

DRAFT ENGINEERING EVALUATION
CEMEX Construction Materials Pacific, LLC
500 Amador Street, San Francisco, CA 94124
Application: #28001
Plant: #17111

BACKGROUND

CEMEX Construction Materials Pacific, LLC (CEMEX) is an existing facility which operates a concrete batch plant at Pier 92 in San Francisco. The facility receives aggregates, cement, and cement supplement (flyash) to produce ready mix concrete. The facility uses both a truck-mixing batch process and a central-mix batching process.

The facility submitted Application #12815 in 2005 to permit Sources S-1 through S-14. The Authority to Construct was issued in October 2005. In 2015, the facility applied to increase concrete production to 934,055 tons per year (TPY) and increase sand and aggregate throughputs at 11 of the 14 sources (S-1 through S-9, S-12, and S-13) in Application #26846 and Application #27409. The Permit to Operate for both applications was issued in 2015. The 2015 applications did not request to increase sand throughput brought by barge (over S-14, the barge conveyor system), nor did they request authorization to bring in aggregate by barge. Currently, the throughput limit for S-14 is 60,000 TPY sand and 0 TPY aggregate.

This application is for an increase in sand throughput at S-14 from 60,000 TPY to 235,572 TPY. The facility has also requested to permit 153,803 TPY of aggregate at S-14. This application does not seek to increase the facility's overall production limit but to increase the facility's operational flexibility. The facility is already permitted to bring in 389,375 TPY sand and 389,375 TPY aggregate by truck. Permit conditions will continue to limit throughputs at downstream sources and the overall production level. (See Permit Condition, part 1; see also Figure 1¹.) Due to these limitations, sand and aggregate brought in via barge effectively reduce the amount of sand and aggregate that may be brought in by truck, and therefore also reduce truck trips to the facility.

This permit application does not trigger Best Available Control Technology (BACT) or a health risk assessment (HRA). In compliance with the California Environmental Quality Act (CEQA), a Draft Initial Study/ Negative Declaration (IS/ND) has been prepared. The IS/ND determined that the project will not have any significant impacts on the environment.

This application will be evaluated as a modification to the following source:

- S-14 Barge Conveyor System & Stockpile (2 Transfer Points)
Conveying Gravel/Sand
Maximum Yearly Sand Throughput: 235,572 Tons/Year
Maximum Daily Sand Throughput: 818 Tons/Day
Maximum Hourly Sand Throughput: 69 Tons/Hour
Maximum Yearly Aggregate Throughput: 153,803 Tons/Year
Maximum Daily Aggregate Throughput: 535 Tons/Day**

¹ Figure 1 illustrates how throughput limits on S-2, S-3, S-4, and S-5 (which are the same as the limit as on S-1) plus the limitation on the size of the sand and aggregate stockpile area (S-15) create a backstop or bottleneck on the total amount of material that can be brought in by truck plus by barge (S-14).

**Maximum Hourly Aggregate Throughput: 45 Tons/Hour
Abated by A-4 Water Spray System**

As shown above, S-14 currently includes a stockpile. Per Air District Permit Handbook Chapter 11.5, Concrete Batch Plants, stockpiles shall be grouped as separate sources. Therefore, the stockpile description will be removed from S-14, and the stockpile will be considered a separate source as shown below:

**S-15 Sand and Aggregate Stockpile
0.25 Acre Common Area
Abated by A-4 Water Spray System**

S-15 is not considered a modified source because it is an existing source and there will be no change in its emissions. The wind-erosion emissions from S-15 will not change because the exposed surface area of the stockpile is unchanged (0.25 acres).² Wind-generated emissions are a function of the exposed area and meteorological conditions rather than the total quantity of material handled; therefore, no increase in emissions is expected from this source. A mister and sprinkler system are located at the corners and along the north and south sides of the storage area to abate particulate matter (PM) emissions.³

Material Receiving and Transfer

Washed dredge sand is imported from British Columbia and brought by ship (referred to in this report as ocean going vessels, or OGVs). The sand is offloaded to barges at Anchorage 9.⁴ Tugboats then tug the barge to Pier 92. Sand is transferred off the barge by mobile handling equipment, such as front-end loaders. Engine emissions from mobile handling equipment are excluded from Air District regulations pursuant to Regulation 1-110.1.

The sand and aggregate are offloaded to S-14, Barge Conveyor System. From the electrically powered conveyor system, the material is then transferred to either S-15, Sand and Aggregate Stockpile, or directly to S-1, Drive-Over Grizzly and Hopper. Sand and aggregate that is first delivered to S-15, Sand and Aggregate Stockpile, will eventually be transferred to S-1, Drive-Over Grizzly and Hopper, by a front-end loader.

S-1 encompasses both the recessed grizzly pit used by trucks and conveyor discharge, and an adjacent hopper that may be loaded by front-loader. Both components feed a common conveyor system and are therefore considered a single emission source. Material can reach S-1 directly from the barge conveyor system (S-14), from transfer trucks, or from the stockpile (S-15) via front-loader.

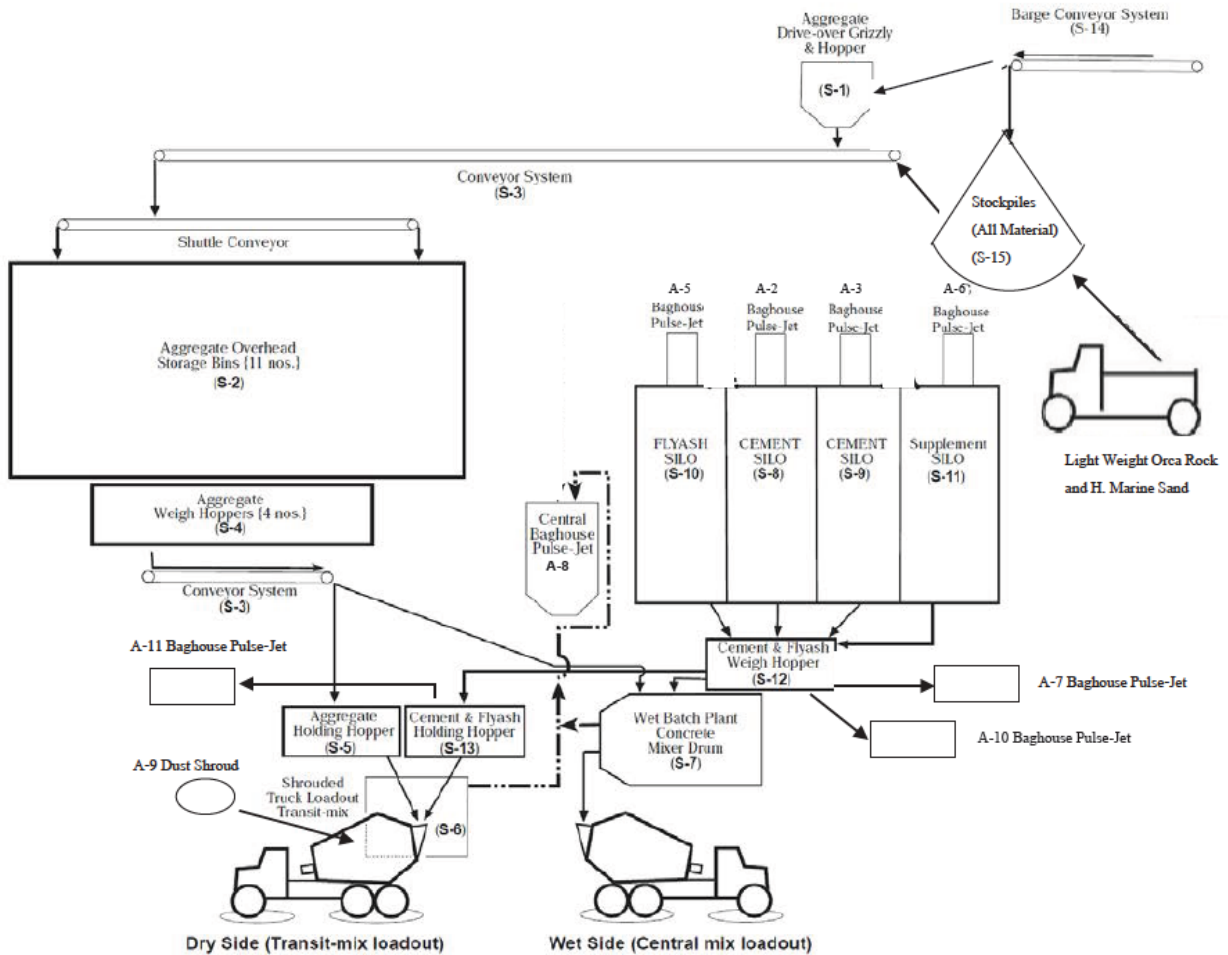
Figure 1 below illustrates the operations at the facility and identifies all sources and abatement devices.

