Air Quality Permitting
Statement of Basis

May 22, 2007

Permit to Construct No. P-2007.0034

Interstate Concrete and Asphalt
Coeur d'Alene, ID

Facility ID No. 777-00403
Portable Concrete Batch Plant
(McNeilus Batch Master 12)

Prepared by:

Marcia Porter, Permit Writer
AIR QUALITY DIVISION

Final

Table of Contents

Acronyms, Units, and Chemical Nomenclatures

ACE	Aspen Consulting and Engineering, Helena, MT.
acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CDARO	Coeur d' Alene Regional Office
CFR	Code of Federal Regulations
CO	carbon monoxide
cy	cubic yard(s)
cy/day	cubic yards per day
cy/year	cubic yards per year
DEQ	Department of Environmental Quality
EI	Emissions Inventory
EPA	U.S. Environmental Protection Agency
HAPs	Hazardous Air Pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
Interstate	Interstate Concrete and Asphalt
m	meter(s)
$\mu g/m^3$	micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
Rules	Rules for the Control of Air Pollution in Idaho
SO_2	sulfur dioxide
SOx	sulfur oxides
TAP's	Toxic Air Pollutants
T/yr	tons per year
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct.

2. FACILITY DESCRIPTION

Concrete is composed of water, cement, sand or fine aggregate, and course aggregate. Supplementary admixtures are added to aid in slump, reduce permeability, increase strength, or influence other concrete properties. Sand and aggregates from storage piles are loaded onto a fixed conveyor and then conveyed to the stack hopper. The materials are transferred to the batch plant bins by conveyor from the three drop points. Bulk admixture is delivered into tanks and then to the batch plant by pressurized hose. The proper weight of sand, aggregate, cement, and admixtures, as required, are dropped into a weigh hopper and mixed. The mixture is then dropped into a mixer truck (or central mix drum). Water is added to the truck or central mix drum and is mixed to reach the right consistency before transport to the pour sight.

3. FACILITY / AREA CLASSIFICATION

Table 3.1 Shows the estimated emissions of particulate matter (PM), criteria air pollutants (which includes only PM_{10} for this facility) and hazardous air pollutants (HAP) emissions from the concrete batch plant for Aerometric Information Retrieval Systems (AIRS) facility classification purposes. The Interstate Concrete and Asphalt Company, Inc., truck mix batch plant known as the Dover facility, is classified as a minor facility because, as shown in the table, the estimated plant emissions are less than major source thresholds without requiring limits on its potential to emit. The AIRS classification therefore is "B."

The facility is portable and may locate anywhere in the state of Idaho except in any PM_{10} non attainment area. A portable equipment relocation form (PERF) must be completed and submitted to DEQ prior to any relocation.

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant for this portable concrete batch facility. This required information is entered into the EPA AIRS database.

Table 3.1 FACILITY CLASSIFICATION EMISSION ESTIMATES [a]

Emission Source	PM (total) (T/yr)	PM_{10} (T/yr)	HAPs (total) (T/yr)	Any HAP (T/yr)
Major Source Thresholds	250 (PSD)	100 (Tier I)	25 (Tier I)	10 (Tier I)
Central Mix Concrete Batch Plant Emissions, point sources only (silo and weigh batcher baghouses)	3.54	0.32	0.026	0.00259 (Manganese)

[a] Facility Classification emissions are based on operation at 150 cy/hr for the batch plant for 8,760 hrs/year, with baghouses treated as process equipment.

4. APPLICATION SCOPE

Interstate Concrete and Asphalt has requested authorization to operate the McNeilus Batch Master 12, a facility manufactured in 1992, in Idaho. They have requested that this portable plant be allowed to operate at 150 cy/hr. DEQ is authorizing 1,800 cubic yard maximum production per day at the initial location, and with maximum annual production limited to 250,000 cy per year at any location in Idaho.

4.1 Application Chronology

02/20/2007	Aspen Consulting and Engineering, Inc. (ACE) submitted modeling protocol to Kevin Schilling on behalf of Interstate Concrete and Asphalt—Dover.
02/21/2007	Kevin Schilling responded positively to Aspen accepting their modeling protocol.
03/14/2007	Received application for 15-Day Pre-Permit Construction from Interstate Concrete, a CD-ROM with modeling results, and the $1000 application fee.
03/21/2007	Approval of Pre-Permit construction and completeness of application sent to Interstate Concrete and Asphalt, Aspen, and CDARO
03/22/2007	Facility draft sent to Interstate Concrete, their consultants (Aspen) and to CDARO for review/comment.
03/22/2007	Processing fee of $1000 requested with facility draft.
03/28 to 04/11/2007	Opportunity for public comment published in Bonner County Daily Bee.
03/28/2007	Received modeling memo approving Aspen site specific modeling for this batch plant.
04/06/2007	Request for a 30 day public comment period received at DEQ.
04/06/2007	DEQ received the $1000.00 processing fee for a PTC emitting less than 1.0 T/yr.
04/18/2007 to 05/17/2007	30-day Public Comment Period.
05/22/2007	Responses to public comments received.
05/22/2007	Final Permit issued.

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

5.1 Equipment Listing

Table 5.1 contains the equipment listing and the emissions controls:

Table 5.1 EQUIPMENT LISTING AND EMISSIONS CONTROLS

Source Description	Emissions Control(s)
Manufacturer: McNeilus (or equivalent): Mfr Date: 1992 Model: Dry Concrete Batch/Batch Master 12 Maximum daily throughput: 150 cubic yards of concrete per hour (cy/hr)	*Cement Storage Silo Baghouse (or equivalent): Manufacturer: McNeilus Model: SFV170 Control Efficiency: 99.6 +% Stack Parameters: Height: 52 feet Exit Diameter: 0.5x 0.67 feet Exit air flow rate: 650 acfm *Cement Supplement (Flyash) Storage Silo Baghouse, or equivalent: Manufacturer: McNeilus Model: Control Efficiency: 96.6+% Stack Parameters: Height: 52 feet Exit Diameter: 0.5 x 0.67 feet Exit air flow rate: 650 acfm Weigh Batcher Baghouse, or equivalent: Manufacturer: McNeilus Model: BFV15 Control Efficiency: 99.60+% Stack Parameters: Height: 19 feet Exit Diameter: 0.5 x 0.67 feet Exit air flow rate: 64 acfm Material Transfer Points, Delivered Wet, Control Efficiency: 75% Truck Loadout Rubber Boot Enclosure Control Efficiency: 95%

* The facility is anticipating adding additional silos and baghouses for each of these products (cement and cement supplement). The additions will meet or exceed the specifications of the existing silos and baghouses.

5.2 Emissions Inventory

The emissions inventory provided in the application for this portable concrete batch plant was developed by ACE based upon AP-42, Section 11.12 emission factors for a truck-mix batch plant, with the following assumptions: 150 cubic yards per hour concrete production capacity, 1,800 cubic yards/day maximum production at the initial location, and annual concrete production limited to 250,000 cubic yards per year at any location.

Fugitive emissions of PM and PM_{10} from material transfer points were assumed to be controlled by 75% because the material is originally delivered wet. Fugitive PM and PM_{10} emissions from the truck load out are controlled by a rubber boot enclosure that is assumed to be 95% efficient. In accordance with DEQ guidance provided in the modeling process, fugitive emissions from vehicle traffic and wind erosion from storage piles were not estimated.

In accordance with DEQ's modeling protocol approval emissions of hexavalent chromium (chromium VI) were estimated at 30% of total chromium emissions from cement silo filling, approximately 21% of total chromium emissions from truck filling, and 30% of the total chromium emissions from cement supplement (flyash) silo filling.

DEQ conducted additional emission inventory calculations using the AP-42 emissions factors, and were correct based upon the assumptions given. The detailed EI for this concrete batch plant can be found in Appendix B.

5.3 Modeling

Based upon the emissions inventory, the potential emission rate of PM_{10} from this facility from point sources and transfer points was estimated at 0.21 lbs per hour and 0.302 tons per year. In accordance with the DEQ modeling standards and methods, fugitive emissions from vehicle traffic and wind erosion from storage piles were not estimated or included. The hourly emission levels exceed the published DEQ modeling thresholds[2] for PM_{10} of 0.2 lb/24 hour average. A full impact modeling analysis was therefore required, and provided by Aspen Consulting and Engineering.

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201...............................Permit to Construct Required

The facility's proposed project does not meet the permit to construct exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a PTC is required.

IDAPA 58.01.01.203...............................Permit Requirements for New and Modified Stationary Sources

The applicant has shown to the satisfaction of DEQ that the facility will comply with all applicable emissions standards, ambient air quality standards, and toxic increments.

IDAPA 58.01.01.210...............................Demonstration of Preconstruction Compliance with Toxic Standards

The applicant has demonstrated preconstruction compliance for all TAPs identified in the permit application.

IDAPA 58.01.01.224...............................Permit to Construct Application Fee

The applicant satisfied the PTC application fee requirement by submitting a fee of $1,000.00 at the time the original application was submitted, March 14, 2007.

IDAPA 58.01.01.225...............................Permit to Construct Processing Fee

The total emissions from the proposed new facility are less than 1.0 T/yr; therefore, the associated processing fee is $1000.00. No permit to construct can be issued without first paying the required processing fee. Interstate Concrete and Asphalt fulfilled this requirement by submitting the processing fee of $1000 on April 06, 2007.

IDAPA 58.01.01.625…………………..Visible Emissions

This rule has been incorporated as a permit condition to require control of particulate emissions from concrete batch plant point sources.

IDAPA 58.01.01.650-651 ....Rules for the Control of Fugitive Dust

This rule has been incorporated as a permit condition to require reasonable control of fugitive dust from the concrete batch plant.

40 CFR 60 ....New Performance Standards, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants.

The provisions of this subpart do not apply to stand-alone screening operations at plants without crushers or grinding mills. The facility is therefore not subject to NSPS.

5.5 Permit Conditions Review

This section describes only those permit conditions that have been revised, modified or deleted as a result of this permit action. All other permit conditions remain unchanged.

5.5.1 Permit condition 1.2 describes the emissions controls that shall be operated as part of this concrete batch facility. Demonstration of compliance with NAAQS and TAP's rules was based upon emissions estimated using the capture efficiencies associated with these controls.

5.5.2 Permit Condition 2.4 limits the concrete production to 1,800 cubic yards per day at the initial location and 250,000 cubic yards in any consecutive 12-month period at any location. This represents the daily production rate requested in the application and the level for which compliance was demonstrated for the 24-hour average PM_{10} NAAQS.

5.5.3 Permit condition 2.9 prohibits operation in any PM_{10} non-attainment area. The modeling analysis predicted that PM_{10} impacts to ambient air quality from operation of this facility would be a significant contribution in a nonattainment area. IDAPA 58.01.01.006 defines a "significant contribution" as any increase in ambient concentrations that would exceed 5.0 µg/m³ (24-hour average) or 1.0 µg/m³ (annual average). The modeling report in Appendix C describes in detail the emissions level from this facility at maximum productivity. The generic modeling report in Appendix D is the memo allowing increased production at sites with increased set back availability.

