value represents the highest three-year average of the annual concentrations in TCEQ Region 15 and was selected for a conservative analysis.

  For the other five counties in TCEQ Region 15 (Brooks, Jim Hogg, Kenedy, Starr, and Willacy), background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 484790313 located at Mines Rd. 11601 FM 1472, Laredo, Webb County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (27 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (10.4 µg/m^3). Except for the monitors located in Cameron and Hidalgo Counties, these values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, near TCEQ Region 15 and were selected for a conservative analysis. The monitors from Cameron and Hidalgo Counties are overly conservative for these other five counties given the reported emissions and greater populations (which is related to mobile emissions) for Cameron and Hidalgo Counties.

- Region 16 - Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 484790313 located at Mines Rd. 11601 FM 1472, Laredo, Webb County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the 24-hr concentrations was used for the 24-hr value (27 µg/m^3). The three-year average (2019-2021) of the annual concentrations was used for the annual value (10.4 µg/m^3). These values represent the highest three-year average of the 98th percentile of the annual distribution of the 24-hr concentrations and the highest three-year average of the annual concentrations, respectively, in TCEQ Region 16 and were selected for a conservative analysis.

NO_2

- Background concentrations for 1-hr NO_2 were obtained from the EPA AIRS monitor 481410044 located at 800 S San Marcial St., El Paso, El Paso County. The three-year average (2019-2021) of the 98th percentile of the annual distribution of the maximum daily 1-hr concentrations was used for the 1-hr value (117 µg/m^3). This value represents the highest three-year average of the 98th percentile of the annual distribution of the maximum daily 1-hr concentrations in the state and was selected for a conservative analysis. Background concentrations for annual NO_2 were obtained from the EPA AIRS monitor 482011052 located at 822 North Loop, Houston, Harris County. The highest annual concentration from 2021 was used for the annual value (30 µg/m^3). This value represents the highest annual concentration in the state and was selected for a conservative analysis.

B. Setback Distances

Predicted concentrations from Tables 1a and 1b were used together with background concentrations discussed above to determine minimum setback distances between any baghouse or internal combustion engine and the nearest property line for each TCEQ Region. The minimum setback distances for the 30 yd^3/hr maximum hourly production rate scenario also accounts for the 131,400 yd^3/yr annual production rate. The minimum setback distances for the 100 yd^3/hr, 150 yd^3/hr, 200 yd^3/hr, 250 yd^3/hr, and 300 yd^3/hr maximum hourly production rate scenarios also account for the 650,000 yd^3/yr annual production rate. The minimum setback distances are listed below by TCEQ Region for both the partial enclosure of the truck loading activities and no partial enclosure of the truck loading activities scenarios.

Table 2a. TCEQ Region 1 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	100	100

Table 2b. TCEQ Region 2 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	100	100

Table 2c. TCEQ Region 3 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	100	100

Table 2d. TCEQ Region 4 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	100	100

Table 2e. TCEQ Region 5 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	100	100

Table 2f. TCEQ Region 6 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2g. TCEQ Region 7 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2h. TCEQ Region 8 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2i. TCEQ Region 9 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2j. TCEQ Region 10 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	200	100

Table 2k. TCEQ Region 11 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2l. TCEQ Region 12 - Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties - Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	200	100
150	200	100
200	200	100
250	200	100
300	300	200

Table 2m. TCEQ Region 12 - Austin, Colorado, Matagorda, Walker, and Wharton Counties - Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	100	100
300	200	100

Table 2n. TCEQ Region 13 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2o. TCEQ Region 14 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2p. TCEQ Region 15 - Cameron and Hidalgo Counties - Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	200	100
200	300	100
250	300	200
300	500	200

Table 2q. TCEQ Region 15 - Brooks, Jim Hogg, Kenedy, Starr, and Willacy Counties - Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

Table 2r. TCEQ Region 16 Minimum Setback Distances (feet)

Production Rate (yd^3/hr)	No Partial Enclosure of Truck Loading	Partial Enclosure of Truck Loading
30	100	NA
100	100	100
150	100	100
200	100	100
250	200	100
300	200	100

As noted above, the minimum setback distances listed in Tables 2a – 2r are for any baghouse or internal combustion engine and the nearest property line. For the other emission generating facilities or activities (material handling activities, truck loading, and stockpiles), they shall not be located closer than 50 feet less than the applicable minimum setback distance to the nearest property line (e.g., 50 feet for a minimum setback distance of 100 feet; 150 feet for a minimum setback distance of 200 feet; etc.).

3. Model Used and Modeling Techniques

ISCST3 (Version 02035) was used.

A unitized emission rate of 1 pound per hour (lb/hr) was used to predict a generic impact for each source. The generic impact was multiplied by the pollutant-specific emission rates to calculate a maximum predicted concentration for each source. The maximum predicted concentration for each source was added together to get a total predicted concentration for each pollutant for comparison with applicable standards/thresholds.

