

**Statement of Basis  
Concrete Batch Plant General Permit**

**Permit to Construct No. P-2016.0001  
Project ID 61644**

**The Sprinkler Shop dba Hard Core Concrete  
Rupert, Idaho**

**Facility ID 067-00051**

**Final**

**April 18, 2016**  
**Craig Woodruff** *cw*  
**Permit Writer**

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

<b>FACILITY INFORMATION .....</b>	<b>4</b>
Description .....	4
Permitting History .....	4
Application Scope .....	4
Application Chronology .....	4
<b>TECHNICAL ANALYSIS .....</b>	<b>5</b>
Emissions Units and Control Equipment .....	5
Emissions Inventories .....	6
Ambient Air Quality Impact Analyses .....	13
<b>REGULATORY ANALYSIS.....</b>	<b>13</b>
Attainment Designation (40 CFR 81.313) .....	13
Facility Classification.....	13
Permit to Construct (IDAPA 58.01.01.201).....	14
Tier II Operating Permit (IDAPA 58.01.01.401) .....	14
Visible Emissions (IDAPA 58.01.01.625) .....	14
Fugitive Emissions (IDAPA 58.01.01.650) .....	14
Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701) .....	15
Rules for Control of Odors (IDAPA 58.01.01.775).....	15
Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70).....	15
PSD Classification (40 CFR 52.21) .....	16
NSPS Applicability (40 CFR 60).....	16
NESHAP Applicability (40 CFR 61) .....	16
MACT Applicability (40 CFR 63).....	16
Permit Conditions Review .....	16
<b>PUBLIC REVIEW.....</b>	<b>17</b>
Public Comment Opportunity .....	17
<b>APPENDIX A – EMISSIONS INVENTORIES.....</b>	<b>18</b>
<b>APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES.....</b>	<b>19</b>

## ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
Btu	British thermal units
CAA	Clean Air Act
CBP	concrete batch plant
CFR	Code of Federal Regulations
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	CO <sub>2</sub> equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NSPS	New Source Performance Standards
PAH	polyaromatic hydrocarbons
PM	particulate matter
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
PW	process weight rate
<i>Rules</i>	<i>Rules for the Control of Air Pollution in Idaho</i>
scf	standard cubic feet
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxides
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
VOC	volatile organic compounds
yd <sup>3</sup>	cubic yards
µg/m <sup>3</sup>	micrograms per cubic meter

## **FACILITY INFORMATION**

### ***Description***

The Sprinkler Shop dba Hard Core Concrete has proposed a new stationary truck mix concrete batch plant consisting of aggregate stockpiles, a cement storage silo, a cement supplement (fly ash) storage silo, a weigh batcher, and conveyors. The facility combines aggregate, sand, fly ash, and cement and then transfers the mixture into a truck mixer, along with water, for in-transit mixing of the concrete. In addition, water heater(s) are used to heat the water in cold weather prior to use for the mixing of concrete.

The Applicant has proposed that line power will be used exclusively at the facility. Therefore, no IC engines powering electrical generators were included in the application.

### ***Permitting History***

This is the initial PTC for a new facility thus there is no permitting history.

### ***Application Scope***

This is the initial PTC for a new facility.

The concrete batch plant will be fed a mixture of aggregates from imported aggregate.

The process begins with materials being fed via front end loader to a compartment bin feeder system and then dispensed in metered proportions to a collecting conveyor. The material will pass over a scalping screen before being conveyed into the truck mixer.

Particulate emissions will be controlled by maintaining the moisture content at 1.5% by weight for all ¼ in and smaller aggregate feed materials via water sprays.

The Applicant has proposed concrete production rate throughput limits of 120 cubic yards per hour, 1,500 cubic yards per day, and 100,000 cubic yards per year.

### ***Application Chronology***

December 14, 2015	DEQ received an application, an application fee, and a processing fee.
January 25, 2016	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
February 2, 2016	DEQ determined that the application was complete.
April 12, 2016	DEQ made available the draft permit and statement of basis for peer and regional office review.
April 12, 2016	DEQ made available the draft permit and statement of basis for applicant review.
April 18, 2016	DEQ issued the final permit and statement of basis.

# TECHNICAL ANALYSIS

## Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
Materials Handling	<u>Material Transfer Points:</u> Materials handling Concrete aggregate transfers Truck unloading of aggregate Aggregate conveyor transfers Aggregate handling	Maintaining the moisture content in ¼" or smaller aggregate material at 1.5% by weight, using water sprays, using shrouds, or other emissions controls	N/A
Concrete Mixer	<u>Concrete Batch Plant – Truck Mix:</u> Manufacturer: St. Mark Material Model: Transit mix 120 Manufacture Date: 10/1/15 Max. production: 120 yd <sup>3</sup> /hr, 1100 yd <sup>3</sup> /day, and 100,000 yd <sup>3</sup> /yr  <u>Cement Storage Silo:</u> Baghouse Manufacturer <sup>a</sup> : Lam Model: BV-5  <u>Fly Ash Storage Silo:</u> Baghouse Manufacturer <sup>a</sup> : Lam Model: BV-5	<u>Cement Storage Silo Baghouse:</u> Manufacturer: Lam Model: BV-5 PM <sub>10</sub> /PM <sub>2.5</sub> control efficiency: 99%  <u>Fly Ash Storage Silo Baghouse:</u> Manufacturer: Lam Model: BV-5 PM <sub>10</sub> /PM <sub>2.5</sub> control efficiency: 99%  <u>Weigh Batchers Baghouse:</u> Manufacturer: Wam Model: CT1000 PM <sub>10</sub> /PM <sub>2.5</sub> control efficiency: 99%  <u>Truck Load-out Shroud:</u> Control: Shroud with a water-ring PM <sub>10</sub> /PM <sub>2.5</sub> control efficiency: 80%  <u>Material Transfer Points:</u> Control: Industry specific water sprays PM <sub>10</sub> /PM <sub>2.5</sub> control efficiency: 75%	<u>Cement Storage Silo Baghouse Exhaust:</u> Exit height: 64 ft (19.5 m) Exit diameter: 2.0 ft (0.61 m) Exit flow rate: 1200 acfm Exit temperature: ambient  <u>Fly Ash Silo Baghouse Exhaust:</u> Exit height: 64 ft (19.5 m) Exit diameter: 2.0 ft (0.61 m) Exit flow rate: 1200 acfm Exit temperature: ambient  <u>Weigh Batchers Baghouse Exhaust:</u> Exit height: 20 ft (6.10 m) Exit diameter: 2.0 ft (0.61 m) Exit flow rate: 1000 acfm Exit temperature: ambient
Water Heater	<u>Water Heater No 1:</u> Manufacturer: NATCO Model: F85H100NACK Heat input rating: 1.0 MMBtu/hr Fuel: Natural Gas	N/A	<u>Boiler Exhaust:</u> Exit height: 16 ft (4.88 m) Exit diameter: 0.69 ft (0.21 m) Exit flow rate: 370 acfm Exit temperature: 200 °F (93.3 °C)
Water Heater	<u>Water Heater No 2:</u> Manufacturer: NATCO Model: F85H100NACK Heat input rating: 1.0 MMBtu/hr Fuel: Natural Gas	N/A	<u>Boiler Exhaust:</u> Exit height: 16 ft (4.88 m) Exit diameter: 0.69 ft (0.21 m) Exit flow rate: 370 acfm Exit temperature: 200 °F (93.3 °C)

- a. Both the storage silo baghouse and supplement storage silo flyash baghouse are considered process equipment and therefore there is no associated control efficiency. Controlled PM<sub>10</sub> emission factors were used when determining PTE and for modeling purposes.

## ***Emissions Inventories***

### **Potential to Emit**

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit an emission inventory was developed for the concrete batch plant operations at the facility associated with this proposed project using the DEQ developed CBP EI spreadsheet (see Appendix A). Emissions estimates of criteria pollutant PTE were based on the following assumptions:

- Maximum concrete throughput does not exceed 120 yd<sup>3</sup>/hour, 1,500 yd<sup>3</sup>/day, and 100,000 yd<sup>3</sup>/year (per the Applicant).
- Baghouse control efficiencies were assumed to be 99.0%.
- Fugitive emissions of particulate matter (PM), PM<sub>10</sub>, and PM<sub>2.5</sub> from the concrete batch plant material transfer points were assumed to be controlled by manual water sprays, sprinklers, or spray bars, or an equivalent method that reduce PM emissions by an estimated 75%. The assumed 75% control efficiency is based on the Western Regional Air Partnership Fugitive Dust Handbook. According to the Handbook, water suppressant of material handling can range from 50-90% control. Assuming the average of 70% and including another 5% due to Best Management Practices required by the permit allow for 75% control to be a conservative estimate.
- Aggregate is washed before delivery to the concrete batch plant site, and water is used on-site to control the temperature of the aggregate. Particulate matter and PM<sub>10</sub> emissions from the weigh batcher transfer point are controlled by a baghouse and truck mix load-out emissions are controlled by a shroud with a water -ring. Capture efficiency of the truck mix load-out boot with water ring or equivalent was estimated at 80%.
- Controlled emissions of particulate toxic air pollutants (TAPs) were estimated based on the presence of a baghouse on the cement/cement supplement silos, a baghouse/cartridge on the weigh batcher, and 80% control for truck load-out emissions. Hexavalent chromium content was estimated at 20% of total chromium for cement, and 30% of total chromium for the cement supplement/fly ash. The hexavalent chromium percentages were taken from a University of North Dakota study, by the Energy and Environmental Research Center, Center for Air Toxic Metals. Detailed emissions calculations can be found in Appendix A of this document.
- Determining emissions from a concrete batch plant also includes transfer emissions from the number of drop points throughout the process. The PM<sub>10</sub> emissions from truck-mix loading operations are defined by an equation which includes the wind speed at each drop point and the moisture content of cement and cement supplement and a number of exponents and constants defined by AP-42 Equation 11.12-1(6/06). An average value of wind speed and moisture content are 7 mph and 6%, respectively<sup>1</sup>. The following equation of particulate emissions is specific to PM<sub>10</sub>. The resulting emissions were used to determine a factor to help evaluate wind speed variations in AERMOD modeling.

---

<sup>1</sup> 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006. This data is from the Western Regional Climate Center (<http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO>). 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises. The percentages used in AP-42 are typical for most concrete batching operations.

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

Where:

k = particle size multiplier

a = exponent

b = exponent

c = constant

U = mean wind speed

M = moisture content

- The second transfer emissions calculations were used to determine conveyor emissions. For both coarse and fine aggregate to a conveyor. It was assumed that 82% or 164 cy/hr of the concrete produced was aggregate. This percentage was based on 1,865 lb coarse aggregate, 1,428 lb sand, 564 lb cement/supplement and 167 lb water for a total of 4,024 lb concrete as defined by AP-42 Table 11.12-5 (06/06). The fine and coarse aggregate contributions were separated into 36% and 46% of the total concrete production<sup>2</sup>. Employing emission factors from AP-42 Table 11.12-5 (6/06) for conveyor transfer and assuming 75% control efficiency as stated earlier for conveyor transfer PM<sub>10</sub> emissions were calculated for each transfer point. For both fine and coarse aggregate the facility has 3 transfer points.
- Any emissions unit outside a 1,000 ft radius from the concrete batch plant was not included in the emissions modeling analysis for this project.

### Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a “Synthetic Minor” source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

The following table presents the uncontrolled Potential to Emit for regulated air pollutants from all emissions units at the facility as determined by DEQ staff using the DEQ Concrete Batch Plant EI spreadsheet. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this operation uncontrolled Potential to Emit is calculated with 0% control efficiency for the Concrete Batch Plant itself.

**Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS**

Source	PM <sub>10</sub> /PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	CO <sub>2</sub> e
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
<b>Point Sources</b>						
Concrete batch plant <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A
Water Heater No. 1	0.011	0.000882	0.147	0.124	0.008	178
Water Heater No. 2	0.011	0.000882	0.147	0.124	0.008	178
Materials handling	0.19	N/A	N/A	N/A	N/A	N/A
<b>Total, Point Sources</b>	<b>0.21</b>	<b>0.00</b>	<b>0.29</b>	<b>0.25</b>	<b>0.02</b>	<b>356</b>

a.) PM<sub>10</sub>/PM<sub>2.5</sub> emissions from the concrete batch plant are considered fugitive emissions and are therefore not included in the Potential to Emit.

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

The following table presents the uncontrolled Potential to Emit for HAP pollutants from all emissions units at the facility as determined by DEQ staff using the DEQ Concrete Batch Plant EI spreadsheet. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this operation uncontrolled Potential to Emit is calculated with 0% control efficiency for the Concrete Batch Plant itself.

**Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS**

IDAPA Listing	Hazardous Air Pollutants	PTE (T/yr)
585	Acrolein	0.00
	Chromium metal (II and III)	1.66E-04
	Cobalt metal dust, and fume	1.85E-07
	Ethyl benzene	0.00
	Hexane	3.97E-03
	Manganese as Mn (fume)	8.66E-04
	Mercury (alkyl compounds as Hg)	5.74E-07
	Methyl chloroform	0.00
	Naphthalene	2.24E-04
	Phosphorous	5.48E-04
	Propionaldehyde	0.00
	Quinone	0.00
	Selenium	3.71E-05
	Toluene	7.50E-06
Xylene	0.00	
586	Acetaldehyde	0.00
	Arsenic	1.74E-04
	Benzene	4.83E-07
	Benzo(a)pyrene	2.76E-10
	Beryllium and compounds	3.61E-06
	1,3-Butadiene	0.00
	Cadmium and compounds	3.61E-06
	Chromium (VI)	3.50E-05
	Formaldehyde	1.72E-05
	3-Methylcholanthrene	4.14E-10
Nickel	1.73E-04	
Not listed	Acenaphthene	4.14E-10
	Acenaphthylene	4.14E-10
	Anthracene	5.52E-10
	Benzo(b)fluoranthene	4.14E-10
	Benzo(k)fluoranthene	4.14E-10
	Benzo(e)pyrene	0.00
	Benzo(g,h,i)perylene	2.76E-10
	Chrysene	4.14E-10
	Dibenzo(a,h)anthracene	2.76E-10
Isooctane	0.00	
<b>Total</b>		<b>0.0062</b>

### Pre-Project Potential to Emit

Pre-project Potential to Emit is used to establish the change in emissions at a facility as a result of this project.

This is a new facility. Therefore, pre-project emissions are set to zero for all criteria pollutants.

### Post Project Potential to Emit

Post project Potential to Emit is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post project Potential to Emit includes all permit limits resulting from this project.

The following table presents the post project Potential to Emit for criteria and GHG pollutants from all emissions units at the facility as determined by DEQ staff using the DEQ Concrete Batch Plant EI spreadsheet. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

**Table 4 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS**

Source	PM <sub>10</sub> /PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO		VOC		CO <sub>2e</sub>
	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	T/yr <sup>(b)</sup>
Concrete batch plant <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Heater No. 1	0.007	0.011	0.000588	0.000882	0.098	0.147	0.082	0.124	0.005	0.008	178
Water Heater No. 2	0.007	0.011	0.000588	0.000882	0.098	0.147	0.082	0.124	0.005	0.008	178
Materials handling	0.24	0.19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Post Project Totals</b>	<b>0.25</b>	<b>0.21</b>	<b>0.00</b>	<b>0.00</b>	<b>0.20</b>	<b>0.29</b>	<b>0.16</b>	<b>0.25</b>	<b>0.01</b>	<b>0.02</b>	<b>356</b>

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.

b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

c) PM<sub>10</sub>/PM<sub>2.5</sub> emissions from the concrete batch plant are considered fugitive emissions and are therefore not included in the Potential to Emit.

### Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

**Table 5 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS**

Source	PM <sub>10</sub> /PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO		VOC		CO <sub>2e</sub>
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	T/yr
Pre-Project Potential to Emit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Potential to Emit	0.25	0.21	0.00	0.00	0.20	0.29	0.16	0.25	0.01	0.02	356
<b>Changes in Potential to Emit</b>	<b>0.25</b>	<b>0.21</b>	<b>0.00</b>	<b>0.00</b>	<b>0.20</b>	<b>0.29</b>	<b>0.16</b>	<b>0.25</b>	<b>0.01</b>	<b>0.02</b>	<b>356</b>

### Non-Carcinogenic TAP Emissions

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table. Pre-project non-carcinogenic TAP emissions are set to zero because this is an initial permit to construct:

**Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS**

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Acrolein	0.0	0.00E-03	0.0000	0.017	No
Barium	0.0	6.47E-06	0.000006	2	No
Chromium metal (II and III)	0.0	6.14E-05	0.00006	0.033	No
Cobalt metal dust, and fume	0.0	1.24E-07	0.0000001	0.0033	No
Copper (fume)	0.0	1.25E-06	0.00000125	0.013	No
Ethyl benzene	0.0	0.00E-03	0.0000	29	No
Hexane	0.0	2.65E-03	0.0027	12	No
Manganese as Mn (fume)	0.0	2.22E-04	0.0002	0.067	No
Mercury (alkyl compounds as Hg)	0.0	3.82E-07	0.0000004	0.001	No
Methyl chloroform	0.0	0.00E-03	0.0000	127	No
Methyl ethyl ketone (MEK)	0.0	0.00E-03	0.0000	39.3	No
Molybdenum (soluble)	0.0	1.62E-06	0.000002	0.333	No
Naphthalene	0.0	1.50E-04	0.0002	3.33	No
Pentane	0.0	2.35E-03	0.0024	118	No
Phosphorous	0.0	1.90E-04	0.0002	0.007	No
Propionaldehyde	0.0	0.00E-03	0.0000	0.0287	No
Quinone	0.0	0.00E-03	0.0000	0.027	No
Selenium	0.0	9.44E-06	0.0000094	0.013	No
Toluene	0.0	5.00E-06	0.000005	25	No
Vanadium as V <sub>2</sub> O <sub>5</sub> , (respirable dust and fume)	0.0	3.38E-06	0.0000034	0.003	No
Xylene	0.0	0.00E-03	0.0000	29	No
Zinc metal	0.0	4.26E-05	0.000043	0.667	No

None of the PTEs for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

## Carcinogenic TAP Emissions

Pre- and post-project, as well as the change in, carcinogenic TAP emissions are presented in the following table. Pre-project carcinogenic TAP emissions are set to zero because this is an initial permit to construct:

**Table 8 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS**

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Acetaldehyde	0.00E-03	0.00E-03	0.0000	3.0E-03	No
Arsenic	0.00E-03	8.42E-06	0.000008	1.5E-06	Yes
Benzene	0.00E-03	1.41E-06	0.0000014	8.0E-04	No
Benzo(a)pyrene	0.00E-03	8.06E-10	0.0000000008	2.0E-06	No
Beryllium and compounds	0.00E-03	2.04E-07	0.0000002	2.8E-05	No
1,3-Butadiene	0.00E-03	0.00E-03	0.000000	2.4E-05	No
Cadmium and compounds	0.00E-03	1.42E-06	0.000001	3.7E-06	No
Chromium (VI)	0.00E-03	1.73E-06	0.000002	5.6E-07	Yes
Formaldehyde	0.00E-03	5.04E-05	0.0001	5.1E-04	No
3-Methylcholanthrene	0.00E-03	1.21E-09	0.000000001	2.5E-06	No
Nickel	0.00E-03	1.01E-05	0.000010	2.7E-05	No
PAHs Total	0.00E-03	7.66E-09	0.0000	2.0E-06	No
POM Total	0.00E-03	7.66E-09	0.00000001	2.0E-06	No
<b>Non-Listed (in 586) PAHs</b>					
2-Methylnaphthalene	0.00E-03	1.61E-08	0.00000002	9.10E-05	No
Acenaphthene	0.00E-03	1.21E-09	0.00000000	9.10E-05	No
Acenaphthylene	0.00E-03	1.21E-09	0.00000000	9.10E-05	No
Anthracene	0.00E-03	1.61E-09	0.00000000	9.10E-05	No
Benzo(g,h,i)perylene	0.00E-03	8.06E-10	0.00000000	9.10E-05	No
Dichlorobenzene	0.00E-03	8.06E-07	0.00000081	9.10E-05	No
Fluoranthene	0.00E-03	2.01E-09	0.00000000	9.10E-05	No
Fluorene	0.00E-03	1.88E-09	0.00000000	9.10E-05	No
Naphthalene (Annual)	0.00E-03	4.10E-07	0.00000041	9.10E-05	No
Phenanthrene	0.00E-03	1.14E-08	0.00000001	9.10E-05	No
Pyrene	0.00E-03	3.36E-09	0.00000000	9.10E-05	No

a) Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

Some of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for arsenic and chromium (VI) because the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

**Post Project HAP Emissions**

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

**Table 9 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY**

<b>IDAPA Listing</b>	<b>Hazardous Air Pollutants</b>	<b>PTE (T/yr)</b>
585	Acrolein	0.00
	Chromium metal (II and III)	3.78E-05
	Cobalt metal dust, and fume	1.85E-07
	Ethyl benzene	0.00
	Hexane	3.97E-03
	Manganese as Mn (fume)	1.75E-04
	Mercury (alkyl compounds as Hg)	5.74E-07
	Methyl chloroform	0.00
	Naphthalene	2.24E-04
	Phosphorous	1.15E-04
	Propionaldehyde	0.00
	Quinone	0.00
	Selenium	7.57E-06
Toluene	7.50E-06	
Xylene	0.00	
586	Acetaldehyde	0.00
	Arsenic	3.63E-05
	Benzene	4.83E-07
	Benzo(a)pyrene	2.76E-10
	Beryllium and compounds	8.62E-07
	1,3-Butadiene	0.00
	Cadmium and compounds	3.22E-06
	Chromium (VI)	7.58E-06
	Formaldehyde	1.72E-05
	3-Methylcholanthrene	4.14E-10
Nickel	3.87E-05	
Not listed	Acenaphthene	4.14E-10
	Acenaphthylene	4.14E-10
	Anthracene	5.52E-10
	Benzo(b)fluoranthene	4.14E-10
	Benzo(k)fluoranthene	4.14E-10
	Benzo(e)pyrene	0.00
	Benzo(g,h,i)perylene	2.76E-10
	Chrysene	4.14E-10
	Dibenzo(a,h)anthracene	2.76E-10
Isooctane	0.00	
<b>Total</b>	<b>0.0046</b>	

The estimated PTE for all federally listed HAPs combined is below 25 T/yr and no PTE for a federally listed HAP exceeds 10 T/yr. Therefore, this facility is not a Major Source for HAPs.

