

NON-TITLE V AIR PERMIT EVALUATION SHEET (Technical Support Document – TSD)

PERMIT NO.: 19##

MINOR MOD.

NON-MINOR MOD.

RENEWAL

PERMIT ENGINEER: Ryan Eberle

DATE PREPARED: ##

BUSINESS NAME: Coffman Specialties, Inc.

BUSINESS TYPE: Concrete Batch Plant

	Yes	No
SOURCE TYPE: NSPS	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BACT	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MACT	<input type="checkbox"/>	<input checked="" type="checkbox"/>
NESHAP	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BRDT	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Synthetic Minor	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DESCRIPTION OF SOURCE

Non-Title V permit for a new portable source. Coffman Specialties, Inc. (Coffman) owns and operates a portable central mix concrete batch plant and a portable diesel generator. Based on the information presented in the permit application and subsequently provided information, the SIC and NAICS codes for the facility are 3273 and 327320, respectively, and the facility will operate 10 hours per day, 6 days per week, and 25 weeks per year. Coffman requested a maximum hourly throughput of 300 tons per hour and 900,000 tons per year of concrete production.

Concrete Batch Plant

The raw materials are delivered to the plant by truck into an underground hopper that feeds a radial stacker. The cement and cement supplement (flyash and calcium carbonate) are transferred to elevated storage silos and ground-level guppies pneumatically. The sand and coarse aggregate are transferred to ground storage bins by front end loader. From the ground

storage bins, the sand and coarse aggregate are transferred to elevated bins by belt conveyors. From these elevated bins, the constituents are fed by gravity to weigh hoppers, which deposit the proper amounts of each material onto a common transfer conveyor that discharges into the central mix drum. Cement and cement supplement are also discharged into the central mix drum through individual weigh hoppers at the base of the elevated silo. Water is added and the concrete is mixed in the central mix drum before being transferred to the transport trucks.

The cement and cement supplement storage silos and associated weigh hoppers and central mix drum loading are ducted to a common baghouse to control particulate matter emissions.

Generator

The trailer-mounted generator (internal combustion engine) at the facility is used to supply main power to the concrete batch plant and is operated on an as-needed basis. The generator is considered nonroad and exempt from permitting as long as it is not in the same location for more than 12 consecutive months.

Permitted Equipment

A list of permitted equipment is included in Table 1.

Table 1. Permitted Equipment

Equipment Description	Rated Capacity (ea.)	Quantity
Concrete Batch Plant		
Erie Strayer MG-11C (built as MC-12C) Portable Central Mix Concrete Batch Plant, including: Elevated Storage Bin (4 compartments) Conveyors (x5) Cement/supplement storage silo (715 bbls - split)	300 yd ³ /hr	1
Saunco RF-2000 (Baghouse)	11,000 cfm	1
Cement/Supplement Guppies	600 bbls	2
Feed bins (custom-built)	600 tons/hr	5
Feed bins (underground)	600 tons/hr	1
Conveyor	600 tons/hr	1
Thor Stacker	600 tons/hr	1

A list of insignificant activities is included in Table 2. Insignificant activities are defined in the Gila River Indian Community (GRIC) Code: Title 17 Chapter 9, Part II, Section 1.0 and are not subject to permitting requirements.

Table 2. Insignificant Activities

Equipment Description	Rated Capacity (ea.)	Quantity
N/A	N/A	N/A

The portable generator used to supply power to the concrete batch plant (Caterpillar C27, Serial MJE00109, manufactured 10/3/2006, Tier 2) is considered nonroad and not subject to permitting. However, if the generator is in the same location for more than 12 months, it will be deemed a stationary source and subject to permitting requirements.

ALLOWABLE EMISSIONS

The emission limits for the facility are presented in Table 3.

