Statement of Basis
Concrete Batch Plant General Permit

Permit to Construct No. P-2021.0033
Project ID 62664

Small Mine Development, LLC
Salmon, Idaho

Facility ID 059-00015

Final

October 29, 2021
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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.

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
CBP	concrete batch plant
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
HAP	hazardous air pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
MACT	Maximum Achievable Control Technology
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
PW	process weight rate
Rules	*Rules for the Control of Air Pollution in Idaho*
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_X	sulfur oxides
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
VOC	volatile organic compounds
yd^3	cubic yards

FACILITY INFORMATION

Description

Small Mine Development, LLC has proposed a new stationary central mix concrete batch plant consisting of aggregate stockpiles and a cement storage silo. The facility uses augers to transport and combine aggregate, water, and cement mixture into shotcrete to support underground mining activities.

Bulk cement is delivered to a storage silo equipped with a baghouse control. The silo uses an auger to transfer cement to the cement hopper, which then transfers the material to the mixing screw via an auger. Blended aggregates consisting of sand and pea gravel is delivered from an outside source to the aggregate storage area. A front end loader retrieves the aggregates and places them in the aggregates hopper. An auger on the bottom of the hopper feeds the aggregates to a mixing hopper and mixing auger where water, cement, and aggregates combine into a shotcrete mixture. The wet shotcrete is then discharged to a suitable truck for delivery underground.

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 12 cubic yards per hour, 60 cubic yards per day, and 21,900 cubic yards per year.

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.

Application Chronology

July 10, 2021	DEQ received an application and an application and processing fee.
July 15 – July 30, 2021	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
August 11, 2021	DEQ determined that the application was complete.
October 7, 2021	DEQ made available the draft permit and statement of basis for peer and regional office review.
October 8, 2021	DEQ made available the draft permit and statement of basis for applicant review.
October 22, 2021	DEQ received the permit processing fee.
October 29, 2021	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	Material Transfer Points: 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	Concrete Batch Plant –Central Mix: Manufacturer: RPM Model: RPM-30 Manufacture Date: 1996 Max. production: 12 yd^3/hr, 288 yd^3/day, and 105,120 yd^3/yr Cement Storage Silo: Storage capacity: 52.9 cubic yards (yd^3) Bin Vent Filter/Baghouse Manufacturer[(a)]: Belgrade Steel Tank Model: Belle 150	Cement Storage Silo Bin Vent Filter/Baghouse: Manufacturer: Belgrade Steel Tank Model: Belle 150 $PM_{10}/PM_{2.5}$ control efficiency: 99.9% Material Transfer Points: Control: Water sprays $PM_{10}/PM_{2.5}$ control efficiency: 75%	Cement Storage Silo Bin Vent Filter/Baghouse Exhaust: Exit height: 40 ft (13.41 m) Exit diameter: 3.6 ft (1.1 m) Exit flow rate: 375 acfm Exit temperature: Ambient

a) The storage silo baghouse is considered process equipment and therefore there has no associated control efficiency. Controlled PM_{10} 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 12 yd^3/hour, 60 yd^3/day, and 21,900 yd^3/year (per the Applicant).
- Baghouse control efficiencies were assumed to be 99.0%.
- Fugitive emissions of particulate matter (PM), PM_{10}, and $PM_{2.5}$ 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. Particulate matter and PM10 emissions from the central mix load-out are controlled by a boot. Capture efficiency of the truck mix load-out boot or equivalent was estimated at 70%.

- Controlled emissions of particulate toxic air pollutants (TAPs) were estimated based on the presence of a baghouse controlling emissions from the cement silo. Hexavalent chromium content was estimated at 20% of total chromium for cement. 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_{10} emissions from central-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 11.12-2 (6/06). An average value of wind speed and moisture content are 7 mph, 4.17%, and 1.77%, respectively[1]. The following equation of particulate emissions is specific to PM_{10}. The resulting emissions were used to determine a factor to help evaluate wind speed variations in AERMOD modeling.

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

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%, which for this facility is 10 yd^3/hr (0.82 x 12 yd^3/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[2]. 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_{10} emissions were calculated for each transfer point. For both fine and coarse aggregate the facility has 4 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.

[1] 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.

[2] 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 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	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC
	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources					
Concrete batch plant[(a)]	0.53	0.00	0.00	0.00	0.00
Total, Point Sources	**0.53**	**0.00**	**0.00**	**0.00**	**0.00**

a) $PM_{10}/PM_{2.5}$ emissions from the concrete batch plant are considered "fugitive emissions" and therefore are not included in the Potential to Emit.

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-06
	Cobalt metal dust, and fume	0.00
	Ethyl benzene	0.00
	Hexane	0.00
	Manganese as Mn (fume)	4.77E-05
	Mercury (alkyl compounds as Hg)	0.00
	Methyl chloroform	0.00
	Naphthalene	0.00
	Phosphorous	1.70E-05
	Propionaldehyde	0.00
	Quinone	0.00
	Selenium	2.89E-08
	Toluene	0.00
	Xylene	0.00
586	Acetaldehyde	0.00
	Arsenic	6.88E-06
	Benzene	0.00
	Benzo(a)pyrene	0.00
	Beryllium and compounds	3.74E-08
	1,3-Butadiene	0.00
	Cadmium and compounds	6.38E-07
	Chromium (VI)	3.95E-07
	Formaldehyde	0.00
	3-Methylcholanthrene	0.00
	Nickel	3.56E-06
Not listed	Acenaphthene	0.00
	Acenaphthylene	0.00
	Anthracene	0.00
	Benzo(b)fluoranthene	0.00
	Benzo(k)fluoranthene	0.00
	Benzo(e)pyrene	0.00
	Benzo(g,h,i)perylene	0.00
	Chrysene	0.00
	Dibenzo(a,h)anthracene	0.00
	Isooctane	0.00
	Total	**0.0001**

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.

The following table presents the pre-project potential to emit for all criteria 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 4 PRE-PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]
Concrete batch plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pre-Project Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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.

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 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 5 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]
Concrete batch plant	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals	**0.03**	**0.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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.

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 6 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	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
Post Project Potential to Emit	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Changes in Potential to Emit	**0.03**	**0.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Non-Carcinogenic TAP Emissions

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table:

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	0.00	0.0000	**0.017**	No
Barium	0.0	0.00	0.000000	**2**	No
Chromium metal (II and III)	0.0	1.02E-06	0.00000102	**0.033**	No
Cobalt metal dust, and fume	0.0	0.00	0.0000000	**0.0033**	No
Copper (fume)	0.0	0.00	0.00000000	**0.013**	No
Ethyl benzene	0.0	0.00	0.0000	**29**	No
Hexane	0.0	0.00	0.0000	**12**	No
Manganese as Mn (fume)	0.0	1.10E-05	0.0000110	**0.067**	No
Mercury (alkyl compounds as Hg)	0.0	0.00	0.0000000	**0.001**	No
Methyl chloroform	0.0	0.00	0.0000	**127**	No
Methyl ethyl ketone (MEK)	0.0	0.00	0.0000	**39.3**	No
Molybdenum (soluble)	0.0	0.00	0.000000	**0.333**	No
Naphthalene (24-hour)	0.0	0.00	0.0000	**3.33**	No
Pentane	0.0	0.00	0.0000	**118**	No
Phosphorous	0.0	5.73E-06	0.0000057	**0.007**	No
Propionaldehyde	0.0	0.00	0.0000	**0.0287**	No
Quinone	0.0	0.00	0.0000	**0.027**	No
Selenium	0.0	6.61E-09	0.00000000661	**0.013**	No
Toluene	0.0	0.00	0.000000	**25**	No
Vanadium as V_2O_5, (respirable dust and fume)	0.0	0.00	0.0000000	**0.003**	No
Xylene	0.0	0.00	0.0000	**29**	No
Zinc metal	0.0	0.00	0.000000	**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:

