Permit to Construct No. P-2007.0167

Final

Romero General Construction Corporation

Portable Concrete Batch Plant

Facility ID No. 777-00421

December 10, 2007

H.E. **Harbi Elshafei**

Permit Writer

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

Table of Contents

Acronyms, Units, and Chemical Nomenclature

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
Btu	British thermal unit
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
gr	grain (1 lb = 7,000 grains)
dscf	dry standard cubic feet
EI	Emissions Inventory
EPA	U.S. Environmental Protection Agency
gpm	gallons per minute
HAPs	Hazardous Air Pollutants
hp	horsepower
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometer
lb/hr	pound per hour
m	meter(s)
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MSE	Millennium Science & Engineering, Inc.
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
PC	permit condition
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	Synthetic Minor
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/yr	tons per year
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. FACILITY DESCRIPTION

Romero General Construction Corporation (Romero) operates a portable truck mix concrete batch plant consisting of aggregate storage bin(s), a cement storage silo, cement supplement (flyash) storage silo, weigh batcher, and conveyors. The plant's maximum capacity is 120 cubic yards of concrete per hour (cy/hr), with a normal maximum production of 1,051,200 cubic yards of concrete per year. The plant combines sand, gravel, and cement and transfers the mixture into a truck along with a measured amount of water for in-transit mixing of concrete. When operating at the Mountain Home Air Force Base (MHAFB), rocks are crushed by a portable rock crusher that is located at a distance greater than 660 feet from the plant. Electrical power for the portable plant will be provided by a diesel generator with a maximum rated capacity of 315 horsepower (hp). However, when the concrete batch plant is located elsewhere, the permit does not allow a generator, but allows collocation with crusher if not operated simultaneously.

2. APPLICATION SCOPE

Romero has submitted a Permit to Construct (PTC) application for a portable concrete batch plant and requested that this portable plant be allowed to operate at 120 cy/hr, 2880 cy/day, with a maximum annual production of concrete from this plant limited to 1,051,200 cy/yr at the MHAFB location. Romero also requested to allow the facility to be powered by a diesel generator. This PTC is the facility's initial permit.

2.1 Application Chronology

7/16/07	DEQ received PTC application with fees from Romero.
7/26/07	DEQ received an addendum to Romero's PTC application.
8/13/07	DEQ determined the application complete.
8/21/07	DEQ received a certified addendum to Romero's PTC application.

3. TECHNICAL ANALYSIS

3.1 Emission Unit and Control Device

Table 3.1 lists all emission units and control devices in the PTC.

Table 3.1 EMISSION UNIT AND CONTROL DEVICE INFORMATION

Emission Unit/ID No.	Description	Control Device
Concrete Batch Plant	Concrete Batch Plant – Truck Mix Manufacturer: CON-E-CO Maximum production capacity: 120 cubic yards of concrete per hour (cy/hr) Model: Lo-Pro 12 Concrete Batch Plant	Cement Storage Silo Baghouse: Manufacturer: CON-E-CO Model: PJC-300S Cleaning mechanism: pulse jet Particulate control efficiency: 99.9% Cement Supplement (Flyash) Storage Silo Baghouse: Manufacturer: CON-E-CO Model: PJC-300S Number of bags: 216 Cloth Area: 1520 square feet Particulate control efficiency: 99.9% Weigh Batcher Baghouse: Manufacturer: CON-E-CO Model: 14-23 Bag cleaning method: Reverse air flow Control efficiency: 99.9% Truck Loadout, Boot, Enclosure, or Equivalent Control efficiency: 95% (estimated) Material Transfer Point Water Sprays, or equivalent Control efficiency: 75% (estimated)
Diesel Generator	Diesel Generator Manufacturer: MQ Power Model: DCA180SSJ Maximum Rated Capacity: 315 hp (235 kW) Maximum fuel consumption: 11.4 gallons/hr Cylinder displacement: 1.13 liters per cylinder	None

3.2 Emissions Inventory

The emissions inventory (EI) provided in the application for operations at MHAFB of the portable concrete batch plant and for the diesel generator were based on AP-42, Section 11.12 (emission factors for a truck-mix concrete batch plant) and Section 3.3 (emission factors for SO_2, VOC, and TAPs for gasoline and diesel industrial engines). The EI was prepared by Millennium Science & Engineering, Inc. (MSE). Emission factors for PM, CO, and NO_x, for the diesel generator were supplied by vendor MQ Power. Also, the following information was used for estimating emissions from the concrete batch plant: 120 cubic yard per hour (cy/hr) concrete production capacity, 24-hour per day operation, and annual concrete production limit of 1,051,200 cubic yard per year. The following assumptions were used to estimate emissions for the diesel generator: generator's maximum rated capacity of 315 hp and operation of 8,760 hours per year.