Table 3. Emission Limits (pounds)

Pollutant	Twelve Month Rolling Total
Particulate Matter <10 Micron Diameter (PM ₁₀)	1,400
Particulate Matter (PM)	3,700
Total Hazardous Air Pollutants (HAPs)	100

APPLICABLE GRIC REGULATIONS

Part II

- Section 1: Definitions
- Section 2: Applicability of Permit Requirements
- Section 4: Non-Title V Permit Requirements
- Section 5: Permit Revisions at a Non-Title V Source
- Section 10: Confidentiality of Information
- Section 11: Fees

Part V

- Section 1: Open Burning
- Section 2: General Requirements for Fugitive Dust-Producing Activities

Part VI

- Section 1: Visible Emissions

Part VII

- Section 3: Non-Metallic Mineral Mining and Processing

FEDERAL REGULATORY APPLICABILITY

NSPS - Based on the information provided in the permit application, this source does not process non-metallic minerals, and concrete batch plants are not listed in the New Source Performance Standards (NSPS). The associated portable generator was constructed after July 11, 2005; however, since the generator will not be in the same location for more than 12 months, the generator is considered “nonroad” and not subject to the NSPS for internal combustion engines (40 CFR 60 Subpart IIII).

NESHAP/MACT - Based on the information provided in the permit application, this source emits Hazardous Air Pollutants (HAPs) from the concrete batch plant. However, the facility (concrete batch plant) is not a specifically listed Federal National Emission Standards for Hazardous Air Pollutants (NESHAP) Source Category and is not a major source. The federal HAPs list is fully incorporated into Part II, Section 1.0, and a GRIC HAP is defined as any Federally-listed HAP.

ALLOWABLE EMISSION CALCULATIONS

For concrete batching and aggregate processing, particulate matter (PM), consisting of aggregate, sand, cement and cement supplement dust, is the primary pollutant of concern. In addition, there are emissions of metals that are associated with cement and cement supplement from concrete batching. Most of the emission sources are fugitive in nature. The point sources of emissions include those activities that are controlled (e.g., the transfer of cement and cement supplement material to silos/guppies and weigh hopper and central mix drum loading).

Fugitive sources of PM emissions include the processing (e.g, transfer, screening, crushing, etc.) and handling of sand and aggregate, vehicle traffic, and wind erosion from sand and aggregate storage piles. The amount of fugitive PM emissions generated depends primarily on the surface moisture content of these materials.

The emission calculations for the facility were based on AP-42 emission factors and formulas, grain- loading requirements for control devices, and material throughputs provided in the permit application. Non-fugitive emissions will be generated from the following source(s):

- Baghouse (1)

The calculations for the emission limits are included as an attachment to this TSD.

Major Source Determination

Based on the maximum hourly throughput of the concrete batch plant (600 tph), the facility’s potential-to-emit (PTE) does not exceed the major source threshold of 100 tpy for any regulated air pollutant (NO_x, CO, SO_x, VOCs, HAPs, PM₁₀, PM, etc) at a maximum annual operating time of 8,760 hours.

According to the definition of major source in Part II, Section 1.0 of the AQMP and 40 CFR 70.2, the fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source unless the source is listed or is being regulated by NSPS or NESHAP as of August 7, 1980. Since the facility is not listed in the definition of a major source and is not subject to NSPS or NESHAP, only non-fugitive emissions (i.e. emissions from a baghouse, dust collector, etc.) were evaluated to determine if the source will be considered a major source. Based on the calculations, the facility does not exceed the major source thresholds for criteria pollutants or HAPs.

BEST REASONABLE AND DEMONSTRATED TECHNOLOGY (BRDT) APPLICABILITY

Based on the information provided in the permit application and the attached emissions calculations, the facility does not exceed the BRDT thresholds provided in Part II, Section 4.2(A)(2). Table 4 shows the permitted facility emissions and the BRDT thresholds.

Table 5. BRDT Applicability

Pollutant	Annual Emissions (tons)	BRDT Threshold (tons)	BRDT Applicable?	Trigger Compound
NOx	0.00	>75 but <100	No	---
VOC	0.00	>75 but <100	No	---
CO	0.00	>75 but <100	No	---
SOx	0.00	>75 but <100	No	---
PM10	9.10	>75 but <100	No	---
PM	26.04	>75 but <100	No	---
Lead	0.00	>75 but <100	No	---
Single HAP	<0.01	3	No	---
Total HAPs	0.01	5	No	---
Ultra HAPs	0.00	300*	No	---

* = pounds per year

MODELING ANALYSIS

A modeling analysis was not conducted because facility emissions were below the BRDT thresholds.