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	0.00	0.00	0.0000	3.0E-03	No
Arsenic	**0.00**	**1.57E-06**	**0.000002**	**1.5E-06**	**Yes**
Benzene	0.00	0.00	0.0000000	8.0E-04	No
Benzo(a)pyrene	0.00	0.00	0.0000000000	2.0E-06	No
Beryllium and compounds	0.00	8.55E-09	0.000000009	2.8E-05	No
1,3-Butadiene	0.00	0.00	0.000000	2.4E-05	No
Cadmium and compounds	0.00	1.46E-07	0.000000146	3.7E-06	No
Chromium (VI)	0.00	9.03E-08	0.00000009	5.6E-07	No
Formaldehyde	0.00	0.00	0.0000	5.1E-04	No
3-Methylcholanthrene	0.00	0.00	0.000000000	2.5E-06	No
Nickel	0.00	8.12E-07	0.00000081	2.7E-05	No
PAHs Total	0.00	0.00	0.0000	2.0E-06	No
POM Total[(a)]	0.00	0.00	0.00000000	2.0E-06	No
Non-Listed (in 586) PAHs					
2-Methylnaphthalene	0.00	0.00	0.00000000	9.10E-05	No
Acenaphthene	0.00	0.00	0.00000000	9.10E-05	No
Acenaphthylene	0.00	0.00	0.00000000	9.10E-05	No
Anthracene	0.00	0.00	0.00000000	9.10E-05	No
Benzo(g,h,i)perylene	0.00	0.00	0.00000000	9.10E-05	No
Dichlorobenzene	0.00	0.00	0.00000000	9.10E-05	No
Fluoranthene	0.00	0.00	0.00000000	9.10E-05	No
Fluorene	0.00	0.00	0.00000000	9.10E-05	No
Naphthalene (Annual)	0.00	0.00	0.00000000	9.10E-05	No
Phenanathrene	0.00	0.00	0.00000000	9.10E-05	No
Pyrene	0.00	0.00	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 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

IDAPA Listing	Hazardous Air Pollutants	PTE (T/yr)
585	Acrolein	0.00
	Chromium metal (II and III)	1.66E-06
	Cobalt metal dust, and fume	0.00
	Ethyl benzene	0.00
	Hexane	0.00
	Manganese as Mn (fume)	4.77E-05
	Mercury (alkyl compounds as Hg)	0.00
	Methyl chloroform	0.00
	Naphthalene	0.00
	Phosphorous	1.70E-05
	Propionaldehyde	0.00
	Quinone	0.00
	Selenium	2.89E-08
	Toluene	0.00
	Xylene	0.00
586	Acetaldehyde	0.00
	Arsenic	6.88E-06
	Benzene	0.00
	Benzo(a)pyrene	0.00
	Beryllium and compounds	3.74E-08
	1,3-Butadiene	0.00
	Cadmium and compounds	6.38E-07
	Chromium (VI)	3.95E-07
	Formaldehyde	0.00
	3-Methylcholanthrene	0.00
	Nickel	3.56E-06
Not listed	Acenaphthene	0.00
	Acenaphthylene	0.00
	Anthracene	0.00
	Benzo(b)fluoranthene	0.00
	Benzo(k)fluoranthene	0.00
	Benzo(e)pyrene	0.00
	Benzo(g,h,l)perylene	0.00
	Chrysene	0.00
	Dibenzo(a,h)anthracene	0.00
	Isooctane	0.00
	Total	**0.0001**

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_{10}, $PM_{2.5}$, SO_2, NO_X, CO, VOC, HAP, and TAP, with the exception of Arsenic 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[3]. 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,
- The Concrete Operation Setback Distance Requirements permit condition,

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Lemhi County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

A = Use when any one HAP has permitted emissions > 10 T/yr or if the aggregate of all HAPS (Total HAPs) has permitted emissions > 25 T/yr.

SM80 = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of Total HAPs.

SM = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits < 8 T/yr of a single HAP and/or < 20 T/yr of Total HAPs.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 10 and 25 T/yr HAP major source thresholds.

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

UNK = Class is unknown.

For All Other Pollutants:

A = Use when permitted emissions of a pollutant are > 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are < 80 T/yr.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 100 T/yr major source threshold.

UNK = Class is unknown.

Table 10 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM_{10}	0.53	0.12	**100**	B
$PM_{2.5}$	0.53	0.07	**100**	B
SO_2	0.00	0.00	**100**	B
NO_X	0.00	0.00	**100**	B
CO	0.00	0.00	**100**	B
VOC	0.00	0.00	**100**	B
HAP (single)	4.77E-05	4.77E-05	**10**	B
Total HAPs	7.79E-05	7.79E-05	**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 proposed new emissions source. 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_{10} 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 2.6.

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:

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

- IDAPA 58.01.01.702.01.a: If PW is < 17,000 lb/hr; $E = 0.045 (PW)^{0.60}$
- IDAPA 58.01.01.702.01.b: If PW is ≥ 17,000 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 21,900 y^3/hr, E is calculated as follows:

- Proposed throughput = 4,024 lb per cubic yard x 12 y^3/hr = 48,288 lb/hr

Therefore, E is calculated as:

- $E = 1.10 \times PW^{0.25} = 1.10 \times (48{,}288)^{0.25} = 16.31$ lb-PM/hr

As presented previously in the Emissions Inventories Section of this evaluation the post project PTE for this emissions unit is 0.03 lb-PM_{10}/hr. Assuming PM is 50% PM_{10} means that PM emissions will be 0.06 lb-PM/hr (0.03 lb-PM_{10}/hr ÷ 0.5 lb-PM_{10}/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 2.5 and 2.7.

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. 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 63.

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.

Permit Condition 2.3 establishes that the concrete batch plant shall not collocate with a rock crushing plant, any other concrete batch plant, or a concrete batch plant as requested by the Applicant.

Permit Condition 2.4 establishes that the permittee shall not relocate the permitted equipment until a PTC has been obtained that allows operation at the proposed new site. This requirement is based upon imposing reasonable permit conditions for non-portable concrete batch plants.

As discussed previously, Permit Condition 2.5 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 2.6 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 2.7 establishes that the permittee monitor and record odor complaints to demonstrate compliance with the facility-wide permit requirements.

Permit Condition 2.8 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 $PM_{2.5}$, SO_2, NO_X, 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 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 establishes setback distance restrictions for the concrete production operation when the IC engines are operating and not operating. The setback distance restrictions are based upon the results of the Ambient Air Quality Modeling Analysis performed for this project.

Permit Condition 3.7 requires that the applicant employ a boot or shroud to control emissions from the central loadout operation as proposed by the applicant.

Permit Condition 3.8 requires that the applicant employ a baghouse to control emissions from the cement storage silo operation as proposed by the applicant.

