State of Idaho
Department of Environmental Quality
Air Quality Division

**AIR QUALITY PERMIT**
**STATEMENT OF BASIS**

# Permit to Construct No. P-2008.0004

**Final**

**Zanetti Bros., Inc.**

**Zanetti Plant Yard**

**Osburn, Idaho**

**Facility ID No. 079-00004**

**May 1, 2008**

**Morrie Lewis**

**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

| | |
|---|---|
| AACC | acceptable ambient concentration for carcinogens |
| acfm | actual cubic feet per minute |
| AFS | AIRS Facility Subsystem |
| AIRS | Aerometric Information Retrieval System |
| BMP | Best Management Practices |
| CAM | Compliance Assurance Monitoring |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| cy/day | cubic yards per calendar day |
| cy/h | cubic yards per hour |
| cy/yr | cubic yards per consecutive 12-calendar month period |
| DEQ | Department of Environmental Quality |
| EL | Screening Emissions Levels |
| ft | feet |
| $^{o}F$ | degrees Fahrenheit |
| HAP | Hazardous Air Pollutants |
| IDAPA | a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act |
| lb/hr | pounds per hour |
| m | meters |
| 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 |
| Rules | Rules for the Control of Air Pollution in Idaho |
| SIP | State Implementation Plan |
| $SO_2$ | sulfur dioxide |
| TAPs | toxic air pollutants |
| T/yr | tons per year |
| VOC | volatile organic compound |

# 1. FACILITY INFORMATION

## 1.1 Facility Description

Zanetti Bros., Inc. operates a concrete batch and aggregate plant, referred to as the Zanetti Plant Yard. The concrete batch plant's maximum capacity is 150 cubic yards of concrete per hour (cy/hr), with a maximum concrete production of 400 cy/day and 45,000 cy/yr at the facility. The concrete batch plant is connected to the electrical grid.

Rock and aggregate are crushed at the rock crushing and screening operations to reduce material in size to desired specifications for direct sale and for further processing in the concrete batch plant.

Concrete is produced by combining water, cement, sand (fine aggregate), and gravel (coarse aggregate). Supplementary cementitious materials, also called mineral admixtures or pozzolan minerals, may be added to make the concrete mixtures more economical, reduce permeability, increase strength, or influence other concrete properties. Typical examples are natural pozzolans, fly ash, ground granulated blast-furnace slag, and silica fume, which can be used individually with Portland or blended cement or in different combinations. Chemical admixtures are usually liquid ingredients that are added to concrete to entrain air, reduce the water required to reach a required slump, retard or accelerate the setting rate, to make the concrete more flowable or other more specialized functions.[1]

A concrete batch plant consists of storage bins or stockpiles for the sand and gravel, storage silos for the cement and cement supplement, weigh bins that weigh each component, conveyors, a water supply, and a control panel. Typically, three or four different sizes of gravel and one or two different sizes of sand are stockpiled for varying job specifications. Cement and supplementary cementing materials are delivered by truck and pneumatically transferred to the appropriate storage silo. A baghouse/cartridge filter is mounted above each silo to capture cement or cement supplement as air is displaced in the silo. For this source category, the baghouse/cartridge filter is considered primarily as process equipment, with a secondary function as air pollution control equipment.

After the storage bins are filled, the production process begins when sand and gravel are drop-fed into their respective weigh bins. When a pre-determined amount of each is weighed, the aggregate is heavily wetted for better mixing and to minimize fugitive dust prior to being dropped onto a conveyor, which transfers the mixture into either a truck for in-transit mixing or a central mix drum for mixing onsite. A predetermined amount of cement and cement supplement is also weighed and drop-fed through a chute into the mixer. The chute provides a measure of dust control. A separate baghouse/cartridge filter is used to capture dust from the weigh bins and the truck loading. Water is then added to the truck mix or central mix drum.

## 1.2 Permitting History

This PTC will replace the existing Facility Permit No. 13-1420-0004-00. The existing concrete batch plant will be dismantled prior to startup of the new facility.

| | |
|---|---|
| July 18, 1979 | Facility Permit No. 13-1420-0004-00 issued for a concrete batch plant and rock crushing facility. (S) |

[1] AP-42 Section 11.12, June 2006.

## 2. APPLICATION SCOPE

Zanetti Bros., Inc., operates a concrete batch plant and crushing and screening operation referred to as the "Zanetti Plant Yard." The concrete batch plant maximum capacity is 150 cubic yards per hour (cy/hr), with a maximum production of 400 cy/day and 45,000 cy/yr. The crushing and screening operation maximum capacity is 105 cy/hr, with a maximum production of 1,893 cy/day and 15,147 cy/yr. The facility is connected to an electrical grid.

### 2.1 Application Chronology

| | |
|---|---|
| January 9, 2008 | DEQ received a PTC application and $1,000 application fee. |
| February 7, 2008 | DEQ determined the application complete. |
| January 23 through February 6, 2008 | Opportunity for a public comment period was held. No comment or request for a public comment period was received. |
| April 2, 2008 | Draft permit and statement of basis were sent for peer and Coeur d'Alene Regional Office (CRO) review. |
| April 4, 2008 | Draft permit and statement of basis were sent for facility review. |
| April 29, 2008 | $1,000 PTC processing fee was received. |
| May 1, 2008 | Final permit and statement of basis were issued. |

# 3. TECHNICAL ANALYSIS

## 3.1 Emission Units and Control Devices

| Emissions Units / Processes | Emissions Control Device | Emissions Sources |
|---|---|---|
| Cement Storage Silo No. 1 | Baghouse/cartridge filter | Cement Storage Silo No. 1 Baghouse/Cartridge Filter<br>Exit height: 50 ft<br>Exit diameter: (2) 11/16" x 48" slots<br>(2) 5/8" x 30" slots<br>Exit air flow rate: 1,500 acfm (max.)<br>Control efficiency: 99.9% |
| Cement Storage Silo No. 2 | Baghouse/cartridge filter | Cement Storage Silo No. 2 Baghouse/Cartridge Filter<br>Exit height: 36 ft<br>Exit diameter: (2) 11/16" x 48" slots<br>(2) 5/8" x 30" slots<br>Exit air flow rate: 1,500 acfm<br>Control efficiency: 99.9% |
| Weigh batcher | Baghouse/cartridge filter | Weigh Batcher Vent Baghouse/Cartridge Filter<br>Exit height: 25 ft<br>Exit diameter: (2) 2" x 12"<br>Exit air flow rate: 180 acfm<br>Control efficiency: 99.9% |
| Truck loading | Mixer/shroud, boot, enclosure, or equivalent | Truck Loadout Mixer Shroud Baghouse/Cartridge Filter<br>Exit height: 25 ft<br>Exit diameter: 15 ¾" x 21"<br>Exit air flow rate: 5,880 acfm<br>Control efficiency: 99.9% |
| Primary & secondary crushing operations | Best Management Practices (BMP) | "Grizzly" crusher and cone crusher<br>Estimated Control Efficiency: 75% |
| Materials Transfer (Fugitives) | BMP, water sprays, or equivalent control methods | Screens (7),<br>Conveyors (15),<br>Aggregate dump to ground,<br>Sand dump to ground,<br>Aggregate dump to conveyor,<br>Sand dump to conveyor,<br>Aggregate conveyor to elevator storage, and<br>Sand conveyor to elevated storage,<br>Road traffic and windblown dust.<br>Estimated Control Efficiency: 75% |

## 3.2 Emissions Inventory

The emissions inventory provided in the application for this concrete batch plant was based on AP-42 Section 11.12 emission factors for a truck-mix concrete batch plant, and the following assumptions: 150 cy/hr and 400 cy/day concrete production capacity, with maximum concrete production limited to 45,000 cy/yr. Baghouse/cartridge filter capture efficiencies were presumed to be 99.9% based on the information provided with the application.

