Statement of Basis

Concrete Batch Operations General Permit

Final

Triple C Concrete
Rupert, Idaho
Facility ID No. 777-00499

Permit to Construct P-2010.0184
Project No. 60670

January 18, 2011 H.E.
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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations for non-carcinogens
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BMP	best management practices
Btu	British thermal units
Btu/lb	British thermal units per pound
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CBP	concrete batch plant
CFR	Code of Federal Regulations
CI	compression ignition
CO	carbon monoxide
cy/day	cubic yard per day
cy/hr	cubic yard per hour
cy/yr	cubic yard per year
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EF	Emission Factor
EI	Emission Inventory
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
g/kW-hr	gram per kilowatt hour
gr	grain (1 lb = 7,000 grains)
HAP	hazardous air pollutants
HMA	Hot mix asphalt plant
hp	horsepower
hr/yr	hours per year
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
kW	kilowatts
lb/cy	pound per cubic yard
lb/10^3 gal	pound per thousand gallons
lb/gal	pound per gallon
lb/hr	pounds per hour
lb/MMBtu	pound per million British thermal unit
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MMscf/hr	million standard cubic feet per hour
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NAICS	North American Industry Classification System

NSCR	Non-Selective Reduction Catalyst
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PAH	polyaromatic hydrocarbons
PC	permit condition
PERF	Portable Equipment Relocation Form
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SCL	significant contribution limits
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
T/yr	tons per consecutive 12-calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TCEQ	Texas Commission on Environmental Quality
UTM	Universal Transverse Mercator
VOC	volatile organic compounds
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Triple C Concrete is a portable truck mix concrete batch plant that may consist of the following: aggregate stockpiles, a cement storage silo, a cement supplement (flyash) storage silo, a weigh batcher, conveyors and an electric power supply. The facility combines aggregate, flyash and cement, and transfers the mixture into a truck along with a measured amount of water for in-transit mixing of the concrete. Electrical power will be supplied to the facility either by the local power grid. At most a 5.0 MMBtu/hr heat input rating for the water heater(s) is used to heat the water in cold weather prior to use for the mixing of concrete.

Permitting History

The following information was derived from a review of the information supplied by the permittee and from permit files available to DEQ. All previous Permits to Construct (PTC) listed below are superseded (S) upon issuance of this general permit.

January 21, 2011	P-2010.0184 Project No. 60670, Initial general concrete batch plant permit (A)

Application Scope

This permit is the initial PTC for a portable Concrete Batch Plant (CBP).

Application Chronology

December 14, 2010	A PTC application and combined application and processing fee ($1,500) were received.
December 29, 2010	An opportunity for a public comment period was held. No requests for a public comment period were received.
January 12, 2011	P-2010.0184 Project 60670 application was deemed complete.
January 13, 2011	P-2010.0184 Project 60670 was provided for peer review.
January 14, 2011	P-2010.0184 Project 60670 was provided for facility review. No comments on the draft PTC were received from the facility.

TECHNICAL ANALYSIS

Emissions Units and Control Devices

Table 1 CONCRETE BATCH PLANT AND CONTROL DEVICE INFORMATION[a]

Emissions Unit Description	Control Device Description	Emissions Discharge Point ID No. and/or Description
Concrete Batch Plant – Truck Mix Manufacturer: Stephens Model: Stall.10yd.150T-4 Maximum capacity: 125 cy/hr; 1000 cy/day, 250,000cy/yr Maximum production: 500 cy/day and 150,000 cy/year	Cement Storage Silo Baghouse No. 1[c]: Manufacturer: Belgrade Model: Belle 225 18 bags 6' x 0.66' baghouse Cement Supplement Storage Silo Flyash Baghouse No. 2[a]: Manufacturer: Belgrade Model: Belle 225 18 bags 6' x 0.66' baghouse Weigh Batcher Baghouse: Manufacturer: Stephens Model: SV-20 14 bags 4.25 x 1.33 baghouse Load-out Boot with water ring: Boot plus cement tube water ring Material Transfer Point Water Sprays or Equivalent Best Management Practices Sprays and other suppressants	Baghouse No. 1 stack Stack height:≥16.4 feet Exit diameter:≥3.28 feet Exit air flow rate: ≥0.003 ft/sec Exit Temperature: Ambient Control efficiency: 99% Baghouse No. 2 stack Stack height:≥16.4 feet Exit diameter: ≥3.28 feet Exit air flow rate: ≥0.003 ft/sec Exit Temperature: Ambient Control efficiency: 99% Weigh Batcher Baghouse: Stack height: ≥9.84 feet Exit diameter:≥3.28 feet Exit air flow rate: ≥0.003 ft/sec Exit Temperature: Ambient Control efficiency: 99% Load-out Boot with water ring: Control efficiency: 99% Materials Transfer: Control Efficiency: 95%
Two natural gas fired water heaters (or equivalent[b]) Maximum Rating: 1 MMBtu/hr, each Maximum Fuel Usage: 2.6 MMscf/yr (combined for both heaters)	None	Stack height: ≥16.4 feet Stack diameter 11.8 inches Exit Velocity: 34.4 ft/sec

a. Note that this table is for informational purposes only and the actual operation at the facility may deviate slightly.

b. "or equivalent" is defined as equipment which has an equivalent or less than listed in this table, which does not result in an increase in emissions, and which does not result in the emission of a toxic air pollutant not previously emitted.

c. Both the storage silo baghouse and supplement storage silo flyash baghouse are considered process equipment and therefore there is no associated control efficiency. Controlled PM_{10} emission factors were used when determining PTE and for modeling purposes.

Emissions Inventories

The emissions inventory for this portable concrete batch plant was developed by DEQ and is based on AP-42 Section 11.12 emission factors for central-mix and truck-mix concrete batch plants and the following assumptions: 50 cy per hour concrete production capacity and concrete production limits of 500 cy per day and 150,000 cy per year. Baghouse/cartridge filter capture efficiencies were presumed to be 99.0% in DEQ's generic emissions estimation.

The emissions analysis developed by DEQ, at most, assumes one central-mix or truck-mix concrete batch plant, a 5.0 MMBtu/hr diesel-fired water heater and a 1,340 bhp diesel-fired internal combustion engine are used. All possible equipment may not be included in the facility specific emissions inventory. Only equipment identified within the application material will be included in the inventory. AP-42 Sections 3.3 and 3.4 (10/96) were used to determine both criteria and TAPs emissions from the diesel-fired engine. AP-42 Section 1.3 (9/98) was used to calculate emissions from the diesel-fired water heater. These are the worst-case scenarios that were assumed by DEQ. It should be noted that, this facility does not have a diesel-fired water heater or a diesel-fired internal combustion engine.

Fugitive emissions of particulate matter (PM) and PM_{10} from batch plant material transfer points were assumed to be controlled by manual water sprays, sprinklers, or spray bars, or an equivalent method (e.g., enclosing the entire process inside a building) that reduce the emissions by an estimated 75%. The assumed 75% control efficiency is based on the Western Regional Air Partnership Fugitive Dust Handbook. According to the Handbook, water suppressant of material handling can range from 50-90% control. Assuming the average of 70% and including another 5% due to Best Management Practices required by the permit allow for 75% control to be a conservative estimate. For an additional 20% control, which reduces the setback distance, the following practices must be adhered to: continuous use of a 3-sided bunker for all aggregate piles and handling areas, covering of unused aggregate piles and eliminating all visible emissions beyond the property boundary.

Aggregate is washed before delivery to the batch plant site, and water is used on-site to control the temperature of the aggregate. Particulate matter and PM_{10} emissions from the weigh batcher transfer point are controlled by a baghouse/cartridge, and truck mix load-out emissions are controlled by a boot. Capture efficiency of the truck mix load-out boot with water ring or equivalent was estimated at 99%.

Controlled emissions of particulate toxic air pollutants (TAPs) were estimated based on the presence of a baghouse on the cement/cement supplement silos, a baghouses/cartridge on the weigh batcher, and 99% control for truck load-out emissions. Hexavalent chromium content was estimated at 20% of total chromium for cement, and 30% of total chromium for the cement supplement/fly ash. The hexavalent chromium percentages were taken from a University of North Dakota study, by the Energy and Environmental Research Center, Center for Air Toxic Metals. The two tables listed below compare uncontrolled and controlled emissions. Lead emissions are shown in Table 4. Detailed emissions calculations can be found in Appendix A of this document.

Table 2 UNCONTROLLED EMISSIONS ESTIMATES OF PM_{10}

Emissions Unit				Emission Factor[a]	PM_{10}	
				lb/cy	lb/hr	T/yr
Aggregate delivery to ground storage*	Hourly Throughput cy/hr	50		0.0031	0.155	0.233
Sand delivery to ground storage*	Annual Throughput cy/yr	150,000		0.0007	0.035	0.053
Aggregate transfer to conveyor*				0.0031	0.155	0.233
Sand transfer to conveyor*				0.0007	0.035	0.053
Aggregate transfer to elevated storage*				0.0031	0.155	0.233
Sand transfer to elevated storage*				0.0007	0.035	0.053
Cement delivery to Silo (controlled EF because baghouse is process equipment)				0.0001	0.005	0.008
Cement supplement delivery to Silo (controlled EF because baghouse is process equipment)				0.0002	0.010	0.015
Weigh hopper loading (sand & aggregate batcher loading)				0.0040	0.200	0.300
Truck mix loading, Table 11.12-2 (0.278 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete) / 2000 lb = 0.0784 lb/cy)				0.0784	3.920	5.880
Total, Point Sources					**4.135**	**6.203**
Total, Process Fugitives					**0.570**	**0.858**

a. The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2 (6/06), typical composition per cubic yard of concrete (1,865 lb aggregate, 1428 lbs sand, 491 lbs cement, 73 lbs cement supplement, and 20 gallons of water = 4,024 lb/cy), and closely match Table 11.12-5 values (6/06) when rounded to the same number of figures. AP-42 lists the same EFs for uncontrolled and controlled emissions, so control estimates are based on the assumed control levels input on the right hand side of the table.

* Considered fugitive for facility classification purposes.