Fugitive emissions of PM and PM_{10} from material transfer points were assumed to be controlled by water sprays with a control efficiency of 75%. Fugitive PM and PM_{10} emissions from truck mix loadout are controlled by a boot, enclosure, or equivalent.

The emissions estimates provided by the applicant were checked by DEQ staff and were found to be acceptable. The emissions estimates presented in Appendix B of this document provided the basis for the National Ambient Air Quality Standards (NAAQS) and TAPs analyses and for determining the processing fee assessed in accordance with IDAPA 58.01.01.225.

Table 3.2.1 EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NOx		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Cement Storage 1 Bin	0.084	0.37	--	--	--	--	--	--	--	--
Cement Storage 2 Bin	0.084	0.37	--	--	--	--	--	--	--	--
Weigh Batcher	0.048	0.21	--	--	--	--	--	--	--	--
Diesel Generator	0.056	0.24	0.65	2.83	1.76	7.70	0.31	1.37	0.78	3.41
Total, Point Sources	0.272	1.19	0.65	2.83	1.76	7.70	0.31	1.37	0.78	3.41
Aggregate Delivery to Ground Storage	0.372	1.63	--	--	--	--	--	--	--	--
Sand Delivery to Ground Storage	0.084	0.37	--	--	--	--	--	--	--	--
Aggregate Transfer to Conveyor	0.372	1.63	--	--	--	--	--	--	--	--
Sand Transfer to Conveyor	0.084	0.37	--	--	--	--	--	--	--	--
Truck Loading (Truck Mix)	0.55	2.39	--	--	--	--	--	--	--	--
Total, Process Fugitives	1.46	6.39	--	--	--	--	--	--	--	--

Table 3.2.2 TAP AND HAP EMISSIONS SUMMARY

TAPs	HAPs	24-hour Average[a]	Annual Average[a]	HAPs/TAPs
		lb/hr	lb/hr	T/yr
Arsenic	Arsenic		2.95E-05[b] 1.86E-08[c]	1.29E-04 7.9E-08
Beryllium	Beryllium		2.66E-06[b] 2.13E-09[c]	1.2E-05 9.3E-09
Cadmium	Cadmium		5.83E-09[b] 2.13E-09[c]	2.6E-08 9.3E-09
Chromium	Chromium	3.59E-05[b] 1.27E-07[c]		1.57E-04 5.56E-07
Chromium(VI)	Chromium(VI)		1.08E-05[b] 2.54E-08[c]	4.73E-05 1.11E-07
Manganese	Manganese	7.54E-06[b] 5.12E-07[c]		3.30E-05 2.24E-06
Nickel	Nickel		6.72E-05[b] 1.83E-07[c]	2.94E-04 8.02E-07
Phosphorus		1.04E-04		4.6E-04
Selenium	Selenium	2.13E-06		9.3E-06
Benzene	Benzene		1.36E-03	5.9E-03
1,3-Butadiene	1,3-Butadiene		5.71E-05	2.5E-04
Formaldehyde	Formaldehyde		1.72E-03	7.5E-03
Toluene		5.97E-04		2.61E-03
Xylene		4.16E-04		1.82E-03
Acetaldehyde			1.12E-03	4.9E-03
Acrolein		1.35E-04		5.91E-04
Naphthalene		1.24E-04		5.4E-04
Fluorine		4.26E-05		1.9E-04
Benzo(a)pyrene			2.74E-07	1.2E-06
Total PAH			2.45E-04	1.07E-03

a. 24-hour average only applies to non-carcinogenic TAPs. Annual average only applies to carcinogenic TAPs.
b. Emissions for Cement Storage 1 Bin.
c. Emissions for Cement Storage 2 Bin.

3.3 Ambient Air Quality Impact Analysis

Romero has demonstrated compliance to DEQ's satisfaction that emissions from this facility when operated at MHAFB will not cause or significantly contribute to a violation of any ambient air quality standard. Romero 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. A summary of the modeling analysis can be found in the modeling memo in Appendix C.

When the concrete batch plant is operated in compliance with the permit at locations other than at MHAFB, pre-construction compliance was demonstrated using DEQ's generic modeling analysis. A copy of this analysis is included in Appendix C of this document.

4. REGULATORY REVIEW

4.1 Attainment Designation (40 CFR 81.313)

The initial location for this facility is in Elmore County, which is designated as attainment or unclassifiable for PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, and Ozone. Reference 40 CFR 81.313.