## **Ambient Air Quality Impact Analyses**

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, VOC, HAP, and TAP from this project were below applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline<sup>3</sup>. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix B.

An ambient air quality impact analysis document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

As a result of the ambient air quality impact analysis, as well as information submitted by the Applicant for specific operating scenarios, the following conditions (along with corresponding monitoring and record keeping requirements) were placed in the permit:

- The Emissions Limits permit condition,
- The Concrete Production Limits permit condition,

## **REGULATORY ANALYSIS**

### **Attainment Designation (40 CFR 81.313)**

The facility is located in Minidoka County, which is designated as attainment or unclassifiable for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

### **Facility Classification**

The AIRS/AFS facility classification codes are as follows:

For THAPs (Total Hazardous Air Pollutants) Only:

- A = Use when any one HAP has actual or potential emissions  $\geq 10$  T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions  $\geq 25$  T/yr.
- SM80 = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the permit sets limits  $\geq 8$  T/yr of a single HAP or  $\geq 20$  T/yr of THAP.
- SM = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the potential HAP emissions are limited to  $< 8$  T/yr of a single HAP and/or  $< 20$  T/yr of THAP.
- B = Use when the potential to emit without permit restrictions is below the 10 and 25 T/yr major source threshold
- UNK = Class is unknown

---

<sup>3</sup> Criteria pollutant thresholds in Table 1, State of Idaho Air Quality Modeling Guideline, Doc ID AQ-011, rev. 1, December 31, 2002.

For All Other Pollutants:

- A = Actual or potential emissions of a pollutant are  $\geq 100$  T/yr.
- SM80 = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are  $\geq 80$  T/yr.
- SM = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are  $< 80$  T/yr.
- B = Actual and potential emissions are  $< 100$  T/yr without permit restrictions.
- UNK = Class is unknown.

**Table 60 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION**

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	0.42	0.42	100	B
PM <sub>10</sub> /PM <sub>2.5</sub>	0.21	0.21	100	B
SO <sub>2</sub>	0.00	0.00	100	B
NO <sub>x</sub>	0.29	0.29	100	B
CO	0.25	0.25	100	B
VOC	0.02	0.02	100	B
HAP (single)	3.97 E-03	3.97E-03	10	B
HAP (Total)	0.0062	0.0046	25	B

**Permit to Construct (IDAPA 58.01.01.201)**

IDAPA 58.01.01.201 Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the concrete batch plant including a transit mix 120, a cement storage silo baghouse, a cement supplement (fly ash) storage baghouse, a weigh batcher baghouse, two natural gas fired water heaters, aggregate stockpiles, and conveyors. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

**Tier II Operating Permit (IDAPA 58.01.01.401)**

IDAPA 58.01.01.401 Tier II Operating Permit

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

**Visible Emissions (IDAPA 58.01.01.625)**

IDAPA 58.01.01.624 Visible Emissions

The sources of PM<sub>10</sub> emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 3.4.

**Fugitive Emissions (IDAPA 58.01.01.650)**

IDAPA 58.01.01.650 Rules for the Control of Fugitive Emissions

The sources of fugitive emissions at this facility are subject to the State of Idaho fugitive emissions standards. These requirements are assured by Permit Conditions 2.1, 2.2, and 2.4.

## **Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)**

IDAPA 58.01.01.701

Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment's process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 and IDAPA 58.01.01.702 establish PM emission limits for equipment that commenced operation on or after October 1, 1979 and for equipment operating prior to October 1, 1979, respectively.

For equipment that commenced operation on or after October 1, 1979, the PM allowable emission rate (E) is based on one of the following four equations:

$$\text{IDAPA 58.01.01.701.01.a: If PW is } < 9,250 \text{ lb/hr; } E = 0.045 (PW)^{0.60}$$

$$\text{IDAPA 58.01.01.701.01.b: If PW is } \geq 9,250 \text{ lb/hr; } E = 1.10 (PW)^{0.25}$$

For equipment that commenced prior to October 1, 1979, the PM allowable emission rate is based on one of the following equations:

$$\text{IDAPA 58.01.01.702.01.a: If PW is } < 17,000 \text{ lb/hr; } E = 0.045 (PW)^{0.60}$$

$$\text{IDAPA 58.01.01.702.01.b: If PW is } \geq 17,000 \text{ lb/hr; } E = 1.12 (PW)^{0.27}$$

As discussed previously in the Emissions Inventory Section, concrete has a density of 4,024 lb per cubic yard. Thus, for the new Concrete Batch Plant proposed to be installed as a result of this project with a proposed throughput of 120 y<sup>3</sup>/hr, E is calculated as follows:

$$\text{Proposed throughput} = 4,024 \text{ lb per cubic yard} \times 120 \text{ y}^3/\text{hr} = 482,880 \text{ lb/hr}$$

Therefore, E is calculated as:

$$E = 1.10 \times PW^{0.25} = 1.10 \times (482,880)^{0.25} = 29.0 \text{ lb-PM/hr}$$

As presented previously in the Emissions Inventories Section of this evaluation the post project PTE for this emissions unit is 0.41 lb-PM<sub>10</sub>/hr. Assuming PM is 50% PM<sub>10</sub> means that PM emissions will be 0.82 lb-PM/hr (0.41 lb-PM<sub>10</sub>/hr ÷ 0.5 lb-PM<sub>10</sub>/lb-PM). Therefore, compliance with this requirement has been demonstrated.

## **Rules for Control of Odors (IDAPA 58.01.01.775)**

IDAPA 58.01.01.750

Rules for Control of Odors

Section 776.01 states that no person shall allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution. These requirements are assured by Permit Conditions 2.3 and 2.5.

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

IDAPA 58.01.01.301

Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for all criteria pollutants or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

### ***PSD Classification (40 CFR 52.21)***

40 CFR 52.21

Prevention of Significant Deterioration of Air Quality

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

### ***NSPS Applicability (40 CFR 60)***

The facility is not subject to any NSPS requirements 40 CFR Part 60.

### ***NESHAP Applicability (40 CFR 61)***

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

### ***MACT Applicability (40 CFR 63)***

The facility is not subject to any MACT requirements 40 CFR Part 60.

### ***Permit Conditions Review***

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Permit condition 1.1 establishes the permit to construct scope.

Permit condition, Table 1.1, provides a description of the purpose of the permit and the regulated sources, the process, and the control devices used at the facility.

### ***Facility-Wide Conditions***

As discussed previously, permit condition 2.1 establishes that the permittee shall take all reasonable precautions to prevent fugitive particulate matter (PM) from becoming airborne and provides examples of the controls in accordance with IDAPA 58.01.01.650-651.

As discussed previously, permit condition 2.2 establishes that the concrete batch plant shall employ efficient fugitive dust controls and provides examples of the controls in accordance with IDAPA 58.01.01.808.01 and 808.02.

As discussed previously, permit condition 2.3 establishes that there are to be no emissions of odorous gases, liquids, or solids from the permit equipment into the atmosphere in such quantities that cause air pollution.

As discussed previously, permit condition 2.4 establishes that the permittee shall monitor fugitive dust emissions on a daily basis to demonstrate compliance with the facility-wide permit requirements.

As discussed previously, permit condition 2.5 establishes that the permittee monitor and record odor complaints to demonstrate compliance with the facility-wide permit requirements.

Permit Condition 2.6 establishes that the permittee shall maintain records as required by the Recordkeeping General Provision.

## **Concrete Batch Plant Equipment**

Permit condition 3.1 provides a process description of the concrete production process at this facility.

Permit condition 3.2 provides a description of the control devices used on the concrete production equipment at this facility.

Permit condition 3.3 establishes hourly and annual emissions limits for PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and VOC emissions from the concrete production operation at this facility.

As discussed previously, Permit Condition 3.4 establishes a 20% opacity limit for the concrete batch plant baghouse and the boiler stacks or functionally equivalent openings associated with the concrete production operation.

Permit Condition 3.5 establishes an hourly, a daily, and an annual concrete production limit for the concrete production operation as proposed by the Applicant.

Permit condition 3.6 requires that the Applicant employ a boot with a water ring to control emissions from the truck loadout operation as proposed by the Applicant.

Permit condition 3.7 requires that the Applicant employ industry specific water sprays on material transfer points to control fugitive emissions as proposed by the Applicant.

Permit condition 3.8 establishes that the Permittee monitor and record hourly and daily concrete production to demonstrate compliance with the Concrete Production Limits permit condition.

Permit condition 3.9 establishes that the Permittee shall establish procedures for operating the baghouse. This is a DEQ imposed standard requirement for operations using baghouses to control particulate emissions.

Permit Condition 3.10 establishes that the permittee shall maintain records as required by the Recordkeeping General Provision.

## **PUBLIC REVIEW**

### ***Public Comment Opportunity***

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c or IDAPA 58.01.01.404.01.c. During this time, there were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

## APPENDIX A – EMISSIONS INVENTORIES

## Data Input Tab

Note: All blue text is meant to be edited by the processing engineer.

- 1 Enter the facility information in the "Facility Information" boxes.
- 2 Enter the concrete production rates that were applied for. Note: The hourly limit may be any value but the daily and annual rates are limited to the appropriate pulldown menu items.
- 3 Enter the daily operating hours for the facility.
- 4 Select "T" or "C" as the type of facility. "T" represents truck mix and "C" represents central mix  
The fugitive control efficiency can either be 75% or 95%. 0% is used to calculate uncontrolled emissions.  
75% Fugitive Control assumes typical Best Management Practices like those identified in IDAPA 58.01.01.650-651.  
95% Fugitive Control assumes typical control methods such as limiting dust from traffic, enclosed aggregate piles, and covering or suppressing piles.  
This amount of control also assumes that no visible emissions will occur at the property boundary.  
Truck loadout control efficiency can be either 70% or 95%.  
70% Control Loadout assumes a boot shroud or enclosure with 70% control efficiency during truck loadout.  
95% Control Loadout assumes a boot shroud and a water ring spray system.  
As an alternative, the facility can choose to route truck loadout emissions to a baghouse.
- 5 Select the dropdown stating whether or not a water heater will be used onsite.  
If the selected answer is "Yes", fill out the remainder of the section. The facility may have up to two water heaters up to a heating input rating less than 10 MMBtu  
Select the appropriate fuel type for each heater and enter the rating of each unit. Remember to set all heaters not used to fuel type "N/A"  
Enter the annual operating hours of the heaters. Note: It assumed that they will operate simultaneously.
- 6 Select the dropdown stating whether or not an engine will be used as an electrical power source at the facility.  
If the selected answer is "Yes", enter the make, model, and the horsepower of the engine.  
The EPA certification rating needs to be entered as well.  
Enter a zero if there is only one engine. For example, if there is only a 1,000 bhp engine, enter "0" as the rating for the small engine.  
Enter a negative one (-1) if there is only one engine. For example, if there is only a 1,000 bhp engine, enter -1 as the certification for the small engine.  
The facility may have up to 2 small engines (<=600 bhp) and one large engine (>600 bhp).  
Enter the number of operating hours for each engine.
- 7 Enter the number of transfer points at the facility; the default value is two (2).

## CBP Criteria Tab

- 9 Daily and annual throughput is restricted to specific amounts defined in the pulldown menu.  
The daily throughput may be any of the four options but the annual throughput is limited to 150,000 cy/yr (General Permit assumption).
- 10 Depending on the data inputs, emissions are calculated for all criteria and TAP emissions associated with the concrete batch plant.  
Note that 20% Chromium VI is used for cement and 30% Cr 6+ is used for the supplement or flyash

## EI-Nat Gas Water Heater Tab

- 11 Natural Gas Water Heater - Limited to only natural gas as a fuel source.  
If two heaters are selected and both are natural gas, the rating will be additive.  
If the water heater being used is not natural gas-fired the hr/day and hr/yr should both be set to zero

## EI-Diesel Water Heater Tab

- 12 Diesel water heater - Limited to only 15 ppm sulfur content ASTM disillate fuel.  
If two heaters are selected and both are diesel-fired, the rating will be additive.  
If the water heater being used is not diesel-fired the hr/day and hr/yr should both be set to zero

## Propane Water Heater Tab

- 13 Propane water heater - Limited to only propane as a fuel source  
If two heaters are selected and both are propane, the rating will be additive.  
If the water heater being used is not propane-fired the hr/day and hr/yr should both be set to zero

## IC Engine Input Tab

- 14 This section reiterates the input parameters and makes a few calculations associated with the IC engine.

## Large and Small IC Engine Emissions Tabs

- 15 This tab displays the emissions associated with the IC engines. These emissions assume worst case scenario. There is no user input here.

## GHG Emissions

- 16 This tab displays the emissions associated with the generator. These emissions assume worst case scenario. There is no user input here.

## Transfer Points Tab

- 17 The number of transfer points may be updated by the user and is highlighted in blue. The default assumes 2.

## Final EI Tab

- 18 This tab provides the total emissions for the facility.

## Data Input

### 1. Facility Information

Facility Name:	The Sprinkler Shop Inc.
Facility ID:	067-00051
Permit and Project No.:	P-2016.0001 Project 61644
Source Type:	Concrete Batch Plant
Manufacturer/Model:	St. Mark Materials/ Transit mix 120

### 2. Concrete Production Rates

Maximum Hourly Concrete Production Rate:	120		
Proposed Daily Concrete Production Rate:	1,500	cy/day	12.50
Proposed Maximum Annual Concrete Production Rate:	100,000	cy/year	hr/day

### 3. Daily Operating Hours

Maximum daily hours of operation for facility?	18
--	----

### 4. Concrete Batch Plant Specifications

Is the facility type a truck mix (T) or central mix (C)?	T
What level of PM control is used for loadout, either Truck or Central?	80%
What level of PM control is used for fugitive emissions?	75%

### 5. Water Heater Usage

Does this facility use a water heater?	Yes		
How many units?	2	Heat Input Rating	
What type of fuel, Diesel, Natural Gas or Propane for unit 1?	Natural Gas	1	MMBtu/hr
If multiple units, what type of fuel, Diesel, Natural Gas or Propane for unit 2?	Natural Gas	1	MMBtu/hr
Are you assuming continual operations throughout the year?	No		
Maximum annual hours of water heater operation? (If assuming continual operation, enter 8,760)	3000		

### 6. Internal Combustion Engine(s)

Are internal combustion engines used to provide electrical power at the facility?	No
How many small engines (less than or equal to 600 bhp) are being used at the facility?	0
Horsepower rating of small engine #1 (<=600 bhp)? (If no engine enter 0)	0
Horsepower rating of small engine #2 (<=600 bhp)? (If no engine enter 0)	0
Horsepower rating of large engine (greater than 600 bhp)? (If no engine enter 0)	0

Note: If there is no small or large engine enter -1 for the certification

	Small IC Engine #1	Small IC Engine #2	Large IC Engine
Select the EPA Certification:	-1	-1	-1
Not an EPA-certified IC engine: Enter "0" (zero)			
Certified Tier 1, Tier 2, Tier 3, or Tier 4 IC engine: Enter 1, 2, 3, or 4			
Certified "BLUE SKY" IC engine: Enter 5			

Enter the annual operating hours for the small IC engine(s)	0
Enter the annual operating hours for the large IC engine	0

### 7. Transfer Points

Enter the total number of transfer points in the facility? (2 is the default)	3
---	---

CRITERIA POLLUTANT EMISSION INVENTORY for Portable Concrete Batch Plant

4/13/16 10:54

<b>Facility Information</b>		<b>Assumptions Implied or Stated in Application:</b>	
Company: Facility ID: Permit and Project No.: Source Type: Manufacturer/Model:	The Sprinkler Shop Inc. 067-00051 P-2016.0001 Project 61644 Concrete Batch Plant St. Mark Materials/ Transit mix 120	See control assumptions Truck Mix (T) or Central Mix (C) <input checked="" type="checkbox"/> T	

<b>Production Rates<sup>1</sup></b>				Per manufacturer Hours of operation per day at max capacity
Maximum Hourly Production Rate:	120	cy/hr		
Proposed Daily Production Rate:	1,500	cy/day	12.50	
Proposed Maximum Annual Production Rate:	100,000	cy/year		
Cement Storage Silo Capacity:	4540	ft <sup>3</sup> 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		

**PM<sub>10</sub> Emissions due to this PTC**

Emissions Point	PM <sub>2.5</sub> Emission Factor <sup>1</sup> (lb/cy)		PM <sub>10</sub> Emission Factor <sup>2</sup> (lb/cy)		Controlled Emission Rate PM <sub>2.5</sub> Max.	Controlled Emission Rate PM <sub>10</sub> Max.	Controlled Emission Rate PM <sub>2.5</sub> 24-hour average		Controlled Emission Rate PM <sub>10</sub> 24-hour average		Controlled Emission Rate PM <sub>2.5</sub> annual average		Controlled Emission Rate PM <sub>10</sub> annual average		Control Assumptions:	
	Controlled	Uncontrolled	Controlled	Uncontrolled	lb/hr <sup>3</sup>	lb/hr <sup>3</sup>	lb/hr <sup>4</sup>	lb/day <sup>4</sup>	lb/hr <sup>4</sup>	lb/day <sup>4</sup>	lb/hr <sup>5</sup>	T/yr <sup>5</sup>	lb/hr <sup>5</sup>	T/yr <sup>5</sup>		
Aggregate delivery to ground storage		0.00096		0.0031	0.03	0.09	0.02	0.36	0.048	1.16	2.74E-03	1.20E-02	0.009	0.039	75%	Water Sprays at Operator's Discretion
Sand delivery to ground storage		0.000225		0.0007	0.01	0.02	3.52E-03	0.08	0.011	0.26	6.42E-04	2.81E-03	0.002	0.009	75%	Water Sprays at Operator's Discretion
Aggregate transfer to conveyor		0.00096		0.0031	0.03	0.09	0.02	0.36	0.048	1.16	2.74E-03	1.20E-02	0.009	0.039	75%	Water Sprays at Operator's Discretion
Sand transfer to conveyor		0.000225		0.0007	0.01	0.02	3.52E-03	0.08	0.011	0.26	6.42E-04	2.81E-03	0.002	0.009	75%	Water Sprays at Operator's Discretion
Aggregate transfer to elevated storage		0.00096		0.0031	0.03	0.09	0.02	0.36	0.048	1.16	2.74E-03	1.20E-02	0.009	0.039	75%	Water Sprays at Operator's Discretion
Sand transfer to elevated storage		0.000225		0.0007	0.01	0.02	3.52E-03	0.08	0.011	0.26	6.42E-04	2.81E-03	0.002	0.009	75%	Water Sprays at Operator's Discretion
Cement delivery to Silo (controlled EF)	0.00003		0.0001		3.60E-03	1.00E-02	1.88E-03	4.50E-02	5.22E-03	1.25E-01	3.42E-04	1.50E-03	9.53E-04	4.17E-03	0.00%	Baghouse in process equipment, use controlled EF
Cement supplement delivery to Silo (controlled EF)	0.000045		0.0002		5.40E-03	2.15E-02	2.81E-03	6.75E-02	1.12E-02	2.68E-01	5.14E-04	2.25E-03	2.04E-03	8.94E-03	0.00%	Baghouse in process equipment, use controlled EF
Weigh hopper loading (sand & aggregate batcher loading)		0.001185		0.0040	1.42E-03	4.74E-03	7.41E-04	1.78E-02	2.47E-03	5.93E-02	1.35E-04	5.93E-04	4.51E-04	1.98E-03	99.0%	Sealed boot (vents back to silo) or baghouse.
Truck mix loading, Table 11.12-2, "0.310 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash/cy concrete)/2000 lb = 0.0074 lb/cy. PM <sub>2.5</sub> was calculated as 15% of PM <sub>10</sub> : "1.118 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash/cy concrete)/0.15/2000 lb = 0.0473 lb/cy		0.0473		0.0874	1.14E+00	2.10	0.59	14.19	1.09	26.22	1.08E-01	4.73E-01	0.20	0.87	80.0%	Boat, enclosure, or equivalent or baghouse or boot w/water ring
Central mix loading, Table 11.12-2, "0.156 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash/cy concrete)/2000 lb = 0.0440 lb/cy. PM <sub>2.5</sub> was calculated as 15% of PM <sub>10</sub> : "0.572 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash/cy concrete)/0.15/2000 lb = 0.0242 lb/cy		0.0000		0.0000	0.00E+00	0.00	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00	0.00	80.0%	Baghouse control
<b>Point Sources Total Emissions</b>	<b>4.86E-02</b>		<b>9.16E-02</b>		<b>1.15E+00</b>	<b>2.13E+00</b>	<b>5.97E-01</b>	<b>1.43E+01</b>	<b>1.11E+00</b>	<b>2.67E+01</b>	<b>1.09E-01</b>	<b>4.77E-01</b>	<b>2.03E-01</b>	<b>8.89E-01</b>		
Process Fugitive Emissions	0.003555		0.0114		0.11	0.34	0.06	1.33	0.18	4.28	0.01	0.04	0.03	0.14		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)			0.1030		2.48	0.65	15.65	1.29	30.95			0.24	1.03			

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION<sup>6</sup> Controlled EF at 1,051,200 cy/yr T/yr (controlled PTE @ 8,760)

Facility Classification Total PM <sub>2.5</sub>	8.40E-03	4.42E+00
Facility Classification Total PM <sub>10</sub> <sup>6,8</sup>	4.21E-03	2.22E+00

<sup>1</sup> The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2, and a percentage of PM that is considered to be PM<sub>2.5</sub>. The percentage used to establish the EFs were based on AP-42, Appendix B, Table B-2.2, Category 3. It was established that the fraction that is PM<sub>2.5</sub> is 15%. Note that the aggregate and sand handling are static EFs in this spreadsheet, but varies during modeling as the wind speed changes each hour.