ANALYSIS OF IMPORTANT PERMIT CONDITIONS

Condition 26: Sets the emission limits for the facility, which were established based on information provided by the Permittee in the permit application and any subsequent responses to information requests. Describes the methods to calculate emissions and the allowable emissions from the facility,

Conditions 27 through 32: Set the production limitations, visible emission limitations, control requirements, operational restrictions (including notice requirements for portable sources), recordkeeping and reporting requirements, and performance test requirements for the concrete batch plant. The production limits were based on material throughputs and production rates provided by the Permittee in the application. The visible emission limitations and control requirements reflect the policies contained in Part VII, Section 3.0. The performance test conditions establish the required testing frequency, test methods, notification and reporting requirements.

Condition 33: Sets the requirements for Operation and Maintenance (O&M) Plans for the air pollution control equipment at the facility. These conditions reflect policies contained in Part VII, Section 3.0, Subsection 5.1.

Condition 34: Sets the limitations for the trailer-mounted, nonroad generator and exempts it from the permit requirements.

Condition 35: Sets the limitations and requirements for open burning, including a list of materials that cannot be burned. These conditions reflect policies contained in Part V, Section 1.0.

Condition 36: Sets the limitations and requirements for fugitive dust generating operations, including, but not limited to, storage piles, track out, and haul roads. These conditions include requirements for dust control plans, emission control systems, compliance determination, monitoring and recordkeeping, control measures, and visible emission limitations, which reflect the policies contained in Part V, Section 2.0.

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Facility Operating Parameters

Note, yellow highlighted values were provided in the application

	hr/day	day/wk	wk/yr	hr/yr
Operating Schedule (CBP 1)	10	6	25	3650

Concrete Batch Plant (CBP) Operating Parameters

Control Equipment	Flowrate (cfm)
Baghouse (mixer loading, silo filling)	11,000

	Production				
	Hourly (yd ³ /hr) ⁽³⁾	Daily (TPD) ⁽¹⁾	Daily (yd ³ /day) ⁽³⁾	Annual (TPY) ⁽²⁾	Annual (yd ³ /yr) ⁽³⁾
Truck Mix CBP #1	300	6,000	3,000	900,000	450,000
Facility Total	300	6,000	3,000	900,000	450,000

Notes:

1. Calculated daily throughput based on hourly rating and operating hours. For example, 300 tons/hour x 10 hrs/day = 3000 tons/day
2. Annual weight of concrete was provided in 10/29/2018 permit application, Section K-1 projects the maximum annual throughput as 730,000 tons/yr.
3. Annual volume of concrete based on the annual weight divided by an average density of concrete (2 tons/cubic yard). Facility will be limited to 4800 yd³/yr and 365,000 yd³/yr.

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Facility Operating Parameters

Material Throughput				
Truck Mix CBP #1				
Concrete Composition Material	TPD ⁽⁴⁾	ton/yr (application)	Ratio	ton/yr (permitted)
Coarse Aggregate	2805.19	36,000	46.8%	420,779
Sand	2025.97	26,000	33.8%	303,896
Cement	701.30	9,000	11.7%	105,195
Cement Supplement (Flyash/CaCO ₃)	233.77	3,000	3.9%	35,065
Total Dry Mix Materials	6,000	77,000	100.0%	900,000
Water	0		0.0%	0
Total Concrete	6,000	77,000	100.0%	900,000

Notes:

4. Fraction of total daily production. Material Daily Throughput (tpd) = Daily Concrete Production (tpd) x [(Annual Material Throughput) / (Annual Concrete Production)]

For example (Coarse Aggregate): 6000 tons/day x (420779.220779221 tpy / 900000 tpy) = 2805.19 tons/day

Vehicle Type	Mean Vehicle Weight (tons)	VMT per day ⁽⁶⁾	VMT per year	Unpaved Road Control Efficiency ⁽⁷⁾
Light Duty (light trucks)	4.0		2,400	
Medium Duty (loaders)	20.0		3,200	
Heavy Duty (concrete/agg trucks)	35.0		3,600	
Average of Vehicle Weights ⁽⁵⁾	21.7	61.33	9,200	70%

Notes:

5. Sum of (weight * fraction of total vehicle distance) for each vehicle class

6. VMT (miles/day) = VMT (miles/year) / (Operating Weeks Per Year x Operating Days Per Week)

7. Control efficiency based on AP-42, Chapter 13.2.2.3 (controls for unpaved roads) and Maricopa County Air Quality Department, Emissions Inventory Help Sheet for Vehicle Travel on Unpaved Roads, 2008