Table 3 CONTROLLED EMISSIONS ESTIMATES OF PM_{10}

Emissions Unit	Control Assumption	PM_{10}	
	%	lb/hr	T/yr
Aggregate delivery to ground storage*	95	0.008	0.012
Sand delivery to ground storage*	95	0.002	0.003
Aggregate transfer to conveyor*	95	0.008	0.012
Sand transfer to conveyor*	95	0.002	0.003
Aggregate transfer to elevated storage*	95	0.008	0.012
Sand transfer to elevated storage*	95	0.002	0.003
Cement delivery to Silo (controlled EF because baghouse is process equipment)	0[a]	0.005	0.008
Cement supplement delivery to Silo (controlled EF because baghouse is process equipment)	0[a]	0.01	0.015
Weigh hopper loading (sand & aggregate batcher loading)	99	0.002	0.003
Truck mix loading, Table 11.12-2 (0.278 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete) / 2000 lb = 0.0784 lb/cy)	99	0.039	0.059
Total, Point Sources		**0.056**	**0.085**
Total, Process Fugitives		**0.03**	**0.045**

* Considered fugitive for facility classification purposes.

a. Cement / Cement Supplement Baghouses are considered process equipment

Table 4 LEAD EMISSIONS ESTIMATES UNCONTROLLED/CONTROLLED

Emissions Unit	Emission Factor	Lead	
	lb/ton	lb/hr	T/yr
Cement Delivery to silo (controlled EF because baghouse is process equipment)	1.09E-08	1.34E-07[a]	2.68E-04[d]
Cement supplement delivery to Silo (controlled EF because baghouse is process equipment)	5.20E-07	9.49E-07[b]	1.9E-03[d]
Truck load-out*	3.62E-06	5.10E-07[c]	1.02E-03[e]
Total, Point sources		1.08E-06	2.17E-03
Total, Process Fugitives		5.10E-07	1.02E-03

*Considered fugitive for facility classification purposes.

a. lb/hr = EF * pounds cement x max hourly production rate /2000 lb/T, where cement is 491 pounds per AP-42 Table 11.12-2 (6/06).

b. lb/hr = EF * pounds cement x max hourly production rate /2000 lb/T, where supplement cement is 73 pounds per AP-42 Table 11.12-2 (6/06).

c. lb/hr = EF * pounds cement x max hourly production rate /2000 lb/T, where cement is 491 pounds + 73 pounds supplement per AP-42 Table 11.12-2 x 99% efficiency. The EF is assumed to be uncontrolled. (6/06).

d. T/yr = EF * pounds cement x hourly production rate x 8,760 hr/yr /2000 lb/T / 2000 lb/T, where cement is 491 pounds or 73 pounds supplement per AP-42 Table 11.12-2. (6/06).

e. T/yr = EF * pounds cement x hourly production rate x 8,760 hr/yr /2000 lb/T / 2000 lb/T, where cement is 491 pounds + 73 pounds supplement per AP-42 Table 11.12-2 x 99% efficiency. The EF is assumed to be uncontrolled. (6/06).

Emissions Inventory for 5.0 MMBtu/hr Water Heater

Triple C Concrete has two natural gas water heaters with a combined heat input of less than 5.0 MMBtu/hr. The water heaters boiler will be used on a limited basis and requires an annual fuel consumption limit. The consumption is restricted to a maximum of 21.5 MMscf per year. The following emissions are reflective of that annual use. Note that the water heater does not have any control devices associated with it.

Table 5 UNCONTROLLED CRITERIA POLLUTANTS FROM NATURAL GAS BOILER

Pollutant	Emissions Factor[a]	Emissions[b]	
	lb/MMscf	lb/hr	T/yr
PM_{10}	7.6	0.037	0.081
SO_2	0.6	0.003	0.007
NO_x	100	0.490	1.073
CO	84	0.412	0.902
VOC	5.5	0.027	0.059
Lead	0.0005	0.0000025	0.0000055
Total		**0.969**	**2.122**

a. AP-42 Section 1.4 (7/98) is the source of all emission factors.

b. 1,020 MMBtu/MMscf which equated to 4.90E03 MMscf/hr and 4,380 hr/yr was used in the emissions calculation.

Emissions Inventory for Transfer Points

Determining emissions from a concrete batch plant also includes transfer emissions from the number of drop points throughout the process. The PM_{10} emissions from Truck-Mix loading operations are defined by an equation which includes the wind speed at each drop point and the moisture content of cement and cement supplement and a number of exponents and constants defined by AP-42 Equation 11.12-1 (6/06). An average value of wind speed and moisture content are 10 mph and 6%, respectively[1]. The following equation of particulate emissions is specific to PM_{10}. The resulting emissions were used to determine a factor to help evaluate wind speed variations in AERMOD modeling.

[1] 10 mph was the average wind speed obtained during two separate EPA tests conducted at Cheney enterprises Cement plant in Roanoke,VA, 1994 (AP-42 11-12 06/06). 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises. The percentages used in AP-42 are typical for most concrete batching operations.

$$E = k(0.0032) * \left[\frac{U^a}{M^b} \right] + c$$

Where:
k = particle size multiplier
a = exponent
b = exponent
c = constant
U = mean wind speed
M = moisture content

The second transfer emissions calculations were used to determine conveyor emissions. For both coarse and fine aggregate to a conveyor. It was assumed that 82% or 164 cy/hr of the concrete produced was aggregate. This percentage was based on 1,865 lb coarse aggregate, 1,428 lb sand, 564 lb cement/supplement and 167 lb water for a total of 4,024 lb concrete as defined by AP-42 Table 11.12-5 (06/06). The fine and coarse aggregate contributions were separated into 36% and 46% of the total concrete production[2]. Employing emission factors from AP-42 Table 11.12-5 (6/06) for conveyor transfer and assuming 75% control efficiency as stated earlier for conveyor transfer PM_{10} emissions were calculated for each transfer point. For both fine and coarse aggregate the facility has two (2) transfer points. Table 5 shows the transfer emissions estimates.

Table 6 TRANSFER POINT EMISSIONS FOR PM_{10}

Pollutant	Emission Factor lb/cy	# of Transfer Pts[a]	Emissions lb/hr	Emissions T/yr
Fine PM_{10}	0.0007	2	0.076	0.0284
Coarse PM_{10}	0.0031	2	0.428	0.1604
Total			**0.504**	**0.189**

a. Transfer points were identified in the application material submitted by the permittee.

Table 7 FACILITY WIDE CRITERIA POLLUTANT EMISSION ESTIMATES

Emissions Unit	PM_{10}	SO^2	NO_x	CO	VOC	Lead
	T/yr	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**
Concrete Batch Plant	0.09	--	--	--	--	0.0032
Natural Gas Water Heater	0.08	0.01	1.07	0.90	0.06	0.00001
Transfer Points	0.19	--	--	--	--	--
Total	**0.36**	**0.01**	**1.07**	**0.90**	**0.06**	**0.0032**

A summary of the estimated controlled emissions of toxic air pollutants (TAP) is provided in the Emissions Inventory within Appendix A. The emission estimates are total summation values of each unit used at the facility which are outlined in the previous table.

Ambient Air Quality Impact Analyses

A circular grid with 5.0 meter receptor spacing, extending out to 100 meters was used in the non-site-specific modeling performed by DEQ. To establish a setback distance, the following procedure was followed for various production levels and operational configurations:

[2] The percentages of coarse and fine aggregate are based on the AP-42 concrete composition. One cubic yard of concrete as defined by AP-42 is 4024 total pounds. Similarly, coarse aggregate is 1865 pounds or 46% of the total and sand (fine) aggregate is 1428 pounds or 36%.

1. Trigger values for the modeling analyses were determined (see Appendix C for details). These are values, when combined with background concentrations, indicated an exceedance of a standard. They were calculated by subtracting the background value from the standard (because the model does not specifically include background in the results). The following are trigger values:

Table 6 AMBIENT AIR IMPACT ANALYSIS TRIGGER VALUES

Pollutants	Averaging Period	Trigger Value (μg/m^3)
PM_{10}	24-hr	77
	Annual	24
SO_2	3-hr	1266
	24-hr	339
	Annual	72
CO	1-hr	36400
	8-hr	7700
NO_2	Annual	83

2. For each operational configuration scenario, pollutant, averaging period, and meteorological data set, all receptors with concentrations equal or greater than the trigger value were plotted. This effectively gave a plot of receptors where the standard could be exceeded for that pollutant and averaging period.
3. The controlling receptor for each pollutant, averaging period, and meteorological data set was identified. First, the receptor having a concentration in excess of the trigger value that was the furthest from any emissions source was identified. The controlling receptor was the next furthest downwind receptor from that point.
4. The minimum setback distance was then calculated. This was the furthest distance between an emissions point and the controlling receptor.

The applicant has demonstrated compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard so long as the setback distance and other permit conditions are complied with. The applicant has also demonstrated compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

Because a separate modeling analysis was not provided to demonstrate compliance with applicable standards in $PM_{2.5}$ and PM_{10} nonattainment areas, this portable facility is not permitted for operation in nonattainment areas.

Permit to Construct (IDAPA 58.01.01.201)

The proposed project does not meet the permit to construct exemption criteria in IDAPA 58.01.01.220–223.

A concrete batch plant with associated internal combustion engine and boiler are not categorically exempt and therefore do not meet the criteria of IDAPA 58.01.01.221 or 222. As a result, a permit to construct is required in accordance with IDAPA 58.01.01.201. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 are not applicable to this permitting action.

Registration Procedures & Requirements for Portable Equipment (IDAPA 58.01.01.500)

Portable equipment needs to be registered within 90 days after permit issuance and DEQ must be notified at least 10 days prior to relocation. This requirement is assured by Permit Condition 15.

Visible Emissions (IDAPA 58.01.01.625)

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 9 and 10.

Rules For Control of Fugitive Dust (IDAPA 650-651)

All sources of fugitive dust emissions at the facility are subject to the State of Idaho rules for controlling fugitive dust. Reasonable precautions shall be taken to prevent particulate matter from becoming airborne. This requirement is assured by Permit Condition 5.

Standards for New Sources (IDAPA 58.01.01.677)

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is assured by Permit Condition 4.

Rules For Control of Odors (IDAPA 58.01.01.775-776)

No person shall allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution. This requirement is assured by Permit Conditions 11 and 12.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

The facility is not classified as a major facility as defined in IDAPA 58.01.01.008.10. The facility is a synthetic minor facility, because without limits on the potential to emit, the emissions of regulated air pollutants the facility would exceed major source thresholds. Therefore, the requirements of IDAPA 58.01.01.300–399 are not applicable to this permitting action.

PSD Classification (40 CFR 52.21 and IDAPA 205)

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility is not subject to the requirements of 40 CFR 60 Subpart IIII – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, and 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because there are not engines on site.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT Applicability (40 CFR 63)

This Concrete Batch plant does not emit or have the potential to emit more than 10 tons or more per year of any HAP, or 25 tons or more per year of any combination of HAPs. Major source Maximum Achievable Control Technology (MACT) requirements therefore do not apply to this facility.