Permit Condition 3.9 requires that the applicant employ industry specific water sprays on material transfer points to control fugitive emissions as proposed by the applicant.

Permit Condition 3.10 establishes that the permittee monitor and record daily concrete production to demonstrate compliance with the Concrete Production Limits permit condition.

Permit Condition 3.11 establishes that the permittee measure and record concrete production equipment setback distances to demonstrate compliance with operating permit requirements.

Permit Condition 3.12 establishes that the permittee shall establish procedures for operating the cement storage silo baghouse. This is a DEQ imposed standard requirement for operations using baghouses to control particulate emissions.

Permit Condition 3.13 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 "Facilty Information" boxes.

2 Enter the concrete production rates that were applied for.

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%, 95%,** or **99%**. **0%** is used to calculate uncontrolled emissions.
75% Control Loadout assumes a boot shroud or enclosure with 70% control efficiency during truck loadout.
80% Control Loadout assumes a boot shroud and a water ring spray system.
99% Control Loadout assumes a boot shroud and a baghouse system.

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. If the engine is a "non-road" IC engine (thus not stationary), "No" shou
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.

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 emisions associated with the IC engines. These emissions assume worst case scenario. There is no user input here.

GHG Emissions

16 This tab displays the emisions 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:	**Small Mine Development, LLC**
Facility ID:	**059-00015**
Permit and Project No.:	**P-2021.0033 Project 62664**
Source Type:	**Staionary Concrete Batch Plant**
Manufacturer/Model:	**Model RPM30**

2. Concrete Production Rates

Maximum Hourly Concrete Production Rate:	**12**	cy/hr	
Proposed Daily Concrete Production Rate:	**60**	cy/day	**5.00**
Proposed Maximum Annual Concrete Production Rate:	**21,900**	cy/year	hr/day

3. Daily Operating Hours

Maximum daily hours of operation for facility?	**24**

4. Concrete Batch Plant Specifications

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

5. Water Heater Usage

Does this facility use a water heater?		**No**		
How many units?		**0**	**Heat Input Rating**	
Water Heater #1				
If using a water heater, select the proposed fuel types and enter the heat input rating of water heater #1.	Natural Gas	**0**	**0**	**MMBtu/hr**
	Diesel	**0**		
	Propane	**0**		
Water Heater #2				
If multiple units, select the proposed fuel types and enter the heat input rating of water heater #2.	Natural Gas	**0**	**0**	**MMBtu/hr**
	Diesel	**0**		
	Propane	**0**		
Are you assuming continual operations throughout the year?		**No**		
Maximum annual hours of water heater operation? (If assuming continual operation, enter 8,760)		**0**		

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 non-road or no engine enter 0)	**0**
Horsepower rating of small engine #2 (<=600 bhp)? (If non-road or no engine enter 0)	**0**
Horsepower rating of large engine (greater than 600 bhp)? (If non-road or no engine enter 0)	**0**

Please enter 0 for all units.

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 I, 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)	**4**

CRITERIA POLLUTANT EMISSION INVENTORY for Portable Concrete Batch Plant

Facility Information 10/8/21 14:31

Company:	**Small Mine Development, LLC**
Facility ID:	**059-00015**
Permit and Project No.:	**P-2021.0033 Project 62664**
Source Type:	**Staionary Concrete Batch Plant**
Manufacturer/Model:	**Model RPM30**

Assumptions Implied or Stated in Application:

See control assumptions

Truck Mix (T) or Central Mix (C C

Production Rates[1]

Maximum Hourly Production Rate:	**12**	cy/hr		Per manufacturer
Proposed Daily Production Rate:	**60**	cy/day	**5.00**	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	**21,900**	cy/year		
Cement Storage Silo Capacity:	4540	ft^3 of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only:	65%	of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:	35%	of the silo capacity		

PM_{10} Emissions due to this PTC

Emissions Point	$PM_{2.5}$ Emission Factor[1] (lb/cy)		PM_{10} Emission Factor[2] (lb/cy)		Controlled Emission Rate $PM_{2.5}$, Max.	Controlled Emission Rate PM_{10}, Max.	Controlled Emission Rate $PM_{2.5}$, 24-hour average		Controlled Emission Rate PM_{10}, 24-hour average		Controlled Emission Rate $PM_{2.5}$, annual average		Controlled Emission Rate PM_{10}, annual average		Control Assumptions:	
	Controlled	Uncontrolled	Controlled	Uncontrolled	lb/hr[3]	lb/hr[3]	lb/hr[4]	lb/day[4]	lb/hr[4]	lb/day[4]	lb/hr[5]	T/yr[5]	lb/hr[5]	T/yr[5]		
Aggregate delivery to ground storage		0.00096		0.0031	0.00	0.01	0.00	0.01	0.002	0.05	6.00E-04	2.63E-03	0.002	0.008	**75%**	Water Sprays at Operator's Discretion
Sand delivery to ground storage		0.000225		0.0007	0.00	0.00	1.41E-04	0.00	0.000	0.01	1.41E-04	6.16E-04	0.000	0.002	**75%**	Water Sprays at Operator's Discretion
Aggregate transfer to conveyor		0.00096		0.0031	0.00	0.01	0.00	0.01	0.002	0.05	6.00E-04	2.63E-03	0.002	0.008	**75%**	Water Sprays at Operator's Discretion
Sand transfer to conveyor		0.000225		0.0007	0.00	0.00	1.41E-04	0.00	0.000	0.01	1.41E-04	6.16E-04	0.000	0.002	**75%**	Water Sprays at Operator's Discretion
Aggregate transfer to elevated storage		0.00096		0.0031	0.00	0.01	0.00	0.01	0.002	0.05	6.00E-04	2.63E-03	0.002	0.008	**75%**	Water Sprays at Operator's Discretion
Sand transfer to elevated storage		0.000225		0.0007	0.00	0.00	1.41E-04	0.00	0.000	0.01	1.41E-04	6.16E-04	0.000	0.002	**75%**	Water Sprays at Operator's Discretion
Cement delivery to Silo (controlled EF)	**0.00003**		**0.0001**		3.60E-04	1.00E-03	**7.50E-05**	1.80E-03	**2.09E-04**	5.01E-03	7.50E-05	3.29E-04	2.09E-04	**9.14E-04**	**0.00%**	Baghouse is process equipment, use controlled EF
Cement supplement delivery to Silo (controlled EF)	**0.000045**		**0.0002**		5.40E-04	2.15E-03	**1.13E-04**	2.70E-03	**4.47E-04**	1.07E-02	1.13E-04	4.93E-04	4.47E-04	**1.96E-03**	**0.00%**	Baghouse is process equipment, use controlled EF
Weigh hopper loading (sand & aggregate batcher loading)		**0.001185**		**0.00395**	1.42E-04	4.74E-04	**2.96E-05**	7.11E-04	**9.88E-05**	2.37E-03	2.96E-05	1.30E-04	9.88E-05	**4.33E-04**	**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. PM2.5 was calculated as 15% of PM: "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**		**0.00000**	0.00E+00	0.00	**0.00**	0.00	**0.00**	0.00	0.00E+00	0.00E+00	0.00	**0.00**	**75.0%**	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. PM2.5 was calculated as 15% of PM: "0.572 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)*0.15/ 2000 lb = 0.0242 lb/cy		**0.0242**		**0.0440**	7.26E-02	0.13	**0.02**	0.36	**0.03**	0.66	1.51E-02	6.62E-02	0.03	**0.12**	**75.0%**	Baghouse control
Point Sources Total Emissions		**2.55E-02**		**4.82E-02**	**7.36E-02**	**1.36E-01**	**1.53E-02**	**3.68E-01**	**2.83E-02**	**6.78E-01**	**1.53E-02**	**6.72E-02**	**2.83E-02**	**1.24E-01**		
Process Fugitive Emissions		0.003555		0.0114	0.01	0.03	0.00	0.05	0.01	0.17	0.00	0.01	0.01	0.03		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)				0.0596		0.17	0.02	0.42	0.04	0.85			0.04	0.15		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[5] **Controlled EF** **at** **105,120 cy/yr** **T/yr** (controlled PTE @ 8,760)