Storage Piles

Storage Piles (acres)	2
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Point Source Emissions

Pollutant	Concrete Batch Plants		
	(lb/day)	(lbs/yr)	(tons/yr)
NOx	---	---	---
VOC	---	---	---
CO	---	---	---
SOx	---	---	---
PM10	9.10	1,364.54	0.68
PM	26.04	3,905.70	1.95
HAPs	0.01	1.16	0.001

Fugitive Emissions

	Aggregate Handling			Unpaved Roads			Storage Piles		
	(lb/day)	(lbs/yr)	(tons/yr)	(lb/day)	(lbs/yr)	(tons/yr)	(lb/day)	(lbs/yr)	(tons/yr)
NOx	---	---	---	---	---	---	---	---	---
VOC	---	---	---	---	---	---	---	---	---
CO	---	---	---	---	---	---	---	---	---
SOx	---	---	---	---	---	---	---	---	---
PM10	101.37	15,204.86	7.60	29.47	4,420.97	2.21	1.04	378.00	0.19
PM	212.49	31,874.03	15.94	115.64	17,346.44	8.67	---	---	---
HAPs	---	---	---	---	---	---	---	---	---

Total Emissions

Pollutant	Point Source Emissions			Fugitive Emissions			Facility Total Emissions		
	(lb/day)	(lbs/yr)	(tons/yr)	(lb/day)	(lbs/yr)	(tons/yr)	(lb/day)	(lbs/yr)	(tons/yr)
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	9.10	1,364.54	0.68	131.88	20,003.83	10.00	9.10	1,364.54	0.68
PM	26.04	3,905.70	1.95	328.13	49,220.47	24.61	26.04	3,905.70	1.95
HAPs	0.01	1.16	0.00	0.00	0.00	0.00	0.01	1.16	0.00

Emission Limits

Pollutant	Point Sources
	(lbs/yr)
NOx	0.00
VOC	0.00
CO	0.00
SOx	0.00
PM10	1,400.00
PM	4,000.00
HAPs	100.00

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Major Source Determination

Potential-To-Emit (PTE) for Point Sources

Pollutant	Plants			Total		
	(lb/day) ⁽¹⁾	(lbs/yr) ⁽²⁾	(tons/yr)	(lb/day)	(lbs/yr)	(tons/yr)
NOx	---	---	---	0.00	0.00	0.00
VOC	---	---	---	0.00	0.00	0.00
CO	---	---	---	0.00	0.00	0.00
SOx	---	---	---	0.00	0.00	0.00
PM10	21.84	7,971.60	3.99	21.84	7,971.60	3.99
PM	62.49	22,809.27	11.40	62.49	22,809.27	11.40
HAPs	0.024	8.76	0.004	0.02	8.76	0.00

Notes:

1. Daily PTE = (daily emissions @ proposed operating hours) * (24 hrs / proposed operating hours)
2. Annual PTE = Daily PTE * 365 days

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Best Reasonable and Demonstrated Technology (BRDT) Analysis Applicability

Pollutant	Total Emissions	BRDT Threshold	Exceeds BRDT Threshold?	Trigger Compound
	(tons/yr)	(tons/yr)		
NOx	0.00	>75 but <100	No	---
VOC	0.00	>75 but <100	No	---
CO	0.00	>75 but <100	No	---
SOx	0.00	>75 but <100	No	---
PM10	0.68	>75 but <100	No	---
PM	1.95	>75 but <100	No	---
Lead	1.23E-05	>75 but <100	No	---
Single HAP	2.76E-04	3	No	---
Total HAPs	6.00E-04	5	No	---
Ultra HAPs	0.00*	300*	No	Fomaldehyde

Notes:

