State of Idaho
Department of Environmental Quality
Air Quality Division

AIR QUALITY PERMIT
STATEMENT OF BASIS

Permit to Construct No. P-2009.0015

Final Permit

Walters Ready Mix, Inc.

Portable

Facility ID No. 777-00450

April 1, 2009

CZ

Carole Zundel

Permit Writer

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

Table of Contents

Acronyms, Units, and Chemical Nomenclature

AAC	acceptable ambient concentration
AACC	acceptable ambient concentration for carcinogens
AIRS	Aerometric Information Retrieval System
CAM	Compliance Assurance Monitoring
CFR	Code of Federal Regulations
CO	carbon monoxide
cy/day	cubic yards per calendar day
cy/hr	cubic yards per hour
cy/yr	cubic yards per year
DEQ	Department of Environmental Quality
EL	screening emissions levels
HAP	hazardous air pollutant
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
MACT	Maximum Achievable Control Technology
$\mu g/m^3$	micrograms per cubic meter
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_x	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
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
SIP	State Implementation Plan
SO_2	sulfur dioxide
TAP	toxic air pollutant
T/yr	tons per year
VOC	volatile organic compound

1. FACILITY INFORMATION

1.1 Facility Description

The facility is a portable truck mix concrete batch plant consisting of aggregate storage bins and stockpiles, a cement storage silo, a cement supplement (flyash) storage silo, a weigh batcher, and conveyors. The facility combines sand, gravel, flyash, and cement and transfers the mixture into a truck along with a measured amount of water for in-transit mixing of the concrete. Electric power will be supplied to the facility from the local power grid.

1.2 Permitting Action and Facility Permitting History

This permit is the initial PTC for this facility.

2. APPLICATION SCOPE AND APPLICATION CHRONOLOGY

2.1 Application Scope

Walters Ready Mix has applied for a PTC to operate a portable concrete batch plant with a permitted throughput limit of 100,000 cubic yards per year.

2.2 Application Chronology

February 9, 2009	DEQ receives application for portable concrete batch plant PTC
February 10, 2009	DEQ receives PTC application fee of $1,000
March 3, 2009	DEQ issues PTC application completeness letter
March 19, 2009	DEQ receives PTC processing fee

3. TECHNICAL ANALYSIS

3.1 Emission Unit and Control Device

Table 3.1 EMISSION UNIT AND CONTROL DEVICE INFORMATION

Emissions Unit Description	Control Device Description
Concrete Batch Plant – Ready Mix Manufacturer: Con-e-co Model: LO pro model 12 Maximum capacity: 130 cy/hr Maximum production: 1040 cy/day and 100,000 cy/yr	Cement Storage Silo Baghouse No. 1: Manufacturer: Con-e-co Model: PJC-300S Cement Storage Silo Baghouse No. 2: Manufacturer: McNeilus Model: SFV 170 Cement Supplement Storage Silo Baghouse No. 1: Manufacturer: Stephens Model: SOS 1020 Weigh Batcher Baghouse: Manufacturer: Con-e-co Model: PJ 9800 Truck Loadout Boot, Enclosure, or Equivalent Material Transfer Point Water Sprays or Equivalent

3.2 Emissions Inventory

The emissions were estimated using the DEQ Concrete Batch Plant Spreadsheet. Controlled emissions estimates are based on the use of the control devices and maximum production limits listed in Table 3.1.

Table 3.2 UNCONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		LEAD
	lb/hr	T/yr	lb/quarter
Aggregate delivery to ground storage	[redacted]	0.155	
Sand delivery to ground storage	[redacted]	0.035	
Aggregate transfer to conveyor	[redacted]	0.155	
Sand transfer to conveyor	[redacted]	0.035	
Aggregate transfer to elevated storage	[redacted]	0.155	
Sand transfer to elevated storage	[redacted]	0.035	
Cement delivery to Silo (controlled EF because baghouse is process equipment)	[redacted]	4.17E-03	3.48E-07
Cement supplement delivery to Silo (controlled EF because baghouse is process equipment)	[redacted]	8.94E-03	2.47E-06
Weigh hopper loading (sand & aggregate batcher loading)	[redacted]	0.198	
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	[redacted]	3.92*	6.64E-06*
Total, Point Sources	[redacted]	**4.13**	2.82E-06
Total, Process Fugitives	[redacted]	**0.57**	6.64E-06