Table 5.5 CRITERIA FOR USING DEQ'S GENERIC CONCRETE BATCH PLANT MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Model				Proposed Project	Comments
Concrete batch plant type	Truck mix or central mix (redi-mix or dry mix)				Truck mix	Meets
Operation in any PM_{10} nonattainment area.	Not proposed.				Not proposed.	Meets
Presence of an electric generator.	No generator.				No generator.	Meets.
No Collocation. Minimum distance from nearest edge of any emissions source to any other source of emissions, including another concrete batch plant, hot mix asphalt plant, or rock crushing plant.	200 meters (656 feet)				Collocation not proposed.	Meets
Number of cement and/or cement supplement storage silos	Not limited.				Two silos	Meets
Maximum daily concrete production (cy/day)	1,500	2,400	3,600	4,800	Must meet setbacks.	Meets
Minimum Setback Distance. Minimum distance from nearest edge of any emissions source to a receptor (meters [m] or feet [ft])[a]	40 m (131 ft)	60 m (197 ft)	100 m (328 ft)	150 m (492 ft)	Must meet setbacks.	Meets
Maximum annual concrete production (cy/year)	300,000	400,000	500,000	500,000	250,000	Meets
Cement and supplement storage silo baghouse(s) Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%				52 ft, 99.6% 52 ft, 99.6%	Cement silo Supplement silos

Table 5.5 CRITERIA FOR USING DEQ'S GENERIC CONCRETE BATCH PLANT MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Model	Proposed Project	Comments
Weigh hopper loading baghouse, or equivalent Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 95%	19 ft. 99.6%	Meets (Conservative 52 ft. allowed above offsets shortage here).
Truck-mix loadout. Minimum PM/PM_{10} control.	95% Boot enclosure, shroud, water sprays, or baghouse/cartridge filter	Boot enclosure	Meets
Transfer Point Fugitives. Minimum PM/PM_{10} control.	75% Water sprays, enclosures, shrouds, or aggregate/sand is damp on an as-received basis and used before significantly drying out.	Manual sprays and sprinklers, aggregate washed before delivery.	Meets.

[a] Distance to any structure normally occupied by members of the public (e.g., a residence, school, health care facility), or outdoor public gathering place. This distance shall be measured from the nearest edge of any storage pile, silo, weigh batcher, transfer point, or conveyor associated with this concrete batch plant. This limitation does not apply to the distance to any public road or highway.

6. PERMIT FEES

An application fee of $1,000.00 is required in accordance with IDAPA 58.01.01.224. The application fee was received by DEQ on March 14, 2007. A permit processing fee of $1,000.00 is required in accordance with IDAPA 58.01.01.225, because the permit required engineering analysis and the increase in emissions from point sources is less than one ton per year. The processing fee was received on April 06, 2007. This facility is not a major source facility and is not subject to Tier I registration fees.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM_{10}	0.302	0	0.302
VOC	0.0	0	0.0
TAPS/HAPS	0.026	0	0.026
Total:	0.328	0	0.328
Fee Due	$ 1,000.00		

7. PERMIT REVIEW

7.1 *Regional Review of Draft Permit*

A facility draft was provided to the Coeur d' Alene Regional Office (CDARO) for comment and review on March 22, 2007, via email. The CDARO office comments were incorporated into the final draft.

7.2 *Facility Review of Draft Permit*

A facility draft was provided to Interstate Concrete and Asphalt, Inc. and their consultants Aspen Consulting Engineers, Inc. on March 22, 2007 via email. Their comments were incorporated into the final draft.

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided from March 28, 2007 thru April 11, 2007 in accordance with IDAPA 58.01.01.209.01.c. During this time, there was one request for a public comment period. According to IDAPA 58.01.01.209.01.c. a 30 day public comment was provided.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that Interstate Concrete and Asphalt, Inc. be issued a final PTC No. P-2007.0034 for the construction and operation of a portable concrete batch plant to be located initially in Bonner County, at 23813 US Highway 2, near Dover, Idaho; known to be 2 miles West of Dover on the North side of Hwy 2. A public comment period is recommended; one comment was received and responded to. The facility does not involve PSD requirements.

MAP/slm Permit No. P-2007.0034

Appendix A

AIRS Information

P-2007.0034

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: Interstate Concrete and Asphalt, Inc.
Facility Location: Portable, Initial location: 23813 U.S. Highway 2, Dover, Idaho
AIRS Number: 777-00403

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	--							U
NO_x	--							U
CO	--							U
PM_{10}	B							U
PT (Particulate)	B							U
VOC	--							U
THAP (Total HAPs)	B							
			APPLICABLE SUBPART					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides)

Appendix B

Emissions Inventory

P-2007.0034

CRITERIA POLLUTANT EMISSION INVENTORY for Truck Mix Portable Concrete Batch Plant

Facility Information 4/10/07 13:50

Company:	Interstate Concrete & Asphalt, Dover (Truck Mix)
Facility ID:	777-00403
Permit No.:	P-2007.0034
Source Type:	Portable Concrete Batch Plant
Manufacturer/Model:	McNeilus

Assumptions Implied or Stated in Application:

See control assumptions

Truck Mix (T) or Central Mix (C)? T

INCREASE IN Production[1]

Maximum Hourly Production Rate:	150	cy/hr		
Proposed Daily Production Rate:	1,800	cy/day	12.00	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	250,000	cy/year		
Cement Storage Silo Capacity:		ft³ of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only:		of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:		of the silo capacity		

DEQ EI VERIFICATION WORKSHEET v. 031307
Tip: Purple text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

Change in PM_{10} Emissions due to this PTC

Emissions Point	PM_{10} Emission Factor[1] (lb/cy)		Controlled Emission Rate, Max.	Controlled Emission Rate, 24-hour average		Controlled Emission Rate, annual average			
	Controlled	Uncontrolled	lb/hr [2]	lb/hr[3]	lb/day[3]	lb/hr[4]	T/yr[4]	Control Assumptions:	
Aggregate delivery to ground storage		0.0031	0.12	0.058	1.40	0.022	0.097	75%	Control. Water sprays.
Sand delivery to ground storage		0.0007	0.03	0.013	0.32	0.005	0.022	75%	Control. Water sprays.
Aggregate transfer to conveyor		0.0031	0.12	0.058	1.40	0.022	0.097	75%	Control. Water sprays.
Sand transfer to conveyor		0.0007	0.03	0.013	0.32	0.005	0.022	75%	Control. Water sprays.
Aggregate transfer to elevated storage		0.0031	0.12	0.058	1.40	0.022	0.097	75%	Control. Water sprays.
Sand transfer to elevated storage		0.0007	0.03	0.013	0.32	0.005	0.022	75%	Control. Water sprays.
Cement delivery to Silo		**0.0001**	1.25E-02	**6.26E-03**	1.50E-01	2.38E-03	**1.04E-02**	0.00%	Baghouse is process equipment
Cement supplement delivery to Silo		**0.0002**	2.68E-02	**1.34E-02**	3.22E-01	5.10E-03	**2.24E-02**	0.00%	Baghouse is process equipment
Weigh hopper loading (sand & aggregate batcher loading)		**0.0040**	2.96E-02	**1.48E-02**	3.56E-01	5.64E-03	**2.47E-02**	95.00%	Baghouse is process equipment
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	0.59	0.29	7.06	0.11	0.49	95.00%	Control. Automatic boot or equivalent.
Central mix loading,Table 11.12-2, "0.134 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete) / 2000 lb = 0.0378 lb/cy		0.0000	0.00	0.00	0.00	0.00	0.00	0.00%	Control. Automatic boot or equivalent.
Point Sources Total Emissions		**4.21E-03**	**6.90E-02**	**3.45E-02**	**8.28E-01**	**1.31E-02**	**5.75E-02**		
Process Fugitive Emissions		0.0898	1.02	0.51	12.19	0.19	0.85		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)		0.0940	1.08	0.54	13.02	0.21	0.90		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6]		Controlled EF	at 1,314,000 cy/yr	T/yr
Facility Classification Total PM[6]		**5.40E-03**		**3.54E+00**
Facility Classification Total PM10[6]		**4.60E-04**		**3.02E-01**

[1] The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2, typical composition per cubic yard of concrete (1865 lb aggregate, 1428 lbs sand, 491 lbs cement, 73 lbs cement supplement, and 20 gallons of water = 4024 lb/cy), and closely match Table 11.12-5 values (version 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.

[2] Max. hourly rate includes reductions associated with control assumptions.

[3] Hourly emissions rate (24-hr average) = Max.hourly emissions rate x (hrs per day) / 24.
Daily emissions rate = max emissions rate (1-hr average) x proposed hrs/day.

[4] Annual average hourly emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) / (8760 hr/yr).
Annual emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) /(2000 lb/T)

[5] Controlled EFs for PM = 0.0002 (cement silo)*(1-controlCS) + 0.0003 (flyash silo)*(1-controlCSS) +0.0040(weigh batcher)*(1-controlWB)
for PM10 = 0.0001 (cement silo)*(1-controlCS) + 0.0002 (flyash silo)*(1-control CSS) +0.0040 (weigh batcher)*(1-controlWB)

[6] Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 3,600 cy/day, and 1,314,000 cy/yr

Lead emissions			Increase in Emissions from this PTC				Emissions for Facility Classification	
Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold		Emission Rate, Quarterly		
	Controlled with fabric filter	Uncontrolled	lb/hr, 1-hr avg.[2]	lb/month[3]	T/yr[4]	lb/hr qtrly avg[5]		T/yr
Cement delivery to silo [2]	**1.09E-08**	7.36E-07	4.01E-07	1.47E-04	6.69E-04	2.01E-07	Point Source	1.76E-06
Cement supplement delivery to Silo [3]	**5.20E-07**	ND	2.85E-06	1.04E-03	4.75E-03	1.42E-06	Point Source	1.25E-05
Truck Loadout (with I29% control)		**3.62E-06**	7.66E-06	2.79E-03	1.28E-02	3.83E-06	Fugitive	
Central Mix (with I30% control)		**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	
Total			**1.09E-05**	**3.98E-03**	**0.018**		**Point Sources**	**1.42E-05**
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

[1] The emissions factors are from AP-42, Table 11.12-8 (version 06/06)
[2] Max. hourly rate = EF x pound of cement/yd³ of concrete x max. hourly concrete production rate/(2000 lb/T)
[3] lb/mo = EF x pound of material/yd³ of concrete x max. daily concrete production rate x (365/12)/(2000 lb/T)
[4] T/yr = EF x pound of material/yd³ of concrete x max. annual concrete production rate/(2000 lb/T)
[5] lb/hr, qtrly avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

Toxic Air Pollutant (TAPs) EMISSIONS INVENTORY, Truck Mix Concrete Batch Plant

4/10/2007 13:51

Facility Information

Company:	Interstate Concrete & Asphalt, Dover (Truck Mix)
Facility ID:	777-00403
Permit No.:	P-2007.0034
Source Type:	Portable Concrete Batch Plant
Manufacturer:	McNeilus

Emissions estimates are based on EFs in AP-42, Table 11.12-8 (version 06/06) and the following composition of one yard of concrete:

Coarse aggregate		1865 pounds
Sand		1428 pounds
Cement		491 pounds
Cement supplement		73 pounds
Water		20 gallons
Concrete		4024 pounds

Truck Mix Loadout Factor: 1

Central Mix Batching Factor: 0

DEQ EI VERIFICATION WORKSHEET Version 031307
Tip: Purple text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated. Review these before you change them.