² Pursuant to Permit Condition, part 1(h), S-15 may not exceed 0.25 acres.

³ Road dust emissions are not considered a modification since there is no increase in vehicle miles traveled (VMT) as a result of this project.

⁴ An anchorage is a site located in the bay for ships to drop anchor and wait. Anchorage 9 off Hunters Point is the largest in the bay.

Figure 1. Facility Diagram



Notes: The mister and sprinkler system (A-4) abates particulate matter emissions from S-1, S-3, S-4, S-5, S-14, and S-15.

EMISSIONS CALCULATIONS

This section analyzes emissions related to the application.

Particulate Matter Emissions

Criteria pollutant emissions for this project are from the transfer of sand and aggregate from the barge to the barge conveyor system (Transfer Point #1), and the transfer of sand and aggregate from the barge conveyor system to either the stockpile or Drive-over Grizzly & Hopper (Transfer Point #2).

S-14 Barge Conveyor Emissions

Emissions resulting from the transfer of sand and aggregate at Transfer Point #1 and Transfer Point #2 are associated with (i.e., attributed to) S-14.

Sand Transfer Emissions:

PM emissions are calculated using emission factors from Chapter 11.12, Concrete Batching, of AP-42 (Fifth Edition, Volume 1). The emission factor for Uncontrolled Total PM₁₀ for sand transfer from Table 11.12-2 is 0.00099 lb/ton. Per Air District Permit Handbook Chapter 11.5, Concrete Batch Plants, PM_{2.5} is 15% of PM₁₀, therefore, the uncontrolled PM_{2.5} emission factor is 0.00015 lb/ton.

Since watering is used to suppress dust, a maximum abatement efficiency of 70% is used in calculating emissions of PM₁₀ per Chapter 11.15 of the Air District Permit Handbook. An abatement efficiency of 40% is used in calculating PM_{2.5} emissions, based on Table B.2-3 of AP-42 Appendix B.2, Generalized Particle Size Distribution, for dust suppression using water sprays⁵.

Table 1. Total PM₁₀ Emissions from Sand Transfer at S-14

	PM ₁₀					
	Abated Emission Factor (lb/ton)	Maximum Daily Sand Throughput (ton/day)	Maximum Daily Sand Emissions (lb/day)	Maximum Yearly Sand Throughput (ton/year)	Maximum Yearly Sand Emissions (lb/year)	Maximum Yearly Sand Emissions (ton/year)
Transfer Point #1	0.000297 ¹	818	0.243	235,572	69.96	0.035
Transfer Point #2	0.000297 ¹	818	0.243	235,572	69.96	0.035
Total	--	--	0.486	--	139.92	0.070

¹Abatement efficiency of 70% applied to 0.00099 lb/ton (AP-42 11.12-2), abated emission factor = 0.000297 lb/ton.

Table 2. Total PM_{2.5} Emissions from Sand Transfer at S-14

	PM _{2.5}					
	Abated Emission Factor (lb/ton)	Maximum Daily Sand Throughput (ton/day)	Maximum Daily Sand Emissions (lb/day)	Maximum Yearly Sand Throughput (ton/year)	Maximum Yearly Sand Emissions (lb/year)	Maximum Yearly Sand Emissions (ton/year)
Transfer Point #1	0.00009 ¹	818	0.074	235,572	21.20	0.011
Transfer Point #2	0.00009 ¹	818	0.074	235,572	21.20	0.011
Total	--	--	0.148	--	42.40	0.022

¹Abatement efficiency of 40% applied to 0.00015 lb/ton (Permit Handbook Ch. 11.5), abated emission factor = 0.00009 lb/ton.

Total emissions from Table 1 will be used to determine respirable crystalline silica emissions in the toxic air contaminant (TAC) emissions section.

⁵ Since the 2021 draft evaluation report for this project, BAAQMD Permit Handbook Chapter 11.5 (Concrete Batch Plants) has been updated to include a 40% abatement efficiency for PM_{2.5} emissions from water spray dust suppression.

Aggregate Transfer Emissions:

Similar to emission calculations for sand transfer, emissions from aggregate transfer were calculated using emissions factors from Chapter 11.12, Concrete Batching, of AP-42 (Fifth Edition, Volume 1). The emission factor for Uncontrolled Total PM₁₀ for aggregate transfer from Table 11.12-2 is 0.0033 lb/ton. Per Air District Permit Handbook Chapter 11.5, Concrete Batch Plants, PM_{2.5} is 15% of PM₁₀, therefore, the uncontrolled PM_{2.5} emission factor is 0.0005 lb/ton. Also, if watering is used to suppress dust, a maximum abatement efficiency of 70% may be used in calculating emissions of PM₁₀ and 40% may be used in calculating emissions of PM_{2.5}.

Table 3. Total PM₁₀ Emissions from Aggregate Transfer at S-14

	PM ₁₀					
	Abated Emission Factor (lb/ton)	Maximum Daily Aggregate Throughput (ton/day)	Maximum Daily Aggregate Emissions (lb/day)	Maximum Yearly Aggregate Throughput (ton/year)	Maximum Yearly Aggregate Emissions (lb/year)	Maximum Yearly Aggregate Emissions (ton/year)
Transfer Point #1	0.00099 ¹	535	0.530	153,803	152.26	0.076
Transfer Point #2	0.00099 ¹	535	0.530	153,803	152.26	0.076
Total	--	--	1.060	--	304.53	0.152

¹Abatement efficiency of 70% applied to 0.0033 lb/ton (AP-42 11.12-2), abated emission factor = 0.00099 lb/ton.

Table 4. Total PM_{2.5} Emissions from Aggregate Transfer at S-14

	PM _{2.5}					
	Abated Emission Factor (lb/ton)	Maximum Daily Aggregate Throughput (ton/day)	Maximum Daily Aggregate Emissions (lb/day)	Maximum Yearly Aggregate Throughput (ton/year)	Maximum Yearly Aggregate Emissions (lb/year)	Maximum Yearly Aggregate Emissions (ton/year)
Transfer Point #1	0.0003 ¹	535	0.161	153,803	46.14	0.023
Transfer Point #2	0.0003 ¹	535	0.161	153,803	46.14	0.023
Total	--	--	0.322	--	92.28	0.046

¹Abatement efficiency of 40% applied to 0.0005 lb/ton (Permit Handbook Ch. 11.5), abated emission factor = 0.0003 lb/ton.

Incremental Increase Emissions Discussion:

The incremental increase in annual sand throughput (235,572 – 60,000 = 175,572 tons per year) was used to calculate the corresponding increase in PM emissions related to increased sand throughput at S-14.

Table 5. PM₁₀ Emissions from the Increase of Sand Throughput at S-14

	PM ₁₀			
	Emission Factor (lb/ton)	Maximum Yearly Sand Throughput (ton/year)	Maximum Yearly Sand Emissions (lb/year)	Maximum Yearly Sand Emissions (ton/year)
Transfer Point #1	0.000297 ¹	175,572	52.14	0.026
Transfer Point #2	0.000297 ¹	175,572	52.14	0.026
Total	--	--	104.29	0.052

¹Abatement efficiency of 70% applied to the uncontrolled PM₁₀ emission factor (0.00099 lb/ton).

Table 6. PM_{2.5} Emissions from the Increase of Sand Throughput at S-14

	PM _{2.5}			
	Emission Factor (lb/ton)	Maximum Yearly Sand Throughput (ton/year)	Maximum Yearly Sand Emissions (lb/year)	Maximum Yearly Sand Emissions (ton/year)
Transfer Point #1	0.00009 ¹	175,572	15.80	0.008
Transfer Point #2	0.00009 ¹	175,572	15.80	0.008
Total	--	--	30.16	0.016

¹Abatement efficiency of 40% applied to uncontrolled PM_{2.5} emission factor (0.00015 lb/ton).

Oceangoing Vessel and Tug Emissions

OGVs and tugboats are used to transport material to the facility. They are sources of nitrogen oxide (NO_x), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO₂), and PM. In accordance with Regulation 2-2-610, emissions of OGVs shall be included in this analysis for the purpose of assessing the facility cumulative increase and offset requirements. Emissions from OGVs are not included for purposes of applying any other provisions of Regulation 2-2.

Sand and aggregate processed at S-14 is brought to CEMEX by OGV, tugboat, and barge. Emissions resulting from the operation of OGVs are calculated 11 nautical miles (nm) offshore at the Bar Pilot Station. Emissions from the OGV for the purposes of this application occur during Leg 1 (transit from Bar Pilot Station to the Golden Gate bridge), Leg 2 (transit from the Golden Gate Bridge to the Bay Bridge), Leg 3 (transit from the Bay Bridge to Anchorage #9), during hoteling at Anchorage #9 while material is being offloaded, and from the outbound return trip. The facility utilizes up to 30 OGVs and tugs per year to transport material to the facility. The OGV also transports materials for companies other than CEMEX at the same time. At a minimum, the OGV delivers materials for three companies at any given time. Therefore, OGV emissions attributed to CEMEX – Pier 92 will be divided by three.