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

4.2 Permit to Construct (IDAPA 58.01.01.201)

Romero proposes to construct a stationary source that does not qualify for a PTC exemption in any of Sections 220 through 223 of the Rules. Therefore, a PTC is required.

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

Not applicable. Emissions of any regulated air pollutants are well below any regulatory requirements for Title V.

4.4 PSD Classification (40 CFR 52.21)

The facility is not subject to PSD requirements.

4.5 NSPS Applicability (40 CFR 60)

The diesel generator at the facility is subject to 40 CFR 60, Subpart IIII – Standard of Performance for Stationary Compression Ignition Internal Combustion Engines.

The concrete batch plant is not subject to NSPS. The provisions of 40 CFR 60 do not apply to stand-alone screening operations at plants without crushers.

4.6 NESHAP Applicability (40 CFR 61)

The facility is not subject to 40 CFR 61.

4.7 MACT Applicability (40 CFR 63)

The facility is not subject to 40 CFR 63.

4.8 CAM Applicability (40 CFR 64)

The facility is not subject to 40 CFR 64.

4.9 Permit Conditions Review

This section describes only those permit conditions that have been added as a result of this permitting action and that may not be self-explanatory.

4.9.1 Permit Conditions 1.3, 2.2, and 3.2 describe the emissions controls that shall be operated as part of this concrete batch plant and the diesel generator. Demonstration of compliance with NAAQS and TAPs rules were based on emissions estimated using the capture efficiencies associated with these controls.

4.9.2 Permit Condition 2.4.1: Limits the concrete production to 1,051,200 cubic yards in any consecutive 12-month period. This is the production level the permittee requested in the application for operations at

MHAFB. Compliance with this permit limit is demonstrated as required in Permit Condition 2.8 by monitoring the concrete production on daily, monthly, and annual bases.

Permit Condition 2.4.2: Limits daily and annual concrete production based on the available setback for operations at locations other than MHAFB. This permit condition 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 people to PM_{10} levels that may approach the 24-hour NAAQS limit. Compliance with this permit condition is demonstrated through Permit Condition 2.9. Permit Condition 2.9 requires the permittee to physically measure the minimum setback distance.

4.9.3 Permit Condition 2.12: This permit condition prohibits operations at the facility in any PM_{10} nonattainment area. Should the permittee desire to operate in any PM_{10} nonattainment area, the permittee shall submit a PTC application to modify this permit.

4.9.4 Diesel Generator – Section 3

The purpose of Section 3 of the permit is to include operation of the diesel generator when the plant is operated at MHAFB and also to include the NSPS requirements for the diesel generator engine. The engine is an affected unit in accordance with 40 CFR 4200 because the diesel generator is a stationary compression ignition (CI) internal combustion engine (ICE) with a displacement of less than 30 liters per cylinder and was manufactured in 2007. A summary of the NSPS applicable requirements included in Section 3 of the permit are:

- NSPS emissions limits for the generator in accordance with 40 CFR 60.4201, 4204, and 4206, and 4207, which reference the emission limits for new nonroad engines in 40 CFR 89. These emission limits are not included specifically in the PTC. However, the NSPS operating requirements which the owner or operator must comply with to assure compliance with the emission limits are included in this PTC.
- Diesel fuel used must meet the requirements of 40 CFR 60.4207, "What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to 40 CFR 60.4200?." One set of fuel criteria becomes applicable on October 1, 2007. Another more stringent fuel requirement becomes applicable October 1, 2010. The fuel limitations are included in the permit instead of including references to them.
- The owner or operator of a stationary CI internal combustion engine must operate the engine in accordance with manufacturer's written instructions pursuant to 40 CFR 60.4211.
- Owners must purchase a generator engine certified to the standards of 40 CFR 60.4201, "What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?."
- In accordance with 40 CFR 60.4209, "what are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?" The owner or operator of stationary compression ignition engines equipped with a diesel particulate filter to comply with emission standards in 40 CFR 60.4204, the diesel filter must be installed with a back pressure monitor that notifies the owner or operator when the high back pressure limit of the engine is approached.

4.9.5 Permit Condition 3.5: Diesel Generator Operations: This permit condition limits the operations of the diesel generator that powers the concrete batch plant to operations at MHAFB only. Emissions from the generator were modeled at the site and found to meet the applicable NAAQS and TAPs requirements. If the permittee chooses to operate the generator outside MHAFB, new dispersion modeling and a revision to this permit will be required.