Increase in Production

Maximum Hourly Production Rate:	150	cy/hr	
Proposed Daily Production Rate:	1,800	cy/day	
Proposed Maximum Annual Production Rate:	250,000	cy/year	

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
3,600 cy/day	7 day/wk,
1,314,000 cy/year	52 wks/year

TAP Emission Factors from AP-42, Table 11.12-8 (Version 06/06)

Emissions Point	Arsenic EF (lb/ton of material loaded)		Beryllium EF (lb/ton of material loaded)		Cadmium EF (lb/ton of material loaded)		Chromium EF (lb/ton of material loaded)		Manganese EF (lb/ton of material loaded)		Nickel EF (lb/ton of material loaded)		Phosphorus EF (lb/ton of material loaded)		Selenium EF (lb/ton of material loaded)		Chromium VI
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Percent of total Cr that is Cr+6
Cement delivery to silo (w/ baghouse)	4.24E-09	1.68E-06	4.90E-10	1.79E-06	4.86E-10	2.34E-07	2.90E-08	2.52E-07	1.17E-07	2.02E-04	4.18E-08	1.76E-05	ND	1.18E-05	ND	ND	20%
Cement supplement delivery to Silo (with baghouse)	1.00E-06	ND	9.04E-08	ND	1.98E-08	ND	1.22E-06	ND	2.56E-07	ND	2.28E-06	ND	3.54E-06	ND	7.24E-08	ND	30%
Truck Loadout (no boot or shroud)	1.16E-06	3.04E-06	1.04E-07	2.44E-07	9.06E-09	3.42E-08	4.10E-06	1.14E-05	2.09E-05	6.12E-05	4.78E-06	1.19E-05	1.23E-05	3.84E-05	1.13E-07	2.62E-06	21.29%
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	21.29%

UNCONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 3,600 cy/day, and 1,314,000 cy/yr

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.
Cement delivery to silo (w/ baghouse)	1.56E-07	6.84E-07	1.79E-08	7.84E-08	1.79E-08	7.84E-08	1.07E-06	4.06E-05	4.31E-08	1.89E-05	1.54E-06	6.74E-06	4.35E-04	1.90E-03	ND	ND	2.14E-07
Cement supplement delivery to Silo (with baghouse)	5.48E-06	2.40E-05	4.95E-07	2.17E-06	1.08E-07	4.75E-07	6.68E-06	2.93E-05	1.40E-06	6.14E-06	1.25E-05	5.47E-05	1.94E-05	8.49E-05	3.96E-07	1.74E-06	2.00E-06
Truck Loadout (NO boot or shroud)	1.29E-04	5.63E-04	1.03E-05	4.52E-05	1.45E-06	6.34E-06	4.82E-04	2.11E-03	2.59E-03	1.13E-02	5.03E-04	2.20E-03	1.62E-03	7.11E-03	1.11E-04	4.85E-04	1.03E-04
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00
Sources Total	1.34E-04	5.88E-04	1.08E-05	4.75E-05	1.57E-06	6.89E-06	4.90E-04	2.18E-03	2.59E-03	1.14E-02	5.17E-04	2.27E-03	2.08E-03	9.10E-03	1.11E-04	4.87E-04	1.05E-04
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
EXCEEDS EL?	Yes		No		No		No		No		Yes		No		No		Yes

Facility Classification: Total Annual HAPs Emissions: 2.60E-02 Tons per year

CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 1,800 cy/day, and 250,000 cy/year

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI		
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.		
Cement delivery to silo (w/ baghouse)[1]	2.97E-08	1.30E-07	3.41E-09	1.49E-08	3.41E-09	1.49E-08	5.34E-07	6.90E-07	2.15E-08	3.59E-06	2.93E-07	1.28E-06	ND	ND	ND	ND	4.08E-08		
Cement supplement delivery to Silo (with baghouse)2	1.04E-06	4.56E-06	9.42E-08	4.12E-07	2.06E-08	9.03E-08	2.25E-05	5.57E-06	4.71E-08	1.17E-06	2.38E-06	1.04E-05	6.52E-05	1.62E-05	1.96E-07	3.30E-07	3.81E-07		
Truck Loadout (WITH boot or shroud)	1.22E-06	5.36E-06	9.82E-08	4.30E-07	1.36E-08	6.03E-08	1.21E-05	2.01E-05	6.47E-05	1.08E-04	4.79E-06	2.10E-05	4.06E-05	6.77E-05	2.77E-08	4.62E-08	9.77E-07	95.00%	Control. Automatic boot or equivalent.
Central Mix Batching (WITH boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00%	Control. Automatic boot or equivalent.
Sources Total	2.29E-06	1.01E-05	1.96E-07	8.57E-07	3.78E-08	1.66E-07	3.51E-05	2.65E-05	7.16E-05	1.13E-04	7.46E-06	3.27E-05	1.06E-04	8.38E-05	2.97E-06	4.96E-06	1.40E-06	2.72E-04	Tons per year
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07		
Percent of EL	152.98%		0.70%		1.02%		0.11%		0.0215%		27.62%		1.51%		0.0228%		249.77%		
EXCEEDS EL?	Yes		No		No		No		No		No		No		No		Yes		

[1] lb/hr, annual average = EF x pound of cement / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr = EF x pound of cement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton / 24 hr/day

[2] lb/hr, annual average = EF x pound of cement supplement / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of cement supplement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton

[3] lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of (cement + cement supplement) / Yd3 of concrete x daily concrete production

[4] T/yr = lb/hr, annual avg x 8760 hr/yr x (1T/2000 lb)

[5] T/yr = EF x pound of cement, or cement supplement, or cement + cement supplement x annual concrete production rate /2000 lb/ton / 2000 lb/ton

Appendix C

Modeling Review

P-2007.0034

MEMORANDUM

DATE: March 28, 2007

Prepared by: Cheryl Robinson, P.E., Staff Engineer/Permit Writer, Air Quality Division

Reviewed by: Darrin Mehr, Modeler/Air Quality Analyst, Air Quality Division

PROJECT NUMBER: P-2007.0034

SUBJECT: Modeling Review for Interstate Concrete & Asphalt, Initial Permit to Construct Application for a Portable Concrete Batch Plant (the "Dover Batch Plant"), with a proposed initial location in Bonner County near Dover, Idaho

---

1.0 Summary

On behalf of Interstate Concrete & Asphalt (Interstate), and in preparation for submitting a Permit to Construct (PTC) application and requesting a 15-day pre-permit construction authorization for a newly-acquired portable 150 cubic yard per hour concrete batch plant, Aspen Consulting & Engineering, Inc. (Aspen) submitted a modeling protocol to DEQ on February 20, 2007. The protocol, which was approved via e-mail on February 21, 2007, reflected previous telephone discussions with DEQ Modeling Coordinator, Kevin Schilling, and was based on using a "typical" concrete batch plant layout and modeling input files provided by DEQ.

On March 14, DEQ received the PTC application, including AERMOD modeling based on an emissions inventory developed by Aspen.

A technical review of the submitted air quality analyses was conducted by DEQ. The submitted modeling analyses in combination with DEQ's staff analyses: 1) utilized appropriate methods and models; 2) were 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 receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
24-hr PM_{10} NAAQS compliance was demonstrated based on an ambient air boundary—referred to as "the fenceline" in the application—defined by a 40-meter (131 foot) radius from the approximate center of the facility footprint. The ambient concentration at this boundary, calculated from the predicted high 6^{th}-high modeled concentration at this point and a generic background concentration for portable sources, reaches 92.7% of the 24-hour PM_{10} NAAQS. This was based on an assumption that the batch plant maximum production is 1,800 cubic yards per day (cy/day).	Permit conditions should be included that impose a minimum setback requirement of 40 meters (131 feet) from the nearest edge of any source associated with this concrete batch plant, and that limit the maximum daily production to no more than 1,800 cy/day.
Annual PM_{10} emissions from point and fugitive sources were estimated to be 0.9 tons per year, which is less than the DEQ modeling threshold of 1 ton per year. Modeling to demonstrate compliance with the annual PM_{10} NAAQS was therefore not required.	A permit conditions should be imposed that limits the maximum annual production to no more than 250,000 cy in any consecutive 12-month period.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
The 24-hour ambient impact for PM_{10} was predicted to be 65.7 μg/m^3. Annual PM_{10} ambient impacts were not reported (annual PM_{10} modeling was not required).	IDAPA 58.01.01.006 defines a PM_{10} impact increase of 5 μg/m^3 (24-hour average) or 1 μg/m^3 (annual average) as a "significant contribution." A permit condition prohibiting operation of this portable facility in any PM_{10} nonattainment area should be imposed.
Preconstruction compliance with TAPs rules was demonstrated using controlled carcinogenic TAPs emissions, so per IDAPA 58.01.01.210.08, an emission limit must be imposed.	A production limit will inherently limit the TAPs emissions. A permit condition should be imposed that limits the maximum annual production to no more than 250,000 cy in any consecutive 12-month period.

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 Interstate Dover Batch Plant is a portable facility that may operate in any attainment or unclassifiable area anywhere in the State of Idaho.

2.1.2 Significant and Full Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources at this new facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions 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 National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS. PM_{10} is the only criteria pollutant emitted by this facility.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Significant Contribution Levels[a] (μg/m^3)[b]**	**Regulatory Limit[c] (μg/m^3)**	**Modeled Value Used[d]**
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1[st] highest[g]
	24-hour	5.0	150[h]	Maximum 6[th] highest[i]
Carbon Monoxide (CO)	8-hour	500	10,000[j]	Maximum 2[nd] highest[g]
	1-hour	2,000	40,000[j]	Maximum 2[nd] highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1[st] highest[g]
	24-hour	5	365[j]	Maximum 2[nd] highest[g]
	3-hour	25	1,300[j]	Maximum 2[nd] highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1[st] highest[g]
Lead	Quarterly	NA	1.5[h]	Maximum 1[st] highest[g]

a. IDAPA 58.01.01.006
b. Micrograms per cubic meter
c. IDAPA 58.01.01.577 for criteria pollutants
d. The maximum 1[st] highest modeled value is always used for significant impact analysis
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
f. Never expected to be exceeded in any calendar year
g. Concentration at any modeled receptor
h. Never expected to be exceeded more than once in any calendar year
i. Concentration at any modeled receptor when using five years of meteorological data
j. Not to be exceeded more than once per year

2.1.3 Toxic Air Pollutant Analyses

Toxic Air Pollutant (TAP) requirements for PTCs are specified in IDAPA 58.01.01.210. If the increase associated with a new source or modification exceeds screening emission levels (ELs) contained in IDAPA 58.01.01.585 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 listed in IDAPA 58.01.01.585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) listed in IDAPA 58.01.01.586, then compliance with TAP requirements has been demonstrated.

2.2 Background Concentrations

Ambient 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 used in these analyses are listed in Table 3. These are the default rural/agricultural background concentrations, which were used because concrete batch plants are typically located outside of urban areas.

Table 3. BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
PM_{10}[b]	24-hour	73
	Annual	26

[a] Micrograms per cubic meter
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

DEQ had previously provided Aspen with input files set up for a "typical" batch plant layout. DEQ's evaluation of the modeling methodology was limited to reviewing the modeling analysis results and model input and output files provided with the application to ensure that the analysis used the methodology proposed in the modeling protocol, and followed the "typical" plant layout in the DEQ-provided input files. DEQ did not rerun the modeling analysis. Table 4 provides a summary of the modeling parameters used in the modeling analysis.

Table 4. MODELING PARAMETERS

Parameter	Description/ Values	Documentation/Additional Description
Model	AERMOD	The **A**merican Meteorological Society/**E**nvironmental Protection Agency **R**egulatory Model Improvement Committee's Dispersion **Mod**el (AERMOD, version 07026) is currently the preferred approved model for permitting analysis.
Meteorological data	Surface Data & Upper Air Data Boise, Idaho 1988-1992	Previous DEQ analyses showed that using Boise meteorological data generated the highest modeled values for concrete batch plants. DEQ provided the applicant with preprocessed Boise 5-year met data for use with the AERMOD/AERMET model. The AERMET files used the actual station anemometer height of 6.1 meters.
Land Use (urban or rural)	Rural	Urban area surface heating was not used in this analysis based on typical land use at concrete batch plant locations.