*** Considered fugitive for facility classification purposes.**

Table 3.3 CONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		LEAD
	lb/hr	T/yr	lb/quarter
Cement delivery to Silo (controlled EF because baghouse is process equipment)	0.0108	0.00417	3.48E-07
Cement supplement delivery to Silo (controlled EF because baghouse is process equipment)	0.0232	0.00894	2.47E-06
Weigh hopper loading (sand & aggregate batcher loading)	0.000514	0.000198	
Truck mix loading	0.51*	0.196*	6.64E-06*
Total, Point Sources	**0.54**	**0.21**	**2.82E-06**
Aggregate delivery to ground storage	0.10	0.039	
Sand delivery to ground storage	0.02	0.009	
Aggregate transfer to conveyor	0.10	0.039	
Sand transfer to conveyor	0.02	0.009	
Aggregate transfer to elevated storage	0.10	0.039	
Sand transfer to elevated storage	0.02	0.009	
Total, Process Fugitives	**0.36**	**0.144**	

*** Considered fugitive for facility classification purposes.**

Table 3.4 UNCONTROLLED TAP AND HAP EMISSIONS SUMMARY

TAPs	HAPs	24-hour Average[a] lb/hr	Annual Average[a] lb/hr
Arsenic	Arsenic		1.16E-04
Beryllium	Beryllium		9.39E-06
Cadmium	Cadmium		1.36E-06
Chromium	Chromium	4.25E-04	
Manganese	Manganese	2.25E-03	
Nickel	Nickel		4.48E-04
Phosphorus	Phosphorus	1.8E-03	
Selenium	Selenium	9.64E-05	
Chromium VI[c]	Chromium VI[c]		9.09E-05

a. 24-hour average only applies to non-carcinogenic TAPs. Annual average only applies to carcinogenic TAPs.
b. NA = not applicable.
c. Chromium is a HAP. Chromium VI is not specifically listed as a HAP by itself.

Table 3.5 CONTROLLED TAP AND HAP EMISSIONS SUMMARY

TAPs	HAPs	24-hour Average[a] lb/hr	Annual Average[a] lb/hr
Arsenic	Arsenic		4.38E-07
Beryllium	Beryllium		3.98E-08
Cadmium	Cadmium		9.72E-09
Chromium	Chromium	4.03E-05	
Manganese	Manganese	1.41E-05	
Nickel	Nickel		1.11E-06
Phosphorus	Phosphorus	1.14E-04	
Selenium	Selenium	4.40E-07	
Chromium VI[c]	Chromium VI[c]		1.77E-07

a. 24-hour average only applies to non-carcinogenic TAPs. Annual average only applies to carcinogenic TAPs.
b. NA = not applicable.
c. Chromium is a HAP. Chromium VI is not specifically listed as a HAP by itself.

3.3 Ambient Air Quality Impact Analysis

Based on the emissions inventory, the potential emission rate of PM_{10} from this concrete batch plant from point sources and fugitive sources was estimated at 0.9 lb/hr and 0.354 T/yr. These levels exceed the published DEQ modeling threshold (Table 1, State of Idaho Air Quality Modeling Guideline, Doc ID AQ-011, rev. 1, December 31, 2002) for PM_{10} of 0.2 lb/hr and 1.0 T/yr.

The DEQ generic modeling results (Table 3.6) demonstrated that for the production rate limits and setbacks that were modeled—and that will be imposed on the operations for this concrete batch plant—the PM_{10} emissions from the concrete batch plant combined with background concentrations would be less than the 24-hr PM_{10} NAAQS.

Table 3.6 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 and capacity	Truck mix (redi-mix or dry mix) or Central mix				Truck mix	Meets
Operation in any PM_{10} nonattainment area	Not proposed				Not proposed	Meets
Presence of an electric generator	No generator. Line power is available.				Not proposed	Meets
<u>No Collocation</u>. 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 m (656 ft)				Collocated operations not proposed	Meets
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.					Meets
Maximum daily concrete production (cy/day)	**1,500**	**2,400**	**3,600**	**4,800**	<1,500 cy/day	Meets
<u>Minimum Setback Distance</u> 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)**	> 40 m (131 ft)	Meets
Maximum annual concrete production (cy/year)	300,000	400,000	500,000	500,000	< 100,000 cy/yr	Meets
<u>Cement and supplement storage silo baghouse(s)</u> Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%				42 ft	Meets
<u>Weigh hopper loading baghouse, or equivalent</u> Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%				40 ft	Meets
<u>Truck-mix loadout or Central Mix loading.</u> Minimum PM/PM_{10} control.	95% Boot enclosure, shroud, water sprays, or baghouse/cartridge filter				Boot, enclosure, or equivalent required in PTC	Meets
<u>Transfer Point Fugitives.</u> 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.				Required in PTC	Meets

[a] The minimum setback distance shall be defined as the minimum distance from the nearest edge of any emissions source to any area outside of a building where the general public has access. This distance shall be measured from the nearest edge of any stockpile, silo, weigh batcher, transfer point, or conveyor associated with this concrete batch plant.