While at Anchorage #9, the OGV may remain idling for as long as 46.8 hours. When the material is ready to be offloaded, a tugboat, which remains stationed at Pier 50, travels to Pier 92 to pick up an empty barge. The tug then transports the barge to Anchorage #9 where it waits up to six hours while material is offloaded onto the barge. Once offloading is complete, the tugboat travels back to Pier 92 to drop off the barge at the facility

and then travels back to Pier 50. There are no engines used on the barge. Therefore, there are no emissions resulting from the operation of the barge.

Since each trip varies with regards to the time needed to offload, the time needed to reach Anchorage #9, and the number of other facilities using the same OGV to transport material, etc., the maximum value for each parameter was used as a conservative estimate of cargo emissions.

Emissions from OGVs and tugboats attributable to CEMEX are summarized in Table 7. Detailed calculations and assumptions are provided in Appendix B. For PM emissions, PM_{2.5} is conservatively assumed to equal PM₁₀ for OGV and tugboat operations.

Table 7. Summary of OGV and Tug Emissions Attributable to CEMEX (30 ship trips/year)

Pollutant	Annual Emissions (tons/year)
CO	3.193
NO _x	26.803
SO ₂	0.534
POC	1.242
PM ₁₀	0.622
PM _{2.5}	0.622

Toxic Air Contaminant Emissions

Crystalline silica is a TAC commonly present in sand. Respirable-sized particles (PM₄) are produced when crystalline silica is processed. CEMEX provided a manufacturer's specification data sheet (MSDS) for the sand imported from British Columbia, which contains up to 90% crystalline silica, as confirmed in a letter dated November 8, 2017. According to *PM₄ Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California*,⁶ the PM₄ crystalline silica emission factor is proportional to the silica content of the bulk material. In this study, the emission factor to crystalline silica content ratio was found to be approximately 1.93E-6. By this ratio, 90% crystalline silica content corresponds to a PM₄ emission factor of 0.000174 lb/ton.

The Air District's regulation of TACs is laid out in Regulation 2, Rule 5. Pursuant to this Regulation, any new or modified source of TACs is required to undergo a health risk assessment (HRA) if TAC emissions exceed the hourly or annual thresholds outlined in Table 2-5-1.⁷ In this project, there are no new sources, and S-14 is the only modified source.⁸ Therefore, total respirable crystalline silica emissions from the transfer of sand at S-14 are considered for health risk analysis (HRA) purposes. As shown in Table 8, below, annual

⁶ John R. Richards, Todd T. Brozell, Charles Rea, Geoff Boraston & John Hayden (2009) PM₄ Crystalline Silica Emission Factors and Ambient Concentrations at Aggregate-Producing Sources in California, Journal of the Air & Waste Management Association, 59:11, 1287-1295, DOI: 10.3155/1047-3289.59.11.1287

⁷ Respirable crystalline silica does not have an hourly threshold, only an annual threshold or trigger level.

⁸ Note emissions from mobile sources are not covered by Regulation 2, Rule 5 because the Air District does not have authority over these sources.

emissions of respirable crystalline silica are 29 lbs/year, which is far below the chronic trigger level. Thus, this project does not require preparation of an HRA.

Table 8. Respirable Crystalline Silica TAC Emissions

Pollutant	Uncontrolled Emissions Factor (lb/ton)	Controlled Emissions Factor (lb/ton) ¹	Annual Emissions ² (lb/year)	Chronic Trigger Level ³ (lbs/year)	Triggers HRA?
Respirable Crystalline Silica PM ₄	0.000174	0.0000609	29	120	No

¹Water-spray abatement efficiency for PM₄ is 65%, consistent with AP-42 Appendix B.2, Table B.2-3

²Calculation based on sum of emissions from 1) transfer of sand to barge conveyor system, and 2) transfer of sand from the conveyor to either the drive over grizzly and hopper, or the stockpile

³Regulation 2, Rule 5, Table 2-5-1

CUMULATIVE INCREASE

Table 9 presents the facility's existing cumulative increases and adds the new emission increases resulting from this application. The increases from this project include:

- aggregate-transfer emissions (Tables 3 and 4),
- incremental sand-transfer emissions (Tables 5 and 6), and
- OGV/tugboat emissions (Appendix B).

The resulting cumulative increases are used to determine offset requirements under Regulation 2-2-302 and 2-2-303, discussed later in this report.

Table 9. Facility Cumulative Emission Increase

Pollutant	Existing Cumulative Increase ¹ (tons/year)	Corrected Cumulative Increase ² (tons/year)	Emission Increase from App #28001 ³ (tons/year)	New Cumulative Increase (tons/year)
POC	0.010	0.010	1.242	1.242 ⁴
NO _x	0.880	0.880	26.803	26.803 ⁵
SO ₂	0.000	0.000	0.534	0.534
CO	0.054	0.054	3.193	3.193 ⁶
PM _{2.5}	0.000	1.741	0.684 ⁷	2.425
PM ₁₀	16.204	8.034	0.826	8.860

¹ Cumulative increase before accounting for Application # 28001.

²Emission calculations in previous applications were greatly overestimated and are corrected in this application.

³Sum of emissions from the increase in sand throughput, total aggregate throughput, and OGV emissions attributable to this application.

⁴For POC, this application provides an updated estimate of total OGV/tugboat emissions. Since the new estimate replaces the previous OGV/tugboat value in the cumulative increase record, the earlier value is not subtracted.

⁵For NO_x, this application provides an updated estimate of total OGV/tugboat emissions. Since the new estimate replaces the previous OGV/tugboat value in the cumulative increase record, the earlier value is not subtracted.

⁶For CO, this application provides an updated estimate of total OGV/tugboat emissions. Since the new estimate replaces the previous OGV/tugboat value in the cumulative increase record, the earlier value is not subtracted.

⁷PM_{2.5} emissions from OGVs/tugboats are conservatively assumed to equal PM₁₀ emissions.

STATEMENT OF COMPLIANCE

Regulation 1: General Provisions and Definitions

Regulation 1, Section 301, Public Nuisance, states the following:

“No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30-day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.”

The facility has not received any public nuisance violations in the past five years and is expected to meet the requirement of Regulation 1-301.

Regulation 2, Rule 1: General Requirements

CEQA

As the lead agency, the Air District has prepared a Draft IS/ND pursuant to CEQA (State Clearinghouse No. pending). The Air District released a Notice of Availability and Intent to Adopt an IS/ND. The Draft IS/ND will be available for public review and comment from February 19, 2026 through March 23, 2026.

The Air District will consider the IS/ND as well as any public comments, prior to determining whether to adopt the IS/ND or approve the application. The Air District will only adopt the IS/ND if it finds, based on the entire record, that there is no substantial evidence that the project will have a significant effect on the environment and that the IS/ND reflects its independent judgment and analysis.

Public Notice

Pursuant to Regulation 2-1-412, public notice is required for an application for a new or modified source located (i) within 1,000 feet of the outer boundary of a K-12 school or (ii) within an Overburdened Community and for which an HRA is required pursuant to Regulation 2-5-401. The facility is not located within 1,000 feet of a school. Additionally, the facility is not located within an Overburdened Community nor was an HRA required under Regulation 2-5-401. Therefore, public notice is not required for this application.

Regulation 2, Rule 2: New Source Review

Regulation 2, Rule 2, Section 301

Per Regulation 2-2-301, Best Available Control Technology (BACT) is required for any new or modified source with a regulated air pollutant potential to emit (PTE) equal to or greater than 10.0 lb/day.

S-14 is the only modified source in this project. The total maximum daily emissions of PM₁₀ from sand and aggregate handling at S-14 is the sum of 0.486 lb/day and 1.060 lb/day (listed in Tables 1 and 3), which is 1.546 lb/day. The total maximum daily emissions of PM_{2.5} from sand and aggregate handling at S-14 is the sum of 0.148 lb/day and 0.322 lb/day (listed in Tables 2 and 4), which is 0.470 lb/day.

The total maximum daily throughput at S-14 will not result in a PM₁₀ or PM_{2.5} emission increase greater than 10.0 lb/day. Therefore, BACT is not required.

Regulation 2, Rule 2, Section 302

Regulation 2-2-302 requires offsets for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of precursor organic compounds (POCs) or nitrogen oxides (NO_x). The PTE threshold determines whether offset requirements apply, while the quantity of offsets required is based on the facility's cumulative emission increase for each pollutant. The only sources of NO_x and POC at CEMEX are OGVs and tugboats. As previously noted, emissions of OGVs/tugboats are included in the offset analysis in accordance with Regulation 2-2-610.

The PTE for NO_x and POC emissions are 26.803 tons per year and 1.242 tons per year, respectively. Since NO_x emissions exceed the 10 tons per year offset threshold but are less than 35 tons per year, the required NO_x offsets will be provided from the Air District's Small Facility Banking Account.