Facility Classification Total PM[6]		**8.40E-03**		**4.42E-01**
Facility Classification Total PM10[6,8]		**4.21E-03**		**2.22E-01**

1 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 $PM_{2.5}$. 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 $PM_{2.5}$ 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.

[2] 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.

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

[4] 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.

[5] 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)

[6] Controlled EFs for PM = 0.0002 (cement silo) + 0.0003 (flyash silo) +0.0079(weigh batcher)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) +0.0040 (weigh batcher)

7 Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 288 cy/day, and 105,120 cy/yr

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

Lead emissions

Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Increase in Emissions from this PTC: Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold		Emission Rate, Quarterly	Emissions for Facility Classification	
	Controlled with fabric	Uncontrolled	lb/hr, 1-hr avg.[2]	lb/month[3]	lb/yr[4]	lb/hr qtrly avg[5]		T/yr
Cement delivery to silo [2]	**1.09E-08**	7.36E-07	3.21E-08	4.88E-06	5.86E-05	6.69E-09	Point Source	1.41E-07
Cement supplement delivery to Silo [3]	**5.20E-07**	ND	2.28E-07	3.46E-05	4.16E-04	4.75E-08	Point Source	9.98E-07
Truck Loadout (with 99.9% control) [8]		**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	0.00E+00
Central Mix (with l30% control)		**3.82E-07**	3.23E-07	4.91E-05	5.90E-04	6.73E-08	Fugitive	1.42E-06
Total			**5.83E-07**	**8.87E-05**	**0.001**		**Point Sources**	**1.14E-06**
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

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

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

10/8/2021 14:31

Facility Information

Company:	Small Mine Development, LLC
Facility ID:	059-00015
Permit No.:	P-2021.0033 Project 62664
Source Type:	Staionary Concrete Batch Plant
Manufacturer:	Model RPM30

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: 0

Central Mix Batching Factor: 1

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.

Concrete Production

Maximum Hourly Production Rate:	12	cy/hr	
Proposed Daily Production Rate:	60	cy/day	
Proposed Maximum Annual Production Rate:	21,900	cy/year	

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
288 cy/day	7 day/wk,
105,120 cy/year	52 wks/year

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

Emissions Point	Arsenic EF (lb/ton of material loaded)		Beryllium EF (lb/ton of material loaded)		Cadmium EF (lb/ton of material loaded)		Chromium EF (lb/ton of material loaded)		Manganese EF (lb/ton of material loaded)		Nickel EF (lb/ton of material loaded)		Phosphorus EF (lb/ton of material loaded)		Selenium EF (lb/ton of material loaded)		Chromium VI
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	**Percent of total Cr that is Cr+6**
Cement silo filling (with baghouse)	**4.24E-09**	1.68E-06	**4.86E-10**	1.79E-08	ND	2.34E-07	**2.90E-08**	2.52E-07	**1.17E-07**	2.02E-04	**4.18E-08**	1.76E-05	ND	**1.18E-05**	ND	ND	**20%**
Cement supplement silo filling (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 loading (no boot or shroud)	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	**0.00E+00**	0.00E+00	**0.00E+00**	**21.29%**
Central Mix Batching (NO boot or shroud)	2.96E-07	**8.38E-06**	ND	ND	7.10E-10	**1.18E-08**	1.27E-07	**1.42E-06**	3.78E-06	**6.12E-05**	2.48E-07	**3.28E-06**	1.20E-06	**2.02E-05**	ND	ND	**21.29%**

UNCONTROLLED TAP EMISSIONS **Note: Includes baghouses as process equipment.** **288 cy/day, and 105,120 cy/yr**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.
Cement silo filling (with baghouse)	1.25E-08	5.47E-08	1.43E-09	6.27E-09	6.89E-07	3.02E-06	8.54E-08	3.25E-06	3.45E-07	1.51E-06	1.23E-07	5.39E-07	3.48E-05	1.52E-04	ND	ND	1.71E-08
Cement supplement silo filling (with baghouse)	4.38E-07	1.92E-06	3.96E-08	1.73E-07	8.67E-11	3.80E-10	5.34E-07	2.34E-06	1.12E-07	4.91E-07	9.99E-07	4.37E-06	1.55E-06	6.79E-06	3.17E-08	1.39E-07	1.60E-07
Truck loading (no boot or shroud)	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Central Mix Batching (NO boot or shroud)	2.84E-05	1.24E-04	ND	ND	3.99E-08	1.75E-07	4.81E-06	2.10E-05	2.07E-04	9.07E-04	1.11E-05	4.86E-05	6.84E-05	2.99E-04	ND	ND	1.02E-06
Sources Total	**2.88E-05**	1.26E-04	**4.10E-08**	1.80E-07	**7.29E-07**	3.19E-06	**5.43E-06**	2.66E-05	**2.08E-04**	9.09E-04	**1.22E-05**	5.35E-05	**1.05E-04**	4.58E-04	**3.17E-08**	1.39E-07	**1.20E-06**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
EXCEEDS EL?	**Yes**		No		No		No		No		**No**		No		No		**Yes**

Facility Classification: Total Annual HAPs Emissions
1.58E-03 **Tons per year**

CONTROLLED TAP EMISSIONS **Note: Includes baghouses as process equipment.** **60 cy/day, and 21,900 cy/year**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.
Cement silo filling (with baghouse)[1]	2.60E-09	1.14E-08	2.98E-10	1.31E-09	1.44E-07	6.29E-07	1.78E-08	7.80E-08	7.18E-08	3.15E-07	2.57E-08	1.12E-07	ND	ND	ND	ND	3.56E-09
Cement supplement silo filling (with baghouse)[2]	9.13E-08	4.00E-07	8.25E-09	3.61E-08	1.81E-11	7.91E-11	7.49E-07	4.88E-07	1.57E-07	1.02E-07	2.08E-07	9.11E-07	2.17E-06	1.41E-06	6.61E-09	2.89E-08	3.34E-08
Truck loading (with baghouse)	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Central Mix Batching (WITH boot or shroud)	1.48E-06	6.47E-06	ND	ND	2.08E-09	9.11E-09	2.50E-07	1.10E-06	1.08E-05	4.72E-05	5.78E-07	2.53E-06	3.56E-06	1.56E-05	ND	ND	5.33E-08
Sources Total	**1.57E-06**	6.88E-06	**8.55E-09**	3.74E-08	**1.46E-07**	6.38E-07	**1.02E-06**	1.66E-06	**1.10E-05**	4.77E-05	**8.12E-07**	3.56E-06	**5.73E-06**	1.70E-05	**6.61E-09**	2.89E-08	**9.03E-08**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
Percent of EL	104.72%		0.03%		3.94%		0.00%		0.0033%		3.01%		0.08%		0.0001%		16.12%
EXCEEDS EL?	**Yes**		No		No		No		No		No		No		No		**No**