* Pounds per year

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Facility HAPs Summary

HAP Name	CAS Number	TCBP Emissions		Generator Emissions		Total Emissions			Ultra HAP
		lbs/day	lbs/yr	lbs/day	lbs/yr	lbs/day	lbs/yr	tons/yr	
Arsenic	7440-38-2	5.14E-04	7.70E-02			5.14E-04	7.70E-02	3.85E-05	
Beryllium	7440-41-7	1.19E-04	1.78E-02			1.19E-04	1.78E-02	8.90E-06	
Cadmium	7440-43-9	1.05E-06	1.58E-04			1.05E-06	1.58E-04	7.88E-08	
Chromium	7440-47-3	4.24E-04	6.36E-02			4.24E-04	6.36E-02	3.18E-05	
Manganese	7439-96-5	3.68E-03	5.51E-01			3.68E-03	5.51E-01	2.76E-04	
Nickel	7440-02-0	7.94E-04	1.19E-01			7.94E-04	1.19E-01	5.96E-05	
Selenium	7782-49-2	1.23E-04	1.84E-02			1.23E-04	1.84E-02	9.19E-06	
Lead	7439-92-1	1.63E-04	2.45E-02			1.63E-04	2.45E-02	1.23E-05	
Total Phosphorus	07723-14-0	1.95E-03	2.92E-01			1.95E-03	2.92E-01	1.46E-04	
		7.76E-03	1.16E+00	0.00E+00	0.00E+00	7.76E-03	1.16E+00	5.82E-04	

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Concrete Batching PM10 & PM Emissions

Operating Parameters

	hr/day	day/wk	wk/yr
Operating Schedule (CBP 1)	10	6	25

Control Equipment	Flowrate (cfm)
Baghouse (mixer loading, silo filling)	11,000

	Production				
	Hourly (TPH)	Daily (TPD) ⁽¹⁾	Daily (yd ³ /yr) ⁽²⁾	Annual (TPY) ⁽¹⁾	Annual (yd ³ /yr) ⁽²⁾
Truck Mix CBP #1	300	6,000	3,000	900,000	450,000
Facility Total	300	6,000	3,000	900,000	450,000

Concrete Composition Data - Truck Mix Plant

Material	Material Throughput					
	Truck Mix CBP #1		Total		Max. Single Plant Total	
	TPD ⁽³⁾	ton/yr	TPD	ton/yr	TPD	ton/yr
Coarse Aggregate	2,805.19	420,779.22	2,805.19	420,779	2,805.19	420,779.22
Sand	2,025.97	303,896.10	2,025.97	303,896	2,025.97	303,896.10
Cement	701.30	105,194.81	701.30	105,195	701.30	105,194.81
Cement Supplement (Flyash/CaCO ₃)	233.77	35,064.94	233.77	35,065	233.77	35,064.94
Total Dry Mix Materials	6,000.00	900,000.00	6,000.00	900,000	6,000.00	900,000.00
Water	0.00	0.00	0.00	0	0.00	0.00
Total Concrete	6,000.00	900,000.00	6,000.00	900,000	6,000.00	900,000.00

PM₁₀:

Source ID	Source	Source Type ⁽⁴⁾	Control method	EF ⁽⁵⁾	PM ₁₀ Emissions ⁽⁶⁾		
				lb/ton	lb/day	lb/yr	tpy
TCBP-1	Cement delivery to silo	Non-Fugitive	Baghouse	0.00034	0.24	35.77	0.02
TCBP-2	Cement supplement delivery to silo (flyash/CaCO ₃)	Non-Fugitive	Baghouse	0.0049	1.15	171.82	0.09
TCBP-3	Weigh hopper loading	Non-Fugitive	Baghouse	0.00053	2.57	385.53	0.19
TCBP-4	Central mix loading	Non-Fugitive	Baghouse	0.0055	5.14	771.43	0.39
Total Non-Fugitive PM₁₀					9.10	1,364.54	0.68

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Concrete Batching HAP Emissions

Concrete Composition Data - Central Mix Plant

Emission Factor Table (Source: AP-42 5th Ed., Section 11.12 Table 11.12-8)

Material	TPD	ton/yr
Coarse Aggregate	2,805.19	420,779
Sand	2,025.97	303,896
Cement	701.30	105,195
Cement Supplement (Flyash/CaCO3)	233.77	35,065

Source:	Cement Silo Filling	Cement Supplement Silo Filling	Central Mix Batching ⁽³⁾
Metal	(lb/ton)	(lb/ton)	(lb/ton)
Arsenic	4.24E-09	1.00E-06	2.96E-07
Beryllium	4.86E-10	9.04E-08	1.04E-07
Cadmium	4.86E-10	1.98E-10	7.10E-10
Total Chromium	2.90E-08	1.22E-06	1.27E-07
Lead	1.09E-08	5.20E-07	3.66E-08
Manganese	1.17E-07	2.56E-07	3.78E-06
Nickel	4.18E-08	2.28E-06	2.48E-07
Total Phosphorus	N/A	3.54E-06	1.20E-06
Selenium	N/A	7.24E-08	1.13E-07