As shown in Table 9, the cumulative increase in NO_x emissions from this application is 26.803 tons per year, and therefore 26.803 tons of NO_x credits are required. Since POC emissions are below 10 tons per year, POC offsets are not required.

Regulation 2, Rule 2, Section 303

Regulation 2-2-303 requires offsets for any new or modified source at a major facility, defined as a facility with a PTE of 100 tons per year or more of PM₁₀, PM_{2.5}, or sulfur dioxide (SO₂).

At CEMEX, emissions of PM₁₀ and PM_{2.5} occur from the operation of Sources 1 through 15, fugitive road dust, and OGV/tugboat emissions.

CEMEX is limited to 155,000 cubic yards of concrete at S-6, Truck Mixing, and 290,000 cubic yards of concrete at S-7, Central Mixing, in the permit conditions. Detailed PTE calculations for these batching sources, based on AP-42 Table 11.12-2, are provided in Appendix C.

CEMEX is limited to 20,241 VMT/year in the permit conditions. Therefore, the road dust emissions listed in Table A-3 of Appendix A reflect the PTE for PM₁₀ and PM_{2.5} from road dust.

CEMEX is limited to 0.25 acres for the size of S-15 Stockpile. Therefore, the emissions in Appendix A reflect the PTE emissions for this source.

OGV and tugboat operations are also sources of PM₁₀ and PM_{2.5} at CEMEX. Their PTE values are shown in Appendix B, where PM_{2.5} is conservatively assumed to equal PM₁₀.

Table 10 summarizes the facility's total potential to emit for PM₁₀ and PM_{2.5}. As shown, the facility's total PTE, 8.860 tons/year PM₁₀ and 2.425 tons/year PM_{2.5}, is well below the 100 tpy "major facility" threshold. Therefore, offset requirements under Regulation 2-2-303 are not triggered.

Table 10. Facility Potential to Emit of PM

Source	PM ₁₀ (tons/year)	PM _{2.5} (tons/year)
Concrete Batching (S-1 through S-14)	3.489	0.636
Stockpile (S-15)	0.023	0.007
Road Emissions	4.726	1.160
OGV/Tugboat	0.622	0.622
Total	8.860	2.425

The only source of SO_x emissions at CEMEX is from the operation of OGV and tugboats. As shown in Table 7 and Table B-2 of Appendix B, the SO_x PTE is 0.534 tons/year and below the 100 ton/year threshold for providing offsets. Thus, offsets for SO_x are not required.

Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants

As explained above, the Air District's regulation of TACs is laid out in Regulation 2, Rule 5. Pursuant to this Regulation, any new or modified source of TACs is required to undergo a HRA if TAC emissions exceed the hourly or annual thresholds outlined in Table 2-5-1. As mentioned previously, this project does not trigger a HRA since emissions of respirable crystalline silica do not exceed the annual trigger limit. Therefore, an HRA was not required for this project.

Regulation 2, Rule 6: Major Facility Review

The requirements of federal operating permit program have been codified in District Regulation 2, Rule 6. This rule requires that major and designated facilities apply for and obtain a Title V federal operating permit. Since this facility will emit less than 100 tons/year each of NO_x, CO, POC, PM₁₀, and SO₂, less than 10 tons/year of any single Hazardous Air Pollutant (HAP), and less than 25 tons/year of all HAPs combined, it is not considered to be a major facility of regulated air pollutants. This facility is also not a designated facility pursuant to any federal NSPS or NESHAP requirements. Therefore, Regulation 2, Rule 6 does not apply to this site.

Regulation 6, Rule 1: Particulate Matter – General Requirements

Regulation 6, Rule 1, Section 301, Ringelmann No. 1 Limitation, requires that visible emissions do not exceed Ringelmann 1.0 for periods aggregating more than 3 minutes in any hour or equivalent opacity.

Regulation 6, Rule 1, Section 305, Visible Particles, prohibits a public nuisance caused by the fallout of visible particulate emissions. This section only applies if such particles fall on real property other than the property of the person responsible for the emissions.

Regulation 6, Rule 1, Section 310, Total Suspended Particulate (TSP) Concentration Limits, limits the concentration of TSP in the exhaust from devices such as baghouses and stacks. S-14 is controlled by water spray and does not exhaust to any baghouse or stack. Therefore, this section does not apply.

Regulation 6, Rule 1, Section 311, Total Suspended Particulate (TSP) Weight Limits, limits TSP from any source based on the process weight rate. Regulation 6-1-311.2 applies to sources that have the potential to emit greater than 1000 kg per year (1.1 tons per year) of TSP. S-14 may have the potential to emit more than 1.1 tons/year, therefore, compliance with this section must be achieved.

S-14 processes 69 tons/hour of sand and 45 tons/hour of aggregate for a total of 114 tons/hour (228,000 lb/hour). Based on this process weight rate, the TSP emission limit in Table 6-1-311.2 is 1.29 lb/hour.

From Table 11-12-2 of AP-42 Chapter 11.12 Concrete Batching, the total PM (which is also considered to be TSP) emission factor for uncontrolled sand transfer operations is 0.0021 pounds of TSP per tons of material transferred. The emission factor for uncontrolled aggregate transfer is 0.0069 pounds of TSP per tons of material transferred. Based on the emission factors for sand and aggregate, maximum hourly uncontrolled TSP emissions are 0.14 lb/hour from sand processing and 0.09 lb/hour from aggregate processing. The total hourly TSP is 0.23 lb/hour which is under the 1.29 lb/hour limit. CEMEX is in compliance with this requirement.

Regulation 6, Rule 6: Particulate Matter – Prohibition of Trackout

Regulation 6, Rule 6 limits the trackout of particulate matter onto public roadways from large bulk material sites, large construction sites, and large disturbed surface sites. CEMEX meets the definition of a large bulk material site since the facility has a stockpile of material greater than 100 square feet. Section 301 limits the extent of trackout to 25 cumulative linear feet and limits the amount of trackout material to 1 quart. Section 302 limits visible emissions during cleaning activities to 20% opacity or Ringelmann 1.0 for 3-minutes in any hour. Regulation 6-6-501 requires CEMEX to monitor the extent of trackout at the facility exits at least two times per each work-day, keep records of any times when trackout exceeds the 25-foot limit, and keep records of all related cleanup events. The Air District has verified that CEMEX is meeting the trackout limitations and expects that CEMEX will continue to comply with Sections 301 and 302. Monitoring requirements will be added to the permit conditions.

Federal Requirements:

New Source Performance Standards

CEMEX is not subject to New Source Performance Standards (NSPS) 40 CFR 60 Subpart OOO, 60.672(b) based on 60.670(a)(2), which states:

- (2) The provisions of this subpart do not apply to the following operations: All facilities located in underground mines; plants without crushers or grinding mills above ground; and wet material processing operations (as defined in §60.671).

Although the facility is not subject to the above NSPS, CEMEX is still expected to comply with the opacity limits of the NSPS in Table 3. Permit Condition #100829 includes visible emission compliance requirements, which are more stringent than NSPS.

There are no applicable National Emission Standards for Hazardous Air Pollutants (NESHAPs) for concrete batch plants.

PERMIT CONDITIONS

In December 2024, Permit Condition #100488 went into effect at this facility as a result of Application #31219. This permit condition will be archived and replaced with the following facility-wide condition below. Part 13 of this permit condition listed source testing requirements for baghouses A-8, A-10, and A-11. CEMEX did not conduct these source tests by the specified date listed in the permit condition. As a result, the facility received Notice of Violation (NOV) A64137. The requirement to test will remain in the new permit condition below with slightly updated language.

Permit Condition #100829 -----

Revised: A #26846 (Approved 2015); A #27409 (Approved 2015); A #31219 (Approved 2024); A #28001

1. The owner/operator shall not exceed the following material throughput per consecutive 12-month period. All references to aggregate in this permit condition refer specifically to rock processed at CEMEX.
 - a. S-1, S-2, S-3, S-4 and S-5: 389,375 tons of aggregate and 389,375 tons of sand at each source
 - b. S-6: 155,000 cubic yards or 325,345 tons of concrete which includes 59,521 tons of cement and supplement
 - c. S-7: 290,000 cubic yards or 608,710 tons of concrete which includes 111,360 tons of cement and supplement
 - d. S-8 & S-9: 135,948 tons of cement at both sources combined
 - e. S-10 & S-11: 34,933 tons of cement supplement at both sources combined
 - f. S-12 & S-13: 170,881 tons of cement and supplement at each source
 - g. S-14: 235,572 tons of sand and 153,803 tons of aggregate
 - h. S-15: 0.25 acres of sand and aggregate at any time during the 12-month period.