75.00% Boot, enclosure, or equivalent or baghouse or boot w/water ring

75.00% Baghouse control

7.75E-05 **Tons per year**

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

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

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

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

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

Facility: **Small Mine Development, LLC**
10/8/2021 14:31 **Permit/Facility ID:** **059-00015** **P-2021.0033 Project 62664**

Max Hourly Production	12	cy/hr	**82%** T/hr is Aggregate =	**10**	**cy/hr**
Max Daily Production	60	cy/day	82% T/hr is Aggregate =	**49**	**cy/day**
Max Annual Production	21,900	cy/yr	82% T/hr is Aggregate =	**17,958**	**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 spped: 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 aggegate respectively. These values are based on EPA tests conducted at Cheney Enterprises Cement plant in Roanoke, VA, 1994. (AP-42 11-12 06/06).

Windspeed Variation Factors for AERMOD modeling:				PM10		PM2.5	
Wind Category	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 spped: 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 aggegate respectively. These values are based on EPA tests conducted at Cheney Enterprises

Windspeed Variation Factors for AERMOD modeling:				PM10		PM2.5	
Wind Category	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 Aggegate (Sand) Transfer to Conveyor

Transfer from truck to conveyor: **10** **cy/hr** **4** 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	0.005	0.001	4.37E-03	9.98E-04	0.019	0.004	1.75E-02	3.99E-03
PM-10 (total)	7.00E-04	0.002	0.000	2.04E-03	4.66E-04	0.009	0.002	8.16E-03	1.86E-03
PM-2.5 (total)	2.25E-04	0.001	0.000	6.56E-04	2.87E-03	0.003	0.001	2.62E-03	1.15E-02

Coarse Aggegate Transfer to Conveyor

Transfer from truck to conveyor: **10** **cy/hr** **4** 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	0.026	0.006	2.42E-02	5.52E-03	0.106	0.022	9.67E-02	2.21E-02
PM-10 (total)	3.10E-03	0.013	0.003	1.17E-02	2.67E-03	0.051	0.011	4.68E-02	1.07E-02
PM-2.5 (total)	9.60E-04	0.004	0.001	3.63E-03	1.59E-02	0.016	0.003	1.45E-02	6.35E-02

Final Concrete Batch Plant Emissions Inventory

Listed Below are the emissions estimates for the units selected.

Company:	**Small Mine Development, LLC**
Facility ID:	**059-00015**
Permit No.:	**P-2021.0033 Project 62664**
Source Type:	**Staionary Concrete Batch Plant**
Manufacturer/Model:	**Model RPM30**

Production

Maximum Hourly Production Rate:	12	cy/hr
Proposed Daily Production Rate:	60	cy/day
Proposed Maximum Annual Production Rate:	21900	cy/year

Tons/year

Emissions Units		$PM_{2.5}$	PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs	CO_2e
CBP Type:	**Central Mix**	0.067	0.12	NA	NA	NA	NA	1.14E-06		N/A
Water Heater #1:	**No Water Heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00		0
Water Heater #2:	**No Water Heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00		0
Small Diesel Engine(s) *:	**No Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0
Large Diesel Engine *:	**No Large Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0
	Annual Totals (T/yr)	**0.07**	**0.12**	**0.00E+00**	**0.00**	**0.00**	**0.00**	**1.14E-06**	**7.79E-05**	**0**

Pounds/hour

		$PM_{2.5}$	PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs
CBP Type:	**Central Mix**	0.015	0.03	NA	NA	NA	NA	5.83E-07	
Water Heater #1:	**No Water Heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00	
Water Heater #2:	**No Water Heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00	
Small Diesel Engine(s) *:	**No Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA	
Large Diesel Engine*:	**No Large Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA	
	Daily Totals (lb/hr)	**0.02**	**0.03**	**0.00E+00**	**0.00**	**0.00**	**0.00**	**5.83E-07**	**2.04E-05**

* The Large engine may run : **There is no large engine.** hr/yr
* The Small engine(s) may run : **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	**1.57E-06**	**6.88E-06**	Annual	1.50E-06	**Yes**
Barium		X	**0.00E+00**	**0.00E+00**	24-hour	3.30E-02	**No**
Beryllium	X	X	**8.55E-09**	**3.74E-08**	Annual	2.80E-05	**No**
Cadmium	X	X	**1.46E-07**	**6.38E-07**	Annual	3.70E-06	**No**
Cobalt	X	X	**0.00E+00**	**0.00E+00**	24-hour	3.30E-03	**No**
Copper		X	**0.00E+00**	**0.00E+00**	24-hour	1.30E-02	**No**
Chromium	X	X	**1.02E-06**	**1.66E-06**	24-hour	3.30E-02	**No**
Manganese	X	X	**1.10E-05**	**4.77E-05**	24-hour	3.33E-01	**No**
Mercury	X	X	**0.00E+00**	**0.00E+00**	24-hour	N/A	**No**
Molybdenum (soluble)		X	**0.00E+00**	**0.00E+00**	24-hour	3.33E-01	**No**
Nickel	X	X	**8.12E-07**	**3.56E-06**	Annual	2.70E-05	**No**
Phosphorus	X	X	**5.73E-06**	**1.70E-05**	24-hour	7.00E-03	**No**
Selenium	X	X	**6.61E-09**	**2.89E-08**	24-hour	1.30E-02	**No**
Vanadium		X	**0.00E+00**	**0.00E+00**	24-hour	3.00E-03	**No**
Zinc		X	**0.00E+00**	**0.00E+00**	24-hour	6.67E-01	**No**
Chromium VI	X	X	**9.03E-08**	**3.95E-07**	Annual	5.60E-07	**No**
Non PAH Organic Compunds							
Pentane		X	**0.00E+00**	**0.00E+00**	24-hour	118	**No**
Methyl Ethyl Ketone	X	X	**0.00E+00**	**0.00E+00**	24-hour	39.3	**No**
Non-PAH HAPs							
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	**0.00E+00**	**0.00E+00**	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	**0.00E+00**	**0.00E+00**	Annual	5.10E-04	**No**
Hexane	X	X	**0.00E+00**	**0.00E+00**	24-hour	12	**No**
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	**0.00E+00**	**0.00E+00**	24-hour	25	**No**
o-Xylene	X	X	**0.00E+00**	**0.00E+00**	24-hour	29	**No**
PAH HAPs							
2-Methylnaphthalene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
3-Methylcholanthrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.50E-06	**No**
7,12-Dimethylbenz(a)anthracene	X		**0.00E+00**	**0.00E+00**	N/A	N/A	**N/A**
Acenaphthene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Acenaphthylene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Anthracene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Benzo(a)anthracene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Benzo(a)pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Benzo(b)fluoranthene	X	X	**0.00E+00**	**0.00E+00**	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	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Benzo(k)fluoranthene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Chrysene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Dibenzo(a,h)anthracene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Dichlorobenzene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Fluoranthene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Fluorene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Indeno(1,2,3-cd)pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Naphthalene (24-hour)	X	X	**0.00E+00**	**0.00E+00**	24-hour	3.33	**No**
Naphthalene (Annual)	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Perylene	X		**0.00E+00**	**0.00E+00**	N/A	N/A	**N/A**
Phenanathrene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
PAH HAPs Total	X	X	**0.00E+00**		Annual	2.00E-06	**No**
7-PAH Group (586 listed TAP)	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**