<sup>2</sup> 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.

<sup>3</sup> Max. hourly rate includes reductions associated with control assumptions.

<sup>4</sup> 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.

<sup>5</sup> 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)

<sup>6</sup> Controlled EFs for PM<sub>2.5</sub> = 0.0002 (cement silo) + 0.0003 (flyash silo) + 0.0076 (weigh batcher) for PM<sub>10</sub> = 0.0001 (cement silo) + 0.0002 (flyash silo) + 0.0040 (weigh batcher)

<sup>7</sup> Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 2,680 cy/day, and 1,051,200 cy/yr  
<sup>8</sup> Emissions for Facility Classification do not include truck mix loading emissions; this is typically considered a fugitive emission source for concrete batch plants.

Emissions Point	Lead Emission Factor <sup>1</sup> (lb/ton of material loaded)		Increase in Emissions from this PTC				Emissions for Facility Classification	
	Controlled with fabric	Uncontrolled	Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold	Emission Rate, Quantity		T/yr	
Cement delivery to silo <sup>2</sup>	1.09E-08	7.36E-07	3.21E-07	1.22E-04	2.68E-04	1.67E-07	Point Source	1.41E-06
Cement supplement delivery to Silo <sup>3</sup>	5.20E-07	ND	2.28E-06	8.66E-04	1.90E-03	1.19E-06	Point Source	9.98E-06
Truck Loadout (with 99.9% control) <sup>8</sup>		3.62E-06	2.45E-05	9.32E-03	2.04E-02	1.28E-05	Fugitive	1.07E-04
Central Mix (with 100% control)		0.00E+00	0.00E+00	0.00E-00	0.00E+00	0.00E+00	Fugitive	0.00E+00
<b>Total</b>			<b>2.71E-05</b>	<b>1.03E-02</b>	<b>0.023</b>		<b>Point Sources</b>	<b>1.14E-05</b>
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

<sup>1</sup> The emissions factors are from AP-42, Table 11.12-6 (version 06/06)

<sup>2</sup> Max. hourly rate = EF x pound of cement/vol<sup>3</sup> of concrete x max. hourly concrete production rate/(2000 lb/T)

<sup>3</sup> lb/mo = EF x pound of material/vol<sup>3</sup> of concrete x max. daily concrete production rate x (365/12)/(2000 lb/T)

<sup>4</sup> T/yr = EF x pound of material/vol<sup>3</sup> of concrete x max. annual concrete production rate/(2000 lb/T)

<sup>5</sup> lb/hr, qty avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

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

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: Blue 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.

**Uncontrolled (Unlimited Production Rate)**

Maximum Hourly Production Rate:	120	cy/hr
Proposed Daily Production Rate:	1,500	cy/day
Proposed Maximum Annual Production Rate:	1,051,200	cy/year
	2,880	cy/day
	1,051,200	cy/year
	24	hrs/day,
	7	day/wk,
	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	NA	1.98E-10	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-10	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)	6.02E-07	1.22E-05	1.04E-07	2.44E-07	9.06E-09	3.42E-08	4.10E-06	1.14E-05	2.09E-05	6.12E-05	4.78E-06	1.19E-05	1.23E-05	3.84E-05	1.13E-07	2.62E-06	21.29%	
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	0.00E+00	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. 2,880 cy/day, and 1,051,200 cy/yr**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI	
	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr <sup>5</sup>	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)	1.25E-07	5.47E-07	1.43E-08	6.27E-08	6.89E-06	3.02E-05	8.54E-07	3.25E-05	3.45E-06	1.51E-05	1.23E-06	5.39E-06	3.48E-04	1.52E-03	ND	ND	1.71E-07	
Cement supplement delivery to Silo (with baghouse)	4.38E-06	1.92E-05	3.96E-07	1.73E-06	8.67E-10	3.80E-09	5.34E-06	2.34E-05	1.12E-06	4.91E-06	9.89E-06	4.37E-05	1.58E-05	6.79E-05	3.17E-07	1.39E-06	1.60E-06	
Truck Loadout (NO baghouse)	4.13E-04	1.81E-03	8.26E-06	3.62E-05	1.16E-06	5.07E-06	3.86E-04	1.69E-03	2.07E-03	9.07E-03	4.03E-04	1.76E-03	1.30E-03	5.69E-03	8.87E-05	3.88E-04	8.21E-05	
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	
<b>Sources Total</b>	<b>4.17E-04</b>	<b>1.83E-03</b>	<b>8.67E-06</b>	<b>3.80E-05</b>	<b>8.05E-06</b>	<b>3.53E-05</b>	<b>3.92E-04</b>	<b>1.75E-03</b>	<b>2.08E-03</b>	<b>9.08E-03</b>	<b>4.14E-04</b>	<b>1.81E-03</b>	<b>1.68E-03</b>	<b>7.28E-03</b>	<b>8.90E-05</b>	<b>3.90E-04</b>	<b>8.39E-05</b>	
IDAPA Screening EL (lb/yr)	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		Yes		No		No		Yes		No		No		Yes	

Facility Classification: Total Annual HAPs Emissions: 2.22E-02 Tons per year

**CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 1,500 cy/day, and 100,000 cy/year**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI	
	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr <sup>5</sup>	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)	1.19E-08	5.20E-08	1.36E-09	5.97E-09	6.36E-07	2.87E-06	4.45E-07	3.56E-07	1.80E-06	1.44E-06	1.17E-07	5.13E-07	ND	ND	ND	ND	1.63E-08	
Cement supplement delivery to Silo (with baghouse)	4.17E-07	1.89E-06	3.77E-08	1.65E-07	8.25E-11	3.61E-10	1.87E-05	2.23E-06	3.93E-06	4.67E-07	9.50E-07	4.16E-06	5.43E-05	6.46E-06	1.65E-07	1.32E-07	1.53E-07	
Truck Loadout (with baghouse)	7.88E-06	3.44E-05	1.57E-07	6.88E-07	2.20E-08	9.64E-08	4.02E-05	3.21E-05	2.16E-04	1.73E-04	7.86E-06	3.36E-05	1.39E-04	1.08E-04	9.24E-06	7.39E-06	1.56E-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	
<b>Sources Total</b>	<b>8.28E-06</b>	<b>3.63E-05</b>	<b>1.96E-07</b>	<b>8.59E-07</b>	<b>6.78E-07</b>	<b>2.97E-06</b>	<b>5.93E-05</b>	<b>3.47E-05</b>	<b>2.21E-04</b>	<b>1.74E-04</b>	<b>8.73E-06</b>	<b>3.82E-05</b>	<b>1.90E-04</b>	<b>1.15E-04</b>	<b>9.40E-06</b>	<b>7.52E-06</b>	<b>1.73E-06</b>	
IDAPA Screening EL (lb/yr)	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 ELS EXCEEDS EL?	552.22%		0.70%		18.32%		0.18%		0.0665%		32.33%		2.71%		0.0723%		309.23%	
EXCEEDS EL?	Yes		No		No		No		No		No		No		No		Yes	

1 lb/hr, annual average = EF x pound of cement / Yd<sup>3</sup> of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/yr, 24-hr = EF x pound of cement / Yd<sup>3</sup> of concrete x daily concrete production rate / 2000lb/Ton / 24 hr/day  
 2 lb/hr, annual average = EF x pound of cement supplement / Yd<sup>3</sup> of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/yr, 24-hr average = EF x pound of cement supplement / Yd<sup>3</sup> of concrete x daily concrete production rate / 2000lb/Ton  
 3 lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd<sup>3</sup> of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/yr, 24-hr average = EF x pound of (cement + cement supplement) / Yd<sup>3</sup> of concrete x daily concrete production rate / 2000lb/Ton  
 4 T/yr = lb/hr, annual avg x 8760 hr/yr x (1/2000 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

NATURAL GAS COMBUSTION, AP-42 SECTION 1.4 (7/98)

Operating Assumptions: 2 MMBtu/hr / 1,020 MMBtu/MMscf = 1.96E-03 MMscf/hr Fuel Use:  
 18 hr/day 0.035 MMscf/day  
 3,000 hr/yr 5.882 MMscf/year

Criteria Air Pollutants	Emission Factor lb/MMscf	Emissions		CBP + Boiler Emissions T/yr	Modeling Threshold 2002 Guidance	Modeling Required?	Modeling Threshold Case-by-Case	Modeling Required?
		lb/hr	T/yr					
NO2	100	1.96E-01	2.94E-01	2.94E-01	1 T/yr	No	7 T/yr	No
CO	84	1.65E-01	2.47E-01	2.47E-01	14 lb/hr	No	70 lb/hr	No
PM10	7.6	1.49E-02	2.24E-02	9.11E-01	0.2 lb/hr	No	0.9 lb/hr	No
		1.49E-02	2.24E-02		1 T/yr	No	7 T/yr	No
PM2.5	7.6	1.49E-02	2.24E-02	5.00E-01				
		1.49E-02	2.24E-02					
SOx	0.6	1.18E-03	1.76E-03	1.76E-03	0.2 lb/hr	No	0.9 lb/hr	No
		1.18E-03	1.76E-03		1 T/yr	No	7 T/yr	No
VOC	5.5	1.08E-02	1.62E-02	1.62E-02	40 T/yr	No		
Lead	0.0005	9.80E-07	1.47E-06	2.26E-02	0.6 T/yr	No		
Lead, continued			5.37E-03	lb/quarter	10 lb/mo	No		
TOTAL			5.81E-01	T/yr	Note: 100 lb/mo Pb in guidance reduced by factor of 10 based on latest Pb NAAQS (reduced in 2008 from 1.5 ug/m3 to 0.15 ug/m3)			

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)	lb/MMscf	lb/hr	T/yr	EL (lb/hr)	Exceeds EL/Modeling Required?
2-Methylnaphthalene	2.40E-05	1.61E-08	5.52E-09	9.10E-05	No
3-Methylchloranthrene	1.80E-06	1.21E-09	4.14E-10	2.50E-06	No
7,12-Dimethylbenz(a)anthrac	1.60E-05	2.35E-08	3.53E-08		
Acenaphthene	1.80E-06	1.21E-09	4.14E-10	9.10E-05	No
Acenaphthylene	1.80E-06	1.21E-09	4.14E-10	9.10E-05	No
Anthracene	2.40E-06	1.61E-09	5.52E-10	9.10E-05	No
Benzo(a)anthracene	1.80E-06	1.21E-09	4.14E-10	9.10E-05	See POM
Benzo(a)pyrene	1.20E-06	8.06E-10	2.76E-10	2.00E-06	See POM
Benzo(b)fluoranthene	1.80E-06	1.21E-09	4.14E-10		See POM
Benzo(g,h,i)perylene	1.20E-06	8.06E-10	2.76E-10	9.10E-05	No
Benzo(k)fluoranthene	1.80E-06	1.21E-09	4.14E-10		See POM
Chrysene	1.80E-06	1.21E-09	4.14E-10		See POM
Dibenzo(a,h)anthracene	1.20E-06	8.06E-10	2.76E-10		See POM
Dichlorobenzene	1.20E-03	8.06E-07	2.76E-07	9.10E-05	No
Fluoranthene	3.00E-06	2.01E-09	6.90E-10	9.10E-05	No
Fluorene	2.80E-06	1.88E-09	6.44E-10	9.10E-05	No
Indeno(1,2,3-cd)pyrene	1.80E-06	1.21E-09	4.14E-10		See POM
Naphthalene	6.10E-04	1.50E-04	2.24E-04	3.33	No
Naphthalene	6.10E-04	4.10E-07	1.40E-07	9.10E-05	No
Phenanthrene	1.70E-05	1.14E-08	3.91E-09	9.10E-05	No
Pyrene	5.00E-06	3.36E-09	1.15E-09	9.10E-05	No
Polycyclic Organic Matter (POM) 7-PAH Group	7.66E-09	7.66E-09	2.62E-09	2.00E-06	No
Non-PAH HAPs					
Benzene	2.10E-03	1.41E-06	4.83E-07	8.00E-04	No
Formaldehyde	7.50E-02	5.04E-05	1.72E-05	5.10E-04	No
Hexane	1.80E+00	2.85E-03	3.97E-03	12	No
Toluene	3.40E-03	5.00E-06	7.50E-06	25	No
Non-HAP Organic Compounds					
Butane	2.10E+00	3.09E-03	4.63E-03		
Ethane	3.10E+00	4.56E-03	6.84E-03		
Pentane	2.60E+00	3.82E-03	5.74E-03	118	No
Propane	1.60E+00	2.35E-03	3.53E-03		
Metals (HAPs)					
Arsenic	2.00E-04	1.34E-07	4.60E-08	1.50E-06	No
Barium	4.40E-03	6.47E-06	9.71E-06	0.033	No
Beryllium	1.20E-05	8.06E-09	2.76E-09	2.80E-05	No
Cadmium	1.10E-03	7.39E-07	2.53E-07	3.70E-06	No
Chromium	1.40E-03	2.06E-06	3.09E-06	0.033	No
Cobalt	8.40E-05	1.24E-07	1.85E-07	0.0033	No
Copper	8.50E-04	1.25E-06	1.88E-06	0.013	No
Manganese	3.80E-04	5.59E-07	8.38E-07	0.067	No
Mercury	2.60E-04	3.82E-07	5.74E-07	0.003	No
Molybdenum	1.10E-03	1.62E-06	2.43E-06	0.333	No
Nickel	2.10E-03	1.41E-06	4.83E-07	2.70E-05	No
Selenium	2.40E-05	3.53E-08	5.29E-08	0.013	No
Vanadium	2.30E-03	3.38E-06	5.07E-06	0.003	No
Zinc	2.90E-02	4.26E-05	6.40E-05	0.667	No

Case-by-Case Modeling Thresholds may be used ONLY with DEQ Approval

TOTAL CBP + WATER HEATER EMISSIONS (POINT SOURCES, T/yr) 1.99

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

DIESEL COMBUSTION, AP-42 SECTION 1.3 (9/98)

Operating Assumptions: 0 MMBtu/hr / 140 MMBtu/10<sup>3</sup> gal = 0.00E+00 10<sup>3</sup> gal/hr Fuel Use: 0.00 gal/day  
 0 hr/day 0 hr/yr 0 gal/year  
 0.0015% sulfur

Criteria Air Pollutants	Emission Factor	Emissions		CBP + Boiler Emissions	Modeling Threshold	Modeling Required?	Modeling Threshold	Modeling Required?
		lb/10 <sup>3</sup> gal	lb/hr					
NO2	20	0.00E+00	0.00E+00	0.00E+00	1 T/yr	No	7 T/yr	No
CO	5	0.00E+00	0.00E+00	0.00E+00	14 lb/hr	No	70 lb/hr	No
PM10 (filterable + condensable)	3.3	0.00E+00	0.00E+00	8.89E-01	0.2 lb/hr	No	0.9 lb/hr	No
		0.00E+00	0.00E+00		1 T/yr	No	7 T/yr	No
PM2.5 (filterable + condensable)	1.8	0.00E+00	0.00E+00	4.77E-01				
		0.00E+00	0.00E+00					
SOx (SO2 + SO3)	0.216	0.00E+00	0.00E+00	0.00E+00	0.2 lb/hr	No	0.9 lb/hr	No
		0.00E+00	0.00E+00		1 T/yr	No	7 T/yr	No
VOC (TOC)	0.556	0.00E+00	0.00E+00	0.00E+00	40 T/yr	No		
Lead EF = 9 lb/10 <sup>12</sup> Btu	9	0.00E+00	0.00E+00	2.26E-02	0.6 T/yr	No		
Lead, continued		0.00E+00	0.00E+00	lb/quarter	10 lb/mo	No		
		TOTAL	0.00E+00	T/yr				

Note: 100 lb/mo Pb in guidance reduced by factor of 10 based on latest Pb NAAQS (reduced in 2008 from 1.5 ug/m3 to 0.15 ug/m3)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)					Exceeds EL/Modeling Required?
	lb/10 <sup>3</sup> gal	lb/hr	T/yr	EL (lb/hr)	
<b>PAH HAPs</b>					
Acenaphthene	2.11E-05	0.00E+00	0.00E+00	9.10E-05	No
Acenaphthylene	2.57E-07	0.00E+00	0.00E+00	9.10E-05	No
Anthracene	1.22E-06	0.00E+00	0.00E+00	9.10E-05	No
Benzo(a)anthracene	4.01E-06	0.00E+00	0.00E+00	9.10E-05	See POM
Benzo(a)pyrene				2.00E-06	See POM
Benzo(b,k)fluoranthene	1.48E-06	0.00E+00	0.00E+00		See POM
Benzo(g,h,i)perylene	2.26E-06	0.00E+00	0.00E+00	9.10E-05	No
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00		See POM
Chrysene	2.38E-06	0.00E+00	0.00E+00		See POM
Dibenzo(a,h)anthracene	1.67E-06	0.00E+00	0.00E+00		See POM
Dichlorobenzene				9.10E-05	No
Fluoranthene	4.84E-06	0.00E+00	0.00E+00	9.10E-05	No
Fluorene	4.47E-06	0.00E+00	0.00E+00	9.10E-05	No
Indeno(1,2,3-cd)pyrene	2.14E-06	0.00E+00	0.00E+00		See POM
Naphthalene	1.13E-03	0.00E+00	0.00E+00	3.33	No
Naphthalene	1.13E-03	0.00E+00	0.00E+00	9.10E-05	No
Phenanthrene	1.05E-05	0.00E+00	0.00E+00	9.10E-05	No
Pyrene	4.25E-06	0.00E+00	0.00E+00	9.10E-05	No
Polycyclic Organic Matter (POM) 7-PAH Group		0.00E+00	0.00E+00	2.00E-06	No
<b>Non-PAH HAPs</b>					
Benzene	2.14E-04	0.00E+00	0.00E+00	8.00E-04	No
Ethyl benzene	6.36E-05	0.00E+00	0.00E+00	2.90E+01	No
Formaldehyde	3.30E-02	0.00E+00	0.00E+00	5.10E-04	No
Hexane	1.80E+00	0.00E+00	0.00E+00	12	No
Toluene	6.20E-03	0.00E+00	0.00E+00	25	No
o-Xylene	1.09E-04			0.007	
<b>Metals (HAPs)</b>					
Arsenic	4.00E+00	0.00E+00	0.00E+00	1.50E-08	No
Barium				0.033	No
Beryllium	3.00E+00	0.00E+00	0.00E+00	2.80E-05	No
Cadmium	3.00E+00	0.00E+00	0.00E+00	3.70E-06	No
Chromium	3.00E+00	0.00E+00	0.00E+00	0.033	No
Cobalt				0.0033	No
Copper	6.00E+00	0.00E+00	0.00E+00	0.013	No
Manganese	6.00E+00	0.00E+00	0.00E+00	0.067	No
Mercury	3.00E+00	0.00E+00	0.00E+00	0.003	No
Molybdenum				0.333	No
Nickel	3.00E+00	0.00E+00	0.00E+00	2.70E-05	No
Selenium	1.50E+01	0.00E+00	0.00E+00	0.013	No
Vanadium				0.003	No
Zinc	4.00E+00	0.00E+00	0.00E+00	0.667	No

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

1,1,1-Trichloroethane 2.38E-04 Not a HAP (1,1,2 TCA is a HAP). Not a 585 or 586 TAP.