5. PERMIT FEES

Table 5.1 lists the processing fee associated with this permitting action. The facility is subject to a processing fee of $5000.00 because its permitted emissions are 16.50 T/yr.

Table 5.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	7.7	0	7.7
SO_2	2.83	0	2.83
CO	1.37	0	1.37
PM_{10}	1.19	0	1.19
VOC	3.41	0	3.41
HAPS	--	0	--
Total:	16.50	0	**16.50**
Fee Due	**$ 5,000.00**		

6. PUBLIC COMMENT

An opportunity for public comment period on the PTC application was provided from August 2, 2007 to August 16, 2007 in accordance with IDAPA 58.01.01.209.01.c. During this time, there were no comments on the application and no requests for a public comment period on DEQ's proposed action.

APPENDIX A – AIRS INFORMATION

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

Facility Name: Romero General Construction
Facility Location: Portable
AIRS Number: 777-000421

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	B		B					U
NO_x	B		B					U
CO	B							U
PM_{10}	B		B					U
PT (Particulate)	B							
VOC	B							U
THAP (Total HAPs)	B							
			APPLICABLE SUBPART					
			IIII					

[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

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline - 1-877-5PERMIT

PERMIT TO CONSTRUCT APPLICATION
Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	Romero General Construction Corp.
Facility Name:	Mountain Home Air Force Base
Facility ID No.:	
Brief Project Description:	Concrete Batch Plant

SUMMARY OF EMISSIONS INCREASE (PROPOSED PTE - PREVIOUSLY MODELED PTE) - POINT SOURCES

1.	2.	3.											
		PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Emissions units	**Stack ID**	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Source(s)													
Cement Storage Bin 1	P1	0.08	0.37										
Cement Storage Bin 2	P2	0.08	0.37										
Cement Batcher	P3	0.05	0.21										
Electric Generator	P4	0.06	0.24	0.65	2.83	1.76	7.70	0.31	1.37	0.78	3.41		
name of the emissions unit5													
name of the emissions unit6													
name of the emissions unit7													
name of the emissions unit8													
name of the emissions unit9													
name of the emissions unit10													
name of the emissions unit11													
name of the emissions unit12													
name of the emissions unit13													
name of the emissions unit14													
name of the emissions unit15													
name of the emissions unit16													
name of the emissions unit17													
name of the emissions unit18													
name of the emissions unit19													
name of the emissions unit20													
name of the emissions unit21													
(Insert more rows as needed)													
Total		0.27	1.19	0.65	2.83	1.76	7.70	0.31	1.37	0.78	3.41		

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
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PERMIT TO CONSTRUCT APPLICATION
Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	Romero General Construction Corp.
Facility Name:	Mountain Home Air Force Base
Facility ID No.:	
Brief Project Description:	Concrete Batch Plant

SUMMARY OF EMISSIONS INCREASE (PROPOSED PTE - PREVIOUSLY MODELED PTE) - FUGITIVE SOURCES

1.	2.	3. Air Pollutant Maximum Change in Emissions Rate (lbs/hr or t/yr)											
		PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Fugitive Source Name	**Fugitive ID**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**
Fugitive Source(s)													
Aggregate delivery to storage	F1	0.37	1.63										
Sand delivery to storage	F2	0.08	0.37										
Aggregate transfer to conveyor	F3	0.37	1.63										
Sand transfer to conveyor	F4	0.08	0.37										
Truck loading (truck mix)	F5	0.55	2.39										
name of fugitive source6													
name of fugitive source7													
name of fugitive source8													
name of fugitive source9													
name of fugitive source10													
name of fugitive source11													
name of fugitive source12													
name of fugitive source13													
name of fugitive source14													
name of fugitive source15													
name of fugitive source16													
name of fugitive source17													
name of fugitive source18													
name of fugitive source19													
name of fugitive source20													
name of fugitive source21													
(insert more rows as needed)													
Total		1.46	6.39										

Particulate Matter Emission Calculations
Temporary Concrete Batch Plant, Mountain Home, Idaho
Romero General Construction Corp.