By using DEQ's generic modeling approach for concrete batch plants, the Walters Ready Mix plant is required to have a minimum setback from the property boundary of approximately 131 feet. The proposed project meets all the recommended parameters of generic modeling.

Fugitive emissions from traffic and wind erosion from stockpiles are not considered in DEQ's generic modeling; emissions from these sources are controlled through the use of Best Management Practices (BMP) contained in the permit.

Uncontrolled TAP emissions estimates in Table 3.4 of arsenic, nickel, and chromium VI exceeded the applicable emissions screening level (EL). The controlled emissions estimates in Table 3.5 of these compounds were below the applicable EL. Compliance with the TAP increments was demonstrated, because using the controlled ambient concentration is an option for demonstrating compliance in accordance with IDAPA 58.01.01.210.08, and because the generic modeling conducted in the development of the TAP rules indicates that if an emissions rate is below the EL, then the controlled ambient concentrations are expected to be below the AAC and AACC.

Walters Ready Mix, Inc. has demonstrated compliance to DEQ's satisfaction that emissions from the Walters Ready Mix plant will not cause or significantly contribute to a violation of any ambient air quality standard. Walters Ready Mix, Inc. has also demonstrated compliance to DEQ's satisfaction that an emissions increase due to this permitting action will not exceed any AAC or AACC for TAPs. Compliance was demonstrated using DEQ's generic modeling analysis.

4. REGULATORY REVIEW

4.1 Attainment Designation (40 CFR 81.313)

The facility is a portable facility and can be located in any attainment or unclassified area.

4.2 Permit to Construct (IDAPA 58.01.01.201)

A PTC is required for this facility because it is the construction of a new facility with estimated PM_{10} emissions is 3.54 tons per year, which exceeds the exemption level of 1.5 tons per year.

4.3 Tier II Operating Permit (IDAPA 58.01.01.401)

A Tier II operating permit is not required for this facility.

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

This source does not emit more than the Title V threshold of any applicable air pollutant, so it is not a Title V source. This is a true minor source facility.

4.5 PSD Classification (40 CFR 52.21)

This facility is not a PSD source.

4.6 NSPS Applicability (40 CFR 60)

There are no NSPS regulations that apply to this facility.

The provisions of Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants, do not apply to stand-alone screening operations at concrete batch plants without crushers or grinding mills. The concrete batch plant is therefore not subject to this NSPS.

The concrete batch plant will be powered by the electrical grid. The concrete batch plant is therefore not subject to 40 CFR 60, Subpart IIII – Standard of Performance for stationary Compression Ignition Internal Combustion Engines.

4.7 NESHAP Applicability (40 CFR 61)

There are no NESHAP regulations that apply to this facility.

4.8 MACT Applicability (40 CFR 63)

There are no MACT regulations that apply to this facility.

4.9 CAM Applicability (40 CFR 64)

CAM does not apply to non-Title V sources.

4.10 Permit Conditions Review

This section describes the permit conditions for this initial permit that have been added as a result of this permitting action.

Permit Conditions 1.3 and 2.2

Describe the emission sources and emission controls that shall be operated as part of this concrete batch plant. Demonstration of compliance with NAAQS and TAPs rules was based on emissions estimated using the capture efficiencies associated with these controls. Applicability of DEQ's generic modeling analysis was also determined based on the descriptions of these controls.

Permit Condition 2.3:

Limits visible emissions from the concrete batch plant. Compliance with this limit is demonstrated by monitoring and recordkeeping requirements in Permit Condition 2.11.

Permit Conditions 2.4 and 2.5:

Limits the concrete production to 1,040 cy/day and 100,000 cy/yr at the Walters Ready Mix Plant location. A setback distance of 131 feet from the property boundary has been assessed for the Walters Ready Mix Plant based on the concrete production limit. Compliance with carcinogenic TAPs requirements in the generic modeling for this setback distance was based upon the controlled production levels of 1,040 cy/day and 100,000 cy/yr. An annual production limit is therefore required in accordance with IDAPA 58.01.01.210.08.c. Compliance with the production limit is demonstrated by monitoring the concrete production as required by Permit Condition 2.9.