(Basis: Cumulative increase)
2. The owner/operator shall record the material throughput in a District approved logbook to demonstrate compliance with Part 1. Material throughput shall be totaled on a monthly and consecutive 12-month basis. The logbook shall be kept at the site for at least 24 months from the date of data entry and be made available for inspection to the District staff upon request.

(Basis: Cumulative Increase)
3. The owner/operator shall ensure that visible particulate emissions from the operation of this plant shall not exceed Ringelmann 0.5 or result in fallout on adjacent property in such quantities as to cause public nuisance per District Regulation 1-301.

(Basis: Regulations 6-1-301, 1-301, Regulation 6-6)
4. The owner/operator shall use water spray and if necessary, with chemical suppressant sufficiently for aggregate handling and storage to comply with Part 3.

(Basis: Regulations 6-1-301, 1-301)
5. The owner/operator shall pave the equipment sites, storage sites, work sites, and site truck transport roads and spray with water to minimize fugitive dust emissions from trucking activities to comply with Part 3.

(Basis: Regulations 6-1-301, 1-301, Regulation 6-6)

6. The owner/operator shall ensure no air contaminant is discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour an emission equal to or greater than 20% opacity.
(Basis: Regulation 6-1-302)
7. The owner/operator shall abate PM emissions from S-14 and S-15 using Water Spray System A-4. The owner/operator shall ensure water sprays are at each drop point at the conveyor for S-14. For the stockpile area, S-15, the owner/operator shall ensure the water spray reaches the entire surface area of the stockpile and that the entire surface area remains wet at all times. The owner/operator is required to maintain compliance with the facility's Dust Control Plan at all times.
(Basis: Cumulative Increase, Regulation 6-1-301, Dust Control Plan)
8. The total annual on-site vehicle miles traveled by vehicles associated with facility operations within the facility boundary shall not exceed 20,241 miles in any consecutive 12-month period. To demonstrate compliance with this limit, the facility shall maintain records sufficient to calculate annual VMT, including:
 - a. The number of truck trips entering the facility per day, and
 - b. The standard on-site distance (in miles) traveled per trip.
(Basis: Cumulative Increase, Recordkeeping)
9. The owner/operator shall equip S-6 Transit-Mix Loadout with A-9 Shroud that fully encloses the loading area to minimize the release of particulate emissions during all truck loading operations. The shroud must be properly fitted to ensure a tight seal around the loading area. The owner/operator of A-9 Shroud shall ensure no gaps or openings are present that could allow visible emissions to escape. The shroud must be inspected at least once per shift to ensure its integrity. Truck loading must cease immediately if the shroud is not in place or is not functioning correctly.
(Basis: Cumulative increase; TBACT)
10. The owner/operator shall control all emissions from the following sources by the corresponding abatement devices listed below, during all loading and operational activities:
 - a. S-6 Transit-mix Loadout: Emissions shall be controlled by A-9 Shroud and followed by A-8 Central Baghouse
 - b. S-7 Premixer & Central-mix Loadout: Emissions shall be controlled by A-8 Central Baghouse
 - c. S-8 Cement Silo #1: Emissions shall be controlled by A-2 Baghouse
 - d. S-9 Cement Silo #2: Emissions shall be controlled by A-3 Baghouse
 - e. S-10 Cement Supplement Silo #1: Emissions shall be controlled by A-5 Baghouse
 - f. S-11 Cement Supplement Silo #2: Emissions shall be controlled by A-6 Baghouse
 - g. S-12 Cement & Supplement Weigh Hopper: Emissions shall be controlled by A-7 Baghouse and A-10 Baghouse
 - h. S-13 Cement & Supplement Holding Hopper: Emissions shall be controlled by A-11 Baghouse.
(Basis: Cumulative increase; TBACT)
11. The owner/operator shall equip and maintain all baghouses in operation at the facility with a device for measuring the pressure drop across the baghouse.
(Basis: Regulation 6-1-301, 6-1-310, and 6-1-311)
12. The owner/operator shall inspect all baghouses in operation at the facility on a weekly basis to ensure proper operation. The following items shall be monitored:

- a. The pressure drop across the baghouse shall be checked weekly. The pressure drop shall be no lower than 2 inches of water and no greater than 12 inches of water.
 - b. The baghouse exhaust shall be checked weekly for evidence of particulate breakthrough. If breakthrough is evident from plume observations, dust buildup near the stack outlet, or abnormal pressure drops. The filter bags shall be checked for any tears, holes, abrasions, and scuffs, and replaced as needed.
 - c. All hoppers shall be discharged in a timely manner to maintain compliance with Section (a) of this Part.
 - d. The pulsejet, shaker cleaning system shall be maintained and operated at sufficient intervals to maintain compliance with Section (a) of this Part.
(Basis: Regulation 2-1-403)
13. The owner/operator shall ensure the following outlet grain loading limits are not exceeded:
- a. A-8: 0.0013 grains per dry standard cubic foot
 - b. A-10 and A-11: 0.01 grains per dry standard cubic foot
- (Basis: Cumulative Increase)
14. No later than 60 days from the startup of A-8 Baghouse and no later than 60 days from the issuance date of the Authority to Construct under Application 31219 (December 08, 2024) for A-10 and A-11, the owner/operator shall conduct Air District approved source tests to determine initial compliance with the grain loading limits in Part 12.
- a. Each test run shall be conducted at the following minimum exhaust flow rates (based on 90% of design rate):
 - i. A-8: 12,600 acfm
 - ii. A-10: 389 acfm
 - iii. A-11: 389 acfm
 - b. Each test run shall be conducted while maintaining the following minimum process rates (based on 90% of operating rates):
 - i. For A-8 testing: S-6 shall be operating at a minimum of 135 tons per hour and S-7 shall be operating at a minimum of 315 tons per hour
 - ii. For A-10 testing: the transfer rate to S-12 shall be at least 149 tons per hour
 - iii. For A-11 testing: the transfer rate to S-13 shall be at least 45 tons per hour
 - c. During A-8 testing, S-6 and S-7 shall operate simultaneously at their respective rates specified above.
 - d. Testing shall be conducted using the typical cement and cement supplement materials used in regular operations. The owner/operator shall document the type and specifications of all materials used during testing.
 - e. All material handling operations shall be conducted using normal operating procedures, including normal material drop heights, typical material transfer speeds, and standard material moisture content. The owner/operator shall document these parameters during testing.
 - f. The owner/operator shall document the age of the filter bags and date of last bag replacement prior to testing. Records of any maintenance performed on the baghouses within 30 days prior to testing shall be submitted with the test report.
- The owner/operator shall submit the source test results to the Air District's Source Test Section no later than 60 days after source test completion.
(Basis: Cumulative Increase)

15. The owner/operator shall not exceed a total of 30 ship trips to deliver sand and aggregate to the facility per calendar year. One ship trip includes Leg 1 (transit from Bar Pilot Station to the Golden Gate bridge), Leg 2 (transit from the Golden Gate Bridge to the Bay Bridge), Leg 3 (transit from the Bay Bridge to Anchorage #9), hoteling at Anchorage #9 while material is being offloaded, and the outbound trip. To demonstrate compliance with this permit condition, the owner/operator shall maintain records in a District-approved log. All records shall be retained on site for at least two years from the date of entry and be made available for inspection by District staff on request. (Basis: Cumulative Increase, Regulation 2-2-302, Recordkeeping)
16. The owner/operator shall ensure no barge engines are used to transport or offload sand or aggregate at S-14.
(Basis: Cumulative Increase and Regulation 2-2-302)
17. The owner/operator shall ensure all sand and aggregate processed at S-14 is offloaded from the barge by mobile handling equipment.
(Basis: Cumulative Increase and Regulation 2-2-302)
18. The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the Air District's Manual of Procedures. The owner/operator shall notify the Air District's Source Test Section, in writing, of the source test protocols and projected test dates at least 30 days prior to testing.
(Basis: Cumulative Increase)
19. The owner/operator shall minimize fugitive dust emissions from the truck traffic to comply with Part 3. If Air District inspections confirm a fugitive dust problem exists, then one or more of the following shall be implemented.
 - a. Vacuum sweeping of all plant road surfaces.
 - b. High power water flushing of all plant road surfaces.
 - c. Truck tire washing before any haul truck is allowed off the property.
 - d. Other actions deemed appropriate by the District.(Basis: Regulation 6-1-301)
20. The owner/operator of the Regulated Bulk Material Site shall comply with the following requirements to control visible emissions and manage bulk material spills:
 - a. Visible Emissions Control: The owner/operator shall not cause or allow fugitive dust visible emissions from active operations, bulk material stockpiles, or bulk material spills that:
 - i. Exceed 5 feet in length, 5 feet in width, or 5 feet in height, and 10 percent opacity as determined by EPA Method 203B (or half as dark in shade as Number 1 on the Ringelmann Chart) for more than 3 minutes in any 60-minute period; or
 - ii. Travel or carry beyond the site property line.
 - b. Spill Management: The owner/operator shall clean up any bulk material spill exceeding 12 inches in height or 25 square feet in area by the end of the workday, unless the spill is adequately wetted, covered, or protected by a windscreen with no more than 50 percent porosity that:
 - i. Is equal to or higher than the height of the spill; and
 - ii. Is placed upwind of the spill at a distance no greater than the height of the windscreen.
 - c. Cleanup Activities: Cleanup activities must not result in fugitive dust visible emissions that exceed 20 percent opacity as determined by EPA Method 203B (or as dark in shade as Number 1 on the Ringelmann Chart) for more than 3 minutes in any 60-minute period.