Metal HAP Emissions

Source:	Cement Silo Filling ⁽¹⁾		Cement Supplement Silo Filling ⁽¹⁾		Central Batching ⁽²⁾		Concrete Plant Total		
	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(tons/yr)
Arsenic	2.97E-06	4.46E-04	2.34E-04	3.51E-02	2.77E-04	4.15E-02	5.14E-04	7.70E-02	3.85E-05
Beryllium	3.41E-07	5.11E-05	2.11E-05	3.17E-03	9.72E-05	1.46E-02	1.19E-04	1.78E-02	8.90E-06
Cadmium	3.41E-07	5.11E-05	4.63E-08	6.94E-06	6.64E-07	9.96E-05	1.05E-06	1.58E-04	7.88E-08
Total Chromium	2.03E-05	3.05E-03	2.85E-04	4.28E-02	1.19E-04	1.78E-02	4.24E-04	6.36E-02	3.18E-05
Lead	7.64E-06	1.15E-03	1.22E-04	1.82E-02	3.42E-05	5.13E-03	1.63E-04	2.45E-02	1.23E-05
Manganese	8.21E-05	1.23E-02	5.98E-05	8.98E-03	3.53E-03	5.30E-01	3.68E-03	5.51E-01	2.76E-04
Nickel	2.93E-05	4.40E-03	5.33E-04	7.99E-02	2.32E-04	3.48E-02	7.94E-04	1.19E-01	5.96E-05
Total Phosphorus	N/A	N/A	8.28E-04	1.24E-01	1.12E-03	1.68E-01	1.95E-03	2.92E-01	1.46E-04
Selenium	N/A	N/A	1.69E-05	2.54E-03	1.06E-04	1.58E-02	1.23E-04	1.84E-02	9.19E-06
Total HAP Emissions =							0.01	1.16	0.0006

Table Notes:

1. Emission Factors are in lb of pollutant per ton of material loaded
2. Emission Factors are in lb of pollutant per ton of cement and cement supplement loaded
3. Emission Factors are for central mix batching; however, factors for Beryllium & Selenium for central mix do not exist so truck mix factors were used

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Concrete Batch Plant Aggregate Handling Fugitive Emission Calculations

	hr/day	day/wk	wk/yr
Operating Schedule (CBP 1)	10	6	25

	Production Limits		
	Hourly (TPH)	Daily (TPD)	Annual (TPY)
Truck Mix CBP #1	300	6,000	900,000

Concrete Composition Data - Truck Mix Plant

Material	Material Throughput					
	Truck Mix CBP #1		Total		Max. Single Plant Total	
	TPD	ton/yr	TPD	ton/yr	TPD	ton/yr
Coarse Aggregate	2,805.19	420,779	2,805.19	420,779	2,805.19	420,779
Sand	2,025.97	303,896	2,025.97	303,896	2,025.97	303,896
Cement	701.30	105,195	701.30	105,195	701.30	105,195
Total Dry Mix Materials	6,000.00	900,000	6,000.00	900,000	6,000.00	900,000
Water	0.00	0	0.00	0	0.00	0
Total Concrete	6,000.00	900,000	6,000.00	900,000	6,000.00	900,000

PM10 Emissions

Source	Emission Factor ⁽¹⁾	Number of Drop Points	PM10 Emissions ⁽²⁾		
	lb/ton		lb/day	lbs/yr	tons/yr
Aggregate delivery to underground hopper	0.0033	1	9.26	1,388.57	0.69
Sand delivery to underground hopper	0.00099	1	2.01	300.86	0.15
Aggregate loadout to ground hopper	0.0033	1	9.26	1,388.57	0.69
Sand loadout to ground hopper	0.00099	1	2.01	300.86	0.15
Aggregate hopper/conveyor transfer	0.0033	7	64.80	9,720.00	4.86
Sand hopper/conveyor transfer	0.00099	7	14.04	2,106.00	1.05
		TOTAL:	101.37	15,204.86	7.60