Requires a reasonable setback from any area outside a structure that is accessible to the general public. This condition is necessary to limit exposure to members of the public to PM_{10} levels that may approach the 24-hour NAAQS limit. The minimum setback distance limit is based on the results of DEQ's generic modeling analysis. Modeling of ambient air impacts was based on distances from the approximate center of a typical concrete batch plant. This permit condition, however, is based on distance from the nearest edge of any stockpile or piece of equipment associated with the concrete batch plant. This is intended to simplify the method for demonstrating compliance, i.e., compliance can be demonstrated by directly measuring the distance as required by Permit Condition 2.10.

Permit Conditions 2.6 and 2.7

Requires the operation of control devices according to the manufacturer specifications, and the utilization of strategies and reasonable controls to minimize fugitive emissions. Proper operation of control devices and utilization of control measures is assumed in DEQ's generic modeling analysis.

Permit Condition 2.8

Requires control of fugitive dust and specifies when controls must be applied and types of strategies to use. Compliance is assessed as required on Permit Condition 2.12.

Permit Condition 2.9

Requires the permittee to physically measure the concrete production rate on a daily and an annual basis to demonstrate compliance with the limits in Permit Condition 2.4.

Permit Condition 2.10

Requires the permittee to physically measure the setback distance whenever the plant is moved or the layout is changed such that emissions sources are closer to a property boundary to demonstrate compliance with the limits in Permit Condition 2.5.

Permit Condition 2.11

Requires the permittee to conduct inspection and monitoring to insure compliance with opacity limits in Permit Condition 2.3. Recordkeeping of the results of each inspection and when corrective measures are implemented is also required.

Permit Condition 2.12

Requires the permittee to conduct inspections each day that the plant is operating to assess the control of fugitive emissions and specifies actions to take as a result of such inspections.

Permit Condition 2.13

Prohibits operation of the concrete batch plant in any PM_{10} nonattainment area. IDAPA 58.01.01.006 defines a "significant contribution" as any increase in ambient concentrations that would exceed 5.0 $\mu g/m^3$ (24-hr average) or 1.0 $\mu g/m^3$ (annual average). The generic modeling analysis used to demonstrate preconstruction compliance with NAAQS for this concrete batch plant predicted that PM_{10} impacts to ambient air quality would exceed these levels. In any nonattainment area, concrete batch plant operations would therefore result in a significant contribution. Should the permittee desire to operate in any PM_{10} nonattainment area, the permittee shall submit a PTC application to modify this permit.

Permit Condition 2.14

Prohibits the concrete batch plant from collocating with any other source of emissions. No emission source or activity has been requested in addition to the concrete batch plant and has not been considered for the purposes of DEQ's generic modeling analysis. This limit is necessary to ensure compliance with the 24-hour PM_{10} NAAQS.

Permit Condition 2.15

Requires reporting of the relocation of the concrete batch plant, including providing information necessary to demonstrate compliance with the minimum setback limits in Permit Condition 2.4.

5. PERMIT FEES

Table 5.1 lists the processing fee associated with this permitting action. The facility is subject to a processing fee of $1,000 because it's permitted emissions are less than one ton per year. Refer to the chronology for fee receipt dates. The fee calculation does not include fugitive emissions per IDAPA 58.01.01.225.

Table 5.1 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}	0.21	0	0.21
VOC	0.0	0	0.0
HAPS	2E-05	0	2E-05
Total:	**0.21**	**0**	**0.21**
Fee Due	**$ 1,000.00**		

6. PUBLIC COMMENT

An opportunity for public comment period on the PTC application was provided from February 16, 2009 to March 2, 2009, in accordance with IDAPA 58.01.01.209.01.c. During this time, there were no comments on the application, and there was not a request for a public comment period on DEQ's proposed action.

Appendix A – AIRS Information

AIRS/AFS Facility-wide Classification Form

Facility Name: Walters Ready Mix, Inc.

Facility Location: Portable

Facility ID: 777-00450 **Date:** February 27, 2009

Project/Permit No.: P-2009.0015 **Completed By:** Carole Zundel

☐ Check if there are no changes to the facilitywide classification resulting from this action. (compare to form with last permit)

☐ Yes, this facility is an SM80 source.

Identify the facility's area classification as A (attainment), N (nonattainment), or U (unclassified) for the following pollutants:

	SO2	PM10	VOC
Area Classification:	U	U	U

DO NOT LEAVE ANY BLANK

Check one of the following:

☒ **SIP** [0] - Yes, this facility is subject to SIP requirements. (do not use if facility is Title V)

OR

☐ **Title V** [V] - Yes, this facility is subject to Title V requirements. (If yes, do not also use SIP listed above.)

For SIP or TV, identify the classification (A, SM, B, C, or ND) for the pollutants listed below. Leave box blank if pollutant is not applicable to facility.

