Statement of Basis
Concrete Batch Plant General Permit

Permit to Construct No. P-2018.0021
Project ID 62350

Dixie River dba River Rock Sand & Gravel
Caldwell, Idaho

Facility ID 027-00176

Final

May 22, 2020
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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.

TABLE OF CONTENTS

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE....3
FACILITY INFORMATION....5
Description....5
Permitting History....5
Application Scope....5
Application Chronology....5
TECHNICAL ANALYSIS....6
Emissions Units and Control Equipment....6
Emissions Inventories....6
Ambient Air Quality Impact Analyses....12
REGULATORY ANALYSIS....13
Attainment Designation (40 CFR 81.313)....13
Facility Classification....13
Permit to Construct (IDAPA 58.01.01.201)....14
Tier II Operating Permit (IDAPA 58.01.01.401)....14
Visible Emissions (IDAPA 58.01.01.625)....14
Fugitive Emissions (IDAPA 58.01.01.650)....14
Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)....14
Rules for Control of Odors (IDAPA 58.01.01.775)....15
Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)....15
PSD Classification (40 CFR 52.21)....15
Permit Conditions Review....15
PUBLIC REVIEW....16
Public Comment Opportunity....16
Public Comment Period....16
APPENDIX A – EMISSIONS INVENTORIES
APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES
APPENDIX C – FACILITY DRAFT COMMENTS
APPENDIX D – PROCESSING FEE

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
Btu	British thermal units
CBP	concrete batch plant
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
GHG	greenhouse gases
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
HMA	hot mix asphalt
hp	horsepower
hr/yr	hours per consecutive 12 calendar month period
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PERF	Portable Equipment Relocation Form
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
ppm	parts per million
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge

PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
PW	process weight rate
RAP	recycled asphalt pavement
RFO	reprocessed fuel oil
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
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/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Dixie River dba River Rock Sand & Gravel has proposed to co-locate a hot mix asphalt plant with an existing permitted stationary truck mix concrete batch plant consisting of a rock crusher, aggregate stockpiles, a cement storage silo, a cement supplement (fly ash) storage silo, a weigh batcher, and conveyors. The facility combines aggregate, sand, fly ash, and cement and then transfers the mixture into a truck mixer along with water for in-transit mixing of the concrete. In addition, a boiler is used to heat the water in cold weather prior to use for mixing of the concrete.

The concrete batch plant is fed a mixture of aggregates from imported aggregate and the rock crushing plant. The process begins with materials being fed via front-end loader to a compartment bin feeder system and then dispensed in metered proportions to a collecting conveyor. The material passes over a scalping screen before being conveyed into the truck mixer.

The concrete production rate has throughput limits of 1,440 cubic yards per day, and 375,000 cubic yards per year. The rock crushing production rate is 25,000 ton/month throughput.

Line power is used exclusively at the facility.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

May 24, 2018	P-2018.0021, Initial PTC for a concrete batch plant, Permit status (A, but will become S upon issuance of this permit)

Application Scope

This application is requesting to modify the existing PTC to include co-location of a portable hot mix asphalt plant and a facility name change.

Application Chronology

December 13, 2019	DEQ received an application and an application processing fee.
January 2, 2020	DEQ determined the application was incomplete.
January 6, 2020	DEQ received supplemental information from the applicant.
February 5, 2020	DEQ determined the application was complete.
February 25 – March 11, 2020	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
March 13, 2020	DEQ made available the draft permit and statement of basis for peer and regional office review.
March 23, 2020	DEQ made available the draft permit and statement of basis for applicant review.
April 14 – May 14, 2020	DEQ provided a public comment period on the proposed action.
May 22, 2020	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
Materials Handling	Material Transfer Points: Materials handling Concrete aggregate transfers Truck unloading of aggregate Aggregate conveyor transfers Aggregate handling	Reasonable control
Concrete Mixer	Concrete batch plant – truck mix Manufacturer: Stephens Manufacturing Model: Thoroughbred Portable Manufacture Date: 2016 Max. production: 1,440 yd^3/day and 375,000 yd^3/yr Cement storage silo Bin Vent Filter/ Baghouse Manufacturer[