(Basis: Regulation 6-1-307)

21. The owner/operator of the Regulated Bulk Material Site shall:
- Observe sources and operations for fugitive dust emissions with the sun or light behind the observer during high potential emission times due to wind or activities as specified by the APCO.
 - Conduct monitoring at least twice per workday when the wind is blowing toward the property line and at least once per workday for all other sources and operations.
 - Document monitored sources and operations each workday with active material handling and storage. Records must be maintained onsite for two years and provided to the APCO upon request.

(Basis: Regulation 6-1-506)

22. The owner/operator of CEMEX shall:

- Monitor the extent of the trackout at each active exit from the site onto a paved public road at least twice during each workday, at times when vehicle traffic exiting the site is most likely to create an accumulation of trackout, or as otherwise specified by the APCO;
- Document the active exit locations monitored each workday;
- Document each occasion when the trackout exceeds cumulative 25 linear feet and all trackout control and cleanup actions initiated as a result of monitoring Part a of this condition; and
- Maintain the records required by Part b and Part c of this condition for two years, in electronic, paper hard copy or log book format, and make them available to the APCO upon request.

(Basis: Regulation 6-6-501)

23. In order to demonstrate compliance with the above permit conditions, the following records shall be maintained in a District approved log. These records shall be kept on site and made available for District inspection for a period of at least two years from the date on which a record is made.

- Records of all inspections and all maintenance work including bag replacement for the baghouse. Records of each inspection shall consist of a log containing the date of inspection and the initials of the personnel that inspect the baghouses.

(Basis: Regulation 1-441)

RECOMMENDATION

The Air District has reviewed the material contained in the permit application and has made a preliminary determination that the project is expected to comply with all applicable requirements of Air District, state, and federal air quality-related regulations. However, the project is subject to CEQA review. I recommend that the Air District initiate public review of and comment on the Draft IS/ND. I further recommend that the Air District consider the IS/ND and any comments received prior to taking any final action on issuance of a Permit to Operate for the following sources:

- S-14 Barge Conveyor System (2 Transfer Points)**
Conveying Gravel/Sand
Maximum Yearly Sand Throughput: 235,572 Tons/Year
Maximum Daily Sand Throughput: 818 Tons/Day
Maximum Hourly Sand Throughput: 69 Tons/Hour
Maximum Yearly Aggregate Throughput: 153,803 Tons/Year
Maximum Daily Aggregate Throughput: 535 Tons/Day
Maximum Hourly Aggregate Throughput: 45 Tons/Hour

Abated by A-4 Water Spray System

**S-15 Sand and Aggregate Stockpile
0.25 Acre Common Area
Abated by A-4 Water Spray System**

Prepared by: Simrun Dhoot, Supervising Air Quality Engineer

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Appendix A
Stockpile and Road Dust Emissions

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S-15 Stockpile Emissions

S-15 is not a modified source in this application; its emissions are included for recordkeeping purposes and PTE calculations. PM emissions at the stockpile are due to wind erosion. Drop point emissions were included under S-14. PM emissions at the stockpile are calculated using two methods. The most conservative emissions will be used.

Method 1:

Emission factors for storage piles at concrete batch plants are from Air District Permit Handbook Chapter 11.5 for Concrete Batch Plants. The emission factor for PM₁₀ is:

$$E_{PM_{10}} = 1.7 \text{ lb/acre/day}$$

$$\text{Abated } E_{PM_{10}} = 0.51 \text{ lb/acre/day}$$

Using the assumption that PM_{2.5} is 15% of PM₁₀ and an abatement of 40% for water spray, the emission factor for PM_{2.5} is:

$$E_{PM_{2.5}} = 0.26 \text{ lb/acre/day}$$

$$\text{Abated } E_{PM_{2.5}} = 0.16 \text{ lb/acre/day}$$

Table A-1. Stockpile Emissions Using Method 1

Source #	Source Description	Pollutant	Abated Emissions Factor (lb/acre-day)	Maximum Stockpile Area (acres)	PM Emissions (lbs/day)	PM Emissions ¹ (lbs/year)	PM Emissions (ton/year)
15	Sand and Aggregate Stockpile	PM ₁₀	0.51	0.25	0.13	46.54	0.023
		PM _{2.5}	0.16	0.25	0.04	14.60	0.007

¹Based on 365 days/year.

Method 2:

Emissions of PM₁₀ and PM_{2.5} from wind erosion are also calculated using Equation 4-9 from the EPA document, "Control of Open Fugitive Dust Sources", dated 9/1988:

$$E_{30} = (1.7) \left(\frac{s}{1.5} \right) \left(\frac{365-p}{235} \right) \left(\frac{f}{15} \right) \text{ (lb/acre-day)}$$

Where, E₃₀ = PM₃₀ Emission Factor (lb/acre-day)

s = Silt Content of Sand, Material passing the 200-mesh typical range 0.2-1.58% = 1.58%

p = Number of Days with ≥ 0.01 inches of Precipitation Per Year, AP-42 Figure 13.2.2-1 = 65

f⁹ = Percentage of Time Unobstructed Wind Speed Exceeds 12 mph., based on Mojave Desert Air Quality Management District (MDAQMD) Emissions Inventory Guidance for Mineral

⁹ A draft Environmental Impact Report from the San Francisco Planning Department indicates that the percentage of time wind speed exceeds 12 mph in San Francisco is 10% (Source: https://sfmea.sfplanning.org/CentralSoMaPlanDEIR_13-iv-g-wind.pdf). For a more conservative estimate of emissions, data from MDAQMD was used.

Handling and Processing Industries, Wind Erosion from Stockpiles section (page 18/31) = 13.3%

$$PM_{30} = (1.7) \left(\frac{1.58}{1.5} \right) \left(\frac{365-65}{235} \right) \left(\frac{13.3}{15} \right) = 2.027 \text{ lb/acre-day}$$

The EPA document referenced above estimates that PM₁₀ is 0.5 x E₃₀. Therefore, the PM₁₀ emission factor is:

$$PM_{10} = 0.5 \times (2.027 \text{ lb/acre-day}) = 1.01 \text{ lb/acre-day}$$

Per Air District Permit Handbook Chapter 11.5, Concrete Batch Plants, PM_{2.5} is 15% of PM₁₀.

$$PM_{2.5} = 0.15 \text{ lb/acre-day}$$

Since the stockpile is abated by A-4, Water Spray System, control efficiencies of 70% for PM₁₀ and 40% for PM_{2.5} are assumed:

$$PM_{10} = (1.01 \text{ lb/acre-day}) \times (1-70\%) = 0.303 \text{ lb/acre-day}$$

$$PM_{2.5} = (0.15 \text{ lb/acre-day}) \times (1-40\%) = 0.090 \text{ lb/acre-day}$$

Annual emissions are calculated by multiplying the emission factor by the acres of exposed stockpile area and 365 days/year.

Table A-2. PM Stockpile Emissions Using Method 2

Source #	Source Description	Pollutant	Emissions Factor (lb/acres-day)	Reference	Maximum Sand Stockpile Area (acres)	PM Emissions (lbs/day)	PM Emissions (lbs/year)	PM Emissions (ton/year)
15	Sand and Aggregate Stockpile	PM ₁₀	0.303	EPA Document - "Control of Open Fugitive Dust Sources"	0.25	0.076	27.74	0.014
		PM _{2.5}	0.090	15% of PM ₁₀	0.25	0.023	8.39	0.004

Emissions from the first method are used for determining emissions from S-15 for purposes of offsets which are discussed later in this evaluation.