	SO2	NOx	CO	PM10	PT (PM)	VOC	THAP
Classification:				B	B		B

☐ **PSD** [6] - Yes, this facility has a PSD permit.

If yes, identify the pollutant(s) listed below that apply to PSD. Leave box blank if pollutant does not apply to PSD.

	SO2	NOx	CO	PM10	PT (PM)	VOC	THAP
Classification:	☐	☐	☐	☐	☐	☐	☐

☐ **NSR - NAA** [7] - Yes, this facility is subject to NSR nonattainment area (IDAPA 58.01.01.204) requirements.

Note: As of 9/12/08, Idaho has no facility in this category.

If yes, identify the pollutant(s) listed below that apply to NSR-NAA. Leave box blank if pollutant does not apply to NSR - NAA.

	SO2	NOx	CO	PM10	PT (PM)	VOC	THAP
Classification:	☐	☐	☐	☐	☐	☐	☐

☐ **NESHAP** [8] - Yes, this facility is subject to NESHAP (Part 61) requirements. (THAP only)

If yes, what CFR Subpart(s) is applicable? ______

☐ **NSPS** [9] - Yes, this facility is subject to NSPS (Part 60) requirements.

If yes, what CFR Subpart(s) is applicable? ______

If yes, identify the pollutant(s) regulated by the subpart(s) listed above. Leave box blank if pollutant does not apply to the NSPS.

	SO2	NOx	CO	PM10	PT (PM)	VOC	THAP
Classification:	☐	☐	☐	☐	☐	☐	☐

☐ **MACT** [M] - Yes, this facility is subject to MACT (Part 63) requirements. (THAP only)

If yes, what CFR Subpart(s) is applicable? ______

Appendix B – Emissions Inventory

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

Facility Information

Company:	Walters Ready Mix, Driggs Batch Plant
Facility ID:	777-00450
Permit No.:	P-2009.0015
Source Type:	Portable Concrete Batch Plant
Manufacturer:	CON-E-CO Lo Pro 12

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:	130	cy/hr	
Proposed Daily Production Rate:	3,120	cy/day	
Proposed Maximum Annual Production Rate:	100,000	cy/year	

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
3,120 cy/day	7 day/wk,
1,138,800 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	1.68E-06	4.86E-10	1.79E-08	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. 3,120 cy/day, and 1,138,800 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)	1.35E-07	5.93E-07	1.55E-08	6.79E-08	1.55E-08	6.79E-08	9.26E-07	3.52E-05	3.73E-06	1.64E-05	1.33E-06	5.84E-06	3.77E-04	1.65E-03	ND	ND	1.85E-07	
Cement supplement delivery to Silo (with baghouse)	4.75E-06	2.08E-05	4.29E-07	1.88E-06	9.40E-08	4.12E-07	5.79E-06	2.54E-05	1.21E-06	5.32E-06	1.08E-05	4.74E-05	1.68E-05	7.36E-05	3.44E-07	1.50E-06	1.74E-06	
Truck Loadout (NO baghouse)	1.11E-04	4.88E-04	8.95E-06	3.92E-05	1.25E-06	5.49E-06	4.18E-04	1.83E-03	2.24E-03	9.83E-03	4.36E-04	1.91E-03	1.41E-03	6.17E-03	9.60E-05	4.21E-04	8.90E-05	
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	Facility Classification: Total Annual HAPs Emissions
Sources Total	1.16E-04	5.10E-04	9.39E-06	4.11E-05	1.36E-06	5.97E-06	4.25E-04	1.89E-03	2.25E-03	9.85E-03	4.48E-04	1.96E-03	1.80E-03	7.89E-03	9.64E-05	4.22E-04	9.09E-05	2.26E-02 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	
EXCEEDS EL?	Yes		No		No		No		No		Yes		No		No		Yes	

CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 3,120 cy/day, and 100,000 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 (with baghouse)[1]	1.19E-08	5.20E-08	1.36E-09	5.97E-09	1.36E-09	5.97E-09	9.26E-07	3.56E-07	3.73E-06	1.44E-06	1.17E-07	5.13E-07	ND	ND	ND	ND	1.63E-08	
Cement supplement delivery to Silo (with baghouse)2	4.17E-07	1.83E-06	3.77E-08	1.65E-07	8.25E-09	3.61E-08	3.89E-05	2.23E-06	8.17E-06	4.67E-07	9.50E-07	4.16E-06	1.13E-04	6.46E-06	3.44E-07	1.32E-07	1.53E-07	
Truck Loadout (with baghouse)	9.79E-09	4.29E-08	7.85E-10	3.44E-09	1.10E-10	4.82E-10	4.18E-07	1.61E-07	2.24E-06	8.63E-07	3.83E-08	1.68E-07	1.41E-06	5.41E-07	9.60E-08	3.69E-08	7.81E-09	99.90% Baghouse control
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% N/A
Sources Total	4.38E-07	1.92E-06	3.98E-08	1.74E-07	9.72E-09	4.26E-08	4.03E-05	2.74E-06	1.41E-05	2.77E-06	1.11E-06	4.84E-06	1.14E-04	7.00E-06	4.40E-07	1.69E-07	1.77E-07	1.97E-05 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	29.22%		0.14%		0.26%		0.12%		0.0042%		4.09%		1.63%		0.0034%		31.53%	
EXCEEDS EL?	No		No		No		No		No		No		No		No		No	