PM Emissions

Source	Emission Factor ⁽¹⁾	Number of Drop Points	PM Emissions ⁽²⁾		
	lb/ton		lb/day	lbs/yr	tons/yr
Aggregate delivery to underground hopper	0.0069	1	19.36	2,903.38	1.45
Sand delivery to underground hopper	0.0021	1	4.25	638.18	0.32
Aggregate loadout to ground hopper	0.0069	1	19.36	2,903.38	1.45
Sand loadout to ground hopper	0.0021	1	4.25	638.18	0.32
Aggregate hopper/conveyor transfer	0.0069	7	135.49	20,323.64	10.16
Sand hopper/conveyor transfer	0.0021	7	29.78	4,467.27	2.23
TOTAL:			212.49	31,874.03	15.94

Notes:

1. Uncontrolled Emission Factor source: AP-42 5th Ed., Final Section 11.12 updated June 2006, Table 11.12-2.
2. Daily Emissions (lb/day) = EF (lb/ton) x Material Throughput (tons/day).
Annual Emissions (lb/yr) = EF (lb/ton) x Annual Material Throughput (ton/yr)

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Unpaved Road Fugitive Emission Calculations

Vehicle Type	Vehicle Weight (tons)	VMT per day	VMT per year	Control Efficiency
All Vehicles	21.70	61.33	9,200	70%

$$E = \left[k \left(\frac{s}{12} \right)^a \times \left(\frac{W}{3} \right)^b \right]$$

Source of Equation: See Table Notes (2)

Equation Parameter	PM10	PM
E , annual size-specific uncontrolled emission factor for unpaved industrial roads (lb/VMT) ⁽²⁾	1.60	6.28
k , Particle size multiplier for particle size range, (lb/VMT) (Source: AP-42 Table 13.2.2-2)	1.5	4.9
s , surface material silt content, (%) (Source: AP-42 Chapter 13.2.2)	4.8	4.8
W , mean weight (tons) of the vehicles traveling the road	21.70	21.70
a , constant for PM ₁₀ / PM on industrial roads (Source: AP-42 Table 13.2.2-2)	0.9	0.7
b , constant for PM ₁₀ / PM on industrial roads (Source: AP-42 Table 13.2.2-2)	0.45	0.45

PM10 Emissions

Pollutant	Assumed Control Efficiency ⁽³⁾	Uncontrolled PM10 Emissions ⁽²⁾			Controlled PM10 Emissions ⁽⁴⁾		
		lb/day	lbs/yr	tons/yr	lb/day	lbs/yr	tons/yr
PM10	70%	98.24	14,736.56	7.37	29.47	4,420.97	2.21
PM	70%	385.48	57,821.46	28.91	115.64	17,346.44	8.67

Table Notes:

1. Emission Factor Source: AP-42 5th Ed., Section 13.2.2, Equations 1a and 2, Unpaved Roads, Rev.: November 2006

2. Emissions (lbs/yr) = Emission factor (lb/VMT) x (VMT/year)

Example Calculations For : Uncontrolled PM10 emissions (in lbs per year) from PM10

Based on Equation listed in Table Note (2),

$$\text{Emission Factor for PM10 (All Vehicles)} = [1.5 \times (4.8/12)^{0.9} \times (21.7/3)^{0.45}] = 1.60 \text{ lb/VMT}$$

$$\text{Therefore, Annual Uncontrolled Emissions of PM10 from All Vehicles} = 1.6 \text{ (lb/VMT)} \times 9200 \text{ (VMT/yr)} = 14736.56 \text{ lbs/yr}$$

3. Control efficiency based on AP-42, Chapter 13.2.2.3 (controls for unpaved roads) and Maricopa County Air Quality Department, Emissions Inventory Help Sheet for Vehicle Travel on Unpaved Roads, 2008.

4. Controlled Emissions (lbs/yr) = Uncontrolled Emissions (lbs/yr) x (1 - Control Efficiency) = 14736.56 lbs/yr x (1 - 0.7) = 4420.97 lbs/yr

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Storage Pile Fugitive Emission Calculations

Source	PM ₁₀ EF ¹	Control Method	Control Efficiency	Pile Size	PM ₁₀ Emissions		
	lb/acre-yr			acres	lb/day	lbs/yr	tons/yr
Aggregate Material Stockpiles	630	Wet Supression	70%	2.0	1.04	378.00	0.19

Notes:

1. Emission Factor Source: Maricopa County Air Quality Department, *Emissions Inventory Help Sheet for Sand & Gravel Plants*, 2008