Area source MACT requirements that would apply to the IC engines include Subpart ZZZZ:

40 CFR 63, Subpart ZZZZ............National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines

Triple C Concrete is not subject to this subpart as there are no engines onsite.

CAM Applicability (40 CFR 64)

The facility is not classified as a major source (refer to Title V Classification section). Because the facility does not require a Title V permit, the requirements of CAM are not applicable.

Permit Conditions Review

This section describes the permit conditions for this initial permit.

<u>**Scope**</u>

Purpose

<u>Permit Condition 1.</u>

States that the purpose is to permit a concrete batch plant

<u>Permit Condition 2.</u>

The table in this condition outlines those regulated sources within the permit.

Facility-Wide Conditions

Fuel Specifications

Permit Condition 3.

This condition identifies the allowable fuel that may be combusted in the water heater. In this case only the natural gas is allowed to be combusted in the heaters.

Permit Condition 4.

This condition sets a requirement for fuel burning equipment for PM emissions from the water heater(s) of 0.015 gr/dscf, in accordance with IDAPA 58.01.01.677.

Fugitive Dust Control

Permit Condition 5.

This condition requires that the permittee perform visible emissions checks on see/no see basis to verify that fugitive emissions are not extending beyond the property boundary. If visible emissions are seen, corrective action must be taken. Reasonable control requirements for fugitive dust are needed at any potential site. Permit conditions requires that the plant must take corrective action where practical to control fugitive dust when operating.

Permit Condition 6.

More fugitive dust control is required by implementing Best Management Practices. Visible emissions are determined by a see/no see basis at the facility boundary. If visible emissions are present, the permittee must take appropriate action to correct the problem or perform a Method 22 test. The methods provided in this condition are options that the permittee may use to control any dust problems.

Fugitive Dust Control Monitoring & Recordkeeping

Permit Condition 7.
Requires the permittee to conduct inspections each day that the plant is operating to assess the control of fugitive emissions and specifies corrective actions to take if fugitive dust is not reasonably controlled.

Opacity

Permit Condition 8.

The condition is in accordance with the opacity limit of 20% as stated by IDAPA 58.01.01.625.

Visible Emissions Monitoring & Recordkeeping

Permit Condition 9.

Visible emissions and/or opacity monitoring is required on a monthly basis. This includes a see/no see evaluation of baghouse stacks. If there are any visible emissions, corrective actions must be taken within 24 hours. If the problem persists, a Method 9 opacity test must be performed in accordance to IDAPA 58.01.01.130-136. Records of all inspections need to be maintained as well.

Odors

Permit Condition 10.

The permittee must operate in accordance with IDAPA 58.01.01.776.01 to minimize odors associated with the facility.

Permit Condition 11.

Maintaining records of odor complaints, and corrective action taken demonstrates compliance with this condition.

Nonattainment Areas

Permit Condition 12.

The concrete batch plant cannot relocate and operate in any nonattainment area. Operations within a nonattainment area were not included in the modeling compliance analysis. Therefore, it is not permitted with this general CBP permit. See the associated modeling memo.

Co-location

Permit Condition 13.

The concrete batch plant may only co-locate with one rock crushing facility. Co-location is defined as being within 1,000 ft of the nearest emission unit. This includes the concrete batch plant, silos and the center of any stockpile.

Reporting Requirements

Permit Condition 14.

When relocating to another site, the permittee must submit a Portable Equipment Relocation Form (PERF) within 10 days of desired moving date in accordance with IDAPA 58.01.01.500. A scaled plot must also be included with the PERF form.

Concrete Batch Plant

Description

Permit Condition 15.

The process description is provided to outline the activity at the facility.

Permit Condition 16.

The table in this condition outlines the associated emission control devices for each regulated unit.

Operating Requirements

Permit Condition 17.

Limits the finished concrete production and required setback for any future site. A setback distance from the property boundary was used in the ambient air quality impact analysis to demonstrate compliance with NAAQS and TAP increments. Because the equipment is portable and the location may be changed from its initial location, compliance with a minimum setback distance limit is required. The setback distances are based on a number of criteria which include the use of an engine, control devices such as baghouses, boot enclosures, water ring and other suppressants. The use of a boiler at an average of 12 hours per day is also included in the determination.

One of the biggest drivers when establishing the setback distances was truck loadout. It is accepted by the DEQ that a boot enclosure alone provides 95% control. This acceptance is based on several previously issued permits that demonstrated through manufacturer information. To increase the flexibility of the general permit and allow for small setback distances the permittee has the option to increase the loadout control to 99%. The permittee can increase the control efficiency to 99% in one of two ways; either (1) route all loadout emissions to a baghouse or (2) equip the boot enclosure with a water-fog-ring spray system. A BACT analysis done by the Texas Commission of Environmental Quality (TCEQ) in 2006 suggested that the appropriate control efficiency for the water ring was 85%. Multiply (1-95%) and (1-85%) returns a value of .0075. 1- .0075 = .9925 or 99.25%. Therefore adding the water fog ring to the boot enclosure obtains 99% control efficiency for truck loadout.

The fugitive dust control ranges from 75% to 95%. The additional 20% is obtained by mandating the enclosing of aggregate/sand piles with three-sided barriers and covering piles or adding additional suppressants.

Setback distances of both line power and engine use are included in the condition. This allows for the facility to move from one site that requires an engine for power to another site in which line power is available without requiring a permit revision.

To allow for even more flexibility, AERMOD modeling was conducted to establish a scenario in which no setback distance is required. This requires that all Idaho TAPs emissions levels in IDAPA 58.01.01.585 and 586 are never exceeded. Benzene and POM from the natural gas boiler are the drivers when both loadout and fugitive dust control is maximized at 99% and 95% respectively. Other requirements are that only line power and a natural gas boiler are allowed.

Permit Condition 18.

General restrictions were applied to the water heater when in use. The associated boiler requires an annual fuel usage limit to demonstrate compliance with the NAAQS standards. The limit in this condition is based on a 5 MMBtu/hr maximum water heater and running 4,380 hr/yr. AP-42 Section 1.3 (9/98) assumes 140 MMBtu/10^3 gal which equates to 3.57E-02/10^3 gal/hr for a 5 MMBtu/hr water heater. That hourly rate is multiplied by 4,380 hr/yr to 156,430 gal fuel per year. If the water heater is natural gas, it's annual limit also equates to an hourly fuel consumption rate of 4.90E-03 MMscf/hr multiplied by 4,380 hr/yr, or 21.5 MMscf/yr. The water heater is also limited to only natural gas to verify that emission limits are not exceeded.

Permit Condition 19.

A baghouse filter/cartridge system must be installed on any storage silo and all control equipment must be operated with a developed procedures document. This is required to control particulate emissions and demonstrate compliance with NAAQS standards.

Permit Condition 20.

A water spray bar or equivalent must be installed and all control equipment must be operated with a developed procedures document. This is required to control particulate emissions and demonstrate compliance with NAAQS standards.

Permit Condition 21.

The permittee needs to develop a procedures document outlining operations and maintenance schedules. This procedure must be submitted to the appropriate regional DEQ office for review. This is to demonstrate that all required control equipment is being operated and maintained properly. Also any change whether it is done by the facility or requested by DEQ must be submitted to DEQ within 15 days of the change.

Permit Condition 22.

To achieve 99% control efficiency for truck loadout emissions the permittee must route the emissions to a baghouse or install a water ring with at a minimum 85% control efficiency in conjunction with the boot enclosure. This option was added to reduce the setback distances available within the general permit.

Monitoring & Recordkeeping Requirements

Permit Condition 23.

Concrete production monitoring is required daily, monthly and annually. This is necessary to demonstrate compliance with the production limits.

Permit Condition 24.

Setback monitoring is required to demonstrate compliance with the setback distance requirements. This must be done each time the CBP relocates or anytime the layout has changed. Also, atmospheric characteristics must be documented to verify that assumed emission factors during the analysis to accurate for the location of the plant.

Permit Condition 25.

Each month the water heater's fuel usage needs to be recorded and summed for the previous consecutive 12 months to demonstrate compliance with the annual fuel limit.

General Provisions

General Compliance

Permit Condition 26.

The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Permit Condition 27.

The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Permit Condition 28.

The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Inspection & Entry

Permit Condition 29.

The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Construction & Operation Notification

Permit Condition 30.

The construction and operation notification provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.

Performance Testing

Permit Condition 31.

The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Permit Condition 32.

The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157, and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Permit Condition 33.

The performance test report provision requires that the permittee report any performance test results to DEQ within 30 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Monitoring & Recordkeeping

Permit Condition 34.

The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Excess Emissions

Permit Condition 35.

The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130.

Certification

Permit Condition 36.

The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

False Statements

Permit Condition 37.

The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Tampering

Permit Condition 38.

The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Transferability

Permit Condition 39.

The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Severability

Permit Condition 40.

The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EMISSIONS INVENTORIES

Final Concrete Batch Plant Emissions Inventory

Listed Below are the emissions estimates for the units selected.