[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

CRITERIA POLLUTANT EMISSION INVENTORY for Truck Mix Portable Concrete Batch Plant

Facility Information 4/8/09 9:06

Company:	Walters Ready Mix, Driggs Batch Plant
Facility ID:	777-00450
Permit No.:	P-2009.0015
Source Type:	Portable Concrete Batch Plant
Manufacturer/Model:	CON-E-CO Lo Pro 12

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:	130	cy/hr		Per manufacturer
Proposed Daily Production Rate:	3,120	cy/day	24.00	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	100,000	cy/year		
Cement Storage Silo Capacity:	4540	ft^3 of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only:	65%	of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:	35%	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 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	0.10	0.101	2.42	0.009	0.039	75%	Water Sprays at Operator's Discretion
Sand delivery to ground storage		0.0007	0.02	0.023	0.55	0.002	0.009	75%	Water Sprays at Operator's Discretion
Aggregate transfer to conveyor		0.0031	0.10	0.101	2.42	0.009	0.039	75%	Water Sprays at Operator's Discretion
Sand transfer to conveyor		0.0007	0.02	0.023	0.55	0.002	0.009	75%	Water Sprays at Operator's Discretion
Aggregate transfer to elevated storage		0.0031	0.10	0.101	2.42	0.009	0.039	75%	Water Sprays at Operator's Discretion
Sand transfer to elevated storage		0.0007	0.02	0.023	0.55	0.002	0.009	75%	Water Sprays at Operator's Discretion
Cement delivery to Silo (controlled EF)	0.0001		1.08E-02	1.08E-02	2.60E-01	9.53E-04	4.17E-03	0.00%	Baghouse is process equipment
Cement supplement delivery to Silo (controlled EF)	0.0002		2.32E-02	2.32E-02	5.58E-01	2.04E-03	8.94E-03	0.00%	Baghouse is process equipment
Weigh hopper loading (sand & aggregate batcher loading)		0.0040	5.14E-04	5.14E-04	1.23E-02	4.51E-05	1.98E-04	99.9%	Baghouse control
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	0.01	0.01	0.24	0.00	0.00	99.9%	Baghouse control
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%	N/A
Point Sources Total Emissions		8.26E-02	4.48E-02	4.48E-02	1.08E+00	3.93E-03	1.72E-02		
Process Fugitive Emissions		0.0114	0.37	0.37	8.90	0.03	0.14		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)		0.0940	0.42	0.42	9.98	0.04	0.16		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6]		Controlled EF	at 1,138,800 cy/yr	T/yr
Facility Classification Total PM[5]		8.40E-03		4.78E+00
Facility Classification Total PM10[5,7]		4.21E-03		2.40E+00

[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)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) +0.0040 (weigh batcher)

[6] Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 3,120 cy/day, and 1,138,800 cy/yr

[7] Emissions for Facility Classification do not include truck mix loading emissions; this is typically considered a fugitive emission source for concrete batch plants.

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	3.48E-07	2.54E-04	2.68E-04	3.48E-07	Point Source	1.52E-06
Cement supplement delivery to Silo [3]	5.20E-07	ND	2.47E-06	1.80E-03	1.90E-03	2.47E-06	Point Source	1.08E-05
Truck Loadout (with 99.9% control) [7]		3.62E-06	1.33E-07	9.69E-05	1.02E-04	1.33E-07	Fugitive	
Central Mix (with l30% control)		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	
Total			2.95E-06	2.15E-03	0.002		Point Sources	1.23E-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

Appendix C – Modeling Analysis

MEMORANDUM

DATE: September 18, 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.			
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 any area outside of a building where the general public has access.[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] The general public will be considered to have access to any facility area that is not fenced, posted with no trespassing signs and regularly patrolled or observable by facility staff during plant operations, or separated from the facility by a natural barrier such as a steep cliff. 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.