Case-by-Case Modeling Thresholds may be used ONLY with DEQ Approval

TOTAL CBP + WATER HEATER EMISSIONS (POINT SOURCES, T/yr) 1.39

Facility:  
4/13/2016 10:54

The Sprinkler Shop Inc.  
Permit/Facility ID:

P-2016.0001  
Project 61644 067-00051

**Greenhouse Gas Emissions when Combusting Natural Gas**

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	120000	lb/MMscf	AP-42 Table 1.4-2	176.47	1	176.47
Methane	2.3	lb/MMscf	AP-42 Table 1.4-2	3.38E-03	21	7.10E-02
N <sub>2</sub> O	2.2	lb/MMscf	AP-42 Table 1.4-2	3.24E-03	310	1.00E+00

\* Assumes a heating value of 1,020 Btu/scf and a heater with a rating of 1 MMBtu/hr.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	120000	lb/MMscf	AP-42 Table 1.4-2	176.47	1	176.47
Methane	2.3	lb/MMscf	AP-42 Table 1.4-2	3.38E-03	21	7.10E-02
N <sub>2</sub> O	2.2	lb/MMscf	AP-42 Table 1.4-2	3.24E-03	310	1.00E+00

\* Assumes a heating value of 1,020 Btu/scf and a heater with a rating of 1 MMBtu/hr.

**Greenhouse Gas Emissions when Combusting #2 Diesel**

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	Molecular conversion from C to CO <sub>2</sub>			0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-3	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-8	0.00E+00	310	0.00E+00

\* Water Heater #1 does not burn Diesel.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	Molecular conversion from C to CO <sub>2</sub>			0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-3	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-8	0.00E+00	310	0.00E+00

\* Water Heater #2 does not burn Diesel.

**Greenhouse Gas Emissions when Combusting LPG**

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	310	0.00E+00

\* Water Heater #1 does not burn Propane.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	310	0.00E+00

\* Water Heater #2 does not burn Propane.

**Greenhouse Gas Emissions when Combusting Diesel Fuel**

Small Engine #1 Emissions ≤ 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	1.15	lb/bhp-hr	AP-42 Table 3.3-1	0.00	1	0.00

\* There are no engines at this facility.

Small Engine #2 Emissions ≤ 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	1.15	lb/bhp-hr	AP-42 Table 3.3-1	0.00	1	0.00

\* There is no second small engine at this facility.

Large Engine #1 Emissions > 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	1.16	lb/bhp-hr	AP-42 Table 3.4-1	0.00	1	0.00

\* There is no large engine at this facility.

**Total Greenhouse Gas Emissions**

	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	352.94
Methane	0.14
N <sub>2</sub> O	2.01
<b>Total</b>	<b>355.09</b>

Facility: The Sprinkler Shop Inc.  
 4/13/2016 10:54 Permit/Facility ID: 067-00051 P-2016.0001 Project 61644

Max Hourly Production 120 cy/hr 82% T/hr is Aggregate = 98 cy/hr  
 Max Daily Production 1,500 cy/day 82% T/hr is Aggregate = 1,230 cy/day  
 Max Annual Production 100,000 cy/yr 82% T/hr is Aggregate = 82,000 cy/yr

Aggregate is considered both coarse and fine (sand). The 82% is based on 1,865 lb coarse aggregate, 1,428 lb sand, 564 lb cement/supplement and 167 lb water for a total of 4,024 lb concrete

**Truck Mix Operations Drop Points, AP-42 11-12 (06/06)**

$E = k (0.0032) x(U^a / M^b) + c =$  9.71E-02 3.88E-02 lb/ton for PM10 5.83E-03 lb/ton for PM2.5

k = particle size multiplier 0.8 for PM 0.32 for PM10 0.048 for PM2.5  
 a = exponent 1.75 for PM 1.75 for PM10 1.75 for PM2.5  
 b = exponent 0.3 for PM 0.3 for PM10 0.3 for PM2.5  
 c = constant 0.013 for PM 0.0052 for PM10 0.00078 for PM2.5  
 U = mean wind speed = 10 mph  
 M = moisture content = 6 %

Mean wind speed 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006.  
 This data is from the Western Regional Climate Center (<http://www.wrcc.dri.edu/htmlfiles/avestwind.final.html#IDAHO>).  
 Moisture Content: 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises Cement plant in Roanoke, VA, 1994. (AP-42 11-12 06/06).

Wind Category	Windspeed Variation Factors for AERMOD modeling:			PM10		PM2.5	
	Upper windspeed (m/sec)	Avg windspeed (m/sec)	Avg windspeed (mph)	E @ avg mph	F = Eavg mph/ E@10mph	E @ avg mph	mph/ E@10mph
Cat 1:	1.54	0.77	1.72	6.75E-03	0.1738	1.01E-03	0.1738
Cat 2:	3.09	2.32	5.18	1.58E-02	0.4077	2.38E-03	0.4077
Cat 3:	5.14	4.12	9.20	3.43E-02	0.8831	5.15E-03	0.8831
Cat 4:	8.23	6.69	14.95	7.32E-02	1.885	1.10E-02	1.885
Cat 5:	10.80	9.52	21.28	1.31E-01	3.382	1.97E-02	3.382
Cat 6:	14.00	12.40	27.74	2.06E-01	5.298	3.09E-02	5.298

**Central Mix Operations Drop Points, AP-42 11-12 (06/06)**

$E = k (0.0032) x(U^a / M^b) + c =$  2.08E-03 1.23E-03 lb/ton for PM10 2.54E-04 lb/ton for PM2.5

k = particle size multiplier 0.19 for PM 0.13 for PM10 0.03 for PM2.5  
 a = exponent 0.95 for PM 0.45 for PM10 0.45 for PM2.5  
 b = exponent 0.9 for PM 0.9 for PM10 0.9 for PM2.5  
 c = constant 0.001 for PM 0.001 for PM10 0.0002 for PM2.5  
 U = mean wind speed = 10 mph  
 M = moisture content = 6 %

Mean wind speed 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006.  
 This data is from the Western Regional Climate Center (<http://www.wrcc.dri.edu/htmlfiles/avestwind.final.html#IDAHO>).  
 Moisture Content: 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises

Wind Category	Windspeed Variation Factors for AERMOD modeling:			PM10		PM2.5	
	Upper windspeed (m/sec)	Avg windspeed (m/sec)	Avg windspeed (mph)	E @ avg mph	F = Eavg mph/ E@10mph	E @ avg mph	mph/ E@10mph
Cat 1:	1.54	0.77	1.72	1.11E-03	0.8964	2.24E-04	0.8838
Cat 2:	3.09	2.32	5.18	1.87E-03	1.5160	2.40E-04	0.9456
Cat 3:	5.14	4.12	9.20	2.13E-03	1.7261	2.52E-04	0.9922
Cat 4:	8.23	6.69	14.95	2.41E-03	1.949	2.65E-04	1.0422
Cat 5:	10.80	9.52	21.28	2.65E-03	2.146	2.76E-04	1.0860
Cat 6:	14.00	12.40	27.74	2.89E-03	2.315	2.85E-04	1.1238

**Conveyor and Scalping Screen Emission Points**

Moisture/Control %:  
 Aggregate for CBP typically stabilizes between 5-6% by weight--> Apply additional 25% control to lb/hr, etc. for the higher moisture.  
 Sand aggregate for CBPs is 36%  
 Coarse aggregate for CBPs is 46%

**Fine Aggregate (Sand) Transfer to Conveyor**

Transfer from truck to conveyor: 98 cy/hr 3 Transfer Points

Pollutant	Emission Factor Table 11.12-5 CONVEYOR TRANSFER PT CONTROLLED (lb/cy)	Emissions Per Transfer Point				Total Emissions			
		Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average	Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average
PM (total)	0.0015	0.048	0.025	2.00E-02	4.56E-03	0.144	0.075	5.99E-02	1.37E-02
PM-10 (total)	7.00E-04	0.022	0.012	9.32E-03	2.13E-03	0.067	0.035	2.80E-02	6.38E-03
PM-2.5 (total)	2.25E-04	0.007	0.004	3.00E-03	1.31E-02	0.022	0.011	8.99E-03	3.94E-02

**Coarse Aggregate Transfer to Conveyor**

Transfer from truck to conveyor: 98 cy/hr 3 Transfer Points

Pollutant	Emission Factor Table 11.12-5 CONVEYOR TRANSFER PT CONTROLLED (lb/cy)	Emissions Per Transfer Point				Total Emissions			
		Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average	Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average
PM (total)	0.0064	0.265	0.138	1.10E-01	2.52E-02	0.795	0.414	3.31E-01	7.56E-02
PM-10 (total)	3.10E-03	0.128	0.067	5.35E-02	1.22E-02	0.385	0.201	1.60E-01	3.66E-02
PM-2.5 (total)	9.60E-04	0.040	0.021	1.66E-02	7.25E-02	0.119	0.062	4.97E-02	2.18E-01

### Final Concrete Batch Plant Emissions Inventory

Listed Below are the emissions estimates for the units selected.

Company:	The Sprinkler Shop Inc.
Facility ID:	067-00051
Permit No.:	P-2016.0001 Project 61644
Source Type:	Concrete Batch Plant
Manufacturer/Model:	St. Mark Materials/ Transit mix 120

Production	
Maximum Hourly Production Rate:	120 cy/hr
Proposed Daily Production Rate:	1500 cy/day
Proposed Maximum Annual Production Rate:	100000 cy/year

Emissions Units	Tons/year									
	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Lead	THAPs	CO <sub>2</sub> e	
Truck Mix	0.477	0.89	NA	NA	NA	NA	1.14E-05		N/A	
Water Heater #1:	0.011	0.011	8.82E-04	0.147	0.124	0.008	7.35E-07		178	
Water Heater #2:	0.011	0.011	8.82E-04	0.147	0.124	0.008	7.35E-07		178	
Small Diesel Engine(s) *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0	
Large Diesel Engine *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0	
Transfer/Drop Points	0.059	0.19	NA	NA	NA	NA	NA		N/A	
Annual Totals (T/yr) Note: Load out emissions were not included as they are considered "fugitive".	0.08	0.21	1.76E-03	0.29	0.25	0.02	1.29E-05	4.64E-03	355	

Emissions Units	Pounds/hour									
	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Lead	THAPs		
Truck Mix	0.109	0.20	NA	NA	NA	NA	2.71E-05			
Water Heater #1:	0.007	0.007	5.88E-04	0.098	0.082	0.005	4.90E-07			
Water Heater #2:	0.007	0.007	5.88E-04	0.098	0.082	0.005	4.90E-07			
Small Diesel Engine(s) *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA			
Large Diesel Engine*:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA			
Transfer/Drop Points	0.073	0.24	NA	NA	NA	NA	NA			
Daily Totals (lb/hr) Note: Load out emissions were not included as they are considered "fugitive".	0.09	0.25	1.18E-03	0.20	0.16	0.01	2.81E-05	3.36E-03		

\* The Large engine may run :

\* The Small engine(s) may run :

There is no large engine. hr/yr

There is no small engine. hr/yr

HAPS & TAPS Emissions Inventory

Metals	HAP	TAP	lb/hr	T/yr	Averaging Period	EL lb/hr	Exceeded?
Arsenic	X	X	8.42E-06	3.63E-05	Annual	1.50E-06	Yes
Barium		X	6.47E-06	9.71E-06	24-hour	3.30E-02	No
Beryllium	X	X	2.04E-07	8.62E-07	Annual	2.80E-05	No
Cadmium	X	X	1.42E-06	3.22E-06	Annual	3.70E-06	No
Cobalt	X	X	1.24E-07	1.85E-07	24-hour	3.30E-03	No
Copper		X	1.25E-06	1.88E-06	24-hour	1.30E-02	No
Chromium	X	X	6.14E-05	3.78E-05	24-hour	3.30E-02	No
Manganese	X	X	2.22E-04	1.75E-04	24-hour	3.33E-01	No
Mercury	X	X	3.82E-07	5.74E-07	24-hour	3.00E-03	No
Molybdenum		X	1.62E-06	2.43E-06	24-hour	2.70E-05	No
Nickel	X	X	1.01E-05	3.87E-05	Annual	2.70E-05	No
Phosphorus	X	X	1.90E-04	1.15E-04	24-hour	7.00E-03	No
Selenium	X	X	9.44E-06	7.57E-06	24-hour	1.30E-02	No
Vanadium		X	3.38E-06	5.07E-06	24-hour	3.00E-03	No
Zinc		X	4.26E-05	6.40E-05	24-hour	6.67E-01	No
Chromium VI	X	X	1.73E-06	7.58E-06	Annual	5.60E-07	Yes
<b>Non PAH Organic Compunds</b>							
Pentane		X	2.35E-03	3.53E-03	24-hour	118	No
Methyl Ethyl Ketone		X	0.00E+00	0.00E+00	24-hour	39.3	No
<b>Non-PAH HAPs</b>							
Acetaldehyde	X	X	0.00E+00	0.00E+00	Annual	3.00E-03	No
Acrolein	X	X	0.00E+00	0.00E+00	24-hour	1.70E-02	No
Benzene	X	X	1.41E-06	4.83E-07	Annual	8.00E-04	No
1,3 - Butadiene	X	X	0.00E+00	0.00E+00	Annual	2.40E-05	No
Ethyl Benzene	X	X	0.00E+00	0.00E+00	24-hour	29	No
Formaldehyde	X	X	5.04E-05	1.72E-05	Annual	5.10E-04	No
Hexane	X	X	2.65E-03	3.97E-03	24-hour	12	No
Isooctane	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Methyl Chloroform	X	X	0.00E+00	0.00E+00	24-hour	127	No
Propionaldehyde	X	X	0.00E+00	0.00E+00	24-hour	2.87E-02	No
Quinone	X	X	0.00E+00	0.00E+00	24-hour	2.70E-02	No
Toluene	X	X	5.00E-06	7.50E-06	24-hour	25	No
o-Xylene	X	X	0.00E+00	0.00E+00	24-hour	7.00E-03	No
<b>PAH HAPs</b>							
2-Methylnaphthalene	X	X	1.61E-08	5.52E-09	Annual	9.10E-05	No
3-Methylchloranthrene	X	X	1.21E-09	4.14E-10	Annual	2.50E-06	No
7,12-Dimethylbenz(a)anthracene	X		2.35E-08	3.53E-08	N/A	N/A	N/A
Acenaphthene	X	X	1.21E-09	4.14E-10	Annual	9.10E-05	No
Acenaphthylene	X	X	1.21E-09	4.14E-10	Annual	9.10E-05	No
Anthracene	X	X	1.61E-09	5.52E-10	Annual	9.10E-05	No
Benzo(a)anthracene	X	X	1.21E-09	4.14E-10	Annual	9.10E-05	No
Benzo(a)pyrene	X	X	8.06E-10	2.76E-10	Annual	2.00E-06	No
Benzo(b)fluoranthene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Benzo(e)pyrene	X	X	0.00E+00	0.00E+00	Annual	2.00E-06	No
Benzo(g,h,i)perylene	X	X	8.06E-10	2.76E-10	Annual	9.10E-05	No
Benzo(k)fluoranthene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Chrysene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Dibenzo(a,h)anthracene	X	X	8.06E-10	2.76E-10	Annual	2.00E-06	No
Dichlorobenzene	X	X	8.06E-07	2.76E-07	Annual	9.10E-05	No
Fluoranthene	X	X	2.01E-09	6.90E-10	Annual	9.10E-05	No
Fluorene	X	X	1.88E-09	6.44E-10	Annual	9.10E-05	No
Indeno(1,2,3-cd)pyrene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Naphthalene	X	X	1.50E-04	2.24E-04	24-hour	3.33	No
Naphthalene	X	X	4.10E-07	1.40E-07	Annual	9.10E-05	No
Perylene	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Phenanathrene	X	X	1.14E-08	3.91E-09	Annual	9.10E-05	No
Pyrene	X	X	3.36E-09	1.15E-09	Annual	9.10E-05	No
PAH HAPs Total	X	X	7.66E-09		Annual	2.00E-06	No
Polycyclic Organic Matter (POM)	X	X	7.66E-09	2.62E-09	Annual	2.00E-06	No

Facility: The Sprinkler Shop Inc.  
 4/13/2016 12:48 Permit P-2016.0001 Project 61644

Facility ID: 067-00051

**Internal Combustion Engine > 600 hp (447 kW)**

Fuel Type Toggle =	0
Fuel Consumption Rate	0.00 gal/hr
Calculated MMBtu/hr	0.00 MMBtu/hr
Max Daily Operation	0 hr/day
Max Annual Operation	0 hrs/yr

**Rated Power of Large (hp):** 0

Not EPA Certified:	No
Certified EPA Tier 1:	No
Certified EPA Tier 2:	No
Certified EPA Tier 3:	No
Certified EPA Tier 4:	No
Blue Sky Engine:	No

**Small Internal Combustion Engine #1 < 600 hp (447 kW)**

Fuel Type Toggle =	0
Fuel Consumption Rate	0.00 gal/hr
Calculated MMBtu/hr	0.00 MMBtu/hr
Max Daily Operation	18 hr/day
Max Annual Operation	0 hrs/yr

**Rated Power of Small #1 (hp):** 0

Not EPA Certified:	No
Certified EPA Tier 1:	No
Certified EPA Tier 2:	No
Certified EPA Tier 3:	No
Certified EPA Tier 4:	No
Blue Sky Engine:	No

**Small Internal Combustion Engine #2 < 600 hp (447 kW)**

Fuel Type Toggle =	0
Fuel Consumption Rate	0.00 gal/hr
Calculated MMBtu/hr	0.00 MMBtu/hr
Max Daily Operation	18 hr/day
Max Annual Operation	0 hrs/yr

**Rated Power of Small #2 (hp):** 0

Not EPA Certified:	No
Certified EPA Tier 1:	No
Certified EPA Tier 2:	No
Certified EPA Tier 3:	No
Certified EPA Tier 4:	No
Blue Sky Engine:	No

**Conversion Factors:**

Avg brake-specific fuel consumption (BSFC) =	7000	Btu/hp-hr
1 hp =	0.746	kW
1 lb =	453.592	g

$$g/kW-hr \times (lb/453g) \times (hp-hr/7000 Btu) \times (0.746 kW/hp) \times 10^6 Btu/MMBtu = lb/MMBtu$$

$$g/kW-hr \times 0.23486 = lb/MMBtu$$

Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM=PM10
EMISSION FACTORS USED FOR SMALL ENGINE (lb/MMBtu):	0.00	0.00	0.00	0.000
Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM=PM10
EMISSION FACTORS USED FOR LARGE ENGINE (lb/MMBtu):	0.00	0.00	0.00	0.000

**AP-42, 3.4 (10/96) EMISSION FACTORS (diesel fueled, uncontrolled)**

Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM10
Emission Factor (lb/MMBtu)	0	0	0.00	0
Emission Factor (g/kW-hr)	0.00	0.00	0.00	0.00

**AP-42, Ch 3.3 (10/96) EMISSION FACTORS (diesel fueled, uncontrolled)**

Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM10
Emission Factor (lb/MMBtu)	4.41	0.36	0.95	0.31
Emission Factor (g/kW-hr)	18.78	1.53	4.05	1.32