S-16 Road Emissions

S-16 is not a modified source in this application; its emissions are included for recordkeeping purposes and PTE calculations. These emissions include emissions from all vehicle traffic at the facility. The following equation for emissions from paved roads is provided in Chapter 13.2.1, Paved Roads of AP-42 (updated 1/2011) for vehicles traveling on paved surfaces:

$$E = k(sL)^{0.91} \times W^{1.02} \times (1 - P/4N)$$

Where, E = Emission Factor (lb/Vehicle Miles Traveled)

k = Particle size multiplier (lbs/VMT) = 0.0022, for PM₁₀ from Table 13.2.1-1

sL = road surface silt loading (grams per square meter g/m²) = 12, mean value for concrete batching from Table 13.2.1-4

W = average weight of the vehicles (tons) = 21.77 tons

P = number of wet days with at least 0.01" precipitation = 65 days

N = number of days in the averaging period = 365 days

$$E = 0.0022 \times (12)^{0.91} \times (21.77)^{1.02} \times [1 - (65 / (4 \times 365))]$$

$$E = 0.466 \text{ lb/VMT}$$

Provided that the VMT at Plant #17111 is 20,241, the total PM₁₀ emissions are:

$$\text{Emissions PM}_{10} = 20,241 \times 0.466 = 9,452 \text{ lb/yr}$$

Emissions PM₁₀ = 4.726 tons/year

For PM_{2.5} emissions, a k factor of 0.00054 lb/VMT is used:

$$E = (0.00054) \times (12)^{0.91} \times (21.77)^{1.02} \times [1 - (65 / (4 \times 365))]$$

$$E = 0.11 \text{ lb/VMT}$$

The total PM_{2.5} emissions are:

$$\text{Emissions PM}_{2.5} = 20,241 \times 0.11 = 2,320 \text{ lb/yr}$$

Emissions PM_{2.5} = 1.160 tons/year

Table A-3. Summary of PM Emissions from S-16 Road Travel

Source	PM ₁₀ (ton/year)	PM _{2.5} (ton/year)
Road Emissions	4.726	1.160

Appendix B
OGV and Tug Emissions

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Table B-1. OGV and Tug Inputs

OGV Route	Distance (nm)	Speed (knots)	Time (hours)	Main Engine Load %	Auxiliary Engine Load %
Leg 1 = Transit from Bar Pilot Station to Golden Gate	11	11	5	13	47
Leg 2 = Transit from Golden Gate to Bay Bridge	5.3	11	2.25	4	47
Leg 3 = Transit from South of Bay Bridge to Anchorage #9 (Reduced Speed Zone)	2.6	4.5	2.25	4	47
Leg 4 = Maneuvering from Anchorage #9 to Pier #92 (OGV not Maneuvered to Pier 92)	0	0	0	0	0
OGV Hoteling at Anchorage #9	N/A	N/A	46.8	0	62

Tugboat Route		Time(hrs) for each tug	Main Engine Load %	Auxiliary Engine Load %
(to meet barge) =	Pier 50 to Pier 92	0.5	50	25
(maneuver barge to Anchorage 9) =	Pier 92 to Anchorage #9	0.75	50	25
(waiting for unloading) =	Unloading from OGV to barge	6	50	25
(tug with barge return to Pier 92) =	Anchorage #9 to Pier 92	1	85	25
(tug to return to docking station)=	Pier 92 to Berth	0.5	50	25
Total		8.75		

Assumptions	
Hydrocarbon emissions from fuel combustion are equivalent to Precursor Organic Compound (POC) emissions	
# of OGV Main Engines	1
# of OGV Auxiliary Engines	3
OGV Main Engine Power Per Engine (kW)	12,085
OGV Auxiliary Engine Power Per Engine (kW)	900
Tug CARB Diesel Usage Rate (gal/hr) for Entire Tug	81
# of Tugs Assisting OGV Inbound	1
# of Tugs Assisting OGV Outbound	1
# of Main Engines On Tug	2
# of Auxiliary Engines On Tug	1
Tug Main Engine Power Per Engine (bhp)	1,500
Tug Auxiliary Engine Power Per Engine (bhp)	109
Average Age of Tug Main Engines = 21 yrs	(Model Years 1987-1998 emission factors, 1901-3300 hp/main engine)
Average Age of Tug Auxiliary Engines = 23 yrs	(Model Years pre-1997 emission factors, 51-120 hp/auxiliary engine)
1 Brake Horsepower = 0.7457 Kilowatts	
Calculated load percent for Tug engines from fuel usage rate divided by brake specific fuel consumption x hp	
Information provided about fuel usage rate assumed to be for the whole tug (not per engine) so sulfur is included in main engine emission calcs for tugs.	

Table B-2. OGV Emissions for 30 OGVs Per Year

Ocean-Going Vessel Operations	Engine		Maximum		Emission Factors							Emissions										
	Power	Load	Hours Per		(g/kW-hr)							Maximum Daily (lbs)					Annual (tons)					
	kW	%	Trip	Year	CO	NO _x	SO ₂	HC	PM ₁₀	CO ₂	CH ₄	CO	NO _x	SO ₂	HC	PM ₁₀	CO	NO _x	SO ₂	HC	PM ₁₀	
Main Engine Transit Leg 1 (and out) ^{a, b}	12085	13	3.33	100	1.10	17.00	0.36	0.78	0.25	588.00	0.07	12.70	196.27	4.16	9.01	2.89	0.19	2.94	0.06	0.14	0.04	
Main Engine Transit Leg 2 (and out) ^{a, b}	12085	4	1.50	45	1.10	17.00	0.36	0.78	0.25	588.00	0.07	1.76	27.18	0.58	1.25	0.40	0.03	0.41	0.01	0.02	0.01	
Main Engine Transit RSZ Leg 3 (and out) ^{a, b}	12085	4	1.50	45	1.10	17.00	0.36	0.78	0.25	588.00	0.07	1.76	27.18	0.58	1.25	0.40	0.03	0.41	0.01	0.02	0.01	
Main Engine OGV Hoteling at Anchorage #9 ^b	12085	0	15.60	468	1.10	17.00	0.36	0.78	0.25	588.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Auxiliary Engine Transit Leg 1 (and out) ^{a, b}	2700	47	3.33	100	1.10	13.90	0.40	0.52	0.25	690.00	0.09	10.26	129.62	3.73	4.85	2.33	0.15	1.94	0.06	0.07	0.03	
Auxiliary Engine Leg 2 (and out) ^{a, b}	2700	47	1.50	45	1.10	13.90	0.40	0.52	0.25	690.00	0.09	4.62	58.33	1.68	2.18	1.05	0.07	0.87	0.03	0.03	0.02	
Auxiliary Engine Transit Leg 3 (and out) ^{a, b}	2700	47	1.50	45	1.10	13.90	0.40	0.52	0.25	690.00	0.09	4.62	58.33	1.68	2.18	1.05	0.07	0.87	0.03	0.03	0.02	
Auxiliary Engine Hoteling at Anchorage #9 ^b	2700	62	15.60	468.0	1.10	13.90	0.40	0.52	0.25	690	0.09	63.3	800.2	23.0	29.9	14.4	0.95	12.00	0.35	0.45	0.22	
			Hours per																			
Tugboat Operations*	hp		OGV	Year	(g/hp-hr)		(lb/hr)	(g/hp-hr)														
Main Engine to Meet Barge	3000	50	0.50	15	2.99	12.98	0.02					4.94	21.46	0.01	1.39	0.83	0.07	0.32	0.00015	0.02	0.01	
Main Engine to Escort Barge to Anchorage #9	3000	50	0.75	23	2.99	12.98	0.02	0.84	0.50	0.00	0.00	7.42	32.19	0.02	2.08	1.24	0.11	0.48	0.00023	0.03	0.02	
Main Engine Unloading from OGV to Barge	3000	50	6.00	180	2.99	12.98	0.02	0.84	0.50	0.00	0.00	59.33	257.54	0.12	16.67	9.92	0.89	3.86	0.00180	0.25	0.15	
Main Engine Idle (maneuver ship out from berth)	3000	60	1.50	45	2.99	12.98	0.02	0.84	0.50	0.00	0.00	17.80	77.26	0.03	5.00	2.98	0.27	1.16	0.00045	0.08	0.04	
Main Engine Transporting Barge to Pier 92	3000	85	1.00	30	2.99	12.98	0.02	0.84	0.50	0.00	0.00	16.81	72.97	0.02	4.72	2.81	0.25	1.09	0.00030	0.07	0.04	
Main Engine Pier 92 to Docking Station (Pier 50)	3000	50	0.50	15	2.99	12.98	0.02	0.84	0.50	0.00	0.00	4.94	21.46	0.01	1.39	0.83	0.07	0.32	0.00015	0.02	0.01	
Auxiliary Engine	109	25	8.75	263	4.94	13.00	0.00	1.71	0.71	0.00	0.00	2.60	6.83	0.00	0.90	0.37	0.04	0.10	0.00000	0.01	0.01	
TOTAL EMISSIONS (OGVs and Tugs)												212.87	1786.86	35.63	82.80	41.48	3.193	26.803	0.534	1.242	0.622	

Note:

^a Maximum hours per trip multiplied by two for outbound trips

^b Maximum hours per trip divided by three for number of companies transporting materials at one time

Appendix C
PTE Calculations for S-6 and S-7

DRAFT

Total concrete, cu yd (445,400 x 35%)

155,000

Truck Mixing S-6

Composition of Concrete		
Material	lb/yd	ton/yr
Aggregate	1865	144,537.50
Sand	1428	110,670.00
Cement	491	38,052.50
Cement Supplement	73	5,657.50
Water	167	12,942.50
Total Concrete	4024	311,860.00