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.

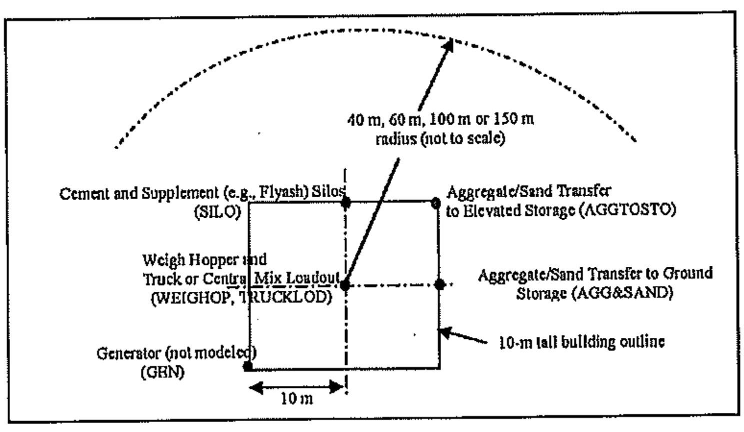

Figure 3-1. Typical Concrete Batch Plant Modeling Layout

For the generic modeling, the ambient air boundary or "fenceline" was taken to be along the perimeter of a circle with a radius of 40, 60, 100, and 150 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/hr_{24}	lb/hr_{24} [c]	lb/hr_{24} [c]	lb/hr_{YR}	lb/hr_{YR}
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/hr_{YR} [a]	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}
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.

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] (μg/m³)[b]**	**AACC[c] (μg/m³)**	**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

3/20/07 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/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 Bin Capacity		ft³ of aerated cement		
Cement Storage Bin Large Compartment Capacity for cement only		of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:		of the silo capacity		

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Change in PM_{10} Emissions due to this PTC

Emissions Point	PM_{10} Emission Factor[1] (lb/cy) Controlled	PM_{10} Emission Factor[1] (lb/cy) Uncontrolled	Controlled Emission Rate, Max lb/hr[2]	Controlled Emission Rate, 24 hour average lb/hr[3]	Controlled Emission Rate, 24 hour average lb/day[3]	Controlled Emission Rate, annual average lb/hr[4]	Controlled Emission Rate, annual average T/yr[4]	Control Assumptions	
Aggregate delivery to ground storage		0.0031	0.23	0.110	2.70	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	2.70	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	2.70	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		5.38E-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	1.10E-02	6.03E-03	1.42E-01	2.26E-03	9.88E-03	99.00%	Baghouse is process equipment
Truck mix loading, Table 11.12-2, "0.274 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 fold 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 fold or equivalent
Point Sources Total Emissions		4.21E-03	9.06E-02	4.53E-02	1.09E+00	1.72E-02	7.54E-02		
Process Fugitive Emissions		0.0895	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		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[5]		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 11.12-6 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) + 0.0070 (weigh batcher)*(1-control/100)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) + 0.0040 (weigh batcher)*(1-control/100)

[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) Controlled with fabric	Lead Emission Factor[1] (lb/ton of material loaded) Uncontrolled	Emission Rate, Max. (lb/hr, 1-hr avg)[2]	Emissions for Comparison with DEQ Modeling Threshold lb/month[3]	Emissions for Comparison with DEQ Modeling Threshold T/yr[4]	Emission Rate, Quarterly lb/hr qtrly avg[5]		T/yr
Cement delivery to silo[2]	1.09E-08	[illegible]	8.03E-07	2.03E-04	1.34E-03	4.01E-07	Point Source	3.62E-00
Cement supplement delivery to Silo[3]	6.20E-07	[illegible]	5.89E-06	2.06E-03	0.49E-03	2.55E-06	Point Source	2.40E-05
Truck Loadout (with 129% control)		3.62E-06	1.63E-05	5.50E-03	2.55E-02	7.66E-00	Fugitive	
Central Mix (with 130% control)		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	
Total			2.18E-06	7.90E-03	0.036		Point Sources	2.89E-06
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

12

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

3/22/2007 17:37

Facility Information

Company	DEQ GENERIC MODEL - 3,600 cy/day and 500,000 cy/year
Facility ID:	777-00000
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