Note: Rating for AP-42 PM10 EF of 0.0573 is "E" or Poor. Used Tier 1 PM EF and presumed PM = PM10

**40 CFR 89 and 1039, EPA CERTIFIED GENERATOR EMISSION FACTORS (g/kW-hr converted to lb/MMBtu)**

Rated Power (kW)	Tier	Applicable?	Model Year <sup>1</sup>	NOx	HC	NMHC + NOx	CO	PM = PM10
kW < 8	1	0	2000	0.0	0.36	2.47	1.88	0.23
kW < 8	2	0	2005	0.00	0.36	1.76	1.88	0.19
kW < 8	4	0	2008	0.00	0.36	1.76	1.88	0.09
kW < 8	BlueSky	0	n/a	0.00	0.36	1.08	1.88	0.11
8 ≤ kW < 19	1	0	2000	0.00	0.36	2.23	1.55	0.19
8 ≤ kW < 19	2	0	2005	0.00	0.36	1.76	1.55	0.19
8 ≤ kW < 19	4	0	2008	0.00	0.36	1.76	1.55	0.09
8 ≤ kW < 19	BlueSky	0	n/a	0.00	0.36	1.06	1.55	0.11
19 ≤ kW < 37	1	0	1999	0.00	0.36	2.23	1.29	0.19
19 ≤ kW < 37	2	0	2004	0.00	0.36	1.76	1.29	0.14
19 ≤ kW < 37	4	0	2008	0.00	0.36	1.10	1.29	0.007
19 ≤ kW < 37	BlueSky	0	n/a	0.00	0.36	1.06	1.29	0.085
37 < kW < 75	1	0	1998	2.16	0.36	0.00	---	---
37 < kW < 75	2	0	2004	0.00	0.36	1.76	1.17	0.09
37 < kW < 75	3	0	2008	0.00	0.36	1.10	1.17	0.09
37 < kW < 75	4	0	2008	0.00	0.36	1.10	1.17	0.007
37 < kW < 75	BlueSky	0	n/a	0.00	0.36	1.10	1.17	0.056
75 < kW < 130	1	0	1997	2.16	0.36	0.00	---	---
75 < kW < 130	2	0	2003	0.00	0.36	1.55	1.17	0.07
75 < kW < 130	3	0	2007	0.00	0.36	0.94	1.17	0.07
75 < kW < 130	4	0	2008	0.09	0.04	0.00	1.17	0.005
75 < kW < 130	BlueSky	0	n/a	0.00	0.36	0.94	1.17	0.042
130 < kW < 225	1	0	1996	2.16	0.31	0.00	2.68	0.13
130 < kW < 225	2	0	2003	0.00	0.31	1.55	0.82	0.05
130 < kW < 225	3	0	2006	0.00	0.31	0.94	0.82	0.05
130 < kW < 560	4	0	2008	0.09	0.04	0.00	0.82	0.005
130 ≤ kW ≤ 560	BlueSky	0	n/a	0.00	0.31	0.94	0.82	0.028
225 < kW < 450	1	0	1996	2.16	0.31	0.00	2.68	0.13
225 < kW < 450	2	0	2001	0.00	0.31	1.50	0.82	0.05
225 < kW < 450	3	0	2006	0.00	0.31	0.94	0.82	0.05
450 < kW < 560	1	0	1996	2.16	0.31	0.00	2.68	0.13
450 < kW < 560	2	0	2002	0.00	0.31	1.50	0.82	0.05
450 < kW ≤ 560	3	0	2006	0.00	0.31	0.94	0.82	0.05
kW > 560	1	0	2000	2.16	0.31	0.00	2.68	0.13
kW > 560	2	0	2006	0.00	0.31	1.50	0.82	0.05
kW > 560	BlueSky	0	n/a	Emission Factor	0.31	0.89	0.82	0.028

40 CFR 89 and 1039, EPA CERTIFIED GENERATOR EMISSION FACTORS FOR LARGE ENGINE (lb/MMBtu)

Rated Power (kW)	Tier	Applicable?	Model Year <sup>1</sup>	NOx	HC	NMHC + NOx	CO	PM10
kW < 8	1	0	2000	0.00	0.00	0.00	0.00	0.00
kW < 8	2	0	2005	0.00	0.00	0.00	0.00	0.00
kW < 8	4	0	2008	0.00	0.00	0.00	0.00	0.00
kW < 8	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	1	0	2000	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	2	0	2005	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	4	0	2008	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	1	0	1999	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	2	0	2004	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	4	0	2008	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	1	0	1998	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	2	0	2004	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	3	0	2008	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	4	0	2008	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	1	0	1997	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	2	0	2003	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	3	0	2007	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	4	0	2008	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	1	0	1996	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	2	0	2003	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	3	0	2006	0.00	0.00	0.00	0.00	0.00
130 < kW < 560	4	0	2008	0.00	0.00	0.00	0.00	0.00
130 < kW < 560	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	1	0	1996	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	2	0	2001	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	3	0	2006	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	1	0	1996	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	2	0	2002	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	3	0	2006	0.00	0.00	0.00	0.00	0.00
kW > 560	1	0	2000	0.00	0.00	0.00	0.00	0.00
kW > 560	2	0	2006	0.00	0.00	0.00	0.00	0.00
kW > 560	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00

## Data Input Tab

Note: All blue text is meant to be edited by the processing engineer.

- 1 Enter the facility information in the "Facility Information" boxes.
- 2 Enter the concrete production rates that were applied for. Note: The hourly limit may be any value but the daily and annual rates are limited to the appropriate pulldown menu items.
- 3 Enter the daily operating hours for the facility.
- 4 Select "T" or "C" as the type of facility. "T" represents truck mix and "C" represents central mix  
The fugitive control efficiency can either be 75% or 95%. 0% is used to calculate uncontrolled emissions.  
75% Fugitive Control assumes typical Best Management Practices like those identified in IDAPA 58.01.01.650-651.  
95% Fugitive Control assumes typical control methods such as limiting dust from traffic, enclosed aggregate piles, and covering or suppressing piles.  
This amount of control also assumes that no visible emissions will occur at the property boundary.  
Truck loadout control efficiency can be either 70% or 95%.  
70% Control Loadout assumes a boot shroud or enclosure with 70% control efficiency during truck loadout.  
95% Control Loadout assumes a boot shroud and a water ring spray system.  
As an alternative, the facility can choose to route truck loadout emissions to a baghouse.
- 5 Select the dropdown stating whether or not a water heater will be used onsite.  
If the selected answer is "Yes", fill out the remainder of the section. The facility may have up to two water heaters up to a heating input rating less than 10 MMBt  
Select the appropriate fuel type for each heater and enter the rating of each unit. Remember to set all heaters not used to fuel type "N/A"  
Enter the annual operating hours of the heaters. Note: It assumed that they will operate simultaneously.
- 6 Select the dropdown stating whether or not an engine will be used as an electrical power source at the facility.  
If the selected answer is "Yes", enter the make, model, and the horsepower of the engine.  
The EPA certification rating needs to be entered as well.  
Enter a zero if there is only one engine. For example, if there is only a 1,000 bhp engine, enter "0" as the rating for the small engine.  
Enter a negative one (-1) if there is only one engine. For example, if there is only a 1,000 bhp engine, enter -1 as the certification for the small engine.  
The facility may have up to 2 small engines (<=600 bhp) and one large engine (>600 bhp).  
Enter the number of operating hours for each engine.
- 7 Enter the number of transfer points at the facility; the default value is two (2).

## CBP Criteria Tab

- 9 Daily and annual throughput is restricted to specific amounts defined in the pulldown menu.  
The daily throughput may be any of the four options but the annual throughput is limited to 150,000 cy/yr (General Permit assumption).
- 10 Depending on the data inputs, emissions are calculated for all criteria and TAP emissions associated with the concrete batch plant.  
Note that 20% Chromium VI is used for cement and 30% Cr 6+ is used for the supplement or flyash

## EI-Nat Gas Water Heater Tab

- 11 Natural Gas Water Heater - Limited to only natural gas as a fuel source.  
If two heaters are selected and both are natural gas, the rating will be additive.  
If the water heater being used is not natural gas-fired the hr/day and hr/yr should both be set to zero

## EI-Diesel Water Heater Tab

- 12 Diesel water heater - Limited to only 15 ppm sulfur content ASTM disillate fuel.  
If two heaters are selected and both are diesel-fired, the rating will be additive.  
If the water heater being used is not diesel-fired the hr/day and hr/yr should both be set to zero

## Propane Water Heater Tab

- 13 Propane water heater - Limited to only propane as a fuel source  
If two heaters are selected and both are propane, the rating will be additive.  
If the water heater being used is not propane-fired the hr/day and hr/yr should both be set to zero

## IC Engine Input Tab

- 14 This section reiterates the input parameters and makes a few calculations associated with the IC engine.

## Large and Small IC Engine Emissions Tabs

- 15 This tab displays the emissions associated with the IC engines. These emissions assume worst case scenario. There is no user input here.

## GHG Emissions

- 16 This tab displays the emissions associated with the generator. These emissions assume worst case scenario. There is no user input here.

## Transfer Points Tab

- 17 The number of transfer points may be updated by the user and is highlighted in blue. The default assumes 2.

## Final EI Tab

- 18 This tab provides the total emissions for the facility.

## Data Input

### 1. Facility Information

Facility Name:	<b>The Sprinkler Shop Inc.</b>
Facility ID:	<b>067-00051</b>
Permit and Project No.:	<b>P-2016.0001 Project 61644</b>
Source Type:	<b>Concrete Batch Plant</b>
Manufacturer/Model:	<b>St. Mark Materials/ Transit mix 120</b>

### 2. Concrete Production Rates

Maximum Hourly Concrete Production Rate:	<b>120</b>		
Proposed Daily Concrete Production Rate:	<b>1,500</b>	cy/day	<b>12.50</b>
Proposed Maximum Annual Concrete Production Rate:	<b>100,000</b>	cy/year	hr/day

### 3. Daily Operating Hours

Maximum daily hours of operation for facility?	<b>18</b>
--	-----------

### 4. Concrete Batch Plant Specifications

Is the facility type a truck mix (T) or central mix (C)?	<b>T</b>
What level of PM control is used for loadout, either Truck or Central?	<b>0%</b>
What level of PM control is used for fugitive emissions?	<b>0%</b>

### 5. Water Heater Usage

Does this facility use a water heater?	<b>Yes</b>		
How many units?	<b>2</b>	Heat Input Rating	
What type of fuel, Diesel, Natural Gas or Propane for unit 1?	<b>Natural Gas</b>	<b>1</b>	MMBtu/hr
If multiple units, what type of fuel, Diesel, Natural Gas or Propane for unit 2?	<b>Natural Gas</b>	<b>1</b>	MMBtu/hr
Are you assuming continual operations throughout the year?	<b>No</b>		
Maximum annual hours of water heater operation? (If assuming continual operation, enter 8,760)	<b>3000</b>		

### 6. Internal Combustion Engine(s)

Are internal combustion engines used to provide electrical power at the facility?	<b>No</b>
How many small engines (less than or equal to 600 bhp) are being used at the facility?	<b>0</b>
Horsepower rating of small engine #1 (<=600 bhp)? (If no engine enter 0)	<b>0</b>
Horsepower rating of small engine #2 (<=600 bhp)? (If no engine enter 0)	<b>0</b>
Horsepower rating of large engine (greater than 600 bhp)? (If no engine enter 0)	<b>0</b>

Note: If there is no small or large engine enter -1 for the certification

	Small IC Engine #1	Small IC Engine #2	Large IC Engine
Select the EPA Certification:	<b>-1</b>	<b>-1</b>	<b>-1</b>
Not an EPA-certified IC engine: Enter "0" (zero)			
Certified Tier 1, Tier 2, Tier 3, or Tier 4 IC engine: Enter 1, 2, 3, or 4			
Certified "BLUE SKY" IC engine: Enter 5			

Enter the annual operating hours for the small IC engine(s)	<b>0</b>
Enter the annual operating hours for the large IC engine	<b>0</b>

### 7. Transfer Points

Enter the total number of transfer points in the facility? (2 is the default)	<b>3</b>
---	----------

CRITERIA POLLUTANT EMISSION INVENTORY for Portable Concrete Batch Plant

4/13/16 12:40

<b>Facility Information</b>		<b>Assumptions Implied or Stated in Application:</b>	
Company:	The Sprinkler Shop Inc.	See control assumptions	
Facility ID:	067-00051	Truck Mix (T) or Central Mix (C) <input checked="" type="checkbox"/> T	
Permit and Project No.:	P-2016.0001 Project 61644		
Source Type:	Concrete Batch Plant		
Manufacturer/Model:	St. Mark Materials/ Transit mix 120		

<b>Production Rates<sup>1</sup></b>			
Maximum Hourly Production Rate:	120	cy/hr	
Proposed Daily Production Rate:	1,500	cy/day	12.50
Proposed Maximum Annual Production Rate:	100,000	cy/year	
Cement Storage Silo Capacity:	4940	ft <sup>3</sup> 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	

Per manufacturer  
Hours of operation per day at max capacity

**PM<sub>10</sub> Emissions due to this PTC**

Emissions Point	PM <sub>2.5</sub> Emission Factor <sup>1</sup> (lb/cy)		PM <sub>10</sub> Emission Factor <sup>2</sup> (lb/cy)		Controlled Emission Rate PM <sub>2.5</sub> Max.	Controlled Emission Rate PM <sub>10</sub> Max.	Controlled Emission Rate PM <sub>2.5</sub> 24-hour average		Controlled Emission Rate PM <sub>10</sub> 24-hour average		Controlled Emission Rate PM <sub>2.5</sub> annual average		Controlled Emission Rate PM <sub>10</sub> annual average		Control Assumptions:	
	Controlled	Uncontrolled	Controlled	Uncontrolled	lb/hr <sup>3</sup>	lb/hr <sup>3</sup>	lb/hr <sup>4</sup>	lb/day <sup>4</sup>	lb/hr <sup>4</sup>	lb/day <sup>4</sup>	lb/hr <sup>5</sup>	T/yr <sup>5</sup>	lb/hr <sup>5</sup>	T/yr <sup>5</sup>		
Aggregate delivery to ground storage		0.00096		0.0031	0.12	0.37	0.06	1.44	0.194	4.65	1.10E-02	4.80E-02	0.035	0.155	0%	Water Sprays at Operator's Discretion
Sand delivery to ground storage		0.000225		0.0007	0.03	0.08	1.41E-02	0.34	0.044	1.06	2.57E-03	1.13E-02	0.008	0.035	0%	Water Sprays at Operator's Discretion
Aggregate transfer to conveyor		0.00096		0.0031	0.12	0.37	0.06	1.44	0.194	4.65	1.10E-02	4.80E-02	0.035	0.155	0%	Water Sprays at Operator's Discretion
Sand transfer to conveyor		0.000225		0.0007	0.03	0.08	1.41E-02	0.34	0.044	1.06	2.57E-03	1.13E-02	0.008	0.035	0%	Water Sprays at Operator's Discretion
Aggregate transfer to elevated storage		0.00096		0.0031	0.12	0.37	0.06	1.44	0.194	4.65	1.10E-02	4.80E-02	0.035	0.155	0%	Water Sprays at Operator's Discretion
Sand transfer to elevated storage		0.000225		0.0007	0.03	0.08	1.41E-02	0.34	0.044	1.06	2.57E-03	1.13E-02	0.008	0.035	0%	Water Sprays at Operator's Discretion
Cement delivery to Silo (controlled EF)	0.00003		0.0001		3.60E-03	1.00E-02	1.88E-03	4.50E-02	5.22E-03	1.25E-01	3.42E-04	1.50E-03	9.53E-04	4.17E-03	0.00%	Baghouse in process equipment, use controlled EF
Cement supplement delivery to Silo (controlled EF)	0.000045		0.0002		5.40E-03	2.15E-02	2.81E-03	6.75E-02	1.12E-02	2.68E-01	5.14E-04	2.25E-03	2.04E-03	6.94E-03	0.00%	Baghouse in process equipment, use controlled EF
Weigh hopper loading (sand & aggregate batcher loading)		0.001185		0.0040	1.42E-03	4.74E-03	7.41E-04	1.78E-02	2.47E-03	5.93E-02	1.35E-04	5.93E-04	4.51E-04	1.98E-03	99.0%	Sealed boot (vents back to silo) or baghouse.
Truck mix loading, Table 11.12-2, "0.310 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/ 2000 lb = 0.0874 lb/cy. PM <sub>2.5</sub> was calculated as 15% of PM <sub>10</sub> : "1.118 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/0.15/2000 lb = 0.0473 lb/cy		0.00473		0.0874	5.68E+00	10.49	2.96	70.95	5.46	131.10	5.40E-01	2.37E+00	1.00	4.37	0.0%	Boot, enclosure, or equivalent or baghouse or boot w/water ring
Central mix loading, Table 11.12-2, "0.156 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/ 2000 lb = 0.0440 lb/cy. PM <sub>2.5</sub> was calculated as 15% of PM <sub>10</sub> : "0.572 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/0.15/2000 lb = 0.0242 lb/cy		0.0000		0.0000	0.00E+00	0.00	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00	0.00	0.0%	Baghouse control
<b>Point Sources Total Emissions</b>	<b>4.86E-02</b>		<b>9.16E-02</b>		<b>5.69E+00</b>	<b>1.05E+01</b>	<b>2.96E+00</b>	<b>7.11E+01</b>	<b>5.48E+00</b>	<b>1.32E+02</b>	<b>5.41E-01</b>	<b>2.37E+00</b>	<b>1.00E+00</b>	<b>4.39E+00</b>		
Process Fugitive Emissions	0.003555		0.0114		0.43	1.37	0.22	5.33	0.71	17.12	0.04	0.18	0.13	0.57		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)			0.1030			11.89	3.18	76.41	6.19	148.67			1.13	4.96		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION<sup>7</sup> Controlled EF at 1,051,200 cy/yr T/yr (controlled PTE @ 8,760)

Facility Classification Total PM <sub>2.5</sub>	8.40E-03	4.42E+00
Facility Classification Total PM <sub>10</sub> <sup>8,9</sup>	4.21E-03	2.22E+00

<sup>1</sup> The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-5, and a percentage of PM that is considered to be PM<sub>2.5</sub>. The percentage used to establish the EFs were based on AP-42, Appendix B, Table B-2.2, Category 3. It was established that the fraction that is PM<sub>2.5</sub> is 15%. Note that the aggregate and sand handling are static EF's in this spreadsheet, but varies during modeling as the wind speed changes each hour.

<sup>2</sup> 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.

<sup>3</sup> Max. hourly rate includes reductions associated with control assumptions.

<sup>4</sup> 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.

<sup>5</sup> 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)

<sup>6</sup> Controlled EFs for PM = 0.0002 (cement silo) + 0.0003 (flyash silo) + 0.0079 (weigh batcher) for PM<sub>10</sub> = 0.0001 (cement silo) + 0.0002 (flyash silo) + 0.0040 (weigh batcher)

<sup>7</sup> Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 2,880 cy/day, and 1,051,200 cy/yr. Emissions for Facility Classification do not include truck mix loading emissions; this is typically considered a fugitive emission source for concrete batch plants.