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

Table 4. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Terrain	Flat/Level	Flat (level) terrain was used because maximum impacts from concrete batch plants are very near the facility. This assumption was deemed to be appropriate and is not a substantial limitation of this model.
Building downwash	Considered	To account for plume downwash effects from any buildings present, or equipment that may cause downwash, a 20-meter square building, 10 meters tall and centered on the weigh hopper and truck mix loadout sources, was used as a representation of structures associated with this concrete batch plant. The PRIME algorithm was not used because building cavity effects are not expected to be significant.
Receptor grid	Grid 1	10-meter spacing along "fenceline" described by a circle with a radius of 40 meters.
	Grid 2	25-meter spacing for distances between the 40 meters "fenceline" and 200 meters.
	Grid 3	50-meter spacing for distances between 200 meters and 500 meters.

3.1.1 Modeling protocol

A protocol was submitted by Aspen to DEQ prior to submission of the AERMOD modeling demonstrations. Aspen used the AERMOD modeling inputs provided by DEQ for a "typical" batch plant layout. Modeling was conducted for short term PM_{10} impacts and long term TAPs impacts. Based on DEQ experience conducting analyses for very similar facilities, long-term (annual) PM_{10} impacts for a 250,000 cy/year batch plant is not a critical factor in determining facility compliance with the NAAQS.

Modeling was conducted using methods required by the *State of Idaho Air Quality Modeling Guideline.*[2]

3.1.2 Model Selection

AERMOD was used by Aspen to conduct the final ambient air impact analyses for this project.

3.1.3 Meteorological Data

Surface and upper air meteorological data for 1988 through 1992 from Boise, Idaho were used for this potentially portable batch plant. Previous DEQ analyses using ISC-based models showed that using Boise meteorological data generated the highest modeled values for concrete batch plants. DEQ provided the applicant with preprocessed Boise 5-year met data for use with the AERMOD/AERMET model.

3.1.4 Terrain Effects

Impacts were assessed assuming flat terrain because the results must be reasonably applicable to all locations for this potentially portable facility. Since maximum impacts from near ground-level emissions sources—such as those at typical concrete batch plants—are very near the emissions source, this assumption was deemed to be appropriate and is not a substantial limitation of the method.

3.1.5 Facility Layout and Ambient Air Boundary

Portable concrete batch plants are somewhat unique compared to other stationary sources in that the equipment layout may change at each new location. Because of this, a generic approach that reflects a typical batch plant layout is appropriate.

For this case, the ambient air boundary was taken to be along the perimeter of a circle with a radius of 40 meters from the center of a 20 meter by 20 meter "typical" plant layout shown in Figure 3-1.

[2] Document ID AQ-011, Rev. 1, State of Idaho Air Quality Modeling Guideline, December 31, 2002.

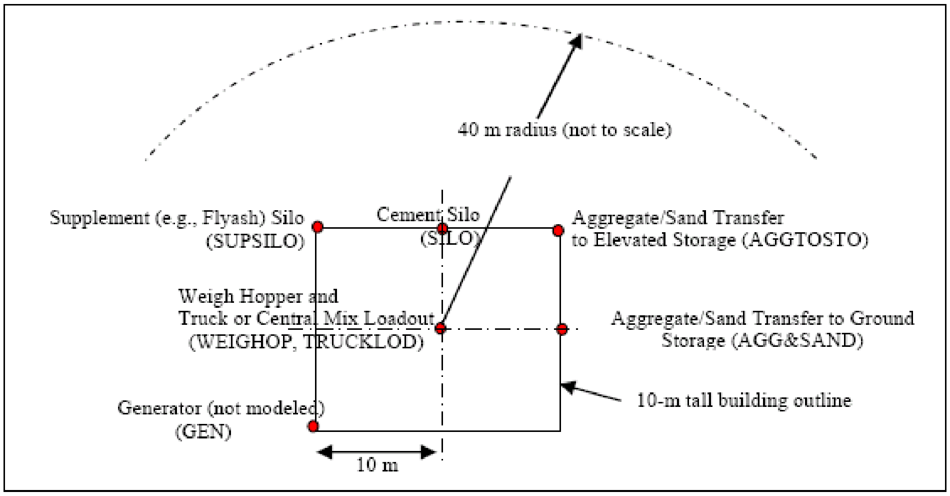

Figure 3-1. TYPICAL CONCRETE BATCH PLANT MODELING LAYOUT

3.1.6 Building Downwash

To account for plume downwash effects from any buildings present, or equipment that may cause downwash, a 20-meter square building, 10 meters tall and centered on the weigh hopper and truck mix loadout sources, was used as a representation of structures associated with this concrete batch plant. The PRIME algorithm was not used because building cavity effects are not expected to be significant.

3.1.7 Receptor Network

The receptor grids used in this analysis met the minimum recommendations specified in the State of Idaho Air Quality Modeling Guideline.

3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application, and include criteria pollutant emissions from all point sources (silo and weigh hopper baghouses) and fugitive emissions sources (modeled as volume sources) including transfers to aggregate and sand storage, aggregate/sand transfer to elevated storage, and truck mix loadout. Per DEQ direction, fugitive emissions excluded wind erosion from aggregate and sand piles and emission from vehicle traffic. The TAPs emissions inventory included controlled emissions from cement and flyash silo filling and truck loadout. Controlled emissions of all TAPs were below the applicable screening emission level except for arsenic and hexavalent chromium (Chromium VI).

DEQ verified that all modeled criteria pollutant emissions rates and TAPs emission rates were equal to or greater than the facility's emissions calculated in the PTC application (see Appendix B of the permit statement of basis). Demonstration of preconstruction compliance for TAPs emissions was based on controlled emissions from a production rate of 250,000 cy/year, with silo baghouses treated as process equipment rather than air pollution control devices.

3.3 Emission Release Parameters

Emission release parameters used in the dispersion modeling analysis submitted by the applicant were reviewed against those in the permit application. Values used for stack height, stack diameter, exhaust temperature, and exhaust velocity for the point sources appeared reasonable and within expected ranges. Additional documentation for the verification of these parameters was not required. Release parameters are summarized in Tables 7-1 and 7-2 from the application (see Attachment 1 to this modeling memo).

3.4 Results for Significant and Full Impact Analyses

A significant contribution analysis was not submitted for this application. Aspen submitted a full impact analysis for the proposed project. The results of the facility-wide modeling for criteria pollutants are shown in Table 5.

Table 5. RESULTS OF FULL IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design Concentration[a] ($\mu g/m^3$)[b]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact[a] ($\mu g/m^3$)	NAAQS[c] ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[d]	24-hour	65.7	73	139	150	92.7%
	Annual	Not Required (NR)	26	NR	50	NR %

[a] Maximum 6[th] highest value (24-hour standard) or 1[st] highest (annual standard) for five years of meteorological data.
[b] Micrograms per cubic meter
[c] National ambient air quality standards
[d] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

The results of the results for the TAPs analysis are shown in Table 6.

Table 6. RESULTS OF TAPs ANALYSIS (UNCONTROLLED EMISSIONS)

TAP	Averaging Period	Modeled Design Concentration[a] ($\mu g/m^3$)[b]	AACC[c] ($\mu g/m^3$)	Percent of AACC
Arsenic	Annual	9.00E-05	2.3E-04	39.1%
Chromium (VI)	Annual	5.00E-05	8.3E-05	60.0%

[a] Maximum 1[st] highest for five years of meteorological data.
[b] Micrograms per cubic meter
[c] Acceptable ambient concentration for carcinogens

4.0 Conclusions

The ambient air impact analysis submitted, in combination with DEQ's verification review, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.

Attachment 1.
Interstate Concrete & Asphalt, Dover Batch Plant Emission Release Parameters

TABLE 7-1
POINT SOURCE MODEL INPUT PARAMETERS
INTERSTATE CONCRETE AND ASPHALT CORP.
DOVER PORTABLE

Source Name	Source Description	UTM Easting (m)	UTM Northing (m)	Stack Height (ft)	Stack Diameter (ft)	Stack Temp (F)	Flowrate (fps)	PM_{10} Model Emission Rate (lb/hr)
SILO	storage silo filling	0	10	32.81	3.28	-460	0.0033	0.0060
WEIGHOP	weigh hopper loading baghouse	0	0	19.00	3.28	-460	0.0033	0.0150
SUPSILO	cement supplement silo	-10	10	32.81	3.28	-460	0.0033	0.0130

DEQ Note: In AERMOD, setting the temperature to 0 K (-460 F) results in the program using the ambient temperatures from the met data files.

TABLE 7-2
VOLUME SOURCE
MODEL INPUT PARAMETERS
INTERSTATE CONCRETE AND ASPHALT CORP.
DOVER PORTABLE

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)	PM_10 (lb/hr)
AGG&SAND	Aggregate/sand to/from storage pile	10	0	2.00	4.65	0.70	0.14
AGGTOSTO	Aggregate/sand to elevated storage	10	10	5.00	4.65	4.65	0.07
TRUCKLOD	truck loading	0	0	5.00	4.65	4.65	0.29

16

7

Appendix D

Generic Modeling Review

(For use at any other than initial location that has available set backs)

P-2007.0034

MEMORANDUM

DATE: March 23, 2007

Prepared by: Cheryl Robinson, P.E., Staff Engineer/Permit Writer, Air Quality Division

Reviewed by: Kevin Schilling, Modeling Coordinator, Air Quality Division

SUBJECT: Portable Concrete Batch Plants – Generic Modeling Results for Typical Plant

---

1. Summary

Most ready-mix concrete batch plants share many characteristics with each other such as equipment design, fugitive dust control practices, emissions quantities for a given processing rate, general facility layout, and emission release parameters. These shared characteristics allow the development of generic methods to assess the air quality impact of these batch plants. The appropriateness of using generic methods is particularly justifiable for ready-mix concrete batch plants because most are permitted as portable sources, and specific equipment configurations will change somewhat from site to site.

1.1 Generic Modeling Applicability

Use of this generic method to demonstrate preconstruction compliance with National Ambient Air Quality Standards (NAAQS) and Idaho toxic air pollutant (TAP) rules from operation of concrete batch plants is designed to generate reasonably conservative results, and may not be applicable to all batch plants.

The key criteria for determining the applicability of the generic modeling results are summarized in Table 1. In cases where the proposed operations differ from these assumptions (e.g., stack heights are lower, or emissions controls do not meet the minimum criteria), the applicant shall provide additional explanation in their modeling protocol to justify use of the generic modeling results. This information, along with DEQ's approval of the modeling protocol shall be included in the statement of basis for the permit.

The appropriateness of this method to specific conditions will be made on a case-by-case basis considering the following:

- Equipment used at the batch plant, especially considering the type and effectiveness of emissions control equipment and practices.
- Proposed location for the facility, considering the presence of any sensitive receptors near the property boundary and the distance from pollutant emitting equipment to the property boundary.
- The presence of other pollutant emitting activities occurring at the site, including collocation with another concrete batch plant, rock crushing equipment and/or hot mix asphalt plants.