Fugitive emissions of particulate matter (PM) and $PM_{10}$ from batch plant material transfer points are assumed to be controlled by manual water sprays, sprinklers, or spray bars, or an equivalent control method (e.g., enclosing the entire process inside a building) that reduce the emissions by an estimated 75%. Aggregate is washed before delivery to the batch plant site, and water is used on-site to control the temperature of the aggregate. Particulate matter (PM) and $PM_{10}$ emissions from the weigh batcher and truck mix loadout transfer points are each controlled by a baghouse/cartridge filter. An estimate of fugitive emissions from vehicle traffic and wind erosion from stockpiles is also provided based on the information provided with the application.

**Table 3.2 EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS – UNCONTROLLED EMISSIONS**

| Emissions Unit | $PM_{10}$ | | $SO_2$ | | NOx | | CO | | VOC | | LEAD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr (quarterly avg) |
| **Point Sources Affected by the Permitting Action** | | | | | | | | | | | |
| Concrete Batch Plant | | 54.3 | | | | | | | | | 7.55E-06 |
| **Total, Point Sources** | | **54.3** | | | | | | | | | **7.55E-06** |

**Table 3.3 EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS – CONTROLLED EMISSIONS**

| Emissions Unit | $PM_{10}$ | | $SO_2$ | | NOx | | CO | | VOC | | LEAD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr (quarterly avg) |
| **Point Sources Affected by the Permitting Action** | | | | | | | | | | | |
| Concrete Batch Plant | 0.006 | 0.008 | | | | | | | | | 7.55E-06 |
| **Total, Point Sources** | **0.006** | **0.008** | | | | | | | | | **7.55E-06** |
| **Process Fugitive/Volume Sources affected by the Permitting Action** | | | | | | | | | | | |
| Concrete Batch Plant[1] | 0.15 | 0.20 | | | | | | | | | |
| Screening | 0.552 | 0.053 | | | | | | | | | |
| Tertiary crushing | 0.058 | 0.006 | | | | | | | | | |
| Crushing & screening[1] | 0.075 | 0.0072 | | | | | | | | | |
| **Total, Process Fugitives** | **0.84** | **0.27** | | | | | | | | | |

1. Excludes fugitive emissions resulting from road traffic and windblown dust.

A summary of the uncontrolled emissions of criteria pollutants is shown in Table 3.2, and controlled emissions in Table 3.3. The uncontrolled emissions of three carcinogenic metals from the concrete batch plant exceeded the applicable screening emissions levels (EL). These emissions are summarized in Table 3.4. The detailed emissions inventory for this facility can be found in Appendix B.

Controlled emissions of toxic air pollutants (TAPs) were estimated based on the presence of baghouses on the cement/cement supplement silos, the weigh batcher, and truck loadout emission sources. Hexavalent chromium content was estimated at 20% of total chromium for cement.

Table 3.4 EMISSIONS ESTIMATES OF TAP EXCEEDING EL – CONTROLLED EMISSIONS

| TAP | HAP | Screening Emissions Level (EL) | Uncontrolled Annual Average[a] | Controlled Annual Average[a] |
|---|---|---|---|---|
| | | lb/hr | lb/hr | lb/hr |
| Arsenic | Arsenic | 1.50E-06 | 1.34E-04 | 1.97E-07 |
| Nickel | Nickel | 2.70E-05 | 5.17E-04 | 4.97E-07 |
| Hexavalent Chromium | Hexavalent Chromium | 5.60E-07 | 1.05E-04 | 7.95E-08 |

a. Annual average applies to carcinogenic TAP, as provided in IDAPA 58.01.01.586.

## 3.3 Ambient Air Quality Impact Analysis

Based on the emissions inventory provided in the application, the potential facility-wide emission rate of $PM_{10}$ from point sources and fugitive sources (except traffic and windblown dust) was estimated at less than the $PM_{10}$ modeling thresholds[2] of 0.9 lb/hr and 7 T/yr. $PM_{10}$ impacts of the crusher plant were not analyzed because impacts of the proposed concrete batch plant will not cause a significant contribution to ambient concentrations. Modeling thresholds were established at a level to assure emissions would not cause impacts over significant contribution levels.

The potential facility-wide emission rates of toxic air pollutants (TAP) from point sources and fugitive sources (except traffic and windblown dust) were less than the screening emission levels (EL) provided in IDAPA 58.01.01.585-586, except for arsenic, nickel, and chromium (VI). As summarized in Table 3.4, the controlled emissions of arsenic, nickel, and chromium (VI) were below the applicable screening emissions levels. 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 TAP rules indicates that if an emissions rate is below the EL, then controlled ambient concentrations are expected to be below the AAC or AACC.

Because controlled emissions were estimated at below the $PM_{10}$ and TAP modeling thresholds, a minimum setback distance requirement was not required. Modeling analysis results were also provided in the application (refer to Appendix C) which demonstrate that arsenic, nickel, and chromium (VI) emissions from the facility would be less than the AAC or AACC.

Fugitive emissions from traffic and wind erosion from stockpiles are not considered in DEQ modeling analysis; emissions from these sources are controlled through the use of Best Management Practices (BMP) contained in Permit Condition 4.5.

Zanetti Bros. Inc. has demonstrated compliance to DEQ's satisfaction that emissions from the Plant Yard facility will not cause or significantly contribute to a violation of any ambient air quality standard. Zanetti Bros. 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. A summary of the modeling analysis is included in Appendix C.

[2] Table 1, State of Idaho Air Quality Modeling Guideline, Doc ID AQ-011, draft revision.

# 4. REGULATORY REVIEW

## 4.1 Attainment Designation (40 CFR 81.313)

The facility is located in Shoshone 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.