Source	Controls	PM Emission Factor Uncontrolled (lb/yd^3 concrete)	PM Emission Rate Uncontrolled (lb/hr)	Control Efficiency	PM Emission Rate Controlled	
					(lb/hr)	(ton/yr)
Cement Storage 1 Bin	PJC-300S	0.07	8.4	99.0%	0.084	0.37
Cement Storage 2 Bin	PJC-300S	0.07	8.4	99.0%	0.084	0.37
Cement Batcher (weigh hopper?)	BV-14 D	0.04	4.8	99.0%	0.048	0.21
Aggregate delivery to ground storage		0.0031	0.372	0.0%	0.372	1.63
Sand delivery to ground storage		0.0007	0.084	0.0%	0.084	0.37
Aggregate transfer to conveyor		0.0031	0.372	0.0%	0.372	1.63
Sand transfer to conveyor		0.0007	0.084	0.0%	0.084	0.37
Truck loading (truck mix)		0.0784	9.408	94.2%	0.55	2.39
		Total:	31.92	--	1.67	7.33

Notes:
1.) Emission factor for Cement Storage Bin 1 and 2 and Cement Batcher from vendor (CON-E-CO). Emission factors for other emission sources from AP-42 Chapter 11.12 "Concrete Batching".

Concrete Capacity and Composition Information

Maximum Capacity: 120 yd^3 concrete/hr

Assumed Concrete Composition (1 yd^3):

1865	lbs coarse aggregate
1428	lbs sand
491	lbs cement
73	lbs cement supplement
4024	lbs total

Ton material/120 yd^3 concrete:

111.90	ton coarse aggregate
85.68	ton sand
29.46	ton cement
4.38	ton cement supplement
231.42	ton total

Toxic Air Pollutant Emission Calculations
Temporary Concrete Batch Plant, Mountain Home, Idaho
Romero General Construction Corp.

	As		Be		Cd		Cr		Cr(VI)	
	EF	Emissions	EF	Emissions	EF	Emissions	EF	Emissions	EF	Emissions
Source	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)
Cement Storage 1 Bin	1.00E-06	2.95E-05	9.04E-08	2.66E-06	1.98E-10	5.83E-09	1.22E-06	3.59E-05	3.66E-07	1.08E-05
Cement Storage 2 Bin	4.24E-09	1.86E-08	4.86E-10	2.13E-09	4.86E-10	2.13E-09	2.90E-08	1.27E-07	5.80E-09	2.54E-08
Cement Batcher (weigh hopper)	--	--	--	--	--	--	--	--	--	--
Aggregate delivery to ground storage	--	--	--	--	--	--	--	--	--	--
Sand delivery to ground storage	--	--	--	--	--	--	--	--	--	--
Aggregate transfer to conveyor	--	--	--	--	--	--	--	--	--	--
Sand transfer to conveyor	--	--	--	--	--	--	--	--	--	--
Truck loading (truck mix)	1.16E-06	3.93E-05	1.04E-07	3.52E-06	9.06E-09	3.07E-07	4.10E-06	1.39E-04	8.20E-07	2.77E-05
Total		6.87E-05		6.18E-06		3.15E-07		1.75E-04		3.86E-05
EL		1.50E-06		2.80E-05		3.70E-06				5.60E-07
Model?		yes		no		no		see Cr (VI)		yes

	Mn		Ni		P		Se	
	EF	Emissions	EF	Emissions	EF	Emissions	EF	Emissions
Source	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)	(lb/ton)	(lb/hr)
Cement Storage 1 Bin	2.56E-07	7.54E-06	2.28E-06	6.72E-05	3.54E-06	1.04E-04	7.24E-08	2.13E-06
Cement Storage 2 Bin	1.17E-07	5.12E-07	4.18E-08	1.83E-07	ND		ND	
Cement Batcher (weigh hopper)	--	--	--	--	--	--	--	--
Aggregate delivery to ground storage	--	--	--	--	--	--	--	--
Sand delivery to ground storage	--	--	--	--	--	--	--	--
Aggregate transfer to conveyor	--	--	--	--	--	--	--	--
Sand transfer to conveyor	--	--	--	--	--	--	--	--
Truck loading (truck mix)	2.08E-05	7.04E-04	4.78E-06	1.62E-04	1.23E-05	4.16E-04	1.13E-07	3.82E-06
Total		7.12E-04		2.29E-04		5.21E-04		5.96E-06
EL		3.33E-01		2.70E-05		7.00E-03		1.30E-02
Model?		no		yes		no		no

Notes:
1.) Emission Factors from AP-42 Chapter 11.12 "Concrete Batching", Table 11.12-8.
2.) Emission Limits (EL) from IDAPA 58.01.01.585 and 586.
3.) Modeling performed for Toxic Air Pollutants (TAPs) emission rates that exceeded the EL.