Company:	Triple C Concrete
Facility ID:	777-00499
Permit No.:	P-2010.0184
Source Type:	Portable Concrete Batch Plant
Manufacturer/Model:	Enter Manufacturer

Production

Maximum Hourly Production Rate:	200	cy/hr
Proposed Daily Production Rate:	500	cy/day
Proposed Maximum Annual Production Rate:	150000	cy/year

Tons/year

Emissions Units		PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs
CBP Type:	Truck Mix	0.08	NA	NA	NA	NA	1.90E-05	
Water Heater/Boiler:	5 MMBtu/hr Natural Gas	0.082	0.006	1.074	0.902	0.059	5.37E-06	
Diesel Engine*:	No Engine	0.00	0.00	0.00	0.00	0.00	NA	
	Transfer/Drop Points	0.19	NA	NA	NA	NA	NA	
	Totals	**0.35**	**0.01**	**1.07**	**0.90**	**0.06**	**2.43E-05**	**2.07E-02**

Pounds/hour

		PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs
CBP Type:	Truck Mix	0.02	NA	NA	NA	NA	6.37E-06	
Water Heater/Boiler:	5 MMBtu/hr Natural Gas	0.037	0.003	0.490	0.412	0.027	2.45E-06	
Diesel Engine*:	No Engine	0.00	0.00	0.00	0.00	0.00	NA	
	Transfer/Drop Points	0.05	NA	NA	NA	NA	NA	
	Totals	**0.11**	**0.00**	**0.49**	**0.41**	**0.03**	**8.82E-06**	**9.63E-03**

* The Large engine may run : There is no large engine. hr/yr

* The Small engine may run : There is no small engine. hr/yr

HAPS & TAPS Emissions Inventory

Metals	HAP	TAP	lb/hr	T/yr	Averaging Period	EL lb/hr	Exceeded?
Arsenic	X	X	1.28E-06	3.70E-06	Annual	1.50E-06	No
Barium		X	2.16E-05	4.72E-05	24-hour	3.30E-02	No
Beryllium	X	X	9.97E-08	3.23E-07	Annual	2.80E-05	No
Cadmium	X	X	2.71E-06	1.42E-06	Annual	3.70E-06	No
Cobalt	X	X	4.12E-07	9.02E-07	24-hour	3.30E-03	No
Copper		X	4.17E-06	9.13E-06	24-hour	1.30E-02	No
Chromium	X	X	1.06E-05	1.50E-05	24-hour	3.30E-02	No
Manganese	X	X	7.37E-06	1.99E-05	24-hour	3.33E-01	No
Mercury	X	X	1.27E-06	2.79E-06	24-hour	3.00E-03	No
Molybdenum		X	5.39E-06	1.18E-05	24-hour	2.70E-05	No
Nickel	X	X	7.32E-06	1.21E-05	Annual	2.70E-05	No
Phosphorus	X	X	2.04E-05	1.78E-05	24-hour	7.00E-03	No
Selenium	X	X	3.27E-07	1.01E-06	24-hour	1.30E-02	No
Vanadium		X	1.13E-05	2.47E-05	24-hour	3.00E-03	No
Zinc		X	1.42E-04	3.11E-04	24-hour	6.67E-01	No
Chromium VI	X	X	3.70E-07	1.62E-06	Annual	5.60E-07	No
Non PAH Organic Compunds							
Pentane		X	7.84E-03	1.72E-02	24-hour	118	No
Methyl Ethyl Ketone		X	0.00E+00	0.00E+00	24-hour	39.3	No
Non-PAH HAPs							
Acetaldehyde	X	X	0.00E+00	0.00E+00	Annual	3.00E-03	No
Acrolein	X	X	0.00E+00	0.00E+00	24-hour	1.70E-02	No
Benzene	X	X	5.15E-06	2.57E-06	Annual	8.00E-04	No
1,3 - Butadiene	X	X	0.00E+00	0.00E+00	Annual	2.40E-05	No
Ethyl Benzene	X	X	0.00E+00	0.00E+00	24-hour	29	No
Fomaldehyde	X	X	1.84E-04	9.19E-05	Annual	5.10E-04	No
Hexane	X	X	8.82E-03	1.93E-02	24-hour	12	No
Isooctane	X		0.00E+00	0.00E+00	NA	NA	NA
Methyl Chloroform	X	X	0.00E+00	0.00E+00	24-hour	127	No
Propionaldehyde	X	X	0.00E+00	0.00E+00	24-hour	2.87E-02	No
Quinone	X	X	0.00E+00	0.00E+00	24-hour	2.70E-02	No
Toluene	X	X	1.67E-05	3.65E-05	24-hour	25	No
o-Xylene	X	X	0.00E+00	0.00E+00	24-hour	7.00E-03	No
PAH HAPs							
2-Methylnaphthalene	X	X	5.88E-08	2.94E-08	Annual	9.10E-05	No
3-Methylchloranthrene	X	X	4.41E-09	2.21E-09	Annual	2.50E-06	No
Acenaphthene	X	X	4.41E-09	2.21E-09	Annual	9.10E-05	No
Acenaphthylene	X	X	4.41E-09	2.21E-09	Annual	9.10E-05	No
Anthracene	X	X	5.88E-09	2.94E-09	Annual	9.10E-05	No
Benzo(a)anthracene	X	X	4.41E-09	2.21E-09	Annual	9.10E-05	No
Benzo(a)pyrene	X	X	2.94E-09	1.47E-09	Annual	2.00E-06	No
Benzo(b)fluoranthene	X	X	4.41E-09	2.21E-09	Annual	2.00E-06	No
Benzo(e)pyrene	X	X	0.00E+00	0.00E+00	Annual	2.00E-06	No
Benzo(g,h,i)perylene	X	X	2.94E-09	1.47E-09	Annual	9.10E-05	No
Benzo(k)fluoranthene	X	X	4.41E-09	2.21E-09	Annual	2.00E-06	No
Chrysene	X	X	4.41E-09	2.21E-09	Annual	2.00E-06	No
Dibenzo(a,h)anthracene	X	X	2.94E-09	1.47E-09	Annual	2.00E-06	No
Dichlorobenzene	X	X	2.94E-06	1.47E-06	Annual	9.10E-05	No
Fluoranthene	X	X	7.35E-09	3.68E-09	Annual	9.10E-05	No
Fluorene	X	X	6.86E-09	3.43E-09	Annual	9.10E-05	No
Indeno(1,2,3-cd)pyrene	X	X	4.41E-09	2.21E-09	Annual	2.00E-06	No
Naphthalene	X	X	5.46E-04	1.20E-03	24-hour	3.33	No
Naphthalene	X	X	1.50E-06	7.48E-07	24-hour	9.10E-05	No
Perylene	X		0.00E+00	0.00E+00	NA	NA	NA
Phenanathrene	X	X	4.17E-08	2.08E-08	Annual	9.10E-05	No
Pyrene	X	X	1.23E-08	6.13E-09	Annual	9.10E-05	No
Polycyclic Organic Matter (POM)	X	X	2.79E-08	1.40E-08	Annual	2.00E-06	No

Total HAPs Emissions: 9.63E-03 2.07E-02 1.93E-02

APPENDIX B – PERMIT FEES

All associated permitting fees were paid when the application was submitted. The total cost of the Concrete Batch General Permit is $1,500. That includes a $1,000 application fee and $500 processing fee.

Per Section 224 of the Rules, all PTC applications are subject to an application fee of $1000.
Per Section 225 of the Rules, General PTC permits are subject to a processing fee of $500. The definition of General permit per the Rules: "no facility-specific requirements (defined as a source category specific permit for which the Department has developed standard emission limitations, operating requirements, monitoring and recordkeeping requirements, and that require minimal engineering analysis. General permit facilities may include portable concrete batch plants, portable hot-mix asphalt plants and portable rock crushing plants.)"

APPENDIX C – AMBIENT AIR QUALITY ANALYSIS

MEMORANDUM

DATE: January 18, 2011

TO: Harbi Elshafei, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT: PTC Applications for a Concrete Batch Plant using DEQ's General Modeling Developed for such Plants

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs)

1.0 Summary

A Permit to Construct (PTC) application has been received for a portable concrete batch plant (CBP) to be operated in Idaho. Non-site-specific air quality impact analyses involving atmospheric dispersion modeling of emissions associated with CBPs meeting specific criteria were performed by DEQ to demonstrate that such facilities would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and 203.03 [Idaho Air Rules Section 203.02 and 203.03]). The permit applicant submitted applicable information and data for DEQ to evaluate whether the proposed facility met the criteria for using DEQ's non-site-specific CBP ambient impact analyses.

A technical review of the submitted information was conducted by DEQ. DEQ staff performed non-site-specific detailed air quality impact analyses to assure compliance with air quality standards for CBPs meeting specified criteria for various production levels and operational configurations. Results from DEQ's analyses were used to establish minimum setback distances between emissions points and the property boundary of the site. The submitted information, in combination with DEQ's air quality analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all locations outside of the required setback distance (closest distance from pollutant emission points to the property boundary). Table 1 presents key assumptions and results to be considered in the development of the permit.

Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 40 CFR 51, Appendix W (Guideline on Air Quality Models). Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted analyses, in combination with DEQ's analyses, demonstrated to the satisfaction of the Department that operation of the proposed facility or modification will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition.

Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY DATA, ASSUMPTIONS, AND CONCLUSIONS OF THE MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Maximum throughput does not exceed 500 cubic yards per day and 150,000 cubic yards per year.	Short-term and annual modeling was performed assuming these rates.
Emissions units must maintain a 732 meter (24 foot) setback distance from the nearest property boundary.	This setback distance is necessary to assure compliance with applicable air quality standards at all ambient air locations.
Allowable emissions summed from generators used at the site are equivalent or less than the values modeled.	Different types and size of engines can be operated provided emissions are limited accordingly.
Fugitive emissions from material handling and vehicle traffic are controlled to a high degree.	Emissions from vehicle traffic were assumed to be negligible.
Emissions rates for applicable averaging periods are not greater than those used in the representative modeling analyses, as listed in this memorandum.	Compliance with NAAQS and TAPs standards has only been demonstrated for those emissions rates listed in these analyses that correspond to specific operational configurations and setback distances.
Co-contributing emissions sources such as other CBPs, HMAs, or rock crushing plants may not be operated at the site.	Emissions are considered co-contributing if they occur within 1,000 feet (305 meters) of each other.
Stack heights for the baghouses, boiler, and generators are as listed in this memorandum or higher.	Actual stack heights may be greater than those listed in this memo.
Stack parameters of exhaust temperature and flow rate should not be less than about 75 percent of values listed in this memorandum.	Higher temperatures and flow rates increase plume rise, allowing the plume to disperse to a larger degree before impacting ground level.
The CBP may not locate in any non-attainment areas.	All analyses performed assumed the facility will be located in areas attaining air quality standards for those pollutants emitted from the CBP.
Compliance with $PM_{2.5}$ has only been demonstrated by using PM_{10} analyses as a surrogate, as was directed by an EPA memorandum.	Once DEQ incorporates $PM_{2.5}$ into permitting (specifically including a $PM_{2.5}$ emissions inventory), this memorandum cannot be used in support of issuing permits.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The CBP will be a portable facility. The CBP will only locate in areas designated as attainment or unclassifiable for all criteria pollutants.