Table 1. CRITERIA FOR USING DEQ's CONCRETE BATCH PLANT GENERIC MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Generic Modeling Assumptions
Concrete batch plant type and capacity	Truck mix (redi-mix or dry mix) or Central mix Maximum 300 cy per hour capacity
Operation in any PM_{10} nonattainment area	Not proposed.

Table 1. CRITERIA FOR USING DEQ's CONCRETE BATCH PLANT GENERIC MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Generic Modeling Assumptions			
Presence of an electric generator.	No generator. Line power is available.			
No Collocation. Minimum distance from nearest edge of any emissions source to any other source of emissions, including another concrete batch plant, hot mix asphalt plant, or rock crushing plant.	200 meters (656 feet)			
Number of cement and/or cement supplement storage silos	Not limited. The model layout assumes all silo emissions are from the same point, and that cement/supplement is not transferred between storage silos.			
Maximum daily concrete production (cy/day)	1,500	2,400	3,600	4,800
Minimum Setback Distance. Minimum distance from nearest edge of any emissions source to a receptor.[a]	**40 m (131 ft)**	**60 m (197 ft)**	**100 m (328 ft)**	**150 m (492 ft)**
Maximum annual concrete production (cy/year)	300,000	400,000	500,000	500,000
Cement and supplement storage silo baghouse(s) Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%			
Weigh hopper loading baghouse, or equivalent Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%			
Truck-mix loadout or Central Mix loading. Minimum PM/PM_{10} control.	95% Boot enclosure, shroud, water sprays, or baghouse/cartridge filter			
Transfer Point Fugitives. Minimum PM/PM_{10} control.	75% Water sprays, enclosures, shrouds, or aggregate/sand is damp on an as-received basis and used before significantly drying out.			

[a] Distance to any structure normally occupied by members of the public (e.g., a residence, school, health care facility), or outdoor public gathering place. This distance shall be measured from the nearest edge of any storage pile, silo, weigh batcher, transfer point, or conveyor associated with this concrete batch plant. This limitation does not apply to the distance to any public road or highway.

1.2 Applicable Permit Conditions

The following permit conditions should be included in any permit using the generic modeling to demonstrate preconstruction compliance with NAAQS and TAPs:

- A prohibition on operating this plant in any PM_{10} nonattainment area. IDAPA 58.01.01.006 defines a PM_{10} impact increase of 5 µg/m3 (24-hour average) or 1 µg/m3 (annual average) as a "significant contribution." The predicted ambient impacts for each of the modeled daily and annual production rates exceed these thresholds.
- Daily concrete production limits based on the setback distance available that day. The setback for each modeled daily production rate is defined by the minimum distance needed to meet the 24-hour PM_{10} NAAQS standard.
- Annual concrete production limits based on the setback distance available at any location. Preconstruction compliance with state TAPs rules was demonstrated using controlled TAPs emissions, so per IDAPA 58.01.01.210.08, an emission limit must be imposed. The production limit inherently limits the TAPs emissions, so a pollutant-specific lb/yr limit is not needed.

- O & M manual and operational requirements that will ensure that a high level of control is consistently achieved and maintained for baghouse/cartridge filters and for control of fugitive emissions from material transfer points.

2. 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 concrete batch plant is a portable facility that may operate in any attainment or unclassifiable area anywhere in the State of Idaho.

2.1.2 Significant and Full Impact Analyses

If estimated maximum criteria pollutant impacts to ambient air from the emissions sources at this facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions 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 National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

The generic modeling does not currently include emissions from any generators (line power is required to be available), so PM10 and lead are the only criteria pollutants emitted by this facility.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1st highest[g]
	24-hour	5.0	150[h]	Maximum 6th highest[i]
Carbon Monoxide (CO)	8-hour	500	10,000[j]	Maximum 2nd highest[g]
	1-hour	2,000	40,000[j]	Maximum 2nd highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest[g]
	24-hour	5	365[j]	Maximum 2nd highest[g]
	3-hour	25	1,300[j]	Maximum 2nd highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest[g]
Lead	Quarterly	NA	1.5[h]	Maximum 1st highest[g]

[a] IDAPA 58.01.01.006
[b] Micrograms per cubic meter
[c] IDAPA 58.01.01.577 for criteria pollutants
[d] The maximum 1st highest modeled value is always used for significant impact analysis
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f] Never expected to be exceeded in any calendar year
[g] Concentration at any modeled receptor
[h] Never expected to be exceeded more than once in any calendar year
[i] Concentration at any modeled receptor when using five years of meteorological data
[j] Not to be exceeded more than once per year

2.1.3 Toxic Air Pollutant Analyses

Toxic Air Pollutant (TAP) requirements for PTCs are specified in IDAPA 58.01.01.210. If the increase associated with a new source or modification exceeds screening emission levels (ELs) contained in IDAPA 58.01.01.585 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 listed in IDAPA 58.01.01.585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) listed in IDAPA 58.01.01.586, then compliance with TAP requirements has been demonstrated.

2.2 Background Concentrations

Ambient 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 used in these analyses are listed in Table 3. These are the default rural/agricultural background concentrations, which were used because concrete batch plants are typically located outside of urban areas.

Table 3. BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration (μg/m3)[a]
PM_{10}[b]	24-hour	73
	annual	26
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO2)	3-hour	34
	24-hour	26
	Annual	8
Nitrogen dioxide (NO2)	Annual	17

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

3. Modeling Impact Assessment

3.1 Modeling Methodology

3.1.1 Model Selection and Key Parameters

Atmospheric dispersion modeling was used to evaluate the air quality impacts from point sources and process fugitive sources. Table 4 provides a summary of the model selection and modeling parameters used in the modeling analyses.

Table 4. MODELING PARAMETERS

Parameter	Description/ Values	Documentation/Additional Description
Model	AERMOD, Version 04300	The Gaussian dispersion model AMS/EPA Regulatory Model (AERMOD) was run for a single case (3,600 cy/day, 500,000 cy/year, with a 100-meter ambient air boundary). This case was used to demonstrate that ambient impacts predicted using AERMOD are lower than impacts predicted using ISCST3 for the same emission points and parameters. This is consistent with results reported by the EPA, which found that AERMOD typically predicted lower concentrations than ISCST3 for rural, low-level stacks; and short term urban, low-level stacks.[2]

[1] Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.
[2] U.S. EPA, Comparison of Regulatory Design Concentrations, AERMOD vs. ISCST3, CTDMPLUS, ISC-PRIME, Staff Report, EPA-454/R-03-002, June 2003 (see page 29).

Table 4. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Model	ISCST3, Version 02035	Due to DEQ schedule and resource constraints, and because ISCST3 results are generally higher (conservative) than AERMOD for these types of near-field analyses, DEQ determined that the Industrial Source Complex Short Term (ISCST3), air dispersion model was acceptable at this time for predicting ambient impacts for all cases.
Meteorological data	Surface Data & Upper Air Data Boise, Idaho 1988-1992 (AERMOD) 1987-1991 (ISCST3)	Previous DEQ analyses showed that using Boise meteorological data generated the highest modeled values at typical concrete batch plant "fenceline" distances, in part because of the well-defined prevailing wind direction at the Boise monitoring location. For the AERMOD run, AERMET pulled the station anemometer height of 6.1 meters directly from the met data files. For the ISCST3 runs, the station anemometer height of 6.1 meters was used.
Land Use (urban or rural)	Rural	Urban area surface heating was not used in this analysis based on typical land use at concrete batch plant locations.
Terrain	Flat/Level	Flat (level) terrain was used because the results must be reasonably applicable to all locations for this portable facility. Maximum impacts from near ground-level emissions sources, such as those at typical concrete batch plants, are very near the emissions source. This assumption was deemed to be appropriate and is not a substantial limitation of this method.
Building downwash	Considered	To account for plume downwash effects from any buildings present, or equipment that may cause downwash, a 20-meter square building, 10 meters tall and positioned at the center of the plant layout, was used as a representation of structures associated with this concrete batch plant. For ISCST3, the building profile input program (BPIP) was used. The PRIME algorithm was not used because building cavity effects are not expected to be significant.
Receptor grid	Grid 1	10-meter spacing along a"fenceline" described by a circle with a radius of 40, 60, 100, or 150 meters.
	Grid 2	25-meter spacing for distances between the "fenceline" and 200 meters.
	Grid 3	50 meter spacing for distances between 200 meters and 500 meters.

3.1.2 Facility Layout and Ambient Air Boundary ("Fenceline")

Portable concrete batch plants are somewhat unique compared to other stationary sources in that the equipment layout may change at each new location. Because of this, a generic approach that reflects a typical batch plant layout is appropriate. The layout used for the modeling is shown in Figure 3-1.

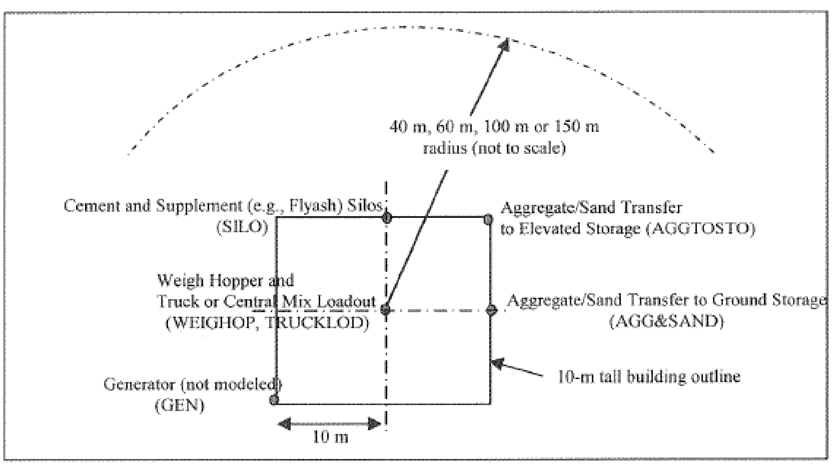

Figure 3-1. Typical Concrete Batch Plant Modeling Layout

5

For the generic modeling, the ambient air boundary or "fenceline" was taken to be along the perimeter of a circle with a radius of 100 meters, 75 meters, or 50 meters from the center of a 20 meter by 20 meter "typical" plant layout shown in Figure 3-1. The boundaries of the 10-meter tall building added to the model to account for plume downwash effects are also defined by this 20 meter by 20 meter square.

3.1.3 Emissions Release Parameters

Emissions from the handling of aggregate/sand and tuck loading were each modeled as volume sources. Table 5 provides parameters used for modeling these sources as well as point source parameters.

Emissions from the handling of aggregate and sand to ground storage and from ground storage to a ground-level conveyor were modeled together as a volume source in a 20-meter square area at the center of the plant. A 2-meter release height was used to represent the average transfer height. Emissions from conveyor transfer to elevated storage were modeled as an elevated volume source on the 20-meter square building, using a 5-meter release height.

Standard modeling guidance for volume sources on or adjacent to structures suggests setting initial dispersion coefficients as follows:

$$\sigma_{y0} = \text{horizontal dimension} / 4.3$$
$$\sigma_{z0} = \text{vertical dimension} / 2.15$$

Miscellaneous ground-level aggregate and sand handling was assumed to occur from activities in a 20-meter square area. Standard modeling guidance for volume sources not on or adjacent to structures suggests setting initial dispersion coefficients as follows:

$$\sigma_{y0} = \text{horizontal dimension} / 4.3$$
$$\sigma_{z0} = \text{vertical dimension} / 4.3$$

Point sources were conservatively modeled in the generic analyses assuming a horizontal release or a rain-capped stack. A stack gas exit velocity of 0.001 meters per second was used to eliminate momentum-induced plume rise, which would only occur from an uninterrupted vertical release.