Total HAPs Emissions (lb/hr) and (T/yr): 2.04E-05 7.79E-05

Uncontrolled Criteria Pollutants

Source	PM10/PM2.5		SO2	NOx	CO	VOC
	lb/hr	T/yr	T/yr	T/yr	T/yr	T/yr
Concrete Batch Plant	1.21E-01	0.53	N/A	N/A	N/A	N/A
Water Heater #1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Water Heater #2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Small Diesel Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Large Diesel Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: The emissions from the transfer drop points are the emissions from the material handling

Facility: Small Mine Development, LLC
10/8/2021 14:31 **Permit** P-2021.0033 Project 62664 **Facility ID:** 059-00015

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	24	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	0	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 x (lb/453g) x (hp-hr/7000 Btu) x (0.746 kW/hp) x 10^6 Btu/MMBtu = lb/MMBtu
g/kW-hr x 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[1]	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	0.00	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[1]	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

M E M O R A N D U M DRAFT

DATE: September 15, 2021

TO: Aaron Hoberg, Permit Writer, Air Program

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

PROJECT: P-2021.0033 PROJ 62664, Initial Permit to Construct for Small Mine Development, LLC Concrete Batch Plant, located at a mine site west of Salmon, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

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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
Cd	Cadmium
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
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
ICO	Idaho Cobalt Operations
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_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	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
SMD	Small Mine Development, LLC
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

Small Mine Development, LLC (SMD) submitted an application for an initial Permit to Construct (PTC) P-2021.0033 PROJ 62664 for their stationary concrete batch plant (CBP), proposed for a mining site about 22 miles west of Salmon, Idaho. Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03) requires that no permit be issued unless it is demonstrated that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment.

The proposed facility allows concrete production in support of underground mining activities. Post-project facility-wide emissions of all criteria pollutants were below levels defined as Below Regulatory Concern (BRC), so NAAQS compliance demonstrations were not required for permit issuance. Facility-wide TAP emissions were below screening emission levels (ELs) for all TAPs except arsenic (As). Conservatively performed air impact modeling was performed to demonstrate compliance with the As TAP increments, provided an established setback distance is maintained. This memorandum provides a summary of the applicability assessment for analyses and air impact analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

DEQ review of submitted data and DEQ 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 emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

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 in accordance with methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

The submitted information and DEQ analyses: 1) showed either a) that estimated potential/allowable emissions are at a level defined as BRC and do not require a NAAQS compliance demonstration, or b) that criteria pollutant emissions increases resulting from the proposed project are below site-specific modeling applicability thresholds, developed to assure that emissions below such levels will not result in ambient air impacts exceeding Significant Impact Levels (SILs); 2) showed that TAP emission increases associated with the project will not result in increased emissions above ELs or ambient air impacts exceeding allowable TAP increments. This conclusion assumes that 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 emissions do not exceed applicable regulatory thresholds requiring further analyses and to assure the requirements of Appendix W are met regarding emissions representative of design capacity or permit allowable rates.

Summary of Submittals and Actions

- July 7, 2021: Application received by DEQ.
- August 11, 2021: Application determined complete by DEQ.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Criteria Pollutant Emission Rates. Facility-wide non-fugitive allowable emission rates of all criteria pollutants are below levels defined as BRC.	A NAAQS compliance demonstration is not required where applicable facility-wide non-fugitive emissions are below BRC levels.
TAP Emission Sources. Allowable emissions of TAPs exceeded ELs for arsenic (As).	TAP increment compliance demonstrations were required for As. Analyses were not required for any other TAPs since emissions were below applicable ELs.
Operations and Throughput. Air impact analyses were performed for emissions associated with a production rate of 21,900 cubic yards/year (cy/year) from the CBP.	Short term production or emission limits are not necessary to demonstrate compliance with NAAQS, provided annual production/emissions are limited to levels below BRC. An annual throughput restriction is also necessary to assure carcinogenic TAP compliance.
Plant Setback Requirements from Site Boundary. Compliance with the As TAP AACC is assured provided a distance of 80 meters (262 feet) is maintained between emission release points of the CBP and the boundary of the area under control of SMD. The CBP may be positioned anywhere on the site, provided the minimum setback distance is maintained. The ambient air boundary for the CBP is considered the boundary inside of which the permittee can legally and effectively control access by those not associated with the CBPs or having business with the CBPs.	Compliance with TAP increments is not assured if the CBP is operated at a location where the distance between the emission points and the ambient air boundary is less than 80 meters.
Public Access Exclusion. Public (anyone not under the control of the permittee) access must be legally and effectively precluded from areas inside the ambient air boundary.	Compliance with TAP increments is only assured if public access is precluded from areas inside this boundary.

2.0 Background Information

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

2.1 Project Description

The SMD project involves operation of a small central mix CBP at the Jervois – Idaho Cobalt Operations (ICO) Mine, which is west of Salmon, Idaho. Pollutant-emitting processes conducted at the CBP include material handling of cement and aggregate. The PTC addresses all of these air pollutant emitting activities associated with the CBP. The proposed CBP will have an allowable production rate of 21,900 cy/year.

2.2 Proposed Location and Area Classification

The CBP will be located within the ICO claim boundary at Easting 707,480 meters, Northing 5,002,270 meters, zone 11, about 50 miles southwest of Salmon, Idaho, within Lemhi county. This area is designated as attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter less than or

equal to a nominal 2.5 micrometers ($PM_{2.5}$). 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:

> ***02. 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

If specific criteria pollutant emission increases associated with the proposed permitting project cannot qualify for a BRC exemption as per Idaho Air Rules Section 221, then the permit cannot be issued unless the application demonstrates that applicable emission increases will not cause or significantly contribute to a violation of NAAQS, as required by Idaho Air Rules Section 203.02.

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. 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 in accordance with methods outlined in Appendix W. 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 emission 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 potential/allowable 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[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.2	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th 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 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th 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.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

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. If project-specific impacts are below the SIL, then the project 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 emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation[1]; 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 emission 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 emission 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. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emissions Source Data

Emissions increases of criteria pollutants and TAPs resulting from the proposed project were estimated by DEQ for the applicable averaging periods using a DEQ-developed emission calculation spreadsheet for CBPs. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analysts are responsible for assuring that potential emission rates provided in the emission inventory are properly used in the modeling applicability assessment and in any air impact modeling performed. The rates listed must represent the maximum allowable rate as averaged over the specified period.

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

The DEQ CBP emission calculation spreadsheet does not ideally match the proposed SMD CBP described in the application. The following were differences between the CBP assumptions used for the spreadsheet and the design of the SMD CBP:

- The spreadsheet assumes 1 cy of cement is 4,024 pounds, consisting of 491 pounds of cement and 73 pounds of supplement. The SMD application indicates that supplement will not be used. The DEQ spreadsheet will overestimate particulate emissions since the emission factors for the handling of supplement are higher than those for cement.