## 4.2 Permit to Construct (IDAPA 58.01.01.201)

The facility does not meet the permit to construct exemption criteria contained in 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)

The facility is classified as a natural minor facility because without limits on the potential to emit, the emissions of all regulated pollutants are less than major source thresholds. In making this determination, the baghouse/cartridge filters for the cement and cement supplement silos were considered to be process equipment, not air pollution control equipment. The AIRS classification is "B."

## 4.4 PSD Classification (40 CFR 52.21)

The facility is classified as a PSD minor facility because without limits on the potential to emit, the emissions of all regulated pollutants are less than PSD major source thresholds.

## 4.5 NSPS Applicability (40 CFR 60)

The facility is not subject to NSPS.

The replacement concrete batch plant is the only new equipment added as a result of this permitting action. Based on information provided in the application, the existing crushing and screening equipment included in Appendix D are not being modified or reconstructed as a result of this permitting action, and were constructed and operating prior to August 31, 1983. As a result, this facility is not subject to the provisions of Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants.

## 4.6 NESHAP Applicability (40 CFR 61)

The facility is not subject to NESHAP.

## 4.7 MACT Applicability (40 CFR 63)

The facility is not subject to MACT standards.

## 4.8 CAM Applicability (40 CFR 64)

The facility is a natural minor Title V source, and is therefore not subject to CAM.

## 4.9 Permit Conditions Review

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

Permit Conditions 1.1, 1.2, and 1.3

- Describes the permitting action scope, the emission sources, and the emission controls that are regulated by the permit to construct. Demonstration of compliance with NAAQS and TAP rules was based on emissions estimated using the capture efficiencies associated with these controls.

Permit Condition 2.1 and 2.2:

- Limits opacity from any point of emission (facility-wide), in accordance with IDAPA 58.01.01.625.
- Requires monthly inspection and recordkeeping to demonstrate compliance with opacity limits and recordkeeping of the results of each inspection when corrective actions are required.

Permit Condition 2.3:

- Requires the use of reasonable precautions for the control of fugitive emissions (facility-wide), in accordance with IDAPA 58.01.01.650-651.

Permit Condition 2.4:

- Requires the use of reasonable fugitive dust control strategies for the control of fugitive dust emissions (facility-wide), in accordance with IDAPA 58.01.01.650-651.

Permit Condition 2.5:

- Requires daily monitoring and recordkeeping of potential fugitive emission sources and corrective actions and control strategies used to demonstrate compliance with Permit Conditions 2.4 and 4.5.

Permit Condition 2.6:

- Restricts the facility from collocating with additional emission sources at or next to the Zanetti Yard Plant. The modeling analysis results provided in the application did not consider the presence of collocated sources.

Permit Condition 3.1, 3.2, 4.1, and 4.2:

- Describe the processes, the emission sources, and the emission controls to be used at the facility. Demonstration of compliance with NAAQS and TAP requirements was based on emissions estimated using the capture efficiencies provided for the baghouse, water spray, and equivalent control devices.

Permit Condition 3.3:

- Limits the concrete production to 400 cy/day and 45,000 cy/yr at the facility. Compliance with $PM_{10}$ and carcinogenic TAP was based upon these controlled production levels; an annual production limit was therefore required in accordance with IDAPA 58.01.01.210.08.c. Compliance with this limit is demonstrated by monitoring the concrete production as required by Permit Condition 3.5.

Permit Condition 3.4

- Requires the development and documentation of procedures for the operation and maintenance of each control device or method, based on a summary of the manufacturer's specifications.

Permit Condition 3.5

- Requires monitoring and recordkeeping of concrete production to demonstrate compliance with Permit Condition 3.3.

Permit Condition 4.3:

- Limits opacity from the emission sources specified in accordance with IDAPA 58.01.01.793.

Permit Condition 4.4:

- Limits the crusher throughput to 1,893 cy/day and 15,147 cy/yr at the facility. Compliance with $PM_{10}$ and carcinogenic TAP was based upon these controlled production levels; an annual production limit is therefore required in accordance with IDAPA 58.01.01.210.08.c. Compliance with this limit is demonstrated by monitoring the sand and gravel production as required by Permit Condition 4.6.

Permit Condition 4.5:

- Requires the use of Best Management Practices for reasonable control of crushers, fugitive and mobile sources of particulate emissions (IDAPA 58.01.01.799).

Permit Conditions 4.6

- Requires monitoring and recordkeeping of the concrete production to demonstrate compliance with Permit Condition 4.4.

## 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 in accordance with IDAPA 58.01.01.225 because the increase in permitted emissions is less than one (1) ton per year, based upon maximum allowable production rates. Because the facility-wide potential emissions are less than one (1) ton per year, the increase in permitted emissions was not determined but is expected to be lower than the estimates provided in Table 5.1.

**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)** |
| $NO_X$ | 0.00 | 0 | 0.00 |
| $SO_2$ | 0.00 | 0 | 0.00 |
| CO | 0.00 | 0 | 0.00 |
| $PM_{10}$ | <0.008 | 0 | <0.008 |
| VOC | 0.00 | 0 | 0.00 |
| HAP[1] | 0.00 | 0 | 0.00 |
| **Total[1]:** | **<0.008** | **0** | **<0.008** |
| **Fee Due** | **$ 1,000.00** | | |

[1] For the purposes of fee calculation, HAP emissions from $PM_{10}$ are included in the $PM_{10}$ emissions total, and are therefore not included in the HAP emissions total.

## 6. PUBLIC COMMENT

An opportunity for public comment period on the PTC application was provided in accordance with IDAPA 58.01.01.209.01.c (refer to Section 2.1 for comment period dates). 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*

**Permittee/ Facility Name:** Zanetti Bros., Inc., Zanetti Plant Yard
**Facility Location:** Osburn, Idaho
**AIRS Number:** 079-00004

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

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

[b] AIRS/AFS Classification Codes:

- A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAP 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 HAP.
- 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

## CRITERIA POLLUTANT EMISSION INVENTORY for Truck Mix Concrete Batch Plant

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| Facility Information | | |
|---|---|---|
| Company: | Zanetti Brothers, Inc., Osburn, Idaho (Truck Mix) | |
| Facility ID: | 079-00004 | |
| Permit No.: | P-2008.0004 | |
| Source Type: | Concrete Batch Plant | |
| Manufacturer/Model: | CON-E-CO/Premier Low Profile 12S | |