2.1.2 Significant and Cumulative NAAQS Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed new facility exceed the significant impact levels (SILs) of Idaho Air Rules Section 006.102 (referred to as significant contribution in Idaho Ai r Rules), then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and Idaho Air Rules Section 203.02. A cumulative NAAQS impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions, and emissions from any nearby co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual[f]	1.0	50[g]	Maximum 1[st] highest[h]
	24-hour	5.0	150[i]	Maximum 6[th] highest[j]
$PM_{2.5}$[k]	Annual[l]	Not established	15[g]	Use PM_{10} as surrogate
	24-hour[m]	Not established	35[g]	Use PM_{10} as surrogate
Carbon monoxide (CO)	8-hour	500	10,000[n]	Maximum 2[nd] highest[h]
	1-hour	2,000	40,000[n]	Maximum 2[nd] highest[h]
Sulfur Dioxide (SO_2)	Annual	1.0	80[g]	Maximum 1[st] highest[h]
	24-hour	5	365[n]	Maximum 2[nd] highest[h]
	3-hour	25	1,300[n]	Maximum 2[nd] highest[h]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[g]	Maximum 1[st] highest[h]
	1-hour[o]	Not established	189[g]	Mean of maximum 8[th] highest[p]
Lead (Pb)	Quarterly	NA	1.5[g]	Maximum 1[st] highest[h]
	3-month	NA	0.15[q]	Maximum 1[st] highest[h]

a. Idaho Air Rules Section 006.102.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.03.b.
d. The maximum 1[st] highest modeled value is always used for the significant impact analysis.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers.
f. The annual PM_{10} standard was revoked in 2006. The standard is still listed because compliance with the annual $PM_{2.5}$ standard is demonstrated by a PM_{10} analysis that demonstrates compliance with the revoked PM_{10} standard.
g. Never expected to be exceeded in any calendar year.
h. Concentration at any modeled receptor.
i. Never expected to be exceeded more than once in any calendar year.
j. Concentration at any modeled receptor when using five years of meteorological data.
k. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
l. 3-year average of the annual concentration.
m. 3-year average of the upper 98[th] percentile of 24-hour concentrations.
n. Not to be exceeded more than once per year.
o. 3-year average of the upper 98[th] percentile of the distribution of maximum daily 1-hour concentrations.
p. Mean (of 5 years of data) of the maximum of 8[th] highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled.
q. 3-month rolling average.

New source review requirements for assuring compliance with $PM_{2.5}$ standards have not yet been completed and promulgated into regulation. EPA has asserted through a policy memorandum that compliance with $PM_{2.5}$ standards will be assured through an air quality analysis for the corresponding PM_{10} standard. Although the PM_{10} annual standard was revoked in 2006, compliance with the revoked PM_{10} annual standard must be demonstrated as a surrogate to the annual $PM_{2.5}$ standard. Once $PM_{2.5}$ is directly incorporated into permitting procedures, this memorandum will no longer be considered as a satisfactory demonstration of $PM_{2.5}$ NAAQS compliance.

New NO_2 and SO_2 short-term standards have recently been promulgated by EPA. The standards will not be applicable for permitting purposes in Idaho until they are incorporated by reference into Idaho Air Rules.

DEQ used non-site-specific full impact analyses to demonstrate compliance with Idaho Air Rules Section 203.02. Established setback distances are minimal distances needed to assure compliance with standards, considering the impact of the CBP and a conservative background value.

2.1.3 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permit requirements for toxic air pollutants from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if total project-wide emissions increases associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

2.2 Background Concentrations

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. Table 3 lists appropriate background concentrations for rural Idaho areas.

Background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Background concentrations in the DEQ non-site-specific analyses were based on DEQ default values for rural/agricultural areas.

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1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

Table 3. BACKGROUND CONCENTRATIONS		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[a]**
PM_{10}[b]	24-hour	73
	Annual	26
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO_2)	3-hour	34
	24-hour	26
	Annual	8
Nitrogen dioxide (NO_2)	Annual	17
Lead (Pb)	Quarterly	0.03

a. Micrograms per cubic meter
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3.0 Modeling Impact Assessment

3.1 *Modeling Methodology*

This section describes the modeling methods used by DEQ to demonstrate compliance with applicable air quality standards.

3.1.1 Overview of Analyses

DEQ performed general non-site-specific analyses that were determined to be reasonably representative of all CBPs meeting DEQ-specified criteria, and the results demonstrated compliance with applicable air quality standards to DEQ's satisfaction.

Table 4 provides a brief description of parameters used in the DEQ modeling analyses.

Table 4. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description[a]**
General facility location	Portable	Can only locate in attainment or unclassifiable areas
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 09292
Meteorological data	Multiple Data Sets	See Section 3.1.4
Terrain	Flat	The analyses assumed flat terrain for the immediate area
Building downwash	Considered	A building of 10 m X 10 m X 10 m high was assumed for downwash consideration.
Receptor Grid	Grid 1	5-meter spacing along the property boundary out 100 meters
	Grid 2	10-meter spacing out to 200 meters

3.1.2 Modeling protocol and Methodology

A modeling protocol was not submitted to DEQ prior to the application because DEQ staff performed non-site-specific air quality impact analyses. Non-site-specific modeling was generally conducted using data and methods described in the *State of Idaho Air Quality Modeling Guideline.*

Because of the portable nature of the CBP, DEQ performed non-site-specific modeling to establish setback distances between emissions source locations and the property boundary for a series of CBP production rates.

3.1.3 Model Selection

Idaho Air Rules Section 202.02 require that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). The refined, steady state, multiple source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. EPA provided a 1-year transition period during which either ISCST3 or AERMOD could be used at the discretion of the permitting agency. AERMOD must be used for all air impact analyses, performed in support of air quality permitting, conducted after November 2006.

AERMOD retains the single straight line trajectory of ISCST3, but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD offers the following improvements over ISCST3:

- Improved dispersion in the convective boundary layer and the stable boundary layer
- Improved plume rise and buoyancy calculations
- Improved treatment of terrain affects on dispersion
- New vertical profiles of wind, turbulence, and temperature

AERMOD was used for the DEQ analyses.

3.1.4 Meteorological Data

Because of the portable nature of CBPs, DEQ used seven different meteorological data sets from various locations in Idaho to assure compliance with applicable standards for the non-site-specific analyses. Table 5 lists the meteorological data sets used in the air impact analyses.

Table 5. METEOROLOGICAL DATA SETS USED IN MODELING ANALYSES

Surface Data	Upper Air Data	Years
Boise	Boise	2001-2005
Aberdeen	Boise	2001-2005
Idaho Falls	Boise	2000-2004
Minidoka	Boise	2000-2004
Soda Springs	Boise	2004-2008
Lewiston	Spokane, Wa	1992-1995, 1997
Sandpoint	Spokane, Wa	2002-2006

Use of representative meteorological data is of greater concern when using AERMOD than when using ISCST3. This is because AERMOD uses site-specific surface characteristics to more accurately account for turbulence. To account for this uncertainty, the following measures were taken:

- Use the maximum of 2nd high modeled concentration to evaluate compliance with the 24-hour PM_{10} standard, rather than the maximum of 6th high modeled concentration typically used when modeling a five-year meteorological data set to demonstrate that the standard will not be exceeded more than once per year on average over a three year period.

- Use the maximum of 1st high modeled concentration to evaluate compliance with all pollutants and averaging times, except for 24-hour PM_{10}.

3.1.5 Terrain Effects

Terrain effects on dispersion were not considered in the non-site-specific analyses. Flat terrain was an appropriate assumption because most emissions sources associated with CBPs are near ground-level and the immediate surrounding area is typically flat for dispersion modeling purposes. Emissions sources near ground-level typically have maximum pollutant impacts near the source, minimizing the potential affect of surrounding terrain to influence the magnitude of maximum modeled impacts.

3.1.6 Facility Layout

DEQ's analyses used a conservative generic facility layout. This was done because the specific layout will vary depending upon product needs and specific characteristics of the site. To provide conservative results, DEQ used a tight grouping of emissions sources. Sources were positioned within 2.5 meters of the center of the facility.

3.1.7 Building Downwash

DEQ's analyses accounted for building downwash in a fairly general manner because of the following:

- Determining a building configuration is extremely difficult given the portable nature of the facility.
- Many CBP have at least semi-permanent structures associated with them, even though the permit will be for portable source.
- Much of the equipment is porous with regard to wind, thereby minimizing downwash effects.

Downwash was accounted for by placing a 10 meter by 10 meter by 10 meter high building among the sources.

3.1.8 Ambient Air Boundary

DEQ's non-site-specific analyses, using a generic facility layout, were used to generate minimum setback distances between emissions units and the property boundary. The issued permit will require this distance be maintained at all locations.

3.1.9 Receptor Network and Generation of Setback Distances

A circular grid with 5.0 meter receptor spacing, extending out to 100 meters was used in the non-site-specific modeling performed by DEQ. To establish a setback distance, the following procedure was followed for various production levels and operational configurations:

1) Trigger values for the modeling analyses were determined. These are values, when combined with background concentrations, indicated an exceedance of a standard. They were calculated

by subtracting the background value from the standard (because the model does not specifically include background in the results). The following are trigger values:

PM_{10}	24-hour	77 $\mu g/m^3$
	annual	24 $\mu g/m^3$
SO_2	3-hour	1266 $\mu g/m^3$
	24-hour	339 $\mu g/m^3$
	annual	72 $\mu g/m^3$
CO	1-hour	36400 $\mu g/m^3$
	8-hour	7700 $\mu g/m^3$
NO_2	annual	83 $\mu g/m^3$

2) For each operational configuration scenario, pollutant, averaging period, and meteorological data set, all receptors with concentrations equal or greater than the trigger value were plotted. This effectively gave a plot of receptors where the standard could be exceeded for that pollutant and averaging period.

3) The controlling receptor for each pollutant, averaging period, and meteorological data set was identified. First, the receptor having a concentration in excess of the trigger value that was the furthest from any emissions source was identified. The controlling receptor was the next furthest downwind receptor from that point.

4) The minimum setback distance was calculated. This was the furthest distance between an emissions point and the controlling receptor.

3.2 Emission Rates

Emissions rates of criteria pollutants and TAPs were calculated for several CBP production rates and operational configurations for various applicable averaging periods.

3.2.1 Criteria Pollutant Emissions Rates

Table 6 lists criteria pollutant emissions rates used in the DEQ non-site-specific modeling analyses for various CBP production rates, operational configurations, and for all averaging periods. Attachment 1 provides additional details of DEQ emissions calculations.

3.2.2 TAP Emissions Rates

Table 7 lists TAP emissions rates for setback-controlling TAPs.

3.3 Emission Release Parameters and Plant Criteria

Table 8 lists the characteristics of CBPs used in DEQ's non-site-specific CBP air impact analyses. Different scenarios were used to generate different setback distances depending upon throughput rates and operational configurations.