Air Pollutant Emissions
Electricity Generator

Combustion Source Characteristics	
Genset Manufacturer	MQ Power
Genset Model	DCA180SSJ
Engine Manufacturer	John Deere
Engine Model	6066HF485
Break Horsepower (bhp)	315
Power Generation (kW - prime)	144
Fuel	Diesel
Max Hourly Fuel Consumption (gal/hr)	11.4
Heating Value (BTU/gal)	128,000
Heat Input Capacity (BTU/hr)	1,459,200

Stack Data	
Stack Height (ft)	5.0
Stack Diameter (ft)	0.38
Exit Gas Temperature (°F)[c]	800
Wet Actual Flow Rate (acfm)	1,371
Wet Standard Flow Rate (wscfm)	251
Dry Standard Flow Rate (dscfm)	224
Grain Loading Flow Rate (dscfm)	290
Stack Velocity (m/s)	63.04
Fd (dscf stack gas/10^6 BTU)	9,190
Fw (wscf stack gas/10^6 BTU)	10,320

Miscellaneous Support Data	
Pressure at Standard Conditions (atm)	1
Temperature at Standard Conditions (K)	293
Ideal Gas Constant (atm-ft^3/mol-K)	1.314
Mountain Home Barometric Pressure (atm)	0.90

Criteria Pollutants

Pollutant	Emission Factor[a]	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (TPY)	Potential Emissions (g/s)
PM_{10} (assume = PM)	0.08	g/bhp-hr	5.56E-02	0.24	0.007
SO_2	2.05E-03	lb/bhp-hr	0.65	2.83	0.081
NO_x	2.53	g/bhp-hr	1.76	7.70	0.221
CO	0.45	g/bhp-hr	0.31	1.37	0.039
VOC	2.47E-03	lb/bhp-hr	0.78	3.41	0.098

PM Grain Loading Standard[b]

Pollutant	Potential Emissions (lb/hr)	Grain Load @ 3% Oxygen (gr/dscf)	PM Grain Standard[b] (gr/dscf)	Meets Standard?
PM	0.056	0.022	0.05	yes

Notes:

(a) Emission factors for PM, CO, and NOx supplied by the vendor (MQ Power). Emission factors for SO_2 and VOC from AP-42 Chapter 3.3, "Gasoline and Diesel Industrial Engines" Table 3.3-1.

(b) IDAPA 58.01.01.677.

(c) The discharge temperature for the generator exhaust was reduced from 905 to 800 °F to account for heat losses from exhaust manifold to discharge elevation.

GensetEmission Estimates.xls
7/18/2007

Air Pollutant Emissions
Electricity Generator

Combustion Source Characteristics		Stack Data	
Genset Manufacturer	MQ Power	Stack Height (ft)	5.0
Genset Model	DCA180SSJ	Stack Diameter (ft)	0.38
Engine Manufacturer	John Deere	Exit Gas Temperature (°F)[c]	800
Engine Model	6066HF485	Wet Actual Flow Rate (acfm)	1,371
Break Horsepower (bhp)	315	Wet Standard Flow Rate (wscfm)	251
Power Generation (kW - prime)	144	Dry Standard Flow Rate (dscfm)	224
Fuel	Diesel	Grain Loading Flow Rate (dscfm)	290
Max Hourly Fuel Consumption (gal/hr)	11.4	Stack Velocity (m/s)	63.04
Heating Value (BTU/gal)	128,000	Fd (dscf stack gas/10^6 BTU)	9,190
Heat Input Capacity (BTU/hr)	1,459,200	Fw (wscf stack gas/10^6 BTU)	10,320

Miscellaneous Support Data	
Pressure at Standard Conditions (atm)	1
Temperature at Standard Conditions (K)	293
Ideal Gas Constant (atm-ft^3/mol-K)	1.314
Mountain Home Barometric Pressure (atm)	0.90

Toxic Air Pollutants

Pollutant	Emission Factor[a] (lb/MMBtu)	Emissions (lb/hr)	Emissions Limit (lb/hr)	AAC/AACC [b] (ug/m^3)	model?
Benzene	9.33E-04	1.36E-03	8.0E-04	0.12	yes
Toluene	4.09E-04	5.97E-04	2.5E+01	18,750	no
Xylenes	2.85E-04	4.16E-04	2.9E+01	21,750	no
1,3-Butadiene	<3.91E-5	5.71E-05	2.4E-05	3.6E-03	yes
Formadehyde	1.18E-03	1.72E-03	5.1E-04	7.7E-02	yes
Acetaldehyde	7.67E-04	1.12E-03	3.0E-03	0.45	no
Acrolein	<9.25E-5	1.35E-04	1.7E-02	12.5	no
Naphthalene	8.48E-05	1.24E-04	3.3E+00	2,500	no
Fluorene	2.92E-05	4.26E-05	1.3E-01	100	no
Benzo(a)anthracene	1.68E-06	2.45E-06		NA	no
Chrysene	3.53E-07	5.15E-07		NA	no
Benzo(b)fluroanthene	<9.91E-8	1.45E-07		NA	no
Benzo(k)fluroanthene	<1.55E-7	2.26E-07		NA	no
Benzo(a)pyrene	<1.88E-7	2.74E-07	2.0E-06	3.0E-04	no
Indeno(1,2,3-cd)pyrene	<3.75E-7	5.47E-07		NA	no
Dibenz(a,h)anthracene	<5.83E-7	8.51E-07		NA	no
Total PAH	1.68E-04	2.45E-04	9.1E-05	1.4E-02	yes