**Assumptions Implied or Stated in Application**

See control assumptions

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

### INCREASE IN Production[1]

| | | | | |
|---|---|---|---|---|
| Maximum Hourly Production Rate: | 150 | cy/hr | | Per manufacturer |
| Proposed Daily Production Rate: | 400 | cy/day | 2.67 | Hours of operation per day at max capacity |
| Proposed Maximum Annual Production Rate: | 45,000 | cy/year | | |
| Cement Storage Silo Capacity: | 4540 | ft³ 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 | | Control Assumptions: | |
|---|---|---|---|---|---|---|---|---|---|
| | Controlled | Uncontrolled | lb/hr[2] | lb/hr[3] | lb/day[3] | lb/hr | T/yr | | |
| Aggregate delivery to ground storage | | 0.0031 | 0.12 | 0 013 | 0 31 | 0 004 | 0 017 | 75% | Water Sprays at Operator's Discretion |
| Sand delivery to ground storage | | 0.0007 | 0.03 | 0 003 | 0 07 | 0 001 | 0 004 | 75% | Water Sprays at Operator's Discretion |
| Aggregate transfer to conveyor | | 0.0031 | 0.47 | 0 052 | 1 24 | 0 016 | 0 070 | 0% | Water Sprays at Operator's Discretion |
| Sand transfer to conveyor | | 0.0007 | 0.11 | 0 012 | 0 28 | 0 004 | 0 016 | 0% | Water Sprays at Operator's Discretion |
| Aggregate transfer to elevated storage | | 0.0031 | 0.47 | 0 052 | 1 24 | 0 016 | 0 070 | 0% | Water Sprays at Operator's Discretion |
| Sand transfer to elevated storage | | 0.0007 | 0.11 | 0 012 | 0 28 | 0 004 | 0 016 | 0% | Water Sprays at Operator's Discretion |
| **Cement delivery to Silo (controlled EF)** | **0.0001** | | 1.25E-02 | **1.39E-03** | 3.34E-02 | 4.29E-04 | **1.88E-03** | **0.00%** | Baghouse is process equipment |
| **Cement supplement delivery to Silo (controlled EF)** | **0.0002** | | 2.68E-02 | **2.98E-03** | 7.15E-02 | 9.18E-04 | **4.02E-03** | **0.00%** | Baghouse is process equipment |
| **Weigh hopper loading (sand & aggregate batcher loading)** | | **0.0040** | 5.93E-04 | **6.59E-05** | 1.58E-03 | 2.03E-05 | **8.89E-05** | **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 | **0.001** | 0 03 | 4.03E-04 | **0.002** | **99.9%** | Transit mixer shroud and 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% | |
| **Point Sources Total Emissions** | | **8.26E-02** | **5.17E-02** | **5.74E-03** | 1 38E-01 | **1.77E-03** | **7.75E-03** | | |
| Process Fugitive Emissions | | 0.0114 | 1.28 | 0.14 | 3.42 | 0.04 | 0.19 | | |
| Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust) | | 0.0940 | 1.34 | 0.15 | 3.56 | 0.05 | 0 20 | | |

| POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6] | | Controlled EF | at 1,314,000 cy/yr | T/yr |
|---|---|---|---|---|
| **Facility Classification Total PM[5]** | | **2.89E-01** | | **1.90E+02** |
| **Facility Classification Total PM10[5]** | | **8.26E-02** | | **5.43E+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 is based on the proposed maximum daily production rate
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) + 0.2806(truck mix)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) +0.0040 (weigh batcher)+0.0784(truck mix)

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

[7] Baghouses are considered process equipment for 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 Avg. | | |
| | Controlled with fabric filter | Uncontrolled | lb/hr, 1-hr avg.[2] | lb/month[3] | T/yr | lb/hr qtrly avg[5] | | T/yr |
| Cement delivery to silo[2] | **1.09E-08** | 7.36E-07 | 4.01E-07 | 3.26E-05 | 6 02E-08 | 4.46E-08 | Point Source | 1.76E-06 |
| Cement supplement delivery to Silo[3] | **5.20E-07** | ND | 2.85E-06 | 2.31E-04 | 4 27E-07 | 3.16E-07 | Point Source | 1 25E-05 |
| Truck Loadout (with 99.9% control) | **1.53E-06** | 3 62E-06 | 6.47E-05 | 5.25E-03 | 9.71E-06 | 7.19E-06 | Point Source | 2 83E-04 |
| Central Mix (with 100% control) | | 0.00E+00 | 0.00E+00 | 0 00E+00 | 0 00E+00 | 0 00E+00 | Fugitive | |
| **Total** | | | **6.80E-05** | **5.51E-03** | **1.02E-05** | | **Point Sources** | **2.98E-04** |
| 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)
T/yr = EF x pound of material/yd³ of concrete x max. annual concrete production rate/(2000 lb/T)

[5] lb/hr, qtrly avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

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

1/31/2008 12:49

**Facility Information**

| | |
|---|---|
| Company: | Zanetti Brothers, Inc., Osburn, Idaho (Truck Mix) |
| Facility ID: | 079-00004 |
| Permit No.: | P-2008.0004 |
| Source Type: | Concrete Batch Plant |
| Manufacturer: | CON-E-CO/Premier Low Profile 12S |

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: | 150 | cy/hr | |
| Proposed Daily Production Rate: | 400 | cy/day | |
| Proposed Maximum Annual Production Rate: | 45,000 | cy/year | |

**Uncontrolled (Unlimited Production Rate)**

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

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

| Emissions Point | Arsenic EF (lb/ton of material loaded) | | Beryllium EF (lb/ton of material loaded) | | Cadmium EF (lb/ton of material loaded) | | Chromium EF (lb/ton of material loaded) | | Manganese EF (lb/ton of material loaded) | | Nickel EF (lb/ton of material loaded) | | Phosphorus EF (lb/ton of material loaded) | | Selenium EF (lb/ton of material loaded) | | Chromium VI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Controlled with Fabric filter | Uncontrolled | Percent of total Cr that is Cr+6 |
| Cement delivery to silo (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 | 2.06E-05 | 6.12E-05 | 4.78E-06 | 1.19E-05 | 1.23E-05 | 3.84E-05 | 1.13E-07 | 2.62E-06 | 21.29% |
| Central Mix Batching (NO boot or shroud) | 0.00E+00 | 0.00E+00 | ND | ND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ND | ND | 21.29% |

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

| Emissions Point | Arsenic | | Beryllium | | Cadmium | | Chromium | | Manganese | | Nickel | | Phosphorus | | Selenium | | Chromium VI | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr annual avg. | T/yr | 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) | 1.56E-07 | 6.84E-07 | 1.79E-08 | 7.84E-08 | 1.79E-08 | 7.84E-08 | 1.07E-06 | 4.06E-05 | 4.31E-06 | 1.89E-05 | 1.54E-06 | 6.74E-06 | 4.35E-04 | 1.90E-03 | ND | ND | 2.14E-07 | | |
| Cement supplement delivery to Silo (with baghouse) | 5.48E-06 | 2.40E-05 | 4.95E-07 | 2.17E-06 | 1.08E-07 | 4.75E-07 | 6.68E-06 | 2.93E-05 | 1.40E-06 | 6.14E-06 | 1.25E-05 | 5.47E-05 | 1.94E-05 | 8.49E-05 | 3.96E-07 | 1.74E-06 | 2.00E-06 | | |
| Truck Loadout (NO shroud or baghouse) | 1.29E-04 | 5.63E-04 | 1.03E-05 | 4.52E-05 | 1.45E-06 | 6.34E-06 | 4.82E-04 | 2.11E-03 | 2.59E-03 | 1.13E-02 | 5.03E-04 | 2.20E-03 | 1.62E-03 | 7.11E-03 | 1.11E-04 | 4.85E-04 | 1.03E-04 | Facility Classification: Total Annual HAPs Emissions | |
| Central Mix Batching (NO boot or shroud) | 0.00E+00 | 0.00E+00 | ND | ND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ND | ND | 0.00E+00 | | |
| Sources Total | 1.34E-04 | 5.88E-04 | 1.08E-05 | 4.75E-05 | 1.57E-06 | 6.89E-06 | 4.90E-04 | 2.18E-03 | 2.59E-03 | 1.14E-02 | 5.17E-04 | 2.27E-03 | 2.08E-03 | 9.10E-03 | 1.11E-04 | 4.87E-04 | 1.05E-04 | 2.60E-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.** **400 cy/day, and 45,000 cy/year**