Emissions Point	Lead Emission Factor <sup>1</sup> (lb/ton of material loaded)		Increase in Emissions from this PTC				Emissions for Facility Classification	
	Controlled with fabric	Uncontrolled	Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold	Emission Rate, lb/ton/yr	Emission Rate, lb/hr	Classification	T/yr
Cement delivery to silo <sup>2</sup>	1.09E-08	7.36E-07	3.21E-07	1.22E-04	2.68E-04	1.67E-07	Point Source	1.41E-06
Cement supplement delivery to Silo <sup>3</sup>	5.20E-07	ND	2.28E-06	8.66E-04	1.90E-03	1.19E-06	Point Source	9.98E-06
Truck Loadout (with 99.9% control) <sup>4</sup>		3.62E-06	1.23E-04	4.66E-02	1.02E-01	6.38E-05	Fugitive	5.37E-04
Central Mix (with 100% control)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	0.00E+00
<b>Total</b>			<b>1.25E-04</b>	<b>4.76E-02</b>	<b>0.104</b>		<b>Point Sources</b>	<b>1.14E-05</b>
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

<sup>1</sup> The emissions factors are from AP-42, Table 11.12-9 (version 06/06)

<sup>2</sup> Max. hourly rate = EF x pound of cement/ton<sup>3</sup> of concrete x max. hourly concrete production rate/(2000 lb/T)

<sup>3</sup> lb/ton = EF x pound of material/ton<sup>3</sup> of concrete x max. daily concrete production rate x (365/12)/2000 lb/T

<sup>4</sup> T/yr = EF x pound of material/ton<sup>3</sup> of concrete x max. annual concrete production rate/(2000 lb/T)

<sup>5</sup> lb/hr, qty avg = lb/ton x 3 months per cty / (8760/4)hrs per cty

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

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:

Facility Information	
Company:	The Sprinkler Shop Inc.
Facility ID:	067-00051
Permit No.:	P-2016.0001 Project 61644
Source Type:	Concrete Batch Plant
Manufacturer:	St. Mark Materials/ Transit mix 120

Truck Mix Loadout Factor: 1  
Central Mix Batching Factor: 0

**DEQ EI VERIFICATION WORKSHEET, Version 03/2007**  
Tip: Blue 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.

**Concrete Production**

Uncontrolled (Unlimited Production Rate)	
Maximum Hourly Production Rate:	24 hrs/day, 2,880 cy/day
Proposed Daily Production Rate:	7 day/wk, 1,051,200 cy/year
Processed Maximum Annual Production Rate:	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 (Percent of total Cr that is Cr+6)	
	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	Controlled with Fabric filter	Uncontrolled
Coarse aggregate	4.24E-09	1.68E-06	4.88E-10	1.79E-06	NA	2.34E-07	2.90E-08	2.52E-07	1.17E-07	2.02E-04	4.18E-08	1.76E-05	1.18E-05	ND	1.18E-05	ND	20%	
Sand	1.00E-06	ND	9.04E-08	ND	1.98E-10	ND	1.22E-06	ND	2.56E-07	ND	2.28E-06	ND	3.54E-06	ND	7.24E-08	ND	30%	
Cement	6.02E-07	1.22E-05	1.04E-07	2.44E-07	9.06E-09	3.42E-08	4.10E-06	1.14E-05	2.09E-05	6.12E-05	4.78E-06	1.19E-05	1.23E-05	3.84E-05	1.13E-07	2.62E-06	21.29%	
Cement supplement	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	0.00E+00	ND	21.29%	

**UNCONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment.**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI	
	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>
Cement delivery to silo (with baghouse)	1.25E-07	5.47E-07	1.43E-08	6.27E-08	6.89E-06	3.02E-05	8.54E-07	3.25E-05	3.45E-06	1.51E-05	1.23E-06	5.39E-06	3.48E-04	1.52E-03	ND	ND	1.71E-07	
Cement supplement delivery to Silo (with baghouse)	4.38E-06	1.92E-05	3.96E-07	1.73E-06	8.67E-10	3.80E-09	5.34E-06	2.34E-05	4.91E-06	1.12E-06	9.99E-06	4.37E-05	1.55E-05	6.79E-05	3.17E-07	1.39E-06	1.60E-06	
Truck Loadout (NO baghouse)	4.13E-04	1.81E-03	8.28E-06	3.62E-05	1.16E-06	5.07E-06	3.86E-04	1.69E-03	2.07E-03	9.07E-03	4.03E-04	1.76E-03	1.90E-03	5.69E-03	8.87E-05	3.86E-04	8.21E-05	
Central Mix Batching (NO dust 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	0.00E+00	0.00E+00	0.00E+00	
Sources Total	4.17E-04	1.83E-03	8.67E-06	3.80E-05	8.05E-06	3.53E-05	3.92E-04	1.75E-03	2.08E-03	9.09E-03	4.14E-04	1.81E-03	1.66E-03	7.28E-03	8.90E-05	3.90E-04	8.39E-05	
IDAPA Screening EL (lb/hr)	1.50E-06	6.70E-06	2.80E-05	1.20E-04	3.70E-06	1.60E-05	3.30E-02	1.50E-01	3.33E-01	7.00E-01	2.70E-05	2.70E-05	7.00E-03	7.00E-03	1.30E-02	5.60E-07	5.60E-07	
EXCEEDS EL?	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	Yes	

**CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment.**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI	
	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr 24-hr avg.	T/yr <sup>4</sup>	lb/hr annual avg.	T/yr <sup>4</sup>
Cement delivery to silo (with baghouse)	1.19E-08	5.20E-08	1.36E-09	5.97E-09	6.56E-07	2.87E-06	4.45E-07	3.56E-07	1.80E-06	1.44E-06	1.17E-07	5.13E-07	ND	ND	ND	ND	1.63E-08	
Cement supplement delivery to Silo (with baghouse)2	4.17E-07	1.83E-06	3.77E-08	1.65E-07	8.25E-11	3.61E-10	1.87E-05	2.23E-06	3.93E-06	4.67E-07	9.50E-07	4.16E-06	5.43E-05	6.48E-06	1.65E-07	1.32E-07	1.53E-07	
Truck Loadout (with baghouse)	3.93E-05	1.72E-04	7.85E-07	3.44E-06	1.10E-07	4.82E-07	2.01E-04	1.61E-04	1.08E-03	8.63E-04	3.63E-05	1.68E-04	6.77E-04	5.41E-04	4.62E-05	3.69E-05	7.81E-06	
Central Mix Batching (WITH dust 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	0.00E+00	0.00E+00	0.00E+00	
Sources Total	3.97E-05	1.74E-04	8.25E-07	3.61E-06	7.66E-07	3.35E-06	2.20E-04	1.63E-04	1.08E-03	8.65E-04	3.94E-05	1.72E-04	7.31E-04	5.48E-04	4.63E-05	3.71E-05	7.98E-06	
IDAPA Screening EL (lb/hr)	1.50E-06	6.70E-06	2.80E-05	1.20E-04	3.70E-06	1.60E-05	3.30E-02	1.50E-01	3.33E-01	7.00E-01	2.70E-05	2.70E-05	7.00E-03	7.00E-03	1.30E-02	5.60E-07	5.60E-07	
Percent of EL	2646.83%	2.94%	20.70%	0.67%	0.32556%	10.44%	10.44%	0.3565%	10.44%	0.3565%	10.44%	0.3565%	10.44%	0.3565%	10.44%	1425.62%	1425.62%	
EXCEEDS EL?	Yes	Yes	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	Yes	

1 lb/hr, annual average = EF x pound of cement / Y03 of concrete x annual concrete production rate / 2000lb/Ton / 24 hr/day  
 2 lb/hr, annual average = EF x pound of cement supplement / Y03 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr / 8760 lb/ton / 24-hr average = EF x pound of cement supplement / Y03 of concrete x daily concrete production rate / 2000lb/Ton  
 3 lb/hr, annual average = EF x pound of cement + cement supplement / Y03 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr / 8760 lb/ton / 24-hr average = EF x pound of cement + cement supplement / Y03 of concrete x daily concrete production  
 4 T/yr = lb/hr, annual avg x 8760 hr/yr x (1/2000 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)

NATURAL GAS COMBUSTION, AP-42 SECTION 1.4 (7/98)

Operating Assumptions: 2 MMBtu/hr / 1,020 MMBtu/MMscf = 1.96E-03 MMscf/hr Fuel Use: 0.035 MMscf/day  
 18 hr/day 5.882 MMscf/year  
 3,000 hr/yr

Criteria Air Pollutants	Emission Factor lb/MMscf	Emissions		CBP + Boiler Emissions T/yr	Modeling Threshold 2002 Guidance	Modeling Required?	Modeling Threshold Case-by-Case	Modeling Required?
		lb/hr	T/yr					
NO2	100	1.96E-01	2.94E-01	2.94E-01	1 T/yr	No	7 T/yr	No
CO	84	1.65E-01	2.47E-01	2.47E-01	14 lb/hr	No	70 lb/hr	No
PM10	7.6	1.49E-02	2.24E-02	4.41E+00	0.2 lb/hr	No	0.9 lb/hr	No
		1.49E-02	2.24E-02	2.39E+00	1 T/yr	No	7 T/yr	No
PM2.5	7.6	1.49E-02	2.24E-02	2.39E+00				
		1.49E-02	2.24E-02					
SOx	0.6	1.18E-03	1.76E-03	1.76E-03	0.2 lb/hr	No	0.9 lb/hr	No
		1.18E-03	1.76E-03		1 T/yr	No	7 T/yr	No
VOC	5.5	1.08E-02	1.62E-02	1.62E-02	40 T/yr	No		
Lead	0.0005	9.80E-07	1.47E-06	1.04E-01	0.6 T/yr	No		
Lead, continued			5.37E-03	lb/quarter	10 lb/mo	No		
TOTAL			5.81E-01	T/yr				

Note: 100 lb/mo Pb in guidance reduced by factor of 10 based on latest Pb NAAQS (reduced in 2008 from 1.5 ug/m3 to 0.15 ug/m3)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)	lb/MMscf	lb/hr	T/yr	EL (lb/hr)	Exceeds
					EL/Modeling Required?
<b>PAH HAPs</b>					
2-Methylnaphthalene	2.40E-05	1.61E-08	5.52E-09	9.10E-05	No
3-Methylchloranthrene	1.80E-06	1.21E-09	4.14E-10	2.50E-06	No
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.35E-08	3.53E-08		
Acenaphthene	1.80E-06	1.21E-09	4.14E-10	9.10E-05	No
Acenaphthylene	1.80E-06	1.21E-09	4.14E-10	9.10E-05	No
Anthracene	2.40E-06	1.61E-09	5.52E-10	9.10E-05	No
Benzo(a)anthracene	1.80E-06	1.21E-09	4.14E-10	9.10E-05	See POM
Benzo(a)pyrene	1.20E-06	8.06E-10	2.76E-10	2.00E-06	See POM
Benzo(b)fluoranthene	1.80E-06	1.21E-09	4.14E-10		See POM
Benzo(g,h,i)perylene	1.20E-06	8.06E-10	2.76E-10	9.10E-05	No
Benzo(k)fluoranthene	1.80E-06	1.21E-09	4.14E-10		See POM
Chrysene	1.80E-06	1.21E-09	4.14E-10		See POM
Dibenzo(a,h)anthracene	1.20E-06	8.06E-10	2.76E-10		See POM
Dichlorobenzene	1.20E-03	8.06E-07	2.76E-07	9.10E-05	No
Fluoranthene	3.00E-06	2.01E-09	6.90E-10	9.10E-05	No
Fluorene	2.80E-06	1.88E-09	6.44E-10	9.10E-05	No
Indeno(1,2,3-cd)pyrene	1.80E-06	1.21E-09	4.14E-10		See POM
Naphthalene	6.10E-04	1.50E-04	2.24E-04	3.33	No
Naphthalene	6.10E-04	4.10E-07	1.40E-07	9.10E-05	No
Phenanthrene	1.70E-05	1.14E-08	3.91E-09	9.10E-05	No
Pyrene	5.00E-06	3.36E-09	1.15E-09	9.10E-05	No
Polycyclic Organic Matter (POM) 7-PAH Group		7.66E-09	2.62E-09	2.00E-06	No
<b>Non-PAH HAPs</b>					
Benzene	2.10E-03	1.41E-06	4.83E-07	8.00E-04	No
Formaldehyde	7.50E-02	5.04E-05	1.72E-05	5.10E-04	No
Hexane	1.80E+00	2.65E-03	3.97E-03	12	No
Toluene	3.40E-03	5.00E-06	7.50E-06	25	No
<b>Non-HAP Organic Compounds</b>					
Butane	2.10E+00	3.09E-03	4.63E-03		
Ethane	3.10E+00	4.56E-03	6.84E-03		
Pentane	2.60E+00	3.82E-03	5.74E-03	118	No
Propane	1.60E+00	2.35E-03	3.53E-03		
<b>Metals (HAPs)</b>					
Arsenic	2.00E-04	1.34E-07	4.60E-08	1.50E-06	No
Barium	4.40E-03	6.47E-06	9.71E-06	0.033	No
Beryllium	1.20E-05	8.06E-09	2.76E-09	2.80E-05	No
Cadmium	1.10E-03	7.39E-07	2.53E-07	3.70E-06	No
Chromium	1.40E-03	2.06E-06	3.09E-06	0.033	No
Cobalt	8.40E-05	1.24E-07	1.85E-07	0.0033	No
Copper	8.50E-04	1.25E-06	1.88E-06	0.013	No
Manganese	3.80E-04	5.59E-07	8.38E-07	0.067	No
Mercury	2.60E-04	3.82E-07	5.74E-07	0.003	No
Molybdenum	1.10E-03	1.62E-06	2.43E-06	0.333	No
Nickel	2.10E-03	1.41E-06	4.83E-07	2.70E-05	No
Selenium	2.40E-05	3.53E-08	5.29E-08	0.013	No
Vanadium	2.30E-03	3.38E-06	5.07E-06	0.003	No
Zinc	2.90E-02	4.26E-05	6.40E-05	0.667	No

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

Case-by-Case Modeling Thresholds may be used ONLY with DEQ Approval

TOTAL CBP + WATER HEATER EMISSIONS (POINT SOURCES, T/yr)	7.46
--	------

Facility:  
4/13/2016 12:40

The Sprinkler Shop Inc.  
Permit/Facility ID:

P-2016.0001  
Project 61644 067-00051

**Greenhouse Gas Emissions when Combusting Natural Gas**

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	120000	lb/MMscf	AP-42 Table 1.4-2	176.47	1	176.47
Methane	2.3	lb/MMscf	AP-42 Table 1.4-2	3.38E-03	21	7.10E-02
N <sub>2</sub> O	2.2	lb/MMscf	AP-42 Table 1.4-2	3.24E-03	310	1.00E+00

\* Assumes a heating value of 1,020 Btu/scf and a heater with a rating of 1 MMBtu/hr.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	120000	lb/MMscf	AP-42 Table 1.4-2	176.47	1	176.47
Methane	2.3	lb/MMscf	AP-42 Table 1.4-2	3.38E-03	21	7.10E-02
N <sub>2</sub> O	2.2	lb/MMscf	AP-42 Table 1.4-2	3.24E-03	310	1.00E+00

\* Assumes a heating value of 1,020 Btu/scf and a heater with a rating of 1 MMBtu/hr.

**Greenhouse Gas Emissions when Combusting #2 Diesel**

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	Molecular conversion from C to CO <sub>2</sub>			0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-3	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-8	0.00E+00	310	0.00E+00

\* Water Heater #1 does not burn Diesel.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	Molecular conversion from C to CO <sub>2</sub>			0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-3	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.3-8	0.00E+00	310	0.00E+00

\* Water Heater #2 does not burn Diesel.

**Greenhouse Gas Emissions when Combusting LPG**

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	310	0.00E+00

\* Water Heater #1 does not burn Propane.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00	1	0.00
Methane	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	21	0.00E+00
N <sub>2</sub> O	0	lb/10 <sup>3</sup> gal	AP-42 Table 1.5-1	0.00E+00	310	0.00E+00

\* Water Heater #2 does not burn Propane.

**Greenhouse Gas Emissions when Combusting Diesel Fuel**

Small Engine #1 Emissions ≤ 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	1.15	lb/bhp-hr	AP-42 Table 3.3-1	0.00	1	0.00

\* There are no engines at this facility.

Small Engine #2 Emissions ≤ 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	1.15	lb/bhp-hr	AP-42 Table 3.3-1	0.00	1	0.00

\* There is no second small engine at this facility.

Large Engine #1 Emissions > 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	1.16	lb/bhp-hr	AP-42 Table 3.4-1	0.00	1	0.00

\* There is no large engine at this facility.

**Total Greenhouse Gas Emissions**

	CO <sub>2</sub> e (T/yr)
CO <sub>2</sub>	352.94
Methane	0.14
N <sub>2</sub> O	2.01
<b>Total</b>	<b>355.09</b>

Facility: The Sprinkler Shop Inc.  
 4/13/2016 12:40 Permi/Facility ID: 067-00051 P-2016.0001 Project 61644

Max Hourly Production 120 cy/hr 82% T/hr is Aggregate = 98 cy/hr  
 Max Daily Production 1,500 cy/day 82% T/hr is Aggregate = 1,230 cy/day  
 Max Annual Production 100,000 cy/yr 82% T/hr is Aggregate = 82,000 cy/yr

Aggregate is considered both coarse and fine (sand). The 82% is based on 1,865 lb coarse aggregate, 1,428 lb sand, 564 lb cement/supplement and 167 lb water for a total of 4,024 lb concrete

**Truck Mix Operations Drop Points, AP-42 11-12 (06/06)**

$E = k (0.0032) x(U^a / M^b) + c =$  9.71E-02 3.88E-02 lb/ton for PM10 5.83E-03 lb/ton for PM2.5

k = particle size multiplier 0.8 for PM 0.32 for PM10 0.048 for PM2.5  
 a = exponent 1.75 for PM 1.75 for PM10 1.75 for PM2.5  
 b = exponent 0.3 for PM 0.3 for PM10 0.3 for PM2.5  
 c = constant 0.013 for PM 0.0052 for PM10 0.00078 for PM2.5  
 U = mean wind speed = 10 mph  
 M = moisture content = 6 %

Mean wind speed 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006.  
 This data is from the Western Regional Climate Center (<http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO>).  
 Moisture Content: 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises Cement plant in Roanoke, VA, 1994. (AP-42 11-12 06/06).

Wind Category	Windspeed Variation Factors for AERMOD modeling:			PM10		PM2.5	
	Upper windspeed (m/sec)	Avg windspeed (m/sec)	Avg windspeed (mph)	E @ avg mph	F = Eavg mph/E@10mph	E @ avg mph	mph/E@10mph
Cat 1:	1.54	0.77	1.72	6.75E-03	0.1738	1.01E-03	0.1738
Cat 2:	3.09	2.32	5.18	1.58E-02	0.4077	2.38E-03	0.4077
Cat 3:	5.14	4.12	9.20	3.43E-02	0.8831	5.15E-03	0.8831
Cat 4:	8.23	6.69	14.95	7.32E-02	1.885	1.10E-02	1.885
Cat 5:	10.80	9.52	21.28	1.31E-01	3.382	1.97E-02	3.382
Cat 6:	14.00	12.40	27.74	2.06E-01	5.298	3.09E-02	5.298

**Central Mix Operations Drop Points, AP-42 11-12 (06/06)**

$E = k (0.0032) x(U^a / M^b) + c =$  2.08E-03 1.23E-03 lb/ton for PM10 2.54E-04 lb/ton for PM2.5

k = particle size multiplier 0.19 for PM 0.13 for PM10 0.03 for PM2.5  
 a = exponent 0.95 for PM 0.45 for PM10 0.45 for PM2.5  
 b = exponent 0.9 for PM 0.9 for PM10 0.9 for PM2.5  
 c = constant 0.001 for PM 0.001 for PM10 0.0002 for PM2.5  
 U = mean wind speed = 10 mph  
 M = moisture content = 6 %

Mean wind speed 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006.  
 This data is from the Western Regional Climate Center (<http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO>).  
 Moisture Content: 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises

Wind Category	Windspeed Variation Factors for AERMOD modeling:			PM10		PM2.5	
	Upper windspeed (m/sec)	Avg windspeed (m/sec)	Avg windspeed (mph)	E @ avg mph	F = Eavg mph/E@10mph	E @ avg mph	mph/E@10mph
Cat 1:	1.54	0.77	1.72	1.11E-03	0.8964	2.24E-04	0.8838
Cat 2:	3.09	2.32	5.18	1.87E-03	1.5160	2.40E-04	0.9456
Cat 3:	5.14	4.12	9.20	2.13E-03	1.7261	2.52E-04	0.9922
Cat 4:	8.23	6.69	14.95	2.41E-03	1.949	2.65E-04	1.0422
Cat 5:	10.80	9.52	21.28	2.65E-03	2.146	2.76E-04	1.0860
Cat 6:	14.00	12.40	27.74	2.86E-03	2.315	2.85E-04	1.1238

**Conveyor and Scalping Screen Emission Points**

Moisture/Control %:  
 Aggregate for CBP typically stabilizes between 5-6% by weight--> Apply additional 25% control to lb/hr, etc. for the higher moisture.  
 Sand aggregate for CBPs is 36%  
 Coarse aggregate for CBPs is 46%

**Fine Aggregate (Sand) Transfer to Conveyor**

Transfer from truck to conveyor: 98 cy/hr 3 Transfer Points

Pollutant	Emission Factor Table 11.12-5 CONVEYOR TRANSFER PT CONTROLLED (lb/cy)	Emissions Per Transfer Point				Total Emissions			
		Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average	Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average
PM (total)	0.0015	0.048	0.025	2.00E-02	4.56E-03	0.144	0.075	5.99E-02	1.37E-02
PM-10 (total)	7.00E-04	0.022	0.012	9.32E-03	2.13E-03	0.067	0.035	2.80E-02	6.38E-03
PM-2.5 (total)	2.25E-04	0.007	0.004	3.00E-03	1.31E-02	0.022	0.011	8.99E-03	3.94E-02

**Coarse Aggregate Transfer to Conveyor**

Transfer from truck to conveyor: 98 cy/hr 3 Transfer Points

Pollutant	Emission Factor Table 11.12-5 CONVEYOR TRANSFER PT CONTROLLED (lb/cy)	Emissions Per Transfer Point				Total Emissions			
		Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average	Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average
PM (total)	0.0064	0.265	0.138	1.10E-01	2.52E-02	0.795	0.414	3.31E-01	7.56E-02
PM-10 (total)	3.10E-03	0.128	0.067	5.35E-02	1.22E-02	0.385	0.201	1.60E-01	3.66E-02
PM-2.5 (total)	9.60E-04	0.040	0.021	1.66E-02	7.25E-02	0.119	0.062	4.97E-02	2.18E-01

**Final Concrete Batch Plant Emissions Inventory**

Listed Below are the emissions estimates for the units selected.