Table 9 provides emissions release parameters for the analyses including stack height, stack diameter, exhaust temperature, and exhaust velocity. Additional details are provided in Attachment 1.

DEQ modeling staff will make the determination of whether any release parameters slightly outside of those listed in Table 8 and 9 are still adequate for using DEQ's non-site-specific air impact analyses for the application in question.

3.4 Results for Cumulative NAAQS Impact Analyses and TAPs Analyses

DEQ determined required setback distances from the non-site-specific modeling results for each CBP production level scenario, criteria pollutant, and averaging period. Table 10 lists setback distances for each production level scenario and averaging period.

4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any air quality standard.

Table 6. EMISSIONS USED IN DEQ MODELING ANALYSES						
Emissions Point in Model	Pollutant	Averaging Period	Emissions Rate (lb/hr)			
			500 cy/day 150,000 cy/yr	1,000 cy/day	1,500 cy/day	2,500 cy/day
TRUCKLOD[a] – truck loadout - controlled by 95% by boot, etc.	PM_{10}	24-hour	0.08166	0.1633	0.2450	0.4083
		annual	0.06712			
TRKLDBAG[a] – truck loadout - controlled by 99% by baghouse	PM_{10}	24-hour	0.01633	0.03267	0.04900	0.08166
		annual	0.1342			
WEIGHOP – weigh hopper loading - controlled by baghouse	PM_{10}	24-hour	8.233E-4	1.647E-3	2.470E-3	4.117E-3
		annual	6.767E-4			
SILO – cement/ fly ash storage silo - controlled by fabric filter	PM_{10}	24-hour	5.464E-3	0.01093	0.01640	0.02732
		annual	4.491E-3			
BOILER[b] – 5 MMBtu/hr diesel boiler - 24 hr/day and 4380 hr/yr	PM_{10}	24-hour	0.1179	0.1179	0.1179	0.1179
		annual	0.05893	0.05893	0.05893	0.05893
	CO	1-hour 8-hour	0.1786	0.1786	0.1786	0.1786
	SO_2	3-hour	0.08518	0.08518	0.08518	0.08518
		24-hour	0.08518	0.08518	0.08518	0.08518
		Annual	0.04259	0.04259	0.04259	0.04259
	NOx	annual	0.4286	0.4286	0.4286	0.4286
NGBOILER[b] – 5 MMBtu/hr nat. gas boiler - 24 hr/day and 4380 hr/yr	PM_{10}	24-hour	0.03725	0.03725	0.03725	0.03725
		annual	0.01863	0.01863	0.01863	0.01863
	CO	1-hour 8-hour	0.4118	0.4118	0.4118	0.4118
	SO_2	3-hour	2.941E-3	2.941E-3	2.941E-3	2.941E-3
		24-hour	2.941E-3	2.941E-3	2.941E-3	2.941E-3
		Annual	1.471E-3	1.471E-3	1.471E-3	1.471E-3
	NOx	annual	0.2451	0.2451	0.2451	0.2451
GEN1 – electrical generator. - Emissions equal to a 1,000 kW powered engine (EPA Tier 2) burning diesel with a 0.0015 Sulfur content. - 24 hr/day and 4380 hr/yr	PM_{10}	24-hour	0.4409	0.4409	0.4409	0.4409
		annual	0.2205	0.2205	0.2205	0.2205
	CO	1-hour 8-hour	7.716	7.716	7.716	7.716
	SO_2	3-hour	0.01422	0.01422	0.01422	0.01422
		24-hour	0.01422	0.01422	0.01422	0.01422
		Annual	7.111E-3	7.111E-3	7.111E-3	7.111E-3
	NOx	annual	7.055	7.055	7.055	7.055
AGG&SND[c] – aggregate/sand transfers at ground level +75% control	PM_{10}	24-hour	0.03963	0.07924	0.1189	0.1981
		annual	0.03257			
AGGTOSTO[c] – agg./sand to elevated storage + 75% control	PM_{10}	24-hour	0.01982	0.03962	0.05944	0.09906
		annual	0.01628			
AGG&SND2[c] – aggregate/sand transfers at ground level +95% control	PM_{10}	24-hour	0.007924	0.01581	0.02378	0.03963
		annual	0.006513			
AGGTOST2[c] – agg./sand to elevated storage + 95% control	PM_{10}	24-hour	0.003962	0.007904	0.01189	0.01982
		annual	0.003257			

a. Impacts will be evaluated for multiple operational scenarios. Truck loadout emissions will either be modeled as controlled by a boot with 95% control efficiency (TRUCKLOD) or as captured and controlled by a baghouse with 99% control efficiency (TRKLDBAG).

b. Impacts will be evaluated for multiple operational scenarios. Boiler emissions will either be modeled as fueled by diesel (BOILER) or as fueled by natural gas (NGBOILER).

c. Impacts will be evaluated for multiple operational scenarios. Aggregate handling emissions will either be modeled as controlled by an additional 75% (AGG&SND and AGGTOSTO) or as controlled by an additional 95% (AGG&SND2 and AGGTOST2). Emissions calculated for a base 10 mph wind speed and a moisture content of 1.77% for aggregate and 4.17% for sand. Emissions in the model are varied with windspeed.

Table 7. TAP EMISSIONS USED IN DEQ ANALYSES			
Emissions Point in Model	**Pollutant**	**Averaging Period**	**Emissions Rate (lb/hr)**
			150,000 cy/yr
TRUCKLOD[a]	Arsenic	period	7.340E-7
	Chromium 6+	period	5.861E-7
	Nickel	period	2.873E-6
TRKLDBAG[a]	Arsenic	period	1.468E-7
	Chromium 6+	period	1.172E-7
	Nickel	period	5.746E-7
SILO	Arsenic	period	6.428E-7
	Chromium 6+	period	2.532E-7
	Nickel	period	1.601E-6
BOILER[b]	POM	period	2.086E-7
	Total PAH	period	2.018E-5
	Formaldehyde	period	5.893E-4
	Arsenic	period	1.000E-5
	Chromium 6+	period	0.0
	Nickel	period	7.500E-6
NGBOILER[b]	POM	period	2.794E-8
	Total PAH	period	1.495E-6
	Formaldehyde	period	1.838E-4
	Arsenic	period	4.902E-7
	Chromium 6+	period	0.0
	Nickel	period	5.147E-6
GEN1	POM	period	2.111E-5
	Total PAH	period	6.102E-4
	Formaldehyde	period	3.703E-4

a. Impacts will be evaluated for multiple operational scenarios. Truck loadout emissions will either be modeled as controlled by a boot with 95% control efficiency (TRUCKLOD) or as captured and controlled by a baghouse with 99% control efficiency (TRKLDBAG).

b. Impacts will be evaluated for multiple operational scenarios. Boiler emissions will either be modeled as fueled by diesel (BOILER) or as fueled by natural gas (NGBOILER).

Table 8. CHARACTERISTIC OF CBP USED IN DEQ GENERIC ANALYSES	
Parameter	**Value or Description**
Throughput Rates	Scenario 1: < 500 cy/day Scenario 1: < 1,000 cy/day Scenario 1: < 1,500 cy/day Scenario 1: < 2,500 cy/day Annual Scenario: 150,000 cy/yr
Co-Contributing Sources	The emissions points of the CBP is not located within 1,000 feet of other permittable (has or would be required to have an air permit to operate) emissions sources.
Silo Filling (SILO) Stack Parameters	Point source controlled by fabric filter. Stack height ≥ 5 m
Weigh Hopper (WEIGHOP) Stack Parameters	Point source controlled by a baghouse. Stack height ≥ 3 m
Truck Loadout (TRUCKLOD) Stack Parameters (boot control)[a]	Fugitive source. Emissions controlled by 95% by a boot and/or water spray. Release height ≥ 5 m
Truck Loadout (TRKLDBAG) Stack Parameters (baghouse control)[a]	Point source controlled by a baghouse. Emissions 100% captured and controlled by baghouse at 99%. Stack height ≥ 5 m
Diesel Boiler (BOILER) Stack Parameters[b]	5 MMBtu/hr, diesel-fired. Stack height ≥ 5 m
Natural Gas Boiler (NGBOILER) Stack Parameters[b]	5 MMBtu/hr, natural gas-fired. Stack height ≥ 5
Electrical Power Generator (GEN1) Stack Parameters	Line power or generator with an engine of ≤ 1,000 kW fueled by low sulfur distillate (0.0015% sulfur). ≤68.5 gal/hr, 24 hr/day, ≤4,380 hr/yr. Can use other generator type, provided operations are restricted such that emissions are equivalent to a 1,000 kW engine at 24 hr/day.
Frontend Loader Transfers at Ground Level (AGG&SND)	≤2 transfers each for any given quantity of aggregate and sand processed. Emissions are assumed controlled by an additional 75% beyond that associated with handling aggregate with a 1.77% moisture content and sand with a 4.17% moisture content.
Material Transfers to Elevated Storage (AGGTOSTO)	≤1 transfer each for any given quantity of aggregate and sand processed. Emissions are assumed controlled by an additional 75% beyond that associated with handling aggregate with a 1.77% moisture content and sand with a 4.17% moisture content.
Frontend Loader Transfers at Ground Level (AGG&SND2)	≤2 transfers each for any given quantity of aggregate and sand processed. Emissions are assumed controlled by an additional 95% beyond that associated with handling aggregate with a 1.77% moisture content and sand with a 4.17% moisture content.
Material Transfers to Elevated Storage (AGGTOST2)	≤1 transfer each for any given quantity of aggregate and sand processed. Emissions are assumed controlled by an additional 95% beyond that associated with handling aggregate with a 1.77% moisture content and sand with a 4.17% moisture content.

a. Impacts will be evaluated for multiple operational scenarios. Truck loadout emissions will either be modeled as controlled by a boot with 95% control efficiency (TRUCKLOD) or as captured and controlled by a baghouse with 99% control efficiency (TRKLDBAG).

b. Impacts will be evaluated for multiple operational scenarios. Boiler emissions will either be modeled as fueled by diesel (BOILER) or as fueled by natural gas (NGBOILER).