| 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[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] | 5.35E-09 | 2.34E-08 | 6.13E-10 | 2.68E-09 | 6.13E-10 | 2.68E-09 | 1.19E-07 | 1.60E-07 | 4.79E-07 | 6.46E-07 | 5.27E-08 | 2.31E-07 | ND | ND | ND | ND | 7.31E-09 | | |
| Cement supplement delivery to Silo (with baghouse)2 | 1.88E-07 | 8.21E-07 | 1.70E-08 | 7.42E-08 | 3.71E-09 | 1.63E-08 | 4.99E-06 | 1.00E-06 | 1.05E-06 | 2.10E-07 | 4.28E-07 | 1.87E-06 | 1.45E-05 | 2.91E-06 | 4.40E-08 | 5.95E-08 | 6.86E-08 | | |
| Truck Loadout (WITH shroud/baghouse) | 4.40E-09 | 1.93E-08 | 3.53E-10 | 1.55E-09 | 4.95E-11 | 2.17E-10 | 5.36E-08 | 7.23E-08 | 2.88E-07 | 3.88E-07 | 1.72E-08 | 7.55E-08 | 1.80E-07 | 2.44E-07 | 1.23E-08 | 1.66E-08 | 3.52E-09 | 99.9% | Transit mixer shroud and 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 | 1.97E-07 | 8.64E-07 | 1.79E-08 | 7.85E-08 | 4.37E-09 | 1.92E-08 | 5.16E-06 | 1.23E-06 | 1.81E-06 | 1.24E-06 | 4.97E-07 | 2.18E-06 | 1.47E-05 | 3.15E-06 | 5.64E-08 | 7.61E-08 | 7.95E-08 | 8.85E-06 | 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 | 13.15% | | 0.06% | | 0.12% | | 0.02% | | 0.0005% | | 1.84% | | 0.21% | | 0.0004% | | 14.19% | | |
| 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

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

# Emissions Inventory for Rock Crusher

1/31/08 12:49

**Facility Information**

| | |
|---|---|
| Company: | Zanetti Bros., Inc. |
| Facility ID: | 079-00004 |
| Permit No. | P-2008.0004 |
| Source Type | Rock Crusher |
| Manufacturer/Model: | n/a |

**Technical Data**

| | | | | |
|---|---|---|---|---|
| Maximum Hourly Production Rate | 105 | cy/hr | 142 | tons/hr[1] |
| Proposed Daily Production Rate | 1,893 | cy/day | 2,556 | tons/day[2] |
| Proposed Maximum Annual Production Rate | 15,147 | cy/year | 20,448 | tons/year[3] |

**Emissions**

| Rock Crusher Emission Source | # of sources | $PM_{10}$ Emission Factor[4] (lb/ton) | | Controlled Emission Rate Max. | Controlled Emission Rate 24-hour Average | | Controlled Emission Rate Annual Average | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Controlled[5] | Uncontrolled | lb/hr | lb/hr | lb/day | lb/hr | T/yr | Control Assumptions |
| Screening | 7 | 0.00074 | | 0.74 | 0 552 | 13.24 | 0 012 | 0.053 | Water Spray |
| Tertiary Crushing[6] | 1 | 0.00054 | | 0.08 | 0 058 | 1.38 | 0 001 | 0.006 | Water Spray |
| Conveyor Transfer Points | 15 | 0 000046 | | 0.10 | 0 073 | 1.76 | 0 002 | 0.007 | Water Spray |
| Truck Unloading (fragmented stone) | 1 | 0 000016 | | 2.27E-03 | 0 002 | 0.04 | 3.73E-05 | 0 0002 | Water Spray |
| Point Sources Total Emissions | 0 | | | 0 | 0 | 0 | 0 | 0 | |
| Fugitive Sources Total Emissions | 24 | 0.0013 | 0 00 | 0.91 | 0.68 | 16.42 | 0.01 | 0.07 | |
| **Rock Crusher** - Facility Wide Total Point Sources + Process Fugitives (Except Road Dust and Windblown Dust) | | 0.0013 | 0 | 0.91 | 0.68 | 16.42 | 0.01 | 0.07 | |

Notes:

1) The maximum hourly production rate is based on an average of 94 5 tons/hr with a 50% margin for operational flexibility and an est. density of 1 35 tons per cubic yard.
2) The rock crushing facility would normally operate 8 hrs/day when needed. The proposed maximum daily production rate assumes 12 hours of operation per day, i.e., a 50% increase over normal daily operation.
3) The rock crushing facility is expected to be operated for 10 to 12 days per year. The proposed maximum annual production rate assumes 18 days per year of operation, i e., a 50% increase over a typical 12 days per year.
4) $PM_{10}$ emission factors are from Table 11.19.2-2 of AP-42, Section 11.19 2, Crushed Stone Processing and Pulverized Mineral Processing, dated June 2006.
5) Controlled emission factors were utilized for all emission sources at the rock crusher facility as water sprays are used throughout the rock crushing operations
6) There are two crushers associated with rock crushing operations at this facility, a primary crusher and a secondary crusher. However, no emission factors are available for primary or secondary crushing. PM/$PM_{10}$ emissions from primary and secondary crushers are unquantifiable, but would be expected to be minimal due to the size of the material processed. To be conservative, one of the two crushers at this facility was considered a tertiary crusher for the emission calculations