Pollutant-specific modeling was performed for the PM_{10}, $PM_{2.5}$, and 1-hr NO_2 NAAQS demonstrations. The pollutant-specific modeling considered the form of the applicable NAAQS, i.e., high sixth high 24-hr concentration over five years for PM_{10}, five-year average of the 98^{th} percentile of 24-hr concentrations for 24-hr $PM_{2.5}$, five-year average of the annual concentrations for annual $PM_{2.5}$, and five-year average of the 98^{th} percentile of maximum 1-hr daily concentrations for NO_2.

For all production rates, except for the 30 yd^3/hr case, additional pollutant-specific modeling for PM_{10} and $PM_{2.5}$ was performed for two different control scenarios: partial enclosure of the truck loading activities and no partial enclosure of the truck loading activities. These additional model runs were performed for just PM_{10} and $PM_{2.5}$ since these two pollutants are associated with the minimum setback distances.

NO_2 was evaluated using a NO_2/NO_x ratio of 0.5. The EPA's March 1, 2011 guidance memo states, "Although well-documented data on in-stack NO_2/NO_x ratios is still limited for many source categories, we also feel that it would be appropriate in the absence of such source-specific in-stack data to adopt a default in-stack ratio of 0.5 as being adequately conservative in most cases and a better alternative to use of the Tier 1 full conversion." Since the location of the maximum concentrations are very close to the source and travel time very short, giving little time for the NO_x to NO_2 conversion to take place, an in-stack ratio of 0.5 is reasonable for this analysis.

A. Land Use

The modeling considered rural and urban dispersion coefficients. The modeling results depict the highest predicted concentrations whether rural or urban was selected.

Since low-level fugitive emissions are significant and these emissions would be terrain following, the modeling only considered flat terrain.

B. Meteorological Data

The ISCST3 modeling analysis used surface data from Austin and upper air data from Victoria for the years 1983, 1984, 1986, 1987, and 1988. Since the analysis is primarily for short-term concentrations, this five-year data set would include worst-case short-term meteorological conditions that could occur anywhere in the state.

The wind directions were used at 10-degree intervals to be coincident with the receptor radials. This would provide predictions along the plume centerline which is a conservative result.

C. Receptor Grid

The ISCST3 modeling used a polar receptor grid with 36 radials spaced every 10 degrees from true north. Receptors were located on each radial at distances of everyone hundred feet out to 1,000 feet. This was done to determine the plume centerline concentration.

D. Building Wake Effects (Downwash)

Downwash was not modeled since there are no significant structures onsite that would impact the flow of emissions.

4. Modeling Emissions Inventory

The modeling represented emissions from all material handling activities, truck loading, and stockpiles as a series of co-located circular area sources 100 feet in diameter at 5, 10, 15, and 20 feet high. These emissions were assumed to be well distributed throughout the site; therefore, an area source would be appropriate. The TCEQ assumed that emissions from the material handling activities, truck loading, and stockpiles would take place from very near ground level to about 20 feet in height. The circular area source type was selected to minimize bias of any one wind direction or source orientation. The modeling represented emissions from baghouses as a single point source 40 feet high with no vertical momentum or buoyancy. The modeling represented the internal combustion engine as a single point source consistent with the parameters furnished by TCEQ's technical permitting staff. The source parameters modeled are listed in Tables 3 and 4.

Table 3. Modeled Point Source Parameters

Source ID	Stack height (feet)	Temperature (°F)	Stack velocity (feet/second)	Stack diameter (feet)
SILOS	40	-460	0.003	0.003
ENGINE	8	900	299.1	0.7

Table 4. Modeled Area Source Parameters

Source ID	Release height (feet)	Radius (feet)
FUG-1	5	50
FUG-2	10	50
FUG-3	15	50
FUG-4	20	50

The material handling activities, truck loading, and stockpiles were modeled as source group FUG. The baghouses were modeled as source group SILOS. The internal combustion engine was modeled as source group ENGINE. All sources were co-located, and the emission rates modeled are listed in Table 5.

As previously noted, modeling was performed for two different control scenarios: partial enclosure of the truck loading activities and no partial enclosure of the truck loading activities. The truck loading emissions are included as a part of source group FUG. The PM_{10} and $PM_{2.5}$ emissions listed in Table 5 for source group FUG represent truck loading emissions with no partial enclosure. The PM_{10} and $PM_{2.5}$ emissions listed for source group FUG-PE represent truck loading emissions with a partial enclosure.