Table 9. EMISSIONS RELEASE PARAMETERS[a]					
Release Point /Location	Source Type	Stack Height (m)[b]	Modeled Diameter (m)	Stack Gas Temp. (K)[c]	Stack Gas Flow Velocity (m/sec)[d]
TRKLDBAG	Point	5.0	0.001[e]	0[f]	0.001[e]
SILO	Point	5.0	1.0[e]	0[f]	0.001[e]
WEIGHOP	Point	3.0	1.0[e]	0[f]	0.001[e]
BOILER	Point	5.0	0.2	450	12.1
NGBOILER	Point	5.0	0.3	450	10.48
GEN	Point	5.0	0.31	500	25
Volume Sources					
Release Point /Location	**Source Type**	**Release Height (m)**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
TRUCKLOD	Volume	5.0	4.65	4.65	
AGG&SND	Volume	2.0	2.33	0.7	
AGGTOSTO	Volume	5.0	2.33	4.65	
AGG&SND2	Volume	2.0	2.33	0.7	
AGGTOST2	Volume	5.0	2.33	4.65	

a. See Attachment 1 for additional details.

b. Meters

c. Kelvin

d. Meters per second

e. Set to limit momentum-induced plume rise since the stack may be capped or emissions may vent horizontally.

f. Using a temperature of 0 K directs the model to use a release temperature equal to ambient air.

Table 10. SETBACK DISTANCES AS A FUNCTION OF THROUGHPUT AND OPERATIONAL CONFIGURATION

CBP Configuration Scenario	Setback (m)	Controlling Pollutant	CBP Configuration Scenario	Setback (m)	Controlling Pollutant
Setbacks for 500 cubic yards per day and 150,000 cubic yards per year					
Scenario 1[a]: mod fugitive dust control, boot on loadout, diesel boiler, generator	58	TAPs	Scenario 9[i]: mod fugitive dust control, boot on loadout, nat. gas boiler, generator	58	TAPs
Scenario 2[b]: high fugitive dust control, boot on loadout, diesel boiler, generator	58	TAPs	Scenario 10[j]: high fugitive dust control, boot on loadout, nat. gas boiler, generator	58	TAPs
Scenario 3[c]: mod fugitive dust control, boot on loadout, diesel boiler, no generator	36	24hr PM_{10}	Scenario 11[k]: mod fugitive dust control, boot on loadout, nat. gas boiler, no generator	29	24hr PM_{10}
Scenario 4[d]: high fugitive dust control, boot on loadout, diesel boiler, no generator	34	24hr PM_{10}	Scenario 12[l]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	25	24hr PM_{10}
Scenario 5[e]: mod fugitive dust control, baghouse on loadout, diesel boiler, generator	58	TAPs	Scenario 13[m]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, generator	58	TAPs
Scenario 6[f]: high fugitive dust control, baghouse on loadout, diesel boiler, generator	58	TAPs	Scenario 14[n]: high fugitive dust control, baghouse on loadout, nat. gas boiler, generator	58	TAPs
Scenario 7[g]: mod fugitive dust control, baghouse on loadout, diesel boiler, no generator	34	24hr PM_{10}	Scenario 15[o]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, no generator	7	24hr PM_{10}
Scenario 8[h]: high fugitive dust control, boot on loadout, diesel boiler, no generator	29	24hr PM_{10}	Scenario 16[p]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	7	24hr PM_{10}
Setbacks for 1,000 cubic yards per day and 150,000 cubic yards per year					
Scenario 1[a]: mod fugitive dust control, boot on loadout, diesel boiler, generator	87	24hr PM_{10}	Scenario 9[i]: mod fugitive dust control, boot on loadout, nat. gas boiler, generator	72	24hr PM_{10}
Scenario 2[b]: high fugitive dust control, boot on loadout, diesel boiler, generator	67	24hr PM_{10}	Scenario 10[j]: high fugitive dust control, boot on loadout, nat. gas boiler, generator	58	TAPs
Scenario 3[c]: mod fugitive dust control, boot on loadout, diesel boiler, no generator	78	24hr PM_{10}	Scenario 11[k]: mod fugitive dust control, boot on loadout, nat. gas boiler, no generator	67	24hr PM_{10}
Scenario 4[d]: high fugitive dust control, boot on loadout, diesel boiler, no generator	57	24hr PM_{10}	Scenario 12[l]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	51	24hr PM_{10}
Scenario 5[e]: mod fugitive dust control, baghouse on loadout, diesel boiler, generator	58	TAPs	Scenario 13[m]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, generator	58	TAPs
Scenario 6[f]: high fugitive dust control, baghouse on loadout, diesel boiler, generator	58	TAPs	Scenario 14[n]: high fugitive dust control, baghouse on loadout, nat. gas boiler, generator	58	TAPs
Scenario 7[g]: mod fugitive dust control, baghouse on loadout, diesel boiler, no generator	46	24hr PM_{10}	Scenario 15[o]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, no generator	42	24hr PM_{10}
Scenario 8[h]: high fugitive dust control, boot on loadout, diesel boiler, no generator	34	24hr PM_{10}	Scenario 16[p]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	34	24hr PM_{10}
Setbacks for 1,500 cubic yards per day and 150,000 cubic yards per year					
Scenario 1[a]: mod fugitive dust control, boot on loadout, diesel boiler, generator	127	24hr PM_{10}	Scenario 9[i]: mod fugitive dust control, boot on loadout, nat. gas boiler, generator	107	24hr PM_{10}

Table 10. SETBACK DISTANCES AS A FUNCTION OF THROUGHPUT AND OPERATIONAL CONFIGURATION

CBP Configuration Scenario	Setback (m)	Controlling Pollutant	CBP Configuration Scenario	Setback (m)	Controlling Pollutant
Scenario 2[b]: high fugitive dust control, boot on loadout, diesel boiler, generator	103	24hr PM_{10}	Scenario 10[j]: high fugitive dust control, boot on loadout, nat. gas boiler, generator	87	24hr PM_{10}
Scenario 3[c]: mod fugitive dust control, boot on loadout, diesel boiler, no generator	118	24hr PM_{10}	Scenario 11[k]: mod fugitive dust control, boot on loadout, nat. gas boiler, no generator	102	24hr PM_{10}
Scenario 4[d]: high fugitive dust control, boot on loadout, diesel boiler, no generator	92	24hr PM_{10}	Scenario 12[l]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	78	24hr PM_{10}
Scenario 5[e]: mod fugitive dust control, baghouse on loadout, diesel boiler, generator	73	24hr PM_{10}	Scenario 13[m]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, generator	71	24hr PM_{10}
Scenario 6[f]: high fugitive dust control, baghouse on loadout, diesel boiler, generator	58	TAPs	Scenario 14[n]: high fugitive dust control, baghouse on loadout, nat. gas boiler, generator	58	TAPs
Scenario 7[g]: mod fugitive dust control, baghouse on loadout, diesel boiler, no generator	68	24hr PM_{10}	Scenario 15[o]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, no generator	61	24hr PM_{10}
Scenario 8[h]: high fugitive dust control, boot on loadout, diesel boiler, no generator	52	24hr PM_{10}	Scenario 16[p]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	38	24hr PM_{10}
Setbacks for 2,500 cubic yards per day and 150,000 cubic yards per year					
Scenario 1[a]: mod fugitive dust control, boot on loadout, diesel boiler, generator	200	24hr PM_{10}	Scenario 9[i]: mod fugitive dust control, boot on loadout, nat. gas boiler, generator	181	24hr PM_{10}
Scenario 2[b]: high fugitive dust control, boot on loadout, diesel boiler, generator	169	24hr PM_{10}	Scenario 10[j]: high fugitive dust control, boot on loadout, nat. gas boiler, generator	159	24hr PM_{10}
Scenario 3[c]: mod fugitive dust control, boot on loadout, diesel boiler, no generator	190	24hr PM_{10}	Scenario 11[k]: mod fugitive dust control, boot on loadout, nat. gas boiler, no generator	169	24hr PM_{10}
Scenario 4[d]: high fugitive dust control, boot on loadout, diesel boiler, no generator	149	24hr PM_{10}	Scenario 12[l]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	133	24hr PM_{10}
Scenario 5[e]: mod fugitive dust control, baghouse on loadout, diesel boiler, generator	127	24hr PM_{10}	Scenario 13[m]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, generator	102	24hr PM_{10}
Scenario 6[f]: high fugitive dust control, baghouse on loadout, diesel boiler, generator	97	24hr PM_{10}	Scenario 14[n]: high fugitive dust control, baghouse on loadout, nat. gas boiler, generator	81	24hr PM_{10}
Scenario 7[g]: mod fugitive dust control, baghouse on loadout, diesel boiler, no generator	117	24hr PM_{10}	Scenario 15[o]: mod fugitive dust control, baghouse on loadout, nat. gas boiler, no generator	97	24hr PM_{10}
Scenario 8[h]: high fugitive dust control, boot on loadout, diesel boiler, no generator	92	24hr PM_{10}	Scenario 16[p]: high fugitive dust control, boot on loadout, nat. gas boiler, no generator	81	24hr PM_{10}

a. Scenario 1: 95% control on loadout (boot, water, etc); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr diesel boiler; 1,000 kW engine for generator.

b. Scenario 2: 95% control on loadout (boot, water, etc); high control of fugitives from material handling (+95%); 5 MMBtu/hr diesel boiler; 1,000 kW engine for generator.

c. Scenario 3: 95% control on loadout (boot, water, etc); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr diesel boiler; no generator.

d. Scenario 4: 95% control on loadout (boot, water, etc); high control of fugitives from material handling (+95%); 5 MMBtu/hr diesel boiler; no generator.

e. Scenario 5: 99% control on loadout (baghouse); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr diesel boiler; 1,000 kW engine for generator.

Table 10. SETBACK DISTANCES AS A FUNCTION OF THROUGHPUT AND OPERATIONAL CONFIGURATION

CBP Configuration Scenario	Setback (m)	Controlling Pollutant	CBP Configuration Scenario	Setback (m)	Controlling Pollutant

f. Scenario 6: 99% control on loadout (baghouse); high control of fugitives from material handling (+95%); 5 MMBtu/hr diesel boiler; 1,000 kW engine for generator.
g. Scenario 7: 99% control on loadout (baghouse); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr diesel boiler; no generator.
h. Scenario 8: 99% control on loadout (baghouse); high control of fugitives from material handling (+95%); 5 MMBtu/hr diesel boiler; no generator.
i. Scenario 9: 95% control on loadout (boot, water, etc); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr nat gas boiler; 1,000 kW engine for generator.
j. Scenario 10: 95% control on loadout (boot, water, etc); high control of fugitives from material handling (+95%); 5 MMBtu/hr nat gas boiler; 1,000 kW engine for generator.
k. Scenario 11: 95% control on loadout (boot, water, etc); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr nat gas boiler; no generator.
l. Scenario 12: 95% control on loadout (boot, water, etc); high control of fugitives from material handling (+95%); 5 MMBtu/hr nat gas boiler; no generator.
m. Scenario 13: 99% control on loadout (baghouse); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr nat gas boiler; 1,000 kW engine for generator.
n. Scenario 14: 99% control on loadout (baghouse); high control of fugitives from material handling (+95%); 5 MMBtu/hr nat gas boiler; 1,000 kW engine for generator.
o. Scenario 15: 99% control on loadout (baghouse); moderate control of fugitives from material handling (+75%); 5 MMBtu/hr nat gas boiler; no generator.
p. Scenario 16: 99% control on loadout (baghouse); high control of fugitives from material handling (+95%); 5 MMBtu/hr nat gas boiler; no generator.