## Summary Table

| Emissions Source | $PM_{10}$ Emission Factor | | Controlled Emission Rate Max. | Controlled Emission Rate 24 hour Average | | Controlled Emission Rate Annual Aaverage | |
|---|---|---|---|---|---|---|---|
| | Controlled (lb/ton) | Uncontrolled (lb/cy) | lb/hr | lb/hr | lb/day | lb/hr | T/yr |
| **Rock Crusher** - Facility Wide Total Point Sources + Process Fugitives (Except Road Dust and Windblown Dust) | 0.0013 | | 0.91 | 0.68 | 16.42 | 0.01 | 0.07 |
| **Concrete Batch Plant** - Facility Wide Total Point Sources + Process Fugitives (Except Road Dust and Windblown Dust) | | 0.094 | 1.34 | 0.15 | 3.56 | 0.05 | 0.20 |
| **Rock Crusher + Concrete Batch Plant** - Facility Wide $PM_{10}$ Emissions | 0.0013 | 0.094 | 2.25 | 0.83 | 19.99 | 0.06 | 0.27 |
| DEQ Modeling Threshold | | | | 0.9 | | | 7 |
| Modeling Required? | | | | No | | | No |

# Appendix C – Modeling Analysis

# 1.0 INTRODUCTION

Zanetti Bros., Inc. is proposing to construct and operate a new concrete batch plant (CBP) at their facility in Osburn, Idaho where they currently operate a rock crusher (RC). The location of the facility is shown on the enclosed topographic maps. Criteria pollutant emissions, which include only particulate matter ($PM_{10}$) and lead, as well as toxic air pollutant (TAP) emissions are summarized in the emissions inventory spreadsheets included as part of the application package. As shown in the spreadsheets, total $PM_{10}$ emissions for the proposed CBP and the existing RC combined are less than the modeling thresholds of 0.9 pound per hour (lb/hr) and 7 tons per year (tons/yr). Also, the increase in lead emissions from the CBP is less than the modeling thresholds of 100 pounds per month (lb/mo) and 0.6 tons/yr for lead. With respect to TAPs, emission factors are available for three of the CBP air emission sources – cement delivery to the silo, cement supplement delivery to the silo, and truck mixing (loadout). No emission factors are available for TAPs from other air emission sources at the CBP or from the RC.

Although controlled TAP emissions from the proposed CBP do not exceed the IDAPA screening emission levels (EL) for any TAP, uncontrolled emissions from the CBP exceed the EL for arsenic, nickel, and chromium VI. Therefore, the Idaho Department of Environmental Quality (DEQ) is requiring an ambient air quality impact analysis (i.e., air dispersion modeling) for these three TAPs to demonstrate compliance with the acceptable ambient concentrations (AAC). Because each of these TAPs is a carcinogen, annual air quality impacts must be determined for comparison to the AACCs listed in Section 586 of IDAPA 58.01.01.

This document describes the methodology which was used to conduct the modeling, including the selected model, model input data, and model options. The modeling methodology was based on discussions with the DEQ. All modeling was conducted in accordance with the *State of Idaho Air Quality Modeling Guidance* (December 2002), the *DEQ Toxic Air Pollutant (TAP) Preconstruction Compliance Application Completeness Checklist* (the TAPs Checklist) (January 2007), the requirements outlined in IDAPA 58.01.01.210 *Demonstration of Preconstruction Compliance with Toxic Standards*, and communications with the DEQ. Method C, TAP Compliance Using Controlled Ambient Concentrations (Section 210.08), of the TAPs Checklist was selected as the compliance method for TAPs from the proposed CBP.

The area in which Zanetti Bros. facility is located is rural with both simple and complex terrain. Therefore, both simple terrain and complex terrain modeling were performed, utilizing the EPA SCREEN3 model. There are no other nearby facilities to include in the analyses.

# 2.0 SOURCE EMISSIONS AND STACK PARAMETERS

As mentioned above, three air emission sources at the proposed CBP were including in the modeling analysis – cement delivery to the silo, cement supplement delivery to the silo, and the truck mixer (loadout). Each of these sources is controlled with a baghouse with the stack parameters listed on the attached Form MI2. Thus, these three sources were considered point sources in the modeling. Controlled emissions for each of the TAPs (arsenic, nickel, and chromium VI) are presented in the enclosed TAP Emissions Inventory spreadsheet. As indicated in this spreadsheet, emission factors for the three TAPs were obtained from Table 11.12-8 of Section 11.12, Concrete Batching, of EPA's *Compilation of Air Pollutant Emission Factors* (June 2006). An emission rate of one (1) lb/hr was assumed for each of the three sources modeled. The predicted model results based on the one lb/hr emission rate were then ratioed utilizing the controlled lb/hr annual average TAP emission rates for arsenic, nickel, and chromium VI, which assume a maximum annual production limitation of 45,000 cubic yards per year (cy/yr). Because these sources are located very close together, as shown in the site plan included with the application package, the sources were collocated in the modeling. These three sources are designated Silo I, Silo II, and PJ-980 (truck mixer) on the site plan.

As indicated on the attached Form MI2, the four vents for the two silo baghouses are oriented downward while the vent for truck mixing is horizontal. Therefore, as agreed by the DEQ, the procedures recommended in Section 5.4.2 of the *State of Idaho Air Quality Modeling Guidance* were utilized in the modeling for each of the three sources. The stack gas exit velocity was set to 0.001 meters per second (m/s) to prevent momentum plume rise and the stack diameter was set at 0.001 meters (m) to prevent stack-tip downwash. Because each of the vents for the baghouses on the two silos have the same stack gas temperature (ambient) and stack height and were assumed to have the same stack diameter and velocity, the cement delivery to the silo and cement supplement delivery to the silo were each modeled as one point source. The truck mixer has only one baghouse vent. Thus, three point sources were modeled with SCREEN3 and the maximum predicted impacts were added, regardless of the maximum impact location, to obtain the maximum air quality impact from all three sources combined.

The SCREEN3 model input and output files are contained on the enclosed CD. It is important to note that the model input and model output files show stack gas velocities and flow rates of zero, even though a stack gas velocity of 0.001 m/s was input for each of the three sources of emissions. The change from 0.001 m/s to 0.000 m/s was made internal to the SCREEN3 model and could not be prevented or changed. Additional model runs were conducted to determine any possible effect of this internal model change on the predicted results. No change to the model results was noted. As a check, the truck mixer was modeled with its actual inside stack diameter and a velocity of 0.001 m/s. The results of the modeling for both simple and complex terrain were identical to those predicted utilizing the assumed stack diameter of 0.001 m. For the silos, the change to the actual stack diameter and use of a 0.001 m/s velocity resulted in the same internal modeling change to a 0.000 m/s velocity. Based on these additional model runs and calculated flow rates, it is believed that this internal model change is the result of the extremely low flow rate associated with the very small stack diameter and very low exit velocity. These model runs are also included on the attached CD.

It is also important to note that consideration was given to the modeling of alternative operating scenarios. Analysis of alternative scenarios is sometimes required because higher ambient concentrations may be predicted with lower plume heights, even if emissions are lower as well. However, since an exit velocity of 0.001 m/s was assumed in the modeling to account for the horizontal and downward-facing vents, use of lower flow rates was not possible and maximum impacts would be predicted utilizing the maximum emission rates.