AP-42 TABLE 11.12-2 Emission Factors from Concrete Batching

Process	PM ₁₀ (lb/ton)	PM ₁₀ Controlled (lb/ton)	Annual PM ₁₀ (lb/yr)
Aggregate transfer to barge conveyor System* (S-14)	0.0033	0.00099	143.09
Sand transfer to barge conveyor system* (S-14)	0.00099	0.000297	32.87
Aggregate transfer to drive over grizzly and hopper or stockpile (S-14)	0.0033	0.00099	143.09
Sand transfer to drive over grizzly and hopper or stockpile (S-14)	0.00099	0.000297	32.87
Aggregate transfer from drive over grizzly and hopper to conveyor (S-1)	0.0033	0.00099	143.09
Sand transfer from drive over grizzly and hopper to conveyor (S-1)	0.00099	0.000297	32.87
Aggregate transfer to storage bins* (to S-2)	0.0033	0.00099	143.09
Sand transfer to storage bins* (to S-2)	0.00099	0.000297	32.87
Aggregate transfer to conveyors* (to S-3)	0.0033	0.00099	143.09
Sand transfer to conveyor* (to S-3)	0.00099	0.000297	32.87
Aggregate transfer to holding hopper* (S-5)	0.0033	0.00099	143.09
Sand transfer to wet batch plant concrete mixer drum* (S-7)	0.00099	0.000297	32.87
Cement delivery to silo (controlled) (S-8 and S-9)		0.00034	12.94
Cement supplement delivery to silo (controlled w/ baghouse) (S-10 and S-11)		0.0049	27.72
Loading to Cement and Flyash Weigh Hopper (controlled w/ baghouse) (S-12)	0.0028	0.0028	122.39
Loading to Cement and Flyash Holding Hopper (controlled w/ baghouse) (S-13)	0.0028	0.0028	122.39
Truck Mix loading (controlled w/baghouse) (S-6)		0.0263	1149.57
Water Spray Efficiency*	70%	Total	2490.78
Total PM₁₀ Emissions (lb/yr)	2,490.78		
Total PM₁₀ Emissions (lb/day)	1.05		
Total PM₁₀ Emissions (TPY)	1.245		

Process	PM _{2.5} (lb/ton)	PM _{2.5} Controlled (lb/ton)	Annual PM _{2.5} (lb/yr)
Aggregate transfer to barge conveyor System* (S-14)	0.0005	0.0003	43.36
Sand transfer to barge conveyor system* (S-14)	0.00015	0.00009	9.96
Aggregate transfer to drive over grizzly and hopper or stockpile (S-14)	0.0005	0.0003	43.36
Sand transfer to drive over grizzly and hopper or stockpile (S-14)	0.00015	0.00009	9.96
Aggregate transfer from drive over grizzly and hopper to conveyor (S-1)	0.0005	0.0003	43.36
Sand transfer from drive over grizzly and hopper to conveyor (S-1)	0.00015	0.00009	9.96
Aggregate transfer to storage bins* (to S-2)	0.0005	0.0003	43.36
Sand transfer to storage bins* (to S-2)	0.00015	0.00009	9.96
Aggregate transfer to conveyors* (to S-3)	0.0005	0.0003	43.36
Sand transfer to conveyor* (to S-3)	0.00015	0.00009	9.96
Aggregate transfer to holding hopper* (S-5)	0.0005	0.0003	43.36
Sand transfer to wet batch plant concrete mixer drum* (S-7)	0.00015	0.00009	9.96
Cement delivery to silo (controlled) (S-8 and S-9)		0.00005	1.90
Cement supplement delivery to silo (controlled w/ baghouse) (S-10 and S-11)		0.0007	3.96
Loading to Cement and Flyash Weigh Hopper (controlled w/ baghouse) (S-12)	0.0004	0.0004	17.48
Loading to Cement and Flyash Holding Hopper (controlled w/ baghouse) (S-13)	0.0004	0.0004	17.48
Truck Mix loading (controlled w/baghouse) (S-6)		0.0039	170.47
*water spray efficiency	40%	Total	531.23
Total PM_{2.5} Emissions (lb/yr)	531.23		
Total PM_{2.5} Emissions (lb/day)	1.46		
Total PM_{2.5} Emissions (TPY)	0.266		

Total concrete, cu yd

290,000

Central Mixing S-7

Composition of Concrete		
Material	lb/yd	ton/yr
Coarse Aggregate	1,865.00	270,425.00
Sand	1,428.00	207,060.00
Cement	491.00	71,195.00
Cement Supplement	73.00	10,585.00
Water	167.00	24,215.00
Total Concrete	4,024.00	583,480.00

AP-42 TABLE 11.12-2 Emission Factors from Concrete Batching

Process	PM ₁₀ (lb/ton)	PM ₁₀ Controlled (lb/ton)	Annual PM ₁₀ (lb/yr)
Aggregate transfer to barge conveyor System* (S-14)	0.0033	0.00099	267.72
Sand transfer to barge conveyor system* (S-14)	0.00099	0.000297	61.50
Aggregate transfer to drive over grizzly and hopper or stockpile (S-14)	0.0033	0.00099	267.72
Sand transfer to drive over grizzly and hopper or stockpile (S-14)	0.00099	0.000297	61.50
Aggregate transfer from drive over grizzly and hopper to conveyor (S-1)	0.0033	0.0033	892.40
Sand transfer from drive over grizzly and hopper to conveyor (S-1)	0.00099	0.00099	204.99
Aggregate transfer to storage bins* (to S-2)	0.0033	0.00099	267.72
Sand transfer to storage bins* (to S-2)	0.00099	0.000297	61.50
Aggregate transfer to conveyors* (to S-3)	0.0033	0.00099	267.72
Sand transfer to conveyor* (to S-3)	0.00099	0.000297	61.50
Aggregate transfer to holding hopper* (S-5)	0.0033	0.00099	267.72
Sand transfer to wet batch plant concrete mixer drum* (S-7)	0.00099	0.000297	61.50
Cement delivery to silo (controlled) (S-8 and S-9)		0.00034	24.21
Cement supplement delivery to silo (controlled w/ baghouse) (S-10 and S-11)		0.0049	51.87
Loading to Cement and Flyash Weigh Hopper (controlled w/ baghouse) (S-12)	0.0028	0.0028	609.41
Loading to Cement and Flyash Holding Hopper (controlled w/ baghouse) (S-13)	0.0028	0.0028	609.41
Central Mix loading (controlled w/baghouse) (S-7)	0.156	0.0055	449.79
*water spray efficiency	70%	Total	4,488.15
Total PM₁₀ Emissions (lb/yr)	4,488.15		
Total PM₁₀ Emissions (lb/day)	12.30		
Total PM₁₀ Emissions (TPY)	2.244		

Process	PM _{2.5} (lb/ton)	PM _{2.5} Controlled (lb/ton)	Annual PM _{2.5} (lb/yr)
Aggregate transfer to barge conveyor System* (S-14)	0.0005	0.0003	81.13
Sand transfer to barge conveyor system* (S-14)	0.00015	0.00009	18.64
Aggregate transfer to drive over grizzly and hopper or stockpile (S-14)	0.0005	0.0003	81.13
Sand transfer to drive over grizzly and hopper or stockpile (S-14)	0.00015	0.00009	18.64
Aggregate transfer from drive over grizzly and hopper to conveyor (S-1)	0.0005	0.0003	81.13
Sand transfer from drive over grizzly and hopper to conveyor (S-1)	0.00015	0.00009	18.64
Aggregate transfer to storage bins* (to S-2)	0.0005	0.0003	81.13
Sand transfer to storage bins* (to S-2)	0.00015	0.00009	18.64
Aggregate transfer to conveyors* (to S-3)	0.0005	0.0003	81.13
Sand transfer to conveyor* (to S-3)	0.00015	0.00009	18.64
Aggregate transfer to holding hopper* (S-5)	0.0005	0.0003	81.13
Sand transfer to wet batch plant concrete mixer drum* (S-7)	0.00015	0.00009	18.64
Cement delivery to silo (controlled) (S-8 and S-9)		0.00005	3.56
Cement supplement delivery to silo (controlled w/ baghouse) (S-10 and S-11)		0.0007	7.41
Loading to Cement and Flyash Weigh Hopper (controlled w/ baghouse) (S-12)	0.0004	0.0004	32.71
Loading to Cement and Flyash Holding Hopper (controlled w/ baghouse) (S-13)	0.0004	0.0004	32.71
Central Mix loading (controlled w/baghouse) (S-7)	0.156	0.0008	65.42
*water spray efficiency	40%	Total	740.39
Total PM_{2.5} Emissions (lb/yr)	740.39		
Total PM_{2.5} Emissions (lb/day)	2.03		
Total PM_{2.5} Emissions (TPY)	0.370		