- Emissions from the mixer are controlled by a shroud at the cement transfer point to the mixer (as indicated in the application). The emission factor is conservative in that it assumes both cement and the higher-emitting supplement are transferred to the mixer.

- Emissions from the transfer of aggregate to the mixer are estimated by the weigh hopper loading factor, assuming no control.

3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emission Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for TAP emission increases or potential emissions of one or more criteria pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. 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.[1]" The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (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. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in cases where a PTC is required for the action regardless of emissions quantities, such as the modification of an existing emissions or throughput limit.

The DEQ emission inventory asserts that facility-wide controlled PTE emissions of all criteria pollutants are below BRC levels, as listed in Table 3. Emissions considered in this calculation are only non-fugitive emissions from the CBP plant, including: cement silo filling; cement transfer to the mixer; loading of aggregate in the mixer. Although emissions from the transfer of cement and aggregate to the mixer are emitted as a fugitive, they are included in facility-wide PTE because it has been determined that such emission points could be reasonably controlled.

Table 3. CRITERIA POLLUTANT NAAQS COMPLIANCE DEMONSTRATION APPLICABILITY

Criteria Pollutant	BRC Level (ton/year)	Applicable Facility Wide PTE Emissions (ton/year)	Air Impact Analyses Required?
PM_{10}[a]	1.5	<0.2	No
$PM_{2.5}$[b]	1.0	<0.1	No
Carbon Monoxide (CO)	10.0	0	No
Sulfur Dioxide (SO_2)	4.0	0	No
Nitrogen Oxides (NOx)	4.0	0	No
Lead (Pb)	0.06	<0.0001	No
Volatile Organic Compounds (VOCs)	4.0	0	No

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

3.1.2 Toxic Air Pollutant Emission Rates

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

Facility-wide potential emissions of arsenic (As) exceed the applicable ELs of Idaho Air Rules Section 586. Air impact modeling analyses were then required to demonstrate that maximum impacts of As 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.

Emissions of As occur from the handling of dry cement. Emissions from the filling of storage silos are controlled by a filtration system and emissions from the transfer of cement to the central mixer are controlled by a shroud.

As is a carcinogenic TAP that is regulated on a long-term basis. Therefore, the appropriate emission rate for impact analyses is the maximum annual emission, expressed as an average pound/hour value over an 8,760-hour period.

Table 4. EMISSIONS RATES MODELED FOR TAP IMPACT ANALYSES		
Source ID	**Description**	**Annual Averaged Arsenic Emission Rates (lb/hr[a])**
SILO	Cement silo loading (conservatively accounts for the use of cement supplement).	9.39 E-8[b]
MIXER	Central mixer (emissions controlled by a shroud).	1.48 E-6

a. Pounds per hour for annual averaging period.
b. Emissions from cement silo loading and supplement silo loading, as indicated in DEQ's CBP calculation spreadsheet, were added together.

3.1.3 Emission Release Parameters

Table 5 lists emission release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for emission sources modeled in the air impact analyses. Emissions from silo loading were modeled as a point source and emissions from the loading of the central mixer were modeled as a volume source. Both sources were conservatively modeled from the same point at the center of the polar grid.

Emissions from cement loading of the mixer were modeled as a volume source on a 10-foot square building, 10 feet high. The initial horizontal and vertical dispersion coefficients were calculated using procedures established in the AERMOD users guide:

σ_{yo} = building length / 4.3 = 10 feet/4.3 = 2.33 feet = 0.71 meters
σ_{zo} = building length / 4.3 = 10 feet/4.3 = 2.33 feet = 0.71 meters

Table 5. POINT SOURCE STACK PARAMETERS USED IN MODELING					
Point Source Parameters					
Release Point	**Description/Location**	**Stack Height (meters)[a]**	**Stack Gas Temp. (Kelvin)**	**Stack Flow Velocity (m/sec)[b]**	**Stack Dia. (meters)[c]**
SILO[d]	Cement silo loading (0 m, 0m)	12.2 (40 ft)	0[e]	14.7	1.10 (3.6)
Volume Source Parameters					
Release Point	**Description/Location**	**Release Height (meters)[a]**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
MIXER	Cement loading of mixer (0 m, 0 m)	1.52 (5 ft)	0.71	0.71	

a. Height in meters at the point of release. Values in parentheses are in feet.
b. Meters per second.
c. Stack diameter in meters at the point of release to the atmosphere. Values in parentheses are in feet.
d. Modeled as an uninterrupted vertical release in AERMOD.
e. Set to 0 to direct model to use a release temperature equal to the ambient air temperature specified in the meteorological data input file.

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 applicable (stationary and non-fugitive) emissions of all criteria pollutants were below levels defined as BRC, and as such, NAAQS compliance demonstrations were not required for permit issuance.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant and/or 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 SMD facility. 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.

The SMD CBP is a stationary facility located at the Jervois – Idaho Cobalt Operations (ICO) Mine. However, DEQ used impact analysis methods that are normally used for portable facilities. These methods use a generic site layout that is designed to generate conservative impacts. The general method used consists of the following:

1. Use a polar receptor grid with the emission points located at the center.

2. Run the model using a representative meteorological dataset.

3. For each model run and pollutant, identify the controlling receptor. The controlling receptor is the one just beyond (further from the emission points) the most distant receptor showing a concentration value over the applicable standard.

4. Determine the distance between the controlling receptor and the emission points for each model run.

5. The minimum setback requirement distance is the furthest distance between the controlling receptor and emission points, considering all model runs.

6. Compliance with identified applicable standards is assured provided the CBP operates as described and the minimum setback between emission sources and the nearest point of ambient air is maintained.

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

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*[2].

Table 6. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description**
General Facility Location	Jervois – Idaho Cobalt Operations (ICO) Mine	Air impact modeling was performed to determine a setback distance needed between emission sources and the nearest point of ambient air.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 21112.
Meteorological Data	Salmon, ID data	See Section 3.3.4 of this memorandum for additional details of the meteorological data.
Terrain	Not Considered	Flat terrain was assumed in the analyses.
Building Downwash	Considered	A 10 ft X 10 ft X 10 ft structure was conservatively assumed at the center of the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD.
Receptor Grid	Polar Grid	Adequate to resolve maximum modeled impacts

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 Appendix W. 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 21112 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 processed a meteorological dataset from the DEQ tower in Salmon, Idaho, for years 2016-2020. These onsite data were supplemented by data collected from the nearby second-level National Weather Service (NWS) station at the Salmon airport (KSMN; station ID 726865-24196). The upper air soundings required by AERMET were obtained from the Boise airport station (site ID 24131). Surface characteristics were determined by DEQ staff using AERSURFACE version 20060. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on 31 years of Salmon precipitation data. Conditions were determined to be "wet" for 2017 and 2020, "dry" for 2019, and "average" for 2016 and 2018. Average moisture content is defined as within a 30 percentile of the 31-year mean of 9.4 inches.

Figure 1 shows a wind rose and wind speed histogram at the Salmon station. On average, surface winds follow the valley structure. The percent calm distribution is 7.9%, and missing data accounts for less than 1% of the data period.