## 3.0 GEP ANALYSES AND BUILDING DIMENSIONS

GEP stack height is the minimum stack height that will prevent a plume from a stack from being entrained in the wake of nearby obstructions. For stacks which are less than GEP height, these downwash effects increase air pollutant concentrations. A GEP analysis was conducted for the two silos and truck mixer. The analysis was conducted following EPA's revised *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulation)* (June 1985).

The GEP formula stack height is defined as follows:

$$H_{GEP} = H_b + 1.5L$$

where $H_{GEP}$ = the formula GEP stack height,
$H_b$ = the nearby building height above stack base height,
L = the lesser of $H_b$ or the maximum projected width of the building, and
nearby = the distance up to 5L within 800 meters of the stack.

Each of the structures listed on the attached Form MI4, Buildings and Structures, and shown on the enclosed site plan was evaluated to determine whether the stacks for the three sources to be modeled were located within the area of influence of (nearby) the structure. These structures include those for the proposed CBP and those for the former CBP located at the site in Osburn. All structures were assumed to have the same base elevation of the stacks included in the modeling. The stacks were determined to be within the influence (within 5L) of seven of the listed structures. These seven structures were the taller tier of the Storage Building by the former CBP, the former CBP Building, the proposed CBP Building, Silos I and II for the proposed CBP, the Aggregate Bin for the proposed CBP, and the Office building. The formula GEP stack height for these seven structures were calculated as 67.5 feet, 127.5 feet, 75 feet, 68 feet, 54 feet, 79.45 feet, and 45 feet, respectively. Thus, the structure resulting in the greatest formula GEP height for all of the stacks modeled was 127.5 feet for the former CBP Building. This building is 50 feet in length, 45 feet in width, and 15.55 meters (51 feet) in height. The maximum projected width for this structure is 67.27 feet. Thus, the structure is squat and the formula GEP stack height is 2.5 times the building height or 127.5 feet (51 x 2.5). In accordance with Section 5.4.4, Building Downwash Parameters, of the *State of Idaho Air Quality Modeling Guidance*, the building with the greatest GEP stack height should be used in the SCREEN3 modeling analysis. Therefore, the proposed CBP building was used in the SCREEN3 modeling of TAPs from the proposed CBP.

## 4.0 SCREEN3 MODELING

The EPA's SCREEN3 model was used for the screening modeling of Zanetti Bros. proposed CBP for both simple and complex terrain. Each of the air emission sources (cement delivery to silo, cement supplement delivery to silo, and truck mixing) was modeled separately, as only one stack can be included in an individual run in the SCREEN3 model. The maximum impacts predicted for each of the three sources were added, without consideration of the location of the maximum impact, for comparison to the AACC for each of the three TAPs.

## 4.1 MODEL OPTIONS

The regulatory default options were selected for the modeling analyses. Fumigation due to inversion break-up was considered but not shoreline fumigation, and rural dispersion was selected as agreed by the DEQ. The model was run for all stability and wind speed categories internal to the model. The ambient temperature will be set to 68°F, and an anemometer height of 10 meters was assumed.

## 4.2 RECEPTOR NETWORK

The receptors listed in the attached table were included in the screening modeling for simple terrain and for complex terrain (including intermediate terrain). Simple terrain receptors were selected based on the distance from Silo I, located between Silo II and the truck mixer vent by plotting circles of radii equal to 50-meter intervals out to one kilometer. A worst-case terrain height was assigned to each radius by identifying the highest elevation (generally to the nearest 10 feet) within the band formed by circles of radii midway between the two adjoining receptor circle radii, and subtracting the base elevation of the stacks. The 100-meter radii to a distance of one kilometer are shown on the enclosed topographic maps.

Much of the Zanetti Bros. property boundary is fenced, as shown in the enclosed site plan. Public access to the facility property is restricted. The closest distance from any of the three stacks to the property boundary of the Zanetti Bros. facility is 122 meters and occurs to the north-northwest near I90. Therefore, the closest receptor was placed at 122 meters in the modeling. Because terrain in this area is slightly less than the base elevation of the stacks, this receptor was assumed to have a zero height above the stack base. The closest residential areas to the stacks are located in a southwesterly direction and terrain heights increase closest to the property in this direction. The closest distance from the stacks to the property boundary in a southwesterly direction is approximately 150 meters. Thus, the second receptor was placed at 150 meters from the stacks. The nearest school (Silver Hills Elementary) is located approximately 700 meters to southeast of the stacks. No school is located to the northwest of the site as shown on the topographic map. As discussed below, the maximum impacts from all three sources was predicted to occur at the receptor closest to the stacks. It is important to note that no terrain heights above stack-top height are allowed for the simple terrain in SCREEN3. Therefore, for each of the sources modeled, terrain heights were set equal to stack-top height for all receptors with heights above stack-top height.

Maximum impacts in areas of complex terrain are often located approximately ten meters below plume centerline height under stable conditions, where plume impaction occurs, because the closest approach distance allowed by the model between the plume centerline and any terrain is ten meters. The SCREEN3 model was used to estimate stable plume heights for each of the stacks. However, for the three stacks modeled, 10 meters below stable plume centerline height was determined to be below stack height. The maximum impacts predicted with the Valley-mode calculation procedures in SCREEN3 were expected to occur at the closest receptor to the stack with a height equal to stack-top height. As the model cannot accept terrain heights equal to or less than stack-top height for the Valley-mode calculations, a receptor was placed at the closest distance to the stacks with a height equal to stack-top height. The height of this closest receptor was set equal to stack-top height plus one foot.

### 4.3 Averaging Periods

The SCREEN3 model predicts one-hour impacts for simple terrain and 24-hour impacts for complex terrain. The impacts for other averaging times must be estimated from these one-hour and 24-hour concentrations. For simple terrain, the maximum annual impacts were calculated by multiplying the maximum predicted one-hour concentration by 0.125 as required by Section 210.03.a.i. of IDAPA 58.01.01.

For the complex terrain receptors (including intermediate terrain), the maximum 24-hour impact was converted to a one-hour average impact by multiplying the 24-hour concentration by a factor of four. If the maximum one-hour impact calculated for complex terrain was greater than the maximum one-hour impact predicted with the simple terrain procedures, then the maximum impact for the annual averaging period would be estimated by applying a factor of 0.125 to the calculated one-hour impact.

## 5.0 MODEL RESULTS

The SCREEN3 model output showed a maximum cavity length of approximately 24 meters or 79 feet. The closest distance to the property boundary of the Zanetti Bros. Osburn facility from the edge of the controlling structure (i.e., the former CBP Building) is 280 feet. Therefore, the cavity region does not extend off property and is not located in ambient air. For this reason, the concentrations predicted by SCREEN3 in the cavity region were not considered in the TAP compliance demonstration.