Notes:
(a) Emission factors from AP-42 Chapter 3.3, "Gasoline and Diesel Industrial Engines" Table 3.3-2.
(b) Shaded values are AACC for carcinogenic pollutants, unshaded values are AAC for non-carcinogenic pollutants.
(c) The discharge temperature for the generator exhaust was reduced from 905 to 800 °F to account for heat losses from exhaust manifold to discharge elevation.

Genset (taps)Emission Estimates.xls
7/26/2007

Lead Emission Calculations
Temporary Concrete Batch Plant, Mountain Home, Idaho
Romero General Construction Corp.

	EF	Emissions		
Source	(lb/ton)	(lb/hr)	(lb/month)	(ton/yr)
Cement Storage 1 Bin	5.20E-07	1.53E-05	1.10E-02	6.71E-05
Cement Storage 2 Bin	1.09E-08	4.77E-08	3.44E-05	2.09E-07
Cement Batcher (weigh hopper)		--	--	--
Aggregate delivery to ground storage		--	--	--
Sand delivery to ground storage		--	--	--
Aggregate transfer to conveyor		--	--	--
Sand transfer to conveyor		--	--	--
Truck loading (truck mix)	1.53E-06	5.18E-05	3.73E-02	2.27E-04
Total		6.71E-05	4.83E-02	2.94E-04
Modeling Threshold			100	0.6
Model?			no	no

Notes:
1.) Emission Factor from AP-42 Chapter 11.12 "Concrete Batching", Table 11.12-8.

HAPs/TAPs Summary
Temporary Concrete Batch Plant, Mountain Home, Idaho
Romero General Construction Corp.

Pollutant	Emissions (lb/hr)		
	Genset	Concrete	Total
Benzene	1.36E-03	--	1.36E-03
Toluene	5.97E-04	--	5.97E-04
Xylenes	4.16E-04	--	4.16E-04
1,3-Butadiene	5.71E-05	--	5.71E-05
Formadehyde	1.72E-03	--	1.72E-03
Acetaldehyde	1.12E-03	--	1.12E-03
Acrolein	1.35E-04	--	1.35E-04
Naphthalene	1.24E-04	--	1.24E-04
Fluorene	4.26E-05	--	4.26E-05
Benzo(a)anthracene	2.45E-06	--	2.45E-06
Chrysene	5.15E-07	--	5.15E-07
Benzo(b)fluroanthene	1.45E-07	--	1.45E-07
Benzo(k)fluroanthene	2.26E-07	--	2.26E-07
Benzo(a)pyrene	2.74E-07	--	2.74E-07
Indeno(1,2,3-cd)pyrene	5.47E-07	--	5.47E-07
Dibenz(a,h)anthracene	8.51E-07	--	8.51E-07
Total PAH	2.45E-04	--	2.45E-04
Arsenic	--	6.87E-05	6.87E-05
Beryllium	--	6.18E-06	6.18E-06
Cadmium	--	3.15E-07	3.15E-07
Chromium (VI)	--	3.86E-05	3.86E-05
Manganese	--	7.12E-04	7.12E-04
Nickel	--	2.29E-04	2.29E-04
Phosphorus	--	5.21E-04	5.21E-04
Selenium	--	5.96E-06	5.96E-06
Total (lb/hr)	5.82E-03	1.58E-03	7.41E-03
Total (ton/yr)	2.55E-02	6.93E-03	3.24E-02

Note:
This screening analysis does not differentiate between
TAPs and HAPs, this is a conservative simplifying assumption.