Table 5. Modeled Emission Rates

Source Group	Production Rate	Pollutant	Averaging Time	Rate (lb/hr)
SILOS	30 yd^3/hr	PM_{10}	24-hr	0.023
SILOS	30 yd^3/hr	$PM_{2.5}$	24-hr	2.69E-03
SILOS	30 yd^3/hr	$PM_{2.5}$	Annual	1.35E-03
SILOS	30 yd^3/hr	SiO_2	1-hr	1.47E-03
SILOS	30 yd^3/hr	SiO_2	Annual	1.19E-04
FUG	30 yd^3/hr	PM_{10}	24-hr	0.199
FUG	30 yd^3/hr	$PM_{2.5}$	24-hr	0.026
FUG	30 yd^3/hr	$PM_{2.5}$	Annual	0.013
FUG	30 yd^3/hr	Ni	1-hr	5.5E-06
FUG	30 yd^3/hr	Ni	Annual	2.8E-06
FUG	30 yd^3/hr	SiO_2	1-hr	9.54E-03
FUG	30 yd^3/hr	SiO_2	Annual	5.81E-04
SILOS	100 yd^3/hr	PM_{10}	24-hr	0.186
SILOS	100 yd^3/hr	$PM_{2.5}$	24-hr	0.032
FUG	100 yd^3/hr	PM_{10}	24-hr	0.169
FUG-PE	100 yd^3/hr	PM_{10}	24-hr	0.095
FUG	100 yd^3/hr	$PM_{2.5}$	24-hr	0.027
FUG-PE	100 yd^3/hr	$PM_{2.5}$	24-hr	0.015
SILOS	150 yd^3/hr	PM_{10}	24-hr	0.279
SILOS	150 yd^3/hr	$PM_{2.5}$	24-hr	0.048
FUG	150 yd^3/hr	PM_{10}	24-hr	0.251
FUG-PE	150 yd^3/hr	PM_{10}	24-hr	0.139
FUG	150 yd^3/hr	$PM_{2.5}$	24-hr	0.041
FUG-PE	150 yd^3/hr	$PM_{2.5}$	24-hr	0.021
SILOS	200 yd^3/hr	PM_{10}	24-hr	0.371
SILOS	200 yd^3/hr	$PM_{2.5}$	24-hr	0.064
FUG	200 yd^3/hr	PM_{10}	24-hr	0.333
FUG-PE	200 yd^3/hr	PM_{10}	24-hr	0.184
FUG	200 yd^3/hr	$PM_{2.5}$	24-hr	0.055
FUG-PE	200 yd^3/hr	$PM_{2.5}$	24-hr	0.028
SILOS	250 yd^3/hr	PM_{10}	24-hr	0.464
SILOS	250 yd^3/hr	$PM_{2.5}$	24-hr	0.08
FUG	250 yd^3/hr	PM_{10}	24-hr	0.413

Source Group	Production Rate	Pollutant	Averaging Time	Rate (lb/hr)
FUG-PE	250 yd^3/hr	PM_{10}	24-hr	0.228
FUG	250 yd^3/hr	$PM_{2.5}$	24-hr	0.066
FUG-PE	250 yd^3/hr	$PM_{2.5}$	24-hr	0.035
SILOS	300 yd^3/hr	PM_{10}	24-hr	0.557
SILOS	300 yd^3/hr	$PM_{2.5}$	24-hr	0.096
SILOS	300 yd^3/hr	Ni	1-hr	1E-05
SILOS	300 yd^3/hr	Ni	Annual	1E-05
SILOS	300 yd^3/hr	SiO_2	1-hr	0.026
SILOS	300 yd^3/hr	SiO_2	Annual	4E-03
FUG	300 yd^3/hr	PM_{10}	24-hr	0.495
FUG-PE	300 yd^3/hr	PM_{10}	24-hr	0.273
FUG	300 yd^3/hr	$PM_{2.5}$	24-hr	0.0802
FUG-PE	300 yd^3/hr	$PM_{2.5}$	24-hr	0.042
FUG	300 yd^3/hr	Ni	1-hr	1.01E-05
FUG	300 yd^3/hr	Ni	Annual	1.01E-05
FUG	300 yd^3/hr	SiO_2	1-hr	0.0157
FUG	300 yd^3/hr	SiO_2	Annual	1.74E-03
SILOS	650,000 yd^3/yr	$PM_{2.5}$	Annual	0.024
FUG	650,000 yd^3/yr	$PM_{2.5}$	Annual	0.021
FUG-PE	650,000 yd^3/yr	$PM_{2.5}$	Annual	0.011
ENGINE	All	PM_{10}	24-hr	0.164
ENGINE	All	$PM_{2.5}$	24-hr	0.164
ENGINE	All	$PM_{2.5}$	Annual	0.164
ENGINE	All	NO_2	1-hr	5.8
ENGINE	All	NO_2	Annual	5.8
ENGINE	All	CO	1-hr	18.7
ENGINE	All	CO	8-hr	18.7
ENGINE	All	SO_2	1-hr	0.012
ENGINE	All	SO_2	3-hr	0.012
ENGINE	All	CHOH	1-hr	8.3E-03
ENGINE	All	CHOH	Annual	8.3E-03

With the exception of the annual pollutants associated with the 30 yd^3/hr maximum hourly production rate case and annual $PM_{2.5}$ associated with the other maximum hourly production rate cases, maximum hourly emission rates were modeled for the short-term and annual standards and thresholds. For the annual pollutants associated with the 30 yd^3/hr maximum hourly production rate case, maximum hourly emission rates were modeled for the internal combustion engine and annual average emission rates, based on 131,400 yd^3/yr, were modeled for all other sources. For annual $PM_{2.5}$ associated with the other maximum hourly production rate cases, maximum hourly emission rates were modeled for the internal combustion engine and annual average emission rates, based on 650,000 yd^3/yr, were modeled for all other sources.