The results of the SCREEN3 modeling are presented in the attached table. As shown in the table, assuming a unit emission rate, the maximum one-hour average concentrations predicted in simple terrain were greater than those predicted for complex terrain. As expected due to the relatively low stack heights and the downward-facing and horizontal release points, the maximum concentrations were predicted for the receptor closest to the stacks at a distance of 122 meters. The maximum one-hour average concentrations for each air emission source were determined by ratioing the predicted concentration (at a unit emission rate) by the lb/hr emission rates for arsenic, nickel, and chromium VI. The one-hour average concentrations were then summed to obtain a total one-hour impact for each

TAP. Maximum annual impacts for each TAP were then calculated by applying a factor of 0.125 to the maximum one-hour concentrations. As shown in the table, the maximum annual concentrations for the three sources combined were less than the AACCs for each of the three TAPs. Thus, compliance is demonstrated for the proposed CBP.

## SCREEN3 MODEL RESULTS

Zanetti Bros., Inc.
Osburn, Idaho

| Air Emissions Source | Maximum 1-hour Concentration @1 lb/hr ($\mu g/m^3$) | | Emission rate (lb/hr annual average) | | | Maximum 1-hour Concentration ($\mu g/m^3$) | | |
|---|---|---|---|---|---|---|---|---|
| | Complex Terrain | Simple Terrain | Arsenic | Nickel | Chromium VI | Arsenic | Nickel | Chromium VI |
| Cement delivery to silo | 13.20 | 122.34 | 5.35E-09 | 5.27E-08 | 7.31E-09 | 6.55E-07 | 6.45E-06 | 8.94E-07 |
| Cement supplement to silo | 13.26 | 160.19 | 1.88E-07 | 4.28E-07 | 6.86E-08 | 3.01E-05 | 6.86E-05 | 1.10E-05 |
| Truck mixer (loadout) | 13.38 | 183.66 | 4.40E-09 | 1.72E-08 | 3.52E-09 | 8.08E-07 | 3.16E-06 | 6.46E-07 |
| Total 1-hour Average Concentration | | | | | | 3.16E-05 | 7.82E-05 | 1.25E-05 |
| **Total Annual Average Concentration** | | | | | | **3.95E-06** | **9.77E-06** | **1.57E-06** |
| **AACC** | | | | | | **2.3E-04** | **4.2E-03** | **8.3E-05** |

Notes:
1) Maximum 1-hour concentrations for complex terrain were calculated by multiplying the maximum predicted 24-hour concentrations by four.
2) Emission rates were based on emission factors from Table 11.12-8 of AP-42, Section 11.12 Concrete Batching and the maximum annual production rate of 45,000 cubic yards per year.
3) Maximum 1-hour concentrations utilizing actual TAP emission rates were calculated from the maximum 1-hour concentrations predicted by SCREEN3 at one (1) lb/hr in simple terrain because concentrations predicted in simple terrain were greater than concentrations predicted with the Valley-mode procedures for intermediate and complex terrain.
4) Total annual average concentrations were obtained by multiplying the total one-hour average concentrations by a factor of 0.125.

**SCREEN3 RECEPTORS**

Zanetti Bros., Inc.
Osburn, Idaho

| SIMPLE TERRAIN | | |
|---|---|---|
| **Distance (m)** | **Elevation (ft)** | **Height (ft)** |
| 122 | 2525 | -4 |
| 150 | 2540 | 11 |
| 200 | 2542 | 13 |
| 250 | 2547 | 18 |
| 300 | 2549 | 20 |
| 350 | 2552 | 23 |
| 400 | 2560 | 31 |
| 410 | 2579 | 50 |
| 450 | 2660 | 131 |
| 500 | 2760 | 231 |
| 550 | 2880 | 351 |
| 600 | 2950 | 421 |
| 650 | 3010 | 481 |
| 700 | 3040 | 511 |
| 750 | 3100 | 571 |
| 800 | 3140 | 611 |
| 850 | 3180 | 651 |
| 900 | 3240 | 711 |
| 950 | 3270 | 741 |
| 1000 | 3320 | 791 |

| COMPLEX TERRAIN | | |
|---|---|---|
| **Distance (m)** | **Elevation (ft)** | **Height (ft)** |
| 410 | 2580 | 51 |
| 450 | 2660 | 131 |
| 500 | 2760 | 231 |
| 550 | 2880 | 351 |
| 600 | 2950 | 421 |
| 650 | 3010 | 481 |
| 700 | 3040 | 511 |
| 750 | 3100 | 571 |
| 800 | 3140 | 611 |
| 850 | 3180 | 651 |
| 900 | 3240 | 711 |
| 950 | 3270 | 741 |
| 1000 | 3320 | 791 |

Notes:

1) Height is the height above stack base elevation of 2529 feet.
2) Heights greater than stack-top height were assumed equivalent to stack-top height for simple terrain.
3) The closest distance with a height equal to stack-top height was selected as the first complex terrain receptor. The height for that closest receptor was set equal to one foot above stack-top height. The first complex terrain receptor shown is for the cement delivery to the silo. For cement supplement delivery to silo, the first complex terrain receptor was 430 meters with a height of 37 feet. For the truck mixer, the first complex terrain receptor was 369 meters with a height of 26 feet.

# Appendix D – Crushing & Screening Equipment Inventory

Emissions Units - Nonmetallic Mineral Processing Plant **Form EU2**

**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
03/27/07

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

**This form requests information about equipment at a nonmetallic mineral processing plant, as defined in 40 CFR 60.671, that generates fugitive emissions only.**

**In addition, Form EU0 and appropriate control equipment forms should be used for each stack emission point from the same plant.**

| IDENTIFICATION | | |
|---|---|---|
| Company Name: Zanetti Bros., Inc. | Facility Name: Plant Yard | Facility ID No: 079-00004 |
| Brief Project Description: | Concrete Batch Transit Mix Plant, Previously Permitted Rock | |

| 1. Equipment Description | 2. Construction Date | 3. Serial Number | 4. Equipment ID Number (company's) | 5. Rated Capacity | 6. Emission Control Type |
|---|---|---|---|---|---|
| "Grizzly" crusher | Before 1979 | unavailable | unavailable | unavailable | Water Sprays |
| Screen 1 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 1 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 2 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Screen 2 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 3 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Screen 3 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 4 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Screen 4 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 5 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 6 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Screen 5 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 7 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 8 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 9 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 10 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 11 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Cone crusher | Before 1979 | unavailable | unavailable | unavailable | Water Sprays |
| Screen 6 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 12 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 13 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Screen 7 | Before 1979 | unavailable | unavailable | 48 sq. ft. | Water Sprays |
| Conveyor 14 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| Conveyor 15 | Before 1979 | unavailable | unavailable | 30 inches | Water Sprays |
| | | | | | |

| OPERATING SCHEDULE (hours/day, or hours/week, or months/year, or other) | |
|---|---|
| 7. Actual Operation | 10 -12 days/year |
| 8. Maximum Operation | 18 days/year |