Company:	The Sprinkler Shop Inc.
Facility ID:	067-00051
Permit No.:	P-2016.0001 Project 61644
Source Type:	Concrete Batch Plant
Manufacturer/Model:	St. Mark Materials/ Transit mix 120

<b>Production</b>	
Maximum Hourly Production Rate:	120 cy/hr
Proposed Daily Production Rate:	1500 cy/day
Proposed Maximum Annual Production Rate:	100000 cy/year

Emissions Units	Tons/year									
	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Lead	THAPs	CO <sub>2</sub> e	
CBP Type:	2.369	4.39	NA	NA	NA	NA	1.14E-05		N/A	
Water Heater #1:	0.011	0.011	8.82E-04	0.147	0.124	0.008	7.35E-07		178	
Water Heater #2:	0.011	0.011	8.82E-04	0.147	0.124	0.008	7.35E-07		178	
Small Diesel Engine(s) *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0	
Large Diesel Engine *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0	
Transfer/Drop Points	0.059	0.19	NA	NA	NA	NA	NA		N/A	
Annual Totals (T/yr) Note: Load out emissions were not included as they are considered "fugitive".	0.08	0.21	1.76E-03	0.29	0.25	0.02	1.29E-05	6.23E-03	355	

Emissions Units	Pounds/hour									
	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Lead	THAPs		
CBP Type:	0.541	1.00	NA	NA	NA	NA	1.25E-04			
Water Heater #1:	0.007	0.007	5.88E-04	0.098	0.082	0.005	4.90E-07			
Water Heater #2:	0.007	0.007	5.88E-04	0.098	0.082	0.005	4.90E-07			
Small Diesel Engine(s) *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA			
Large Diesel Engine *:	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA			
Transfer/Drop Points	0.073	0.24	NA	NA	NA	NA	NA			
Daily Totals (lb/hr) Note: Load out emissions were not included as they are considered "fugitive".	0.09	0.25	1.18E-03	0.20	0.16	0.01	1.26E-04	5.03E-03		

\* The Large engine may run :

\* The Small engine(s) may run :

There is no large engine. hr/yr

There is no small engine. hr/yr

HAPS & TAPS Emissions Inventory

Metals	HAP	TAP	lb/hr	T/yr	Averaging Period	EL lb/hr	Exceeded?
Arsenic	X	X	3.98E-05	1.74E-04	Annual	1.50E-06	Yes
Barium		X	6.47E-06	9.71E-06	24-hour	3.30E-02	No
Beryllium	X	X	8.33E-07	3.61E-06	Annual	2.80E-05	No
Cadmium	X	X	1.50E-06	3.61E-06	Annual	3.70E-06	No
Cobalt	X	X	1.24E-07	1.85E-07	24-hour	3.30E-03	No
Copper		X	1.25E-06	1.88E-06	24-hour	1.30E-02	No
Chromium	X	X	2.22E-04	1.66E-04	24-hour	3.30E-02	No
Manganese	X	X	1.08E-03	8.66E-04	24-hour	3.33E-01	No
Mercury	X	X	3.82E-07	5.74E-07	24-hour	3.00E-03	No
Molybdenum		X	1.62E-06	2.43E-06	24-hour	2.70E-05	No
Nickel	X	X	4.08E-05	1.73E-04	Annual	2.70E-05	Yes
Phosphorus	X	X	7.31E-04	5.48E-04	24-hour	7.00E-03	No
Selenium	X	X	4.64E-05	3.71E-05	24-hour	1.30E-02	No
Vanadium		X	3.38E-06	5.07E-06	24-hour	3.00E-03	No
Zinc		X	4.26E-05	6.40E-05	24-hour	6.67E-01	No
Chromium VI	X	X	7.98E-06	3.50E-05	Annual	5.60E-07	Yes
<b>Non PAH Organic Compounds</b>							
Pentane		X	2.35E-03	3.53E-03	24-hour	118	No
Methyl Ethyl Ketone		X	0.00E+00	0.00E+00	24-hour	39.3	No
<b>Non-PAH HAPs</b>							
Acetaldehyde	X	X	0.00E+00	0.00E+00	Annual	3.00E-03	No
Acrolein	X	X	0.00E+00	0.00E+00	24-hour	1.70E-02	No
Benzene	X	X	1.41E-06	4.83E-07	Annual	8.00E-04	No
1,3 - Butadiene	X	X	0.00E+00	0.00E+00	Annual	2.40E-05	No
Ethyl Benzene	X	X	0.00E+00	0.00E+00	24-hour	29	No
Formaldehyde	X	X	5.04E-05	1.72E-05	Annual	5.10E-04	No
Hexane	X	X	2.65E-03	3.97E-03	24-hour	12	No
Isocotane	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Methyl Chloroform	X	X	0.00E+00	0.00E+00	24-hour	127	No
Propionaldehyde	X	X	0.00E+00	0.00E+00	24-hour	2.87E-02	No
Quinone	X	X	0.00E+00	0.00E+00	24-hour	2.70E-02	No
Toluene	X	X	5.00E-06	7.50E-06	24-hour	25	No
o-Xylene	X	X	0.00E+00	0.00E+00	24-hour	7.00E-03	No
<b>PAH HAPs</b>							
2-Methylnaphthalene	X	X	1.61E-08	5.52E-09	Annual	9.10E-05	No
3-Methylchloranthrene	X	X	1.21E-09	4.14E-10	Annual	2.50E-06	No
7,12-Dimethylbenz(a)anthracene	X		2.35E-08	3.53E-08	N/A	N/A	N/A
Acenaphthene	X	X	1.21E-09	4.14E-10	Annual	9.10E-05	No
Acenaphthylene	X	X	1.21E-09	4.14E-10	Annual	9.10E-05	No
Anthracene	X	X	1.61E-09	5.52E-10	Annual	9.10E-05	No
Benzo(a)anthracene	X	X	1.21E-09	4.14E-10	Annual	9.10E-05	No
Benzo(a)pyrene	X	X	8.06E-10	2.76E-10	Annual	2.00E-06	No
Benzo(b)fluoranthene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Benzo(e)pyrene	X	X	0.00E+00	0.00E+00	Annual	2.00E-06	No
Benzo(g,h,i)perylene	X	X	8.06E-10	2.76E-10	Annual	9.10E-05	No
Benzo(k)fluoranthene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Chrysene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Dibenzo(a,h)anthracene	X	X	8.06E-10	2.76E-10	Annual	2.00E-06	No
Dichlorobenzene	X	X	8.06E-07	2.76E-07	Annual	9.10E-05	No
Fluoranthene	X	X	2.01E-09	6.90E-10	Annual	9.10E-05	No
Fluorene	X	X	1.88E-09	6.44E-10	Annual	9.10E-05	No
Indeno(1,2,3-cd)pyrene	X	X	1.21E-09	4.14E-10	Annual	2.00E-06	No
Naphthalene	X	X	1.50E-04	2.24E-04	24-hour	3.33	No
Naphthalene	X	X	4.10E-07	1.40E-07	Annual	9.10E-05	No
Perylene	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Phenanthrene	X	X	1.14E-08	3.91E-09	Annual	9.10E-05	No
Pyrene	X	X	3.36E-09	1.15E-09	Annual	9.10E-05	No
PAH HAPs Total	X	X	7.66E-09		Annual	2.00E-06	No
Polycyclic Organic Matter (POM)	X	X	7.66E-09	2.62E-09	Annual	2.00E-06	No

Facility: The Sprinkler Shop Inc.  
 4/13/2016 12:45 Permit P-2016.0001 Project 61644

Facility ID: 067-00051

**Internal Combustion Engine > 600 hp (447 kW)**

Fuel Type Toggle =	0
Fuel Consumption Rate	0.00 gal/hr
Calculated MMBtu/hr	0.00 MMBtu/hr
Max Daily Operation	0 hr/day
Max Annual Operation	0 hrs/yr

**Rated Power of Large (hp):** 0

Not EPA Certified:	No
Certified EPA Tier 1:	No
Certified EPA Tier 2:	No
Certified EPA Tier 3:	No
Certified EPA Tier 4:	No
Blue Sky Engine:	No

**Small Internal Combustion Engine #1 < 600 hp (447 kW)**

Fuel Type Toggle =	0
Fuel Consumption Rate	0.00 gal/hr
Calculated MMBtu/hr	0.00 MMBtu/hr
Max Daily Operation	18 hr/day
Max Annual Operation	0 hrs/yr

**Rated Power of Small #1 (hp):** 0

Not EPA Certified:	No
Certified EPA Tier 1:	No
Certified EPA Tier 2:	No
Certified EPA Tier 3:	No
Certified EPA Tier 4:	No
Blue Sky Engine:	No

**Small Internal Combustion Engine #2 < 600 hp (447 kW)**

Fuel Type Toggle =	0
Fuel Consumption Rate	0.00 gal/hr
Calculated MMBtu/hr	0.00 MMBtu/hr
Max Daily Operation	18 hr/day
Max Annual Operation	0 hrs/yr

**Rated Power of Small #2 (hp):** 0

Not EPA Certified:	No
Certified EPA Tier 1:	No
Certified EPA Tier 2:	No
Certified EPA Tier 3:	No
Certified EPA Tier 4:	No
Blue Sky Engine:	No

**Conversion Factors:**

Avg brake-specific fuel consumption (BSFC) =	7000	Btu/hp-hr
1 hp =	0.746	kW
1 lb =	453.592	g

$$g/kW-hr \times (lb/453g) \times (hp-hr/7000 Btu) \times (0.746 kW/hp) \times 10^6 Btu/MMBtu = lb/MMBtu$$

$$g/kW-hr \times 0.23486 = lb/MMBtu$$

Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM=PM10
EMISSION FACTORS USED FOR SMALL ENGINE (lb/MMBtu):	0.00	0.00	0.00	0.000
Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM=PM10
EMISSION FACTORS USED FOR LARGE ENGINE (lb/MMBtu):	0.00	0.00	0.00	0.000

**AP-42, 3.4 (10/96) EMISSION FACTORS (diesel fueled, uncontrolled)**

Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM10
Emission Factor (lb/MMBtu)	0	0	0.00	0
Emission Factor (g/kW-hr)	0.00	0.00	0.00	0.00

**AP-42, Ch 3.3 (10/96) EMISSION FACTORS (diesel fueled, uncontrolled)**

Pollutant:	NOx	VOC (total TOC--> VOCs)	CO	PM10
Emission Factor (lb/MMBtu)	4.41	0.36	0.95	0.31
Emission Factor (g/kW-hr)	18.78	1.53	4.05	1.32

Note: Rating for AP-42 PM10 EF of 0.0573 is "E" or Poor. Used Tier 1 PM EF and presumed PM = PM10

**40 CFR 89 and 1039, EPA CERTIFIED GENERATOR EMISSION FACTORS (g/kW-hr converted to lb/MMBtu)**

Rated Power (kW)	Tier	Applicable?	Model Year <sup>1</sup>	NOx	HC	NMHC + NOx	CO	PM = PM10
kW < 8	1	0	2000	0.0	0.36	2.47	1.88	0.23
kW < 8	2	0	2005	0.00	0.36	1.76	1.88	0.19
kW < 8	4	0	2008	0.00	0.36	1.76	1.88	0.09
kW < 8	BlueSky	0	n/a	0.00	0.36	1.08	1.88	0.11
8 ≤ kW < 19	1	0	2000	0.00	0.36	2.23	1.55	0.19
8 ≤ kW < 19	2	0	2005	0.00	0.36	1.76	1.55	0.19
8 ≤ kW < 19	4	0	2008	0.00	0.36	1.76	1.55	0.09
8 ≤ kW < 19	BlueSky	0	n/a	0.00	0.36	1.06	1.55	0.11
19 ≤ kW < 37	1	0	1999	0.00	0.36	2.23	1.29	0.19
19 ≤ kW < 37	2	0	2004	0.00	0.36	1.76	1.29	0.14
19 ≤ kW < 37	4	0	2008	0.00	0.36	1.10	1.29	0.007
19 ≤ kW < 37	BlueSky	0	n/a	0.00	0.36	1.06	1.29	0.085
37 < kW < 75	1	0	1998	2.16	0.36	0.00	---	---
37 < kW < 75	2	0	2004	0.00	0.36	1.76	1.17	0.09
37 < kW < 75	3	0	2008	0.00	0.36	1.10	1.17	0.09
37 < kW < 75	4	0	2008	0.00	0.36	1.10	1.17	0.007
37 < kW < 75	BlueSky	0	n/a	0.00	0.36	1.10	1.17	0.056
75 < kW < 130	1	0	1997	2.16	0.36	0.00	---	---
75 < kW < 130	2	0	2003	0.00	0.36	1.55	1.17	0.07
75 < kW < 130	3	0	2007	0.00	0.36	0.94	1.17	0.07
75 < kW < 130	4	0	2008	0.09	0.04	0.00	1.17	0.005
75 < kW < 130	BlueSky	0	n/a	0.00	0.36	0.94	1.17	0.042
130 < kW < 225	1	0	1996	2.16	0.31	0.00	2.68	0.13
130 < kW < 225	2	0	2003	0.00	0.31	1.55	0.82	0.05
130 < kW < 225	3	0	2006	0.00	0.31	0.94	0.82	0.05
130 < kW < 560	4	0	2008	0.09	0.04	0.00	0.82	0.005
130 ≤ kW ≤ 560	BlueSky	0	n/a	0.00	0.31	0.94	0.82	0.028
225 < kW < 450	1	0	1996	2.16	0.31	0.00	2.68	0.13
225 < kW < 450	2	0	2001	0.00	0.31	1.50	0.82	0.05
225 < kW < 450	3	0	2006	0.00	0.31	0.94	0.82	0.05
450 < kW < 560	1	0	1996	2.16	0.31	0.00	2.68	0.13
450 < kW < 560	2	0	2002	0.00	0.31	1.50	0.82	0.05
450 < kW ≤ 560	3	0	2006	0.00	0.31	0.94	0.82	0.05
kW > 560	1	0	2000	2.16	0.31	0.00	2.68	0.13
kW > 560	2	0	2006	0.00	0.31	1.50	0.82	0.05
kW > 560	BlueSky	0	n/a	Emission Factor	0.31	0.89	0.82	0.028

40 CFR 89 and 1039, EPA CERTIFIED GENERATOR EMISSION FACTORS FOR LARGE ENGINE (lb/MMBtu)

Rated Power (kW)	Tier	Applicable?	Model Year <sup>1</sup>	NOx	HC	NMHC + NOx	CO	PM10
kW < 8	1	0	2000	0.00	0.00	0.00	0.00	0.00
kW < 8	2	0	2005	0.00	0.00	0.00	0.00	0.00
kW < 8	4	0	2008	0.00	0.00	0.00	0.00	0.00
kW < 8	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	1	0	2000	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	2	0	2005	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	4	0	2008	0.00	0.00	0.00	0.00	0.00
8 ≤ kW < 19	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	1	0	1999	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	2	0	2004	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	4	0	2008	0.00	0.00	0.00	0.00	0.00
19 ≤ kW < 37	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	1	0	1998	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	2	0	2004	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	3	0	2008	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	4	0	2008	0.00	0.00	0.00	0.00	0.00
37 ≤ kW < 75	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	1	0	1997	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	2	0	2003	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	3	0	2007	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	4	0	2008	0.00	0.00	0.00	0.00	0.00
75 ≤ kW < 130	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	1	0	1996	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	2	0	2003	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	3	0	2006	0.00	0.00	0.00	0.00	0.00
130 < kW < 560	4	0	2008	0.00	0.00	0.00	0.00	0.00
130 ≤ kW < 560	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	1	0	1996	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	2	0	2001	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	3	0	2006	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	1	0	1996	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	2	0	2002	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	3	0	2006	0.00	0.00	0.00	0.00	0.00
kW > 560	1	0	2000	0.00	0.00	0.00	0.00	0.00
kW > 560	2	0	2006	0.00	0.00	0.00	0.00	0.00
kW > 560	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00

## APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

**MEMORANDUM**

**DATE:** April 13, 2016  
**TO:** Craig Woodruff, Permit Writer, Air Program  
**FROM:** Kevin Schilling, Stationary Source Modeling Coordinator, Air Program  
**PROJECT:** P-2016.0001 PROJ 61644, PTC for New Concrete Batch Plant Facility in Rupert, ID  
**SUBJECT:** Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

---

**Contents**

**Acronyms, Units, and Chemical Nomenclature ..... 3**  
**1.0 Summary ..... 5**  
**2.0 Background Information ..... 6**  
    2.1 Project Description ..... 6  
    2.2 Proposed Location and Area Classification ..... 6  
    2.3 Air Impact Analysis Required for All Permits to Construct..... 7  
    2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses..... 7  
    2.5 Toxic Air Pollutant Analysis ..... 9  
**3.0 Analytical Methods and Data..... 10**  
    3.1 Emissions Source Data..... 10  
        3.1.1. Modeling Applicability and Modeled Criteria Pollutant Emissions Rates ..... 10  
        3.1.2. Toxic Air Pollutant Emissions Rates..... 11  
        3.1.3. Emissions Release Parameters..... 12  
    3.2 Background Concentrations ..... 13  
    3.3 NAAQS Impact Modeling Methodology ..... 13  
        3.3.1. General Overview of Impact Analyses ..... 13  
        3.3.2 Modeling Protocol and Methodology ..... 13  
        3.3.3 Model Selection ..... 14  
        3.3.4 Meteorological Data..... 14  
        3.3.5 Effects of Terrain on Modeled Impacts..... 14  
        3.3.6 Facility Layout..... 14

3.3.7 Effects of Building Downwash on Modeled Impacts.....	14
3.3.8 Ambient Air Boundary.....	14
3.3.9 Receptor Network.....	15
3.3.10 Good Engineering Practice Stack Height.....	15
<b>4.0 NAAQS Impact Modeling Results.....</b>	<b>15</b>
4.1 Results for NAAQS Analyses.....	15
4.2 Results for TAPs Impact Analyses.....	15
<b>5.0 Conclusions.....</b>	<b>16</b>

## Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
As	Arsenic
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
CBP	Concrete Batch Plant
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
Cr6+	Hexavalent Chromium
DEM	Digital Elevation Map
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
GEP	Good Engineering Practice
hr	hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
m	Meters
m/sec	Meters per second
MMBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NO	Nitrogen Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
NWS	National Weather Service
O <sub>3</sub>	Ozone
Pb	Lead
PM <sub>10</sub>	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
PM <sub>2.5</sub>	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	parts per million
PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit

SIL	Significant Impact Level
SO <sub>2</sub>	Sulfur Dioxide
Sprinkler Shop	The Sprinkler Shop, Inc.
TAP	Toxic Air Pollutant
tpy	tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
μg/m <sup>3</sup>	Micrograms per cubic meter of air

## **1.0 Summary**

The Sprinkler Shop, Inc. (Sprinkler Shop) submitted a Permit to Construct (PTC) application for a new concrete batch plant (CBP) proposed in Rupert, Idaho. The PTC application was received on December 11, 2015. The Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03) require that no permit shall be granted unless it is demonstrated that the new source or modification will not cause or contribute to a violation of an applicable air quality standard.

This memorandum provides a summary of the regulatory applicability and air impact analyses performed to satisfy the requirements of Idaho Air Rules Section 203.02 and 203.03. Idaho Air Rules Section 203.02, requiring a demonstration of compliance with National Ambient Air Quality Standards (NAAQS), was not applicable to this permitting action because maximum emissions of criteria pollutants were at levels qualifying the source for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221. The permitting action was subject to Idaho Air Rules Section 203.03, requiring a demonstration of compliance with Toxic Air Pollutant (TAP) increment standards.

Project-specific air quality analyses involving atmospheric dispersion modeling of estimated TAP emissions associated with the facility were performed by DEQ to demonstrate that the facility would not cause a violation of any identified TAP Acceptable Ambient Concentration (AAC) or Acceptable Ambient Concentration of a Carcinogen (AACC).