ATTACHMENT 1

EMISSIONS CALCULATIONS AND MODELING PARAMETERS FOR

DEQ'S AIR IMPACT ANALYSES

CBP Plant Modeled Emissions Rates

Operations were assumed to be limited to daily and annual throughputs as selected

Daily production scenarios: < 500 cy/day; < 1,000 cy/day < 1,500 cy/day ; < 2,500 cy/day

Annual production: < 150,000 cy/year

Truck Loadout

Truck loadout emissions were modeled for two different operational scenarios. One scenario involves control of emissions by 95%. This typically involves using a boot loading devise and/or water spray rings. The other scenario involves 100% capture of emissions and control to 99% by a baghouse.

Weigh hopper

Emissions from the weigh hopper are assumed to be captured and controlled to 99% by a baghouse.

Boiler

It was assumed a 5 MM Btu/hr boiler would be operated at CBPs. Emissions were modeled using two different operational scenarios. One scenario involves a diesel-fired boiler and the other involves a natural gas-fired boiler. Boiler operations of 24 hours per day and 4,380 hours per year were used to calculate emissions for respective averaging periods.

Cement and Supplement Silo Filling

It was assumed that emissions from silo filling are controlled by a fabric filter. Emissions factors for controlled emissions were used, and it was assumed that a mix of 35% supplement and 55% cement is used in the process.

Power Generator

Emissions were modeled using two different operational scenarios. One scenario involves operating a diesel-fired engine of 1,000 kW rating or less. The other operational scenario does not involve operation of a generator. Emissions estimates were calculated assuming EPA Tier II certification and combustion of 0.0015% sulfur diesel. Generator operations of 24 hours per day and 4,380 hours per year were used to calculate emissions for respective averaging periods.

Aggregate Handling Emissions

Emissions from handling of aggregate and sand were calculated for the following transfers: 1) material to ground storage; 2) material from storage to a receiving hopper; 3) material handling to elevated storage bin.

PM_{10} emissions associated with the handling of aggregate materials were calculated using emissions factors from AP42 Section 13.2.4.

Emissions were calculated using the following emissions equation:

$$E = k(0.0032)\left[\frac{(U/5)^{1.3}}{(M/2)^{1.4}}\right] \quad \text{lb/ton}$$

Where:

k	=	0.35 for PM_{10}
M	=	1.77% for aggregate and 4.17% for sand
U	=	wind speed (mph)

A moisture content of 1.77% for aggregate and 4.17% for sand was used based on defaults suggested for CBPs in AP-42. Emissions were then modified according to supplementary control measures. Two operational scenarios were modeled: 1) assuming additional controls achieve a 75% control; 2) assuming additional controls achieve a 95% control.

In the model, emissions are varied as a function of windspeed, with the base emissions entered for a windspeed of 10 mph.

upper windspeeds for 6 categories: 1.54, 3.09, 5.14, 8.23, 10.8 m/sec

Median windspeed for each category (1 m/sec = 2.237 mph)

Cat 1: (0 + 1.54)/2 = 0.77 m/sec ➢ 1.72 mph
Cat 2: (1.54 + 3.09)/2 = 2.32 m/sec ➢ 5.18 mph
Cat 3: (3.09 + 5.14)/2 = 4.12 m/sec ➢ 9.20 mph
Cat 4: (5.14 + 8.23)/2 = 6.69 m/sec ➢ 14.95 mph
Cat 5: (8.23 + 10.8)/2 = 9.52 m/sec ➢ 21.28 mph
Cat 6: (10.8 + 14)/2 = 12.4 m/sec ➢ 27.74 mph

Base factor for aggregate – use 10 mph wind: $0.35(0.0032)\frac{(10/5)^{1.3}}{(1.77/2)^{1.4}} = 3.272\text{ E}-3$ lb/ton

Adjustment factors to put in the model:

Cat 1: $(1.72/5)^{1.3}$ (1.329 E-3) = 3.319 E-4 lb/ton
Factor = 3.319 E-4/3.272 E-3 = 0.1014

Cat 2: $(5.18/5)^{1.3}$ (1.329 E-3) = 1.392 E-3 lb/ton
Factor = 1.392 E-3/ 3.272 E-3 = 0.4253

Cat 3: $(9.20/5)^{1.3}$ (1.329 E-3) = 2.936 E-3 lb/ton
Factor = 2.936 E-3/3.272 E-3 = 0.8974

Cat 4: $(14.95/5)^{1.3}$ (1.329 E-3) = 5.519 E-3 lb/ton
Factor = 5.519 E-3/3.272 E-3 = 1.687

Cat 5: $(21.28/5)^{1.3}$ (1.329 E-3) = 8.734 E-3 lb/ton
Factor = 8.734 E-3/3.272 E-3 = 2.669

Cat 6: $(27.74/5)^{1.3}$ (1.329 E-3) = 1.233 E-2 lb/ton
Factor = 1.233 E-2/3.272 E-3 = 3.768

These adjustment factors are the same for emissions from handling sand.

1 yd^3 of concrete ≈ 4024 lbs, consisting of:

1865 lbs aggregate
1428 lbs sand
491 lbs cement
73 lbs supplement
20 gal water

Fraction of aggregate = 1865 lb / 4024 lb = 0.463

Base PM_{10} factor for aggregate handling emissions in terms of lb/yd^3:

3.272 E-3 lb PM_{10}	0.463 ton agg	ton	4024 lb conc	=	3.048 E-3 lb
ton agg	ton concrete	2000 lb	yd^3		yd^3

Base daily PM_{10} for 1,000 cy/day and 75% supplementary control:

3.048 E-3 lb PM_{10}	(1-0.75)	1000 yd^3	day	=	3.175 E-2 lb
yd^3		day	24 hour		hr

These sources were modeled as two volume sources: 1) material transfers at ground level (2 each of aggregate and sand); 2) material transfers to elevated storage (1 each of aggregate and sand).

CBP Modeling Parameters

Truck Loadout

Scenario 1-4, 9-12 (as indicated in Table 10): fugitive emissions from loading with boot. model as volume source on a 10 m x 10 m x 10 m high building

Release height = 5 meters
Initial dispersion coefficients: σ_{y0} = 20 m / 4.3 = 4.65 m
σ_{z0} = 10 m / 2.15 = 4.65 m

Scenario 5-8, 13-16 (as indicated in Table 10): 100% capture of emissions and release from baghouse stack. Model as point source with the following parameters:

Stack height = 5.0 m; stack diameter = 0.001 meters (to limit momentum plume rise for potential vertical release or capped release); stack gas temperature = 0 K (model will use ambient air temperature for release); flow velocity = 0.001 meters/second (to limit momentum plume rise for potential vertical release or capped release)

Weigh Hopper

Emissions were modeled as a point source with the following parameters:

Stack height = 3.0 m; stack diameter = 1.0 meters (to limit momentum plume rise for potential vertical release or capped release); stack gas temperature = 0 K (model will use ambient air temperature for release); flow velocity = 0.001 meters/second (to limit momentum plume rise for potential vertical release or capped release)

Boiler

Stack parameters are dependent upon the fuel combusted. A combustion evaluation was used to estimate actual stack flow, assuming respective fuel requirements for a 5 MMBtu/hr boiler and a stack gas release temperature of 450 K.

Parameters for the diesel-fired boiler are as follows:

> Stack height = 5.0 m; stack diameter = 0.2 meters; stack gas temperature = 450 K; flow velocity = 12.1 meters/second (value needed to achieve a 806 acfm flow rate as indicated by a combustion evaluation)

Parameters for the natural gas-fired boiler are as follows:

> Stack height = 5.0 m; stack diameter = 0.3 meters; stack gas temperature = 450 K; flow velocity = 10.48 meters/second (value needed to achieve a 1570 acfm flow rate as indicated by a combustion evaluation)

Cement and Supplement Silo Filling

Emissions were modeled as a point source with the following parameters:

> Stack height = 5.0 m; stack diameter = 1.0 meters (to limit momentum plume rise for potential vertical release or capped release); stack gas temperature = 0 K (model will use ambient air temperature for release); flow velocity = 0.001 meters/second (to limit momentum plume rise for potential vertical release or capped release)

Power Generator

Stack gas temperatures and flow rates are often overestimated by permit applicants, likely because values reported by manufacturers are based on values measured at the exhaust manifold rather than at the point of release to the atmosphere. The parameters used in modeling were derived by the following process:

1. The flow for a 1000 kW generator found online was 6907 cfm at 959° F (515° C)(788 K)
2. A reasonably conservative (on the low side) release temperature of 500 K was selected and the acfm flow of 4383 was calculated for the new temperature.
3. A reasonably conservative flow velocity of 25 m/sec was selected, and then a stack diameter of 0.3101 m was calculated (the diameter needed to generate 4000 acfm with a 25 m/sec velocity).

The final point source parameters were as follows:

> Stack height = 5.0 m; stack diameter = 0.3101 meters; stack gas temperature = 500 K; flow velocity = 25 meters/second.

Aggregate and Sand to and from Storage

Model as a volume source, released from a 10 m X 10 m area, 3 m high, released at 2 m

Initial dispersion coefficients: σ_{y0} = 10 m / 4.3 = 2.33 m
σ_{z0} = 3 m / 4.3 = 0.7 m

Sources include: two transfers, equivalent in emissions to that of a frontend loader, from the point of aggregate and sand delivery to transfer to the CBP receiving hopper.

Aggregate and Sand to Elevated Storage

Model as a volume source on a building that is 10 m X 10 m X 10 m high. Release height = 5 m

Initial dispersion coefficients: σ_{y0} = 10 m / 4.3 = 2.33 m
σ_{z0} = 10 m / 2.15 = 4.65 m

Sources include: one transfer, equivalent in emissions to that of a frontend loader, to the point of aggregate and sand delivery to elevated storage.