Appendix C – Modeling Analysis

MEMORANDUM

DATE: August 17, 2007

TO: Harbi Elshafei, Air Quality Permitting Analyst, Air Program

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

PROJECT NUMBER: P- 2007.0167

SUBJECT: Modeling Review for the Romero General Construction Corp. Permit to Construct for a Concrete Batch Plant at Mountain Home Air Force Base in Mountain Home, Idaho

The applicant, Romero General Construction Corp. (Romero), proposes to locate a portable concrete batch plant at the Mountain Home Air Force Base in Mountain Home, Idaho. The application, including the air impact modeling analyses, was prepared by Millennium Science & Engineering, Inc. (MSE).

The batch plant will have a maximum daily throughput of 2,800 cubic yards. By using DEQ's generic modeling approach for concrete batch plants, this facility would be required to have a set back from ambient air of about 100 meters without accounting for impacts from the generator. Since the set back to ambient air at the proposed location is 955 meters, there is a high degree of confidence, even without source-specific modeling, that operation of the batch plant will not cause or significantly contribute to a violation of an ambient air quality standard.

Site-specific dispersion modeling analyses for the batch plant were conducted by MSE, Romero's consultant. The analyses were submitted to DEQ with the permit application, received by DEQ on July 16, 2007, and supplemental information received on July 27, 2007. Modeling results easily demonstrated compliance with all applicable ambient air quality standards.

DEQ air quality modeling staff is accepting the submitted modeling analyses as "true, accurate, and complete," without additional agency review and/or verification analyses. This decision is based on the professional judgment of DEQ dispersion modeling staff, considering the nature of the emissions sources, the magnitude of the emissions, and the results from the submitted modeling analyses. Therefore, the ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any air quality standard.

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]

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

[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.

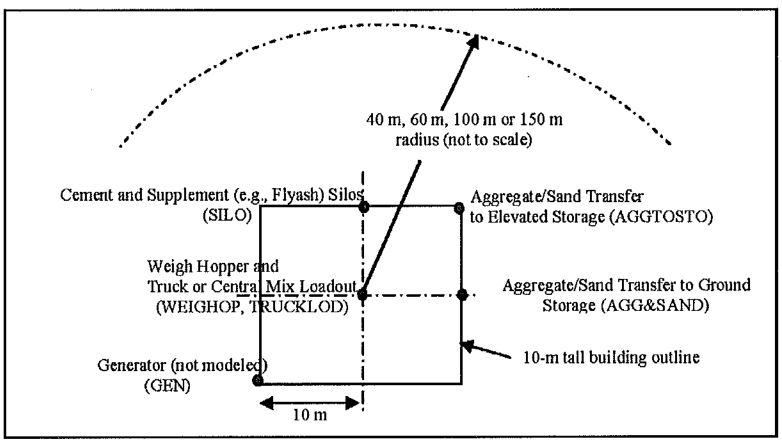

Figure 3-1. Typical Concrete Batch Plant Modeling Layout

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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.

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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:		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		

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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		2.60E-02	1.26E-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	1.10E-02	5.93E-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	7.64E-02		
Process Fugitive Emissions		0.0890	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[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	[illegible]	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	[illegible]	5.69E-06	2.08E-03	9.49E-03	2.85E-06	Point Source	2.49E-05
Truck Loadout (with I29% control)		3.62E-08	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	2.86E-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

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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-xxxxxx
Permit No.:	P-2007.xxxx
Source Type:	Portable Concrete Batch Plant
Manufacturer:	0

Emissions estimates are based on EFs in AP-42, Table 11.12-6 (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	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	[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 (with baghouse)	1.00E-06	[illegible]	9.04E-08	[illegible]	1.98E-08	[illegible]	1.22E-06	[illegible]	2.56E-07	[illegible]	2.28E-06	[illegible]	3.54E-06	[illegible]	7.24E-08	[illegible]	30%
Truck Loadout (no boot or shroud)	[illegible]	3.04E-06	[illegible]	2.44E-07	[illegible]	3.42E-08	[illegible]	1.14E-05	[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	[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[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	6.13E-05	8.62E-06	3.77E-05	3.08E-06	1.35E-05	[illegible]	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	5.78E-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	[illegible]	[illegible]	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	4.30E-03	5.15E-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

2.1394E-06 5.32E-06 6.443E-07

CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 3,600 cy/day, and 500,000 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]	5.94E-08	2.60E-07	6.81E-09	2.98E-08	6.81E-09	2.98E-08	1.07E-06	1.78E-05	4.31E-05	7.18E-06	5.88E-07	2.57E-06	ND	ND	ND	ND	8.13E-08
Cement supplement delivery to Silo (with baghouse)[2]	2.08E-06	9.13E-06	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	1.65E-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 (WITH boot or shroud): 95.00% Control: Automatic boot or equivalent

Central Mix Batching (WITH boot or shroud): 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

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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