The DEQ review of submitted data/analyses and DEQ performance of air impact analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emissions estimates was the responsibility of the permit writer and is addressed in the main body of the DEQ Statement of Basis, and emissions calculation methods were not evaluated in this modeling review memorandum.

The submitted information and analyses, in combination with DEQ's analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emissions estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emissions increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments.

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

Idaho Air Rules require air impact analyses be conducted according to methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed by atmospheric dispersion models using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted information and analyses, in combination with DEQ's analyses, demonstrated to the satisfaction of the Department that

operation of the proposed facility will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure the requirements of Appendix W are met with regard to emissions representing design capacity or permit allowable rates.

<b>Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES</b>	
<b>Criteria/Assumption/Result</b>	<b>Explanation/Consideration</b>
<b>Allowable Throughput.</b> An annual throughput restriction of 100,000 cubic yards of concrete was necessary to demonstrate compliance with TAP increment standards.	An annual throughput restriction is also needed to ensure that annual emissions of criteria pollutants remain below BRC levels.
<b>General Emissions Rates.</b> Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, must represent maximum potential emissions as given by design capacity or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling analyses.
<b>Below Regulatory Concern for Criteria Pollutant Emissions.</b> Maximum non-fugitive annual emissions of PM <sub>10</sub> <sup>a</sup> , PM <sub>2.5</sub> <sup>b</sup> , oxides of nitrogen (NO <sub>x</sub> ), carbon monoxide (CO), sulfur dioxide (SO <sub>2</sub> ), and lead (Pb) are below levels identified as below regulatory concern (BRC) as per Idaho Air Rules Section 221, and the project would be exempt from permitting if it were not for emissions of TAPs exceeding regulatory exemption criteria.	Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having a project-emissions increase that is less than BRC levels, provided the project would have qualified for a BRC permitting exemption except for the emissions levels of another criteria pollutant exceeding the ton/year BRC threshold.

<sup>a</sup>. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

<sup>b</sup>. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

## **2.0 Background Information**

This section provides background information applicable to the project and the site where the facility is located. It also provides a brief description of the applicable air impact analyses requirements for the project.

### ***2.1 Project Description***

The proposed Sprinkler Shop is new stationary concrete batch plant (CBP). Pollutant-emitting processes performed at the facility will include material handling of cement, aggregate, and fly ash. Two 1.0 million British thermal unit per hour (MMBtu/hr) natural gas-fired water heaters will also operate at the facility. The PTC addresses all air pollutant emitting activities at the site.

### ***2.2 Proposed Location and Area Classification***

The facility is located in Rupert, Idaho, within Minidoka county. This area is designated as an attainment or unclassifiable area for sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), lead (Pb), ozone (O<sub>3</sub>), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>), and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers (PM<sub>2.5</sub>). The area is not classified as non-attainment for any criteria pollutants.

## **2.3 Air Impact Analyses Required for All Permits to Construct**

Idaho Air Rules Sections 203.02 and 203.03:

*No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*

*02. NAAQS. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*

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

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

*03. Estimates of Ambient Concentrations. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

## **2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses**

The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 40 CFR 51, Appendix W (Guideline on Air Quality Models). Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a “significant contribution” in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

If modeled maximum pollutant impacts to ambient air from the emissions sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from facility-wide emissions, and emissions from any nearby co-contributing sources, and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	Averaging Period	Significant Impact Levels <sup>a</sup> ( $\mu\text{g}/\text{m}^3$ ) <sup>b</sup>	Regulatory Limit <sup>c</sup> ( $\mu\text{g}/\text{m}^3$ )	Modeled Design Value Used <sup>d</sup>
PM <sub>10</sub> <sup>e</sup>	24-hour	5.0	150 <sup>f</sup>	Maximum 6 <sup>th</sup> highest <sup>g</sup>
PM <sub>2.5</sub> <sup>h</sup>	24-hour	1.2	35 <sup>i</sup>	Mean of maximum 8 <sup>th</sup> highest <sup>j</sup>
	Annual	0.3	12 <sup>k</sup>	Mean of maximum 1 <sup>st</sup> highest <sup>l</sup>
Carbon monoxide (CO)	1-hour	2,000	40,000 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
	8-hour	500	10,000 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
Sulfur Dioxide (SO <sub>2</sub> )	1-hour	3 ppb <sup>o</sup> (7.8 $\mu\text{g}/\text{m}^3$ )	75 ppb <sup>p</sup> (196 $\mu\text{g}/\text{m}^3$ )	Mean of maximum 4 <sup>th</sup> highest <sup>q</sup>
	3-hour	25	1,300 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
	24-hour	5	365 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
	Annual	1.0	80 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	4 ppb (7.5 $\mu\text{g}/\text{m}^3$ )	100 ppb <sup>s</sup> (188 $\mu\text{g}/\text{m}^3$ )	Mean of maximum 8 <sup>th</sup> highest <sup>t</sup>
	Annual	1.0	100 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
Lead (Pb)	3-month <sup>u</sup>	NA	0.15 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
	Quarterly	NA	1.5 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
Ozone (O <sub>3</sub> )	8-hour	40 TPY VOC <sup>v</sup>	75 ppb <sup>w</sup>	Not typically modeled

- <sup>a.</sup> Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
- <sup>b.</sup> Micrograms per cubic meter.
- <sup>c.</sup> Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
- <sup>d.</sup> The maximum 1<sup>st</sup> highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
- <sup>e.</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
- <sup>f.</sup> Not to be exceeded more than once per year on average over 3 years.
- <sup>g.</sup> Concentration at any modeled receptor when using five years of meteorological data.
- <sup>h.</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
- <sup>i.</sup> 3-year mean of the upper 98<sup>th</sup> percentile of the annual distribution of 24-hour concentrations.
- <sup>j.</sup> 5-year mean of the 8<sup>th</sup> highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1<sup>st</sup> highest modeled 24-hour impacts at the modeled receptor for each year.
- <sup>k.</sup> 3-year mean of annual concentration.
- <sup>l.</sup> 5-year mean of annual averages at the modeled receptor.
- <sup>m.</sup> Not to be exceeded more than once per year.
- <sup>n.</sup> Concentration at any modeled receptor.
- <sup>o.</sup> Interim SIL established by EPA policy memorandum.
- <sup>p.</sup> 3-year mean of the upper 99<sup>th</sup> percentile of the annual distribution of maximum daily 1-hour concentrations.
- <sup>q.</sup> 5-year mean of the 4<sup>th</sup> highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1<sup>st</sup> highest modeled 1-hour impacts for each year is used.
- <sup>r.</sup> Not to be exceeded in any calendar year.
- <sup>s.</sup> 3-year mean of the upper 98<sup>th</sup> percentile of the annual distribution of maximum daily 1-hour concentrations.
- <sup>t.</sup> 5-year mean of the 8<sup>th</sup> highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
- <sup>u.</sup> 3-month rolling average.
- <sup>v.</sup> An annual emissions rate of 40 ton/year of VOCs is considered significant for O<sub>3</sub>.
- <sup>w.</sup> Annual 4<sup>th</sup> highest daily maximum 8-hour concentration averaged over three years. The O<sub>3</sub> standard was revised (the notice was signed by the EPA Administrator on October 1, 2015) to 70 ppb. However, this standard will not be applicable for permitting purposes until it is incorporated by reference *sine die* into Idaho Air Rules.

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. As an example, consider a hypothetical case where the SIL analysis indicates the project (new source or modification) has impacts exceeding the SIL and the cumulative impact analysis indicates a violation of the NAAQS. If project-specific impacts are below the SIL at the specific receptors showing the violations during the time periods when modeled violations occurred, then the facility does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emissions increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation<sup>1</sup>; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

## **2.5 Toxic Air Pollutant Analyses**

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

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

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

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

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

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

### **3.0 Analytical Methods and Data**

This section describes the methods and data used in analyses to demonstrate compliance with applicable air quality impact requirements.

#### ***3.1 Emission Source Data***

Emissions of criteria pollutants and TAPs resulting from operation of the Sprinkler Shop CBP were calculated by DEQ for various applicable averaging periods. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emissions estimates is not addressed in this modeling memorandum. DEQ air impact analyses review included verification that the potential emissions rates provided in the emissions inventory were properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emissions inventory. All modeled criteria air pollutant and TAP emissions rates must be equal to or greater than the facility's potential emissions calculated in the PTC emissions inventory or proposed permit allowable emissions rates.

##### ***3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emissions Rates***

Facility-wide potential to emit (PTE) values for all criteria pollutants would qualify for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221 (equal to 10 percent of the emissions defined as significant) if it were not for potential emissions of TAPs exceeding the BRC threshold of 10 percent of emissions screening levels (ELs). DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant."<sup>1</sup> The interpretation policy also states that the exemption criteria of uncontrolled PTE not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. A permit is needed for the proposed Sprinkler Shop CBP only because TAP emissions exceed BRC levels.

The DEQ emissions inventory asserts that facility-wide controlled PTE emissions of specific criteria pollutants are below BRC levels, as listed in Table 3.

Ozone (O<sub>3</sub>) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O<sub>3</sub> is formed in the atmosphere through reactions of VOCs, NO<sub>x</sub>, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.3.3) cannot be used to estimate O<sub>3</sub> impacts resulting from VOC and NO<sub>x</sub> emissions from an industrial facility. O<sub>3</sub> concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

<b>Criteria Pollutant</b>	<b>BRC Level (ton/year)</b>	<b>Applicable Facility Wide PTE Emissions (ton/year)</b>	<b>Air Impact Analyses Required?</b>
PM <sub>10</sub> <sup>a</sup>	1.5	0.0355	No
PM <sub>2.5</sub> <sup>b</sup>	1.0	0.0262	No
Carbon Monoxide (CO)	10.0	0.247	No
Sulfur Dioxide (SO <sub>2</sub> )	4.0	0.0018	No
Nitrogen Oxides (NO <sub>x</sub> )	4.0	0.29	No
Lead (Pb)	0.06	0.000013	No

<sup>a</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

<sup>b</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

Addressing secondary formation of O<sub>3</sub> has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

*... footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*

*The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

DEQ determined it was not appropriate or necessary to require a quantitative source specific O<sub>3</sub> impact analysis because allowable emissions estimates of VOCs and NO<sub>x</sub> are below the 100 tons/year threshold.

### **Secondary Particulate Formation**

The impact from secondary particulate formation resulting from emissions of NO<sub>x</sub>, SO<sub>2</sub>, and/or VOCs was assumed by DEQ to be negligible on the basis of the magnitude of emissions and the short distance from emissions sources to modeled receptors where maximum PM<sub>10</sub> and PM<sub>2.5</sub> impacts were predicted.

#### **3.1.2 Toxic Air Pollutant Emissions Rates**

TAP emissions regulations under Idaho Air Rules Section 210 are only applicable for new or modified sources constructed after July 1, 1995. TAP compliance for the Sprinkler Shop CBP was demonstrated on a facility-wide basis.

Facility-wide emissions of arsenic (As) and chromium 6+ (Cr6+) exceed the applicable emissions screening levels (ELs) of Idaho Air Rules Section 586. Air impact modeling analyses were then required to demonstrate that maximum impacts of As and Cr6+ are below applicable ambient increment standards expressed in Idaho Air Rules Section 585 and 586 as AACs and AACCs.

Table 4 lists the TAP modeled emissions rates for As and Cr6+.

Source ID	Description	Emission Rates (lb/hr <sup>a</sup> )	
		Arsenic Annual	Chromium 6+ Annual
SILO	Cement storage silo filling	1.78E-8	2.44E-8
SUPSILO	Cement supplement (fly ash) storage silo filling	6.25E-7	2.29E-7
UNCONTRKLOAD	Truck loadout	1.767E-5	3.52E-6
HEATER	1.0 MMBtu/hr boiler	1.34E-7	None listed
HEATER2	1.0 MMBtu/hr boiler	1.34E-7	None listed

<sup>a</sup> Pounds per hour for listed averaging period.

Emissions of As and Cr6+ occur from the handling of both dry cement and fly ash. Emissions from the filling of storage silos are controlled by a filtration system and emissions from truck loadout are controlled by the combination of a shroud and a water spray.

As and Cr6+ are carcinogenic TAPs that are regulated on a long-term basis. Therefore, the appropriate emissions rate to use in the impact analysis is the maximum annual emissions, expressed as an average pound/hour value over a 8,760-hour period.

### 3.1.3 Emissions Release Parameters

Table 5 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for emissions sources modeled in the air impact analyses.

Point Source Parameters							
Release Point	Description	UTM <sup>a</sup> Coordinates		Stack Height (m)	Stack Gas Flow Temp. (K) <sup>c</sup>	Stack Flow Velocity (m/sec) <sup>d</sup>	Stack Dia. (m)
		Easting (m) <sup>b</sup>	Northing (m)				
SILO	Cement storage silo filling	280239	4720611	19.5	0 <sup>e</sup>	0.001	0.61
SUPSILO	Cement supplement (fly ash) storage silo filling	280239	4720607	19.5	0 <sup>e</sup>	0.001	0.61
HEATER	1.0 MMBtu/hr boiler	280238	4720609	4.9	366	5.0	0.21
HEATER2	1.0 MMBtu/hr boiler	280238	4720609	4.9	366	5.0	0.21
Volume Source Parameters							
Release Point	Description	UTM Coordinates		Release Height (m)	Int. Hor. Dimension $\sigma_{y0}$ (m)	Int. Vert. Dimension $\sigma_{z0}$ (m)	
		Easting	Northing				
UNCONTRKLOAD	Truck loadout	280249	4720614	3.75	2.33	1.98	

<sup>a</sup> Universal Transverse Mercator.

<sup>b</sup> Meters.

<sup>c</sup> Kelvin.

<sup>d</sup> Meters per second.

<sup>e</sup> Set to 0 to direct model to use a release temperature equal to the ambient air temperature specified in the meteorological data input file.

<sup>f</sup> Set to 0.001 to account for a raincap's restriction of vertical plume momentum flux.

The submitted application provided stack heights for the storage silo vents and the exhaust stack for the water heater. A flow rate of 370 actual cubic feet per minute (acfm) was also provided for the water boiler exhaust, and DEQ conservatively used a 200° F exhaust exit release temperature. The exact location of the two water heater stacks was not specified in the application materials. DEQ

conservatively assumed that the stacks were in the same location (without taking credit for any increased dispersion from merged plumes).

Emissions from truck loadout of dry concrete, fly ash, and aggregate were modeled as a volume source. The release height was set at 3.75 meters, the typical height of cement truck feed chutes. The initial horizontal dimension ( $\sigma_{y0}$ ) was set at a value equal to the length of the source’s side divided by 4.3, as directed by EPA guidance for AERMOD<sup>3</sup>. The length of the adjacent building was used as the source side length for the truck loadout operation. The initial vertical dimension ( $\sigma_{z0}$ ) was set at a value equal to the height of the adjacent building divided by 2.15, as directed by EPA guidance for AERMOD.

### 3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS. Cumulative NAAQS analyses were not required for this project because emissions of all criteria pollutants were below levels defined as BRC, and as such, air impact analyses were not required for these emissions.

### 3.3 Impact Modeling Methodology

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

#### 3.3.1 General Overview of Impact Analyses

DEQ performed the project-specific air pollutant emissions inventory and air impact analyses based on information submitted from the Sprinkler Shop. The submitted information/analyses, in combination with results from DEQ’s air impact analyses, demonstrate compliance with applicable air quality standards to DEQ’s satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 6 provides a brief description of parameters used in the modeling analyses.

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Boise, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 15181.
Meteorological Data	Burley surface data, Boise upper air data	See Section 3.3.4 of this memorandum for additional details of the meteorological data.
Terrain	Not Considered	Immediate area is effectively flat for dispersion effect consideration.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD.
Receptor Grid	Grid 1	DEQ: 10-meter spacing along the property boundary out to 30 meters
	Grid 2	DEQ: 25-meter spacing out to 150 meters.
	Grid 3	DEQ: 50-meter spacing out to 300 meters.
	Grid 4	DEQ: 75-meter spacing out to 500 meters.
	Grid 4	DEQ: 100-meter spacing out to 700 meters.

#### 3.3.2 Modeling Methodology

Final project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline*<sup>2</sup>.

### ***3.3.3 Model Selection***

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). The refined, steady state, multiple source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight line trajectory of ISCST3, but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD version 15181 was used by DEQ for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

### ***3.3.4 Meteorological Data***

DEQ impact analyses used meteorological data processed from Burley surface data and Boise upper air meteorological data for years 2008 through 2012. DEQ determined these data were reasonably representative for the Sprinkler Shop site in Rupert.

These data were processed by DEQ using AERMET version 12345, AERMINUTE version 11325, and AERSURFACE version 13016. DEQ determined these data were reasonably representative for the Sprinkler Shop site.

### ***3.3.5 Effects of Terrain on Modeled Impacts***

DEQ determined the area surrounding the Sprinkler Shop CBP is relatively flat for plume dispersion considerations. The impact modeling was performed using the non-default FLAT terrain option.

### ***3.3.6 Facility Layout***

The location of the proposed CBP on the Sprinkler Shop property was provided to DEQ by a plot plan submitted with the application materials. The plot plan also indicated the location and dimensions of buildings and the site boundary. DEQ used the submitted plot plan and aerial photographs on Google Earth, which uses the WGS84 datum, to establish model inputs of buildings, sources, and the property boundary.

### ***3.3.7 Effects of Building Downwash on Modeled Impacts***

Potential downwash effects on emissions plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

### ***3.3.8 Ambient Air Boundary***

Ambient air is defined in Section 006 of the Idaho Air Rules as “that portion of the atmosphere, external to buildings, to which the general public has access.” Ambient air was considered areas external to the Sprinkler Shop property boundary. The Sprinkler Shop property boundary, as defined in the submitted application, was considered by DEQ as the ambient air boundary. The small size of the site facilitates

restricting public access to the property, and it was assumed the facility will take reasonable measure to preclude public access.

### **3.3.9 Receptor Network**

Table 6 describes the receptor grid used in the submitted analyses. The receptor grid used in DEQ's analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*<sup>2</sup> and DEQ determined that it was adequate to resolve maximum modeled impacts. A receptor grid extending out beyond 1,000 meters from the facility boundary was not necessary for these analyses because pollutants are emitted from relatively short stacks that will cause maximum impacts to be located very close to the source, typically at the ambient air boundary. Also, the surrounding area is relatively free from complex terrain (terrain above stack height) that could cause a high groundlevel impact at a more distant location.

### **3.3.10 Good Engineering Practice Stack Height**

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

$H = S + 1.5L$ , where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

All Sprinkler Shop CBP sources are below GEP stack height. Therefore, it is important to account for plume downwash caused by structures at the facility.

## **4.0 NAAQS and TAPs Impact Modeling Results**

### **4.1 Results for NAAQS Analyses**

A NAAQS analysis was not performed for the Sprinkler Shop CBP facility.

Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having a project-emissions increase that is less than BRC levels, provided the project would have qualified for a BRC permitting exemption except for the emissions levels of another criteria pollutant exceeding the ton/year BRC threshold.

### **4.2 Results for TAPs Impact Analyses**

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with facility-wide emissions exceeding emissions screening levels (ELs). The results of the TAPs analyses are listed in Table 7. The predicted ambient TAPs impacts were below any TAPs increments.

<b>Table 7. RESULTS OF TAPs ANALYSES</b>				
<b>Toxic Air Pollutant</b>	<b>Averaging Period</b>	<b>Maximum Modeled Concentration (<math>\mu\text{g}/\text{m}^3</math>)<sup>a</sup></b>	<b>AAC/AACC<sup>b</sup> (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Percent of AAC/AACC</b>
<b>Carinogenic TAPs</b>				
Arsenic	Annual	2.30E-4	2.3E-4	99.9
Chromium 6+	Annual	4.50E-5	8.3E-5	54

<sup>a</sup> Micrograms per cubic meter

<sup>b</sup> Acceptable ambient concentration for non-carcinogens/acceptable ambient concentration for carcinogens

## **5.0 Conclusions**

The information submitted with the PTC application, combined with DEQ air impact analyses, demonstrated to DEQ's satisfaction that emissions from the Sprinkler Shop CBP facility will not cause or significantly contribute to a violation of any ambient air quality standard.

## References

1. *Policy on NAAQS Compliance Demonstration Requirements*. Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.
2. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at <http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf>.
3. *User's Guide for the AMS/EPA Regulatory Model – AERMOD*. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division. EPA-454/B-03-001. September 2004. (Section 3.3.2.2)