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Increase in Production

Maximum Hourly Production Rate	330	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 days/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	4.24E-09	[illegible]	4.86E-10	[illegible]	4.86E-10	[illegible]	2.90E-08	[illegible]	1.17E-07	[illegible]	4.18E-08	[illegible]	[illegible]	1.18E-05	[illegible]	[illegible]	20%
Cement supplement delivery to silo	1.00E-06	[illegible]	3.24E-08	[illegible]	1.34E-08	[illegible]	1.22E-06	[illegible]	2.56E-07	[illegible]	2.28E-06	[illegible]	3.54E-06		7.24E-08	[illegible]	20%
Truck Loadout	[illegible]	3.04E-06	[illegible]	2.44E-07	[illegible]	3.42E-08	[illegible]	1.14E-05	[illegible]	6.12E-05	[illegible]	3.29E-05	[illegible]	3.34E-05	[illegible]	2.62E-06	21.29%
Central Mix Batching (NO truck or shroud)	[illegible]	0.00E+00	[illegible]	[illegible]	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	0.00E+00	[illegible]	[illegible]	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	lb/hr annual 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	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg
Cement delivery to silo	3.12E-07	1.37E-06	3.56E-08	1.57E-07	3.56E-08	1.57E-07	2.14E-06	6.13E-05	8.52E-06	3.77E-05	2.06E-06	1.26E-05	5.65E-04	3.81E-03	ND	ND	4.27E-07
Cement supplement delivery to silo	1.10E-05	4.83E-05	9.90E-07	4.34E-06	2.17E-07	9.50E-07	1.34E-06	5.85E-06	2.83E-06	1.22E-05	2.52E-06	1.00E-04	3.88E-05	1.70E-04	7.93E-07	3.47E-06	4.91E-06
Truck Loadout	2.57E-04	1.13E-03	2.06E-05	9.34E-05	2.83E-06	1.27E-05	9.64E-04	4.22E-03	5.79E-03	2.27E-02	1.01E-03	4.41E-03	3.25E-01	1.42E-02	2.22E-04	9.71E-04	2.09E-04
Central Mix Batching (NO truck 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	[illegible]		0.00E+00
Sources Total	2.56E-04	1.13E-03	2.17E-05	9.43E-05	3.15E-06	1.30E-05	9.89E-04	4.35E-03	5.19E-03	2.27E-02	1.03E-03	4.55E-03	4.10E-03	1.82E-02	2.22E-04	9.74E-04	2.10E-04
IDAPA Screening EL (lb/hr)	1.50E-05		2.80E-05		3.73E-06		3.33E-02		3.33E-01		2.72E-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

2.1374E-06 5.55E-06 5.49E-07

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr	lb/hr annual 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	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)	5.94E-09	2.60E-07	6.61E-09	2.90E-08	5.81E-09	2.95E-08	1.27E-06	1.78E-06	4.31E-05	7.18E-06	5.90E-07	2.57E-06	ND	ND	ND	ND	6.13E-09
Cement supplement delivery to silo (with baghouse)	2.04E-06	9.13E-06	1.88E-07	8.25E-07	4.13E-08	1.81E-07	4.41E-06	1.11E-06	9.43E-06	2.34E-06	4.75E-06	2.08E-05	1.20E-04	3.23E-05	3.96E-07	6.61E-07	7.60E-07
Truck Loadout (with boot or shroud)	2.45E-06	1.07E-05	1.95E-07	8.40E-07	2.75E-08	1.21E-07	2.41E-05	4.00E-05	1.25E-04	2.16E-04	5.58E-06	4.19E-05	8.12E-05	1.25E-04	5.54E-06	5.24E-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	3.82E-07	1.71E-06	7.50E-08	3.31E-07	7.01E-05	5.31E-05	1.42E-04	2.23E-04	1.49E-05	6.53E-05	2.12E-04	1.65E-04	5.94E-06	5.50E-06	2.80E-06
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-06		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%		14.0%		2.04%		0.21%		0.042%		55.23%		3.02%		0.0457%		499.55%
EXCEEDS EL?	Yes		No		No		No		No		No		No		No		Yes

95.00% Control efficiency (truck loadout)
95.00% Control efficiency (central mix batching)
Total: 5.43E-04 Tons per year

[1] lb/hr, annual average = EF x pound of cement / YD³ of concrete x annual concrete production rate / 2000 lb/Ton / 8760 hr/yr; lb/hr, 24-hr = EF x pound of cement / YD of concrete x daily concrete production rate / 2000 lb/Ton / 24 hr/day
[2] lb/hr, annual average = EF x pound of cement supplement / Yd³ of concrete x annual concrete production rate / 2000 lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of cement supplement / YD of concrete x daily concrete production rate / 2000 lb/Ton
[3] lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd³ of concrete x annual concrete production rate / 2000 lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of (cement + cement supplement) / YD of concrete x daily concrete production
[4] T/yr = lb/hr, annual avg x 8760 hr/yr x (1 T/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

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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