Table 5. EMISSIONS RELEASE PARAMETERS FOR SOURCES

Point Sources						
Source	**UTM Coord. (m)**		**Stack Height (m)[a]**	**Stack Gas Temp. (K)[b]**	**Stack Dia. (m)**	**Flow Rate (m/sec)[c]**
	Easting	**Northing**				
Silo baghouse(s) stack	0	10	10	0, 298.15[d]	1.0	0.001[e]
Weigh hopper baghouse stack	0	0	10	0, 298.15[d]	1.0	0.001[e]
Volume Sources						
Source	**UTM Coord. (m)**		**Release Height (m)**	**Initial Horizontal Coefficient σ_{y0} (m)**	**Initial Vertical Coefficient σ_{z0} (m)**	
	Easting	**Northing**				
Aggregate/sand transfers at ground level	10	10	2	4.65	0.70	
Aggregate/sand transfers at elevated level	10	0	5	4.65	4.65	
Truck loading	0	0	5	4.65	4.65	

a. Meters

b. Kelvin

c. Meters per second

d. When a value of 0 K is used, the AERMOD model uses the ambient air temperature. This value was set to 77 degrees Fahrenheit (298.15 K) for the ISCST3 runs. This is not expected to result in a measurable difference in the ambient impact results.

e. Set to 0.001 m/sec for a horizontal release or release from a rain-capped vertical stack.

3.1.4 Wind Speed Adjustments for Fugitive Emissions

The dispersion model AERMOD has an option by which emissions can be varied as a function of wind speed. There are six wind speed categories, and adjustment factors can be assigned for each category. Emissions for each hour modeled are calculated by multiplying the base rate by the appropriate adjustment factor, as determined by the wind speed specified for the hour within the meteorological data file.

For the AERMOD run, base emissions rates were calculated using a wind speed of 10 miles per hour. Wind speed adjustment factors were then developed for each of the six wind speed categories corresponding to the default wind speed categories within the model. The mean wind speed of each category was calculated, and emissions associated with that mean wind speed were calculated. An adjustment factor was calculated for each wind speed category by dividing the emissions rate for that category by the base emissions rate calculated at a 10 mile per hour wind speed. Table 6 summarizes the wind speed categories and the calculated adjustment factors.

Table 6. WIND SPEED ADJUSTMENT FACTORS FOR MATERIAL HANDLING EMISSIONS

Wind Speed Category	ISCST3 Default Upper Wind Speed for Category (m/sec[a])	Median Wind Speed for Category (m/sec (mph[b]))	Emissions Rate for Category (lb/ton[c])	Adjustment Factor[d]
1	1.54	0.77 (1.72)	3.32E-4	0.101
2	3.09	2.32 (5.18)	1.39E-3	0.425
3	5.14	4.12(9.20)	2.94E-3	0.897
4	8.23	6.69 (14.95)	5.52E-3	1.69
5	10.8	9.52 (21.28)	8.73E-3	2.67
6	Not Defined	12.4[e] (27.74)	1.23E-2	3.77

[a] Meters per second
[b] Miles per hour
[c] Pounds of emissions per ton of material handled
[d] Calculated by dividing the emissions rate for the category by the emissions rate for a 10 mph wind (3.27E-3 lb/ton)
[e] An upper value wind speed of 14 m/sec was used, based on highest values observed in the meteorological files used in the modeling analyses.

3.2 Emission Rates

The emissions inventories (EIs) used for the generic modeling were based on AP-42 Section 11.12 (dated 06/06) emission factors for a truck-mix concrete batch plant. Based on AP-42 factors, estimated emissions from central mix plants would be the same, except that emissions from loadout to a central mixer are expected to be lower.

Hexavalent chromium [Cr+6 or Cr(VI)] was presumed to comprise 20% of the total chromium emissions from cement silo filling, 30% of the total chromium emissions from cement supplement (e.g., flyash) silo filling, and 21.3% of the total chromium emissions from truck loadout.

Point source emissions from the cement and flyash storage silos were presumed to be controlled by baghouses or cartridge filters with minimum capture efficiencies of 99%.

Uncontrolled fugitive emissions of PM_{10} from material transfer points were based on minimum moisture contents taken from AP-42 Table 11.12-2 of 1.77% for aggregate and 4.17% for sand. Fugitive emissions from material transfer points were assumed to be further controlled by 1) receiving sand and aggregate in a wetted condition and using the stockpile before significant drying out occurs, and/or 2) using manual water sprays or water spray bars to control fugitive emissions that reduce the uncontrolled emissions by an estimated 75%.

Fugitive emissions from truck mix loadout or central mixer loading are controlled by a boot, shroud, or water sprays that reduce the uncontrolled emissions by an estimated 95%.

Fugitive emissions resulting from vehicle traffic and wind erosion from storage piles were excluded from the analysis.

Uncontrolled emissions of TAPs from cement and flyash silo filling and truck mix loadout were based on operation of a 300 cy per hour concrete batch plant for 8,760 hours per year. Cement and flyash silo baghouses/cartridge filters were treated as process equipment, i.e., the uncontrolled TAPs emissions from these sources have been reduced by the capture efficiency associated with the baghouse/cartridge filters.

Emissions were estimated for each of the four daily and annual production combinations (described above in Table 1). The 24-hour and annual average PM_{10} emission rates for each case, and the values used for the modeled source input are summarized in Tables 6A and 6B. The emission rates used for the AERMOD analysis were developed using the equations contained in Section 11.12 of AP-42, rather than using the emission factors from Table 11.12-5, so differ slightly due to rounding or as noted in the table. A sample detailed emissions calculation worksheet is included as Attachment 1 to this memorandum.

Table 6A. EMISSIONS RATES FOR SOURCES - PM_{10}

Source	Emission Factor	Control	ISCST3 1,500 cy/day [b] 300,000 cy/yr [b]		ISCST3 2,400 cy/day 400,000 cy/yr	
	lb/cy [a]		lb/hr_{24} [c]	lb/hr_{YR} [c]	lb/hr_{24}	lb/hr_{YR}
Aggregate to ground	0.0031	75%	0.048	0.027	0.078	0.035
Sand to ground	0.0007	75%	0.011	0.006	0.018	0.008
Aggregate to conveyor	0.0031	75%	0.048	0.027	0.078	0.035
Sand to conveyor	0.0007	75%	0.011	0.006	0.018	0.008
AGG&SAND			**0.119**	**0.065**	**0.190**	**0.086**
Aggregate to elevated storage	0.0031	75%	0.048	0.027	0.078	0.035
Sand to elevated storage	0.0007	75%	0.011	0.006	0.018	0.008
AGGTOSTO			**0.059**	**0.033**	**0.095**	**0.043**
Cement to silo (controlled)	0.0001	--	5.22E-03	2.86E-03	8.35E-03	3.81E-03
Flyash to silo (controlled)	0.0002	--	1.12E-02	6.12E-03	1.79E-02	8.16E-03
SILO			**1.64E-02**	**8.98E-03**	**2.62E-02**	**1.20E-02**
Weigh hopper baghouse stack	0.0040	99%	2.47E-03	1.35E-03	3.95E-03	1.80E-03
WEIGHOP			**2.47E-03**	**1.35E-03**	**3.95E-03**	**1.80E-03**
Truck loadout	0.0784	95%	0.24	0.13	0.39	0.18
TRUCKLOD			**0.24**	**0.13**	**0.39**	**0.18**

[a] Pounds per cubic yard of concrete.

[b] Cubic yards of concrete per day and per year.

[c] Pounds per hour on a 24-hour average and annual average.

Table 6B. EMISSIONS RATES FOR SOURCES - PM_{10}

Source	Emission Factor	Control	AERMOD 3,600 cy/day[b]	ISCST3 3,600 cy/day	ISCST3 4,800 cy/day	AERMOD 500,000 cy/yr[b]	ISCST3 500,000 cy/yr[b]
	lb/cy[a]		lb/hr24	lb/hr24[c]	lb/hr24[c]	lb/hrYR	lb/hrYR
Aggregate to ground	0.0031	75%		0.116	0.155		0.044
Sand to ground	0.0007	75%		0.026	0.035		0.010
Aggregate to conveyor	0.0031	75%		0.116	0.155		0.044
Sand to conveyor	0.0007	75%		0.026	0.035		0.010
AGG&SAND			0.2814	**0.285**	**0.380**	0.1071	**0.109**
Aggregate to elevated storage	0.0031	75%		0.116	0.155		0.044
Sand to elevated storage	0.0007	75%		0.026	0.035		0.010
AGGTOSTO			0.1407	**0.143**	**0.190**	0.0535	**0.054**
Cement to silo (controlled)	0.0001	--		1.25E-02	1.67E-02		4.76E-03
Flyash to silo (controlled)	0.0002	--		2.68E-02	3.58E-02		1.02E-02
SILO			3.939E-02[g]	**3.93E-02**	**5.25E-02**	1.497E-02[g]	**1.50E-02**
Weigh hopper baghouse stack **WEIGHOP**	0.0040	99%	2.964E-02[h]	**5.93E-03**	**7.90E-03**	1.128E-02[h]	**2.26E-03**
Truck loadout **TRUCKLOD**	0.0784	95%	0.588	**0.59**	**0.78**	0.2234	**0.22**

[a] Pounds per cubic yard of concrete.

[b] Cubic yards of concrete per day and per year.

[c] Pounds per hour on a 24-hour average and annual average.

The AERMOD analysis for a 300 cy/hr concrete batch plant demonstrated preconstruction compliance for TAPs using uncontrolled emissions and a 100-meter fenceline radius. The uncontrolled emissions, however, were estimated using an older version of AP-42 Table 11.12-8. Using AP-42 factors from the most recent 06/06 edition, uncontrolled emissions of all TAPs for a 300 cy/hr plant were below the applicable screening emission level except for arsenic, nickel, and hexavalent chromium (see page 2 of the example calculation in Attachment 1. Each of these TAPs is a carcinogen, and is subject to an annual AACC. For the ISCST3 analyses, dispersion modeling was done for the controlled emissions of each of these three TAPs. The controlled TAPs emissions used in the ISCST3 analyses are summarized in Tables 7A and 7B.

Table 7A. EMISSIONS RATES FOR SOURCES – CONTROLLED TAPs EMISSIONS

Modeling Case	ISCST3 300,000 cy/yr			ISCST3 400,000 cy/yr		
Pollutant	Arsenic	Nickel	Cr (VI)	Arsenic	Nickel	Cr (VI)
Source	lb/hrYR[a]	lb/hrYR	lb/hrYR	lb/hrYR	lb/hrYR	lb/hrYR
Cement delivery to silo (with baghouse)	3.56E-08	3.51E-07	4.88E-08	4.75E-08	4.69E-07	6.50E-08
Supplement delivery to silo (with baghouse)	1.25E-06	2.85E-06	4.58E-07	1.67E-06	3.80E-06	6.10E-07
SILO	**1.286E-06**	**3.004E-06**	**5.068E-07**	**1.718E-06**	**4.269E-06**	**6.75E-07**
Truck loadout: Cement and supplement delivery to silo (no controls) **TRUCKLOD**	**1.47E-06**	**5.75E-06**	**1.17E-06**	**1.96E-06**	**7.66E-06**	**1.56E-06**

[a.] Pounds per hour, annual average.

9

Table 7B. EMISSIONS RATES FOR SOURCES – CONTROLLED TAPs EMISSIONS

Modeling Case	ISCST3 500,000 cy/yr			[Reserved]		
Pollutant	Arsenic	Nickel	Cr (VI)	Arsenic	Nickel	Cr (VI)
Source	lb/hr$_{YR}$ [a]	lb/hr$_{YR}$	lb/hr$_{YR}$	lb/hr$_{YR}$	lb/hr$_{YR}$	lb/hr$_{YR}$
Cement delivery to silo (with baghouse)	5.94E-08	5.86E-07	8.13E-08			
Supplement delivery to silo (with baghouse)	2.08E-06	4.75E-06	7.63E-07			
SILO	**2.139E-06**	**5.33E-06**	**8.443E-07**			
Truck loadout: Cement and supplement delivery to silo (no controls) **TRUCKLOD**	**2.45E-06**	**9.58E-06**	**1.95E-06**			

a. Pounds per hour, annual average.

3.3 Results for Significant and Full Impact Analyses

A significant contribution analysis was not submitted for this application. Aspen submitted a full impact analysis for the proposed modification project. The results of the facility-wide modeling for criteria pollutants are shown in Table 8.

Table 8. RESULTS OF FULL IMPACT ANALYSES – PM_{10}

Pollutant	Averaging Period	Modeled Design Concentration[a] ($\mu g/m^3$)[b]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact[a] ($\mu g/m^3$)	NAAQS[c] ($\mu g/m^3$)	Percent of NAAQS
ISCST3 Case 1. Low Production:			1,500 cy/day, 300,000 cy/yr, Fenceline at radius of 40 meters			
PM_{10}[d]	24-hour	63.2	73	136.2	150	90.8% (73.2%)[e]
	Annual	11.2	26	37.2	50	74.4%
ISCST3 Case 2. Moderate Production:			2,400 cy/day, 400,000 cy/yr, Fenceline at radius of 60 meters			
PM_{10}[d]	24-hour	79.8	73	152.8	150	102% (82.1%)[e]
	Annual	10.8	26	36.8	50	73.4%
AERMOD Case 3. Moderate Production:			3,600 cy/day, 500,000 cy/yr, Fenceline at radius of 100 meters			
PM_{10}[d]	24-hour	53.3	73	126	150	84.2%
	Annual	5.53	26	31.5	50	63.1%
ISCST3 Case 3. Moderate Production:			**3,600 cy/day, 500,000 cy/yr, Fenceline at radius of 100 meters**			
PM_{10}[d]	24-hour	83.8	73	156.8	150	**104.5% (84.2%)**[e]
	Annual	7.91	26	33.9	50	**67.8%**
ISCST3 Case 4. High Production:			4,800 cy/day, 500,000 cy/yr, Fenceline at radius of 150 meters			
PM_{10}[d]	24-hour	73.8	73	146.8	150	97.9% (78.9%)[e]
	Annual	4.86	26	30.9	50	61.7%

a. Maximum 6th highest value (24-hour standard) for five years of meteorological data.
b. Micrograms per cubic meter
c. National ambient air quality standards
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
e. AERMOD results for Case 3 indicate that using the currently approved AERMOD model would result in significantly lower predicted ambient impact than the ISCST3 analysis (about 20% lower, based on Case No.3 results). The estimated ambient impact for this case had AERMOD been run instead of ISCST3 is shown in brackets. This result was deemed acceptable to demonstrate preconstruction compliance with the 24-hr PM_{10} NAAQS standard.

The results of the ISCST3 results for the controlled ambient impact for TAPs emissions are shown in Table 9.

Table 9. RESULTS OF TAPs ANALYSIS - CONTROLLED EMISSIONS				
TAP	**Averaging Period**	**Modeled Design Concentration[a] ($\mu g/m^3$)[b]**	**AACC[c] ($\mu g/m^3$)**	**Percent of AACC**
Case 1	**1,500 cy/day**	**300,000 cy/year**	**40 meters**	
Arsenic	Annual	7.51E-05	2.3E-04	32.7%
Chromium (VI)	Annual	4.54E-05	8.3E-05	54.7%
Nickel	Annual	2.67E-04	4.23E-03	6.4%
Case 2	**2,400 cy/day**	**400,000 cy/year**	**60 meters**	
Arsenic	Annual	8.79E-05	2.3E-04	38.2%
Chromium (VI)	Annual	6.10E-05	8.3E-05	73.5%
Nickel	Annual	3.12E-04	4.23E-03	7.4%
Case 3	**3,600 cy/day**	**500,000 cy/year**	**100 meters**	
Arsenic	Annual	6.78E-05	2.3E-04	29.5%
Chromium (VI)	Annual	4.63E-05	8.3E-05	55.8%
Nickel	Annual	2.38E-04	4.23E-03	5.6%
Case 4	**4,800 cy/day**	**500,000 cy/year**	**150 meters**	
Arsenic	Annual	4.38E-05	2.3E-04	39.1%
Nickel	Annual	2.98E-05	8.3E-05	35.9%
Chromium (VI)	Annual	1.53E-04	4.23E-03	3.6%

a. Maximum 1st highest value for five years of meteorological data.
b. Micrograms per cubic meter
c. Acceptable ambient concentration for carcinogens

4.0 Conclusions

The ambient air impact analysis conducted by DEQ demonstrated to DEQ's satisfaction that emissions from a concrete batch plant facility that meets the criteria specified in Table 1 will not cause or significantly contribute to a violation of any air quality standard.

Attachment 1.
Sample Emissions Calculation – 3,600 cy/day and 500,000 cy/year

CRITERIA POLLUTANT EMISSION INVENTORY for Truck Mix Portable Concrete Batch Plant

Facility Information — 3/20/07 17:37

Company:	DEQ GENERIC MODEL - 3,600 cy/day and 500,000 cy/year
Facility ID:	777-xxxxxx
Permit No.:	P-2007.xxxx
Source Type:	Portable Concrete Batch Plant
Manufacturer/Model:	

Assumptions Implied or Stated in Application:
Presumes this is an initial permit, not a modification
See control assumptions
Truck Mix (T) or Central Mix (C)? T

INCREASE IN Production[1]

Maximum Hourly Production Rate:	300	cy/hr		
Proposed Daily Production Rate:	3,600	cy/day	12.00	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	500,000	cy/year		
Cement Storage Silo Capacity:		ft^3 of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only:		of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:		of the silo capacity		

DEQ EI VERIFICATION WORKSHEET v. 032007
Tip: Purple text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated.
Review those before you change them.

Change in PM_{10} Emissions due to this PTC

Emissions Point	PM_{10} Emission Factor[1] (lb/cy)		Controlled Emission Rate, Max.	Controlled Emission Rate, 24-hour average		Controlled Emission Rate, annual average		Control Assumptions:	
	Controlled	Uncontrolled	lb/hr[2]	lb/hr[3]	lb/day[3]	lb/hr[4]	T/yr[4]		
Aggregate delivery to ground storage		0.0031	0.23	0.116	2.79	0.044	0.194	75%	Control: Water sprays.
Sand delivery to ground storage		0.0007	0.05	0.026	0.63	0.010	0.044	75%	Control: Water sprays.
Aggregate transfer to conveyor		0.0031	0.23	0.116	2.79	0.044	0.194	75%	Control: Water sprays.
Sand transfer to conveyor		0.0007	0.05	0.026	0.63	0.010	0.044	75%	Control: Water sprays.
Aggregate transfer to elevated storage		0.0031	0.23	0.116	2.79	0.044	0.194	75%	Control: Water sprays.
Sand transfer to elevated storage		0.0007	0.05	0.026	0.63	0.010	0.044	75%	Control: Water sprays.
Cement delivery to Silo (controlled EF)	0.0001		2.50E-02	1.25E-02	3.00E-01	4.76E-03	2.09E-02	0.00%	Baghouse is process equipment
Cement supplement delivery to Silo (controlled EF)	0.0002		5.36E-02	2.68E-02	6.44E-01	1.02E-02	4.47E-02	0.00%	Baghouse is process equipment
Weigh hopper loading (sand & aggregate batcher loading)		0.0040	1.19E-02	6.93E-03	1.42E-01	2.26E-03	9.88E-03	99.00%	Baghouse is process equipment
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	1.18	0.59	14.11	0.22	0.98	95.00%	Control: Automatic boot or equivalent.
Central mix loading, Table 11.12-2, '0.134 lb/ton of cement+flyash' x ((491 lb cement + 73 lb flyash)/cy concrete) / 2000 lb = 0.0378 lb/cy		0.0000	0.00	0.00	0.00	0.00	0.00	95.00%	Control: Automatic boot or equivalent.
Point Sources Total Emissions		4.21E-03	9.05E-02	4.53E-02	1.09E+00	1.72E-02	7.54E-02		
Process Fugitive Emissions		0.0898	2.03	1.02	24.38	0.39	1.69		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)		0.0940	2.12	1.06	25.47	0.40	1.77		

Handwritten in margin: lb/hr; 24-hr; Annual; 0.285; 0.109; 0.143; 0.054; 3.93E-02; 1.50E-02

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6]		Controlled EF	at 2,628,000 cy/yr	T/yr
Facility Classification Total PM[5]		5.08E-03		6.67E+00
Facility Classification Total PM10[5]		3.02E-04		3.97E-01

[1] The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2, typical composition per cubic yard of concrete (1865 lb aggregate, 1428 lbs sand, 491 lbs cement, 73 lbs cement supplement, and 20 gallons of water = 4024 lb/cy), and closely match Table 11.12-5 values (version 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.

[2] Max. hourly rate includes reductions associated with control assumptions.

[3] Hourly emissions rate (24-hr average) = Max hourly emissions rate x (hrs per day) / 24.
Daily emissions rate = max emissions rate (1-hr average) x proposed hrs/day.

[4] Annual average hourly emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) / (8760 hr/yr).
Annual emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) /(2000 lb/T)

[5] Controlled EFs for PM = 0.0002 (cement silo) + 0.0003 (flyash silo) + 0.0079(weigh batcher)*(1-controlWB)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) + 0.0040 (weigh batcher)*(1-controlWB)

[6] Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 7,200 cy/day, and 2,628,000 cy/yr

Lead emissions			Increase in Emissions from this PTC				Emissions for Facility Classification	
Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold		Emission Rate, Quarterly		
	Controlled with fabric	Uncontrolled	lb/hr, 1-hr avg.[2]	lb/month[3]	T/yr[4]	lb/hr qtrly avg[5]		T/yr
Cement delivery to silo[2]	1.09E-08	7.36E-07	8.03E-07	2.93E-04	1.34E-03	4.01E-07	Point Source	3.52E-06
Cement supplement delivery to Silo[3]	5.20E-07	ND	5.69E-06	2.08E-03	9.49E-03	2.85E-06	Point Source	2.49E-05
Truck Loadout (with I29% control)		3.62E-06	1.53E-05	5.59E-03	2.55E-02	7.66E-06	Fugitive	
Central Mix (with I30% control)		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	
Total			2.18E-05	7.96E-03	0.036		Point Sources	2.85E-05
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

[1] The emissions factors are from AP-42, Table 11.12-8 (version 06/06)
[2] Max. hourly rate = EF x pound of cement/yd[3] of concrete x max. hourly concrete production rate/(2000 lb/T)
[3] lb/mo = EF x pound of material/yd[3] of concrete x max. daily concrete production rate x (365/12)/(2000 lb/T)
[4] T/yr = EF x pound of material/yd[3] of concrete x max. annual concrete production rate/(2000 lb/T)
[5] lb/hr, qtrly avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

12

Toxic Air Pollutant (TAPs) EMISSIONS INVENTORY, Truck Mix Concrete Batch Plant

3/20/2007 17:37

Facility Information

Company:	DEQ GENERIC MODEL - 3,600 cy/day and 500,000 cy/year
Facility ID:	777-xxxxxx
Permit No.:	P-2007.xxxx
Source Type:	Portable Concrete Batch Plant
Manufacturer:	0

Emissions estimates are based on EFs in AP-42, Table 11.12-8 (version 06/06) and the following composition of one yard of concrete:

Coarse aggregate	1865	pounds
Sand	1428	pounds
Cement	491	pounds
Cement supplement	73	pounds
Water	20	gallons
Concrete	4024	pounds

Truck Mix Loadout Factor: 1

Central Mix Batching Factor: 0

DEQ EI VERIFICATION WORKSHEET Version 032007
Tip: Purple text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

Increase in Production

Maximum Hourly Production Rate:	300	cy/hr
Proposed Daily Production Rate:	3,600	cy/day
Proposed Maximum Annual Production Rate:	500,000	cy/year

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
7,200 cy/day	7 day/wk,
2,628,000 cy/year	52 wks/year

TAP Emission Factors from AP-42, Table 11.12-8 (Version 06/06)

Emissions Point	Arsenic EF (lb/ton of material loaded)		Beryllium EF (lb/ton of material loaded)		Cadmium EF (lb/ton of material loaded)		Chromium EF (lb/ton of material loaded)		Manganese EF (lb/ton of material loaded)		Nickel EF (lb/ton of material loaded)		Phosphorus EF (lb/ton of material loaded)		Selenium EF (lb/ton of material loaded)		Chromium VI
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Percent of total Cr that is Cr+6
Cement delivery to silo (with baghouse)	4.24E-09	[illegible]	4.86E-10	[illegible]	4.86E-10	3.34E-07	2.90E-08	[illegible]	1.17E-07	[illegible]	4.18E-08	[illegible]	ND	1.18E-05	ND	ND	20%
Cement supplement delivery to Silo (with baghouse)	1.00E-06	ND	9.04E-08	ND	1.98E-08	ND	1.22E-06	ND	2.56E-07	ND	2.28E-06	ND	3.54E-06	ND	7.24E-08	ND	20%
Truck Loadout (no boot or shroud)	[illegible]	3.04E-06	[illegible]	2.44E-07	[illegible]	3.42E-08	[illegible]	1.14E-06	[illegible]	6.12E-05	[illegible]	1.19E-05	[illegible]	3.84E-05	[illegible]	2.62E-06	21.29%
Central Mix Batching (no boot or shroud)	[illegible]	0.00E+00	ND	ND	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	0.00E+00	ND	ND	21.29%

UNCONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 7,200 cy/day, and 2,628,000 cy/yr

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr[4]	lb/hr annual avg	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg.
Cement delivery to silo (with baghouse)	3.12E-07	1.37E-06	3.58E-08	1.57E-07	3.58E-08	1.57E-07	2.14E-06	8.13E-05	8.62E-06	3.77E-05	3.08E-06	1.35E-05	8.69E-04	3.81E-03	ND	ND	4.27E-07
Cement supplement delivery to Silo (with baghouse)	1.10E-05	4.80E-05	9.90E-07	4.34E-06	2.17E-07	9.50E-07	1.34E-05	5.85E-05	2.80E-06	1.23E-05	2.50E-05	1.09E-04	3.88E-05	1.70E-04	7.93E-07	3.47E-06	4.01E-06
Truck Loadout (no boot or shroud)	2.57E-04	1.13E-03	2.06E-05	9.04E-05	2.89E-06	1.27E-05	9.64E-04	4.22E-03	5.18E-03	2.27E-02	1.01E-03	4.41E-03	3.25E-03	1.42E-02	2.22E-04	9.71E-04	2.05E-04
Central Mix Batching (no boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00
Sources Total	2.68E-04	1.18E-03	2.17E-05	9.49E-05	3.15E-06	1.38E-05	9.80E-04	4.36E-03	5.19E-03	2.27E-02	1.03E-03	4.53E-03	4.16E-03	1.82E-02	2.22E-04	9.74E-04	2.10E-04
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
EXCEEDS EL?	Yes		No		No		No		No		Yes		No		No		Yes

Facility Classification: Total Annual HAPs Emissions: 5.21E-02 Tons per year

CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 3,600 cy/day, and 500,000 cy/year

2.1394E-06   5.33E-06   8.443E-07

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg	T/yr[5]	lb/hr 24-hr avg	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg.
Cement delivery to silo (with baghouse)[1]	5.94E-08	2.60E-07	6.81E-09	2.98E-08	6.81E-09	2.98E-08	1.07E-06	1.78E-06	4.31E-06	7.18E-06	5.86E-07	2.57E-06	ND	ND	ND	ND	8.13E-08
Cement supplement delivery to Silo (with baghouse)[2]	2.08E-05	9.13E-05	1.88E-07	8.25E-07	4.13E-08	1.81E-07	4.49E-05	1.11E-05	9.43E-06	2.34E-06	4.75E-06	2.08E-05	1.30E-04	3.23E-05	3.96E-07	6.61E-07	7.63E-07
Truck Loadout (WITH boot or shroud)	2.45E-06	1.07E-05	1.96E-07	8.60E-07	2.75E-08	1.21E-07	2.41E-05	4.02E-05	1.29E-04	2.16E-04	9.58E-06	4.19E-05	8.12E-05	1.35E-04	5.54E-06	9.24E-06	1.95E-06
Central Mix Batching (WITH boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00
Sources Total	4.59E-06	2.01E-05	3.92E-07	1.71E-06	7.56E-08	3.31E-07	7.01E-05	5.31E-05	1.43E-04	2.25E-04	1.49E-05	6.53E-05	2.12E-04	1.68E-04	5.94E-06	9.90E-06	2.80E-06
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
Percent of EL	305.95%		1.40%		2.04%		0.21%		0.0430%		55.23%		3.02%		0.0457%		499.55%
EXCEEDS EL?	Yes		No		No		No		No		No		No		No		Yes

Truck Loadout control: 95.00% Control Automatic boot or equivalent

Central Mix Batching control: 95.00% Control Automatic boot or equivalent

5.43E-04 Tons per year

[1] lb/hr, annual average = EF x pound of cement / Yd[3] of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr = EF x pound of cement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton / 24 hr/day
[2] lb/hr, annual average = EF x pound of cement supplement / Yd[3] of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of cement supplement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton
[3] lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd[3] of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of (cement + cement supplement) / Yd3 of concrete x daily concrete production
[4] T/yr = lb/hr, annual avg x 8760 hr/yr x (1T/2000 lb)
[5] T/yr = EF x pound of cement, or cement supplement, or cement + cement supplement x annual concrete production rate /2000 lb/ton / 2000 lb/ton

13

Attachment 2.
"Fenceline" Radius Calculations

Concrete Batch Plant - Typical Plant Layout Modeling 3/9/2007

"Fenceline" or Ambient Air Boundary Coordinates

Radians = deg * Pi/180
x = Xoffset + c cos (Angle)
y= Yoffset + c sin(Angle)

CASE 1, 40 meter RADIUS

Radius c	40	(meters)
Origin Offset	0	(meters)
Origin Offset	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	39.39	6.95
20	37.59	13.68
30	34.64	20.00
40	30.64	25.71
50	25.71	30.64
60	20.00	34.64
70	13.68	37.59
80	6.95	39.39
90	0.00	40.00
100	-6.95	39.39
110	-13.68	37.59
120	-20.00	34.64
130	-25.71	30.64
140	-30.64	25.71
150	-34.64	20.00
160	-37.59	13.68
170	-39.39	6.95
180	-40.00	0.00
190	-39.39	-6.95
200	-37.59	-13.68
210	-34.64	-20.00
220	-30.64	-25.71
230	-25.71	-30.64
240	-20.00	-34.64
250	-13.68	-37.59
260	-6.95	-39.39
270	0.00	-40.00
280	6.95	-39.39
290	13.68	-37.59
300	20.00	-34.64
310	25.71	-30.64
320	30.64	-25.71
330	34.64	-20.00
340	37.59	-13.68
350	39.39	-6.95
360	40.00	0.00

CASE 2, 60 meter RADIUS

Radius c	60	(meters)
Origin Offset	0	(meters)
Origin Offset	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	59.09	10.42
20	56.38	20.52
30	51.96	30.00
40	45.96	38.57
50	38.57	45.96
60	30.00	51.96
70	20.52	56.38
80	10.42	59.09
90	0.00	60.00
100	-10.42	59.09
110	-20.52	56.38
120	-30.00	51.96
130	-38.57	45.96
140	-45.96	38.57
150	-51.96	30.00
160	-56.38	20.52
170	-59.09	10.42
180	-60.00	0.00
190	-59.09	-10.42
200	-56.38	-20.52
210	-51.96	-30.00
220	-45.96	-38.57
230	-38.57	-45.96
240	-30.00	-51.96
250	-20.52	-56.38
260	-10.42	-59.09
270	0.00	-60.00
280	10.42	-59.09
290	20.52	-56.38
300	30.00	-51.96
310	38.57	-45.96
320	45.96	-38.57
330	51.96	-30.00
340	56.38	-20.52
350	59.09	-10.42
360	60.00	0.00

CASE 3, 100 meter RADIUS

Radius c	75	(meters)
Origin Offset	0	(meters)
Origin Offset	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	73.86	13.02
20	70.48	25.65
30	64.95	37.50
40	57.45	48.21
50	48.21	57.45
60	37.50	64.95
70	25.65	70.48
80	13.02	73.86
90	0.00	75.00
100	-13.02	73.86
110	-25.65	70.48
120	-37.50	64.95
130	-48.21	57.45
140	-57.45	48.21
150	-64.95	37.50
160	-70.48	25.65
170	-73.86	13.02
180	-75.00	0.00
190	-73.86	-13.02
200	-70.48	-25.65
210	-64.95	-37.50
220	-57.45	-48.21
230	-48.21	-57.45
240	-37.50	-64.95
250	-25.65	-70.48
260	-13.02	-73.86
270	0.00	-75.00
280	13.02	-73.86
290	25.65	-70.48
300	37.50	-64.95
310	48.21	-57.45
320	57.45	-48.21
330	64.95	-37.50
340	70.48	-25.65
350	73.86	-13.02
360	75.00	0.00

CASE 4, 125 meter RADIUS

Radius c	125	(meters)
Origin Offset :	0	(meters)
Origin Offset :	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	123.10	21.71
20	117.46	42.75
30	108.25	62.50
40	95.76	80.35
50	80.35	95.76
60	62.50	108.25
70	42.75	117.46
80	21.71	123.10
90	0.00	125.00
100	-21.71	123.10
110	-42.75	117.46
120	-62.50	108.25
130	-80.35	95.76
140	-95.76	80.35
150	-108.25	62.50
160	-117.46	42.75
170	-123.10	21.71
180	-125.00	0.00
190	-123.10	-21.71
200	-117.46	-42.75
210	-108.25	-62.50
220	-95.76	-80.35
230	-80.35	-95.76
240	-62.50	-108.25
250	-42.75	-117.46
260	-21.71	-123.10
270	0.00	-125.00
280	21.71	-123.10
290	42.75	-117.46
300	62.50	-108.25
310	80.35	-95.76
320	95.76	-80.35
330	108.25	-62.50
340	117.46	-42.75
350	123.10	-21.71
360	125.00	0.00