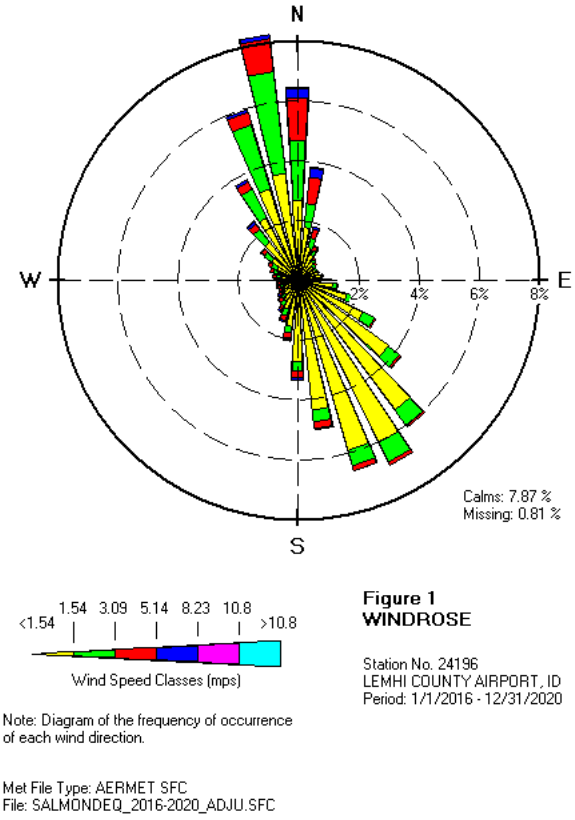
AERMINUTE version 15272 along with AERMET version 19191 was used to process surface and upper air data and to generate a model-ready meteorological data input file. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions. The modeling analyses used the met data set processed with the U* option.

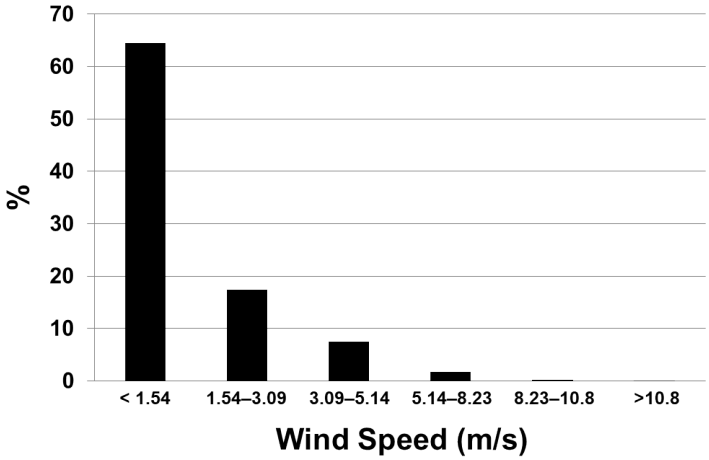
3.3.5 Effects of Terrain on Modeled Impacts

Terrain effects on dispersion were not considered in the non-site-specific analyses. DEQ contends that assuming flat terrain is not a critical limitation of the analyses because most emissions points associated with the CBP are near ground-level and the immediate surrounding area can be considered flat for dispersion modeling purposes. Emissions sources near ground-level typically have maximum pollutant

impacts near the source, minimizing the potential effect of surrounding terrain to influence the magnitude of maximum modeled impacts.

Figure 1. (a) WIND ROSE AND (b) WIND SPEED HISTOGRAM AT THE SALMON, IDAHO, MONITORING SITE (2016-2020).





3.3.6 Facility Layout

DEQ's analyses used a conservative generic facility layout. This was done because the specific layout information was not provided in the application. DEQ modeled all TAP emissions from a single point centered on a 10-foot square building 10 feet high. The building dimensions were set to conservatively account for building downwash, as described in Section 3.3.7 of this memorandum. Table 7 lists the modeled coordinates of emission sources. Both the silo vent and the mixer emission point was positioned at the center of the polar receptor grid.

Table 7. COORDINATES OF MODELED SOURCES

Source Identification Code	Description	Modeled Coordinates (meters)	
		Easting	Northing
SILO and MIXER	Vent for silo loading and mixer loading	0.0	0.0

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 and building heights). A 10-foot square building, 10 feet high, was used in the analysis to conservatively account for downwash. Dimensions and orientation of 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 is typically considered areas external to an identified boundary, inside of which the permittee can legally and effectively preclude access of those not having official business with the permitted facility. The SMD CBP is located on the Jervois – ICO Mine site, but SMD does not have direct and sole control over access to the mine site. Therefore, the mine site ambient air boundary cannot be used for the ambient air boundary of the SMD CBP.

DEQ's non-site-specific analysis methods, using a generic facility layout, were used to generate minimum setback distances between emissions points and the established boundary to ambient air. Setback distances were specified as the distance between emission release points and the closest point of potential public access. Compliance with applicable air quality standards and increments is not demonstrated unless setback distances are maintained. SMD must establish an ambient air boundary that maintains the required setback, inside of which reasonable measures are taken to preclude access by those not having business with SMD.

3.3.9 Receptor Network

A polar grid with 10-meter receptor spacing extending out to 100 meters and 25-meter spacing extending out to 825 was used in the non-site-specific modeling performed by DEQ. Since maximum impacts from sources with near ground level release points occur very near the sources, a more extensive receptor grid was not necessary to assure compliance with applicable standards.

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

3.3.11 Crucial CBP Characteristics Affecting Air Quality Impacts

Table 8 lists characteristics of the CBP that are critical to the TAPs compliance demonstrations.

Table 8. IMPORTANT CHARACTERISTICS OF CBP USED IN DEQ ANALYSES

Parameter	Value or Description
Concrete Production Rates	21,900 cy/year from the CBP
Central Mixing Controls	Emissions from the transfer of cement into the mixer will be controlled by a shroud.
Cement silo	Emissions are controlled by a fabric filter.
Seasonal Restriction	None were assessed.
Ambient Air Boundary	SMD must restrict access to the area within 80 meters (260 feet) of the emission release points.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

Cumulative NAAQS impact analyses were not performed for the SMD CBP facility. Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having facility-wide emissions less than BRC levels.

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 ELs. DEQ determined required setback distances from the non-site-specific modeling results for each TAP with emissions exceeding the EL. Only annual emissions of arsenic exceeded the EL, and Table 9 lists controlling setback distance. Setback distances are the closest allowable distance between the established ambient air boundary and emission sources (silo vents and the cement transfer point to the central mixer).

Table 9. SETBACK DISTANCES AS A FUNCTION OF TAP	
TAP	**Setback Distance**
Arsenic	80 meters (260 feet)

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 SMD CBP facility, as described in this memorandum, will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

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 https://www.deq.idaho.gov/permits/air-quality-permitting .

APPENDIX C – FACILITY DRAFT COMMENTS

The facility had no comments on the draft Permit.

APPENDIX D – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:	**Small Mine Development, LLC**
Address:	**50 Miles SW of Salmon ID**
City:	**Salmon**
State:	**Idaho**
Zip Code:	**83467**
Facility Contact:	**Phillip Joggerst**
Title:	**Project Engineer**
AIRS No.:	**327320**

Y	Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N
Y	Did this permit require engineering analysis? Y/N
N	Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM10	0.1	0	0.1
VOC	0.0	0	0.0
Total:	0.1	0	**0.1**
Fee Due	**$ 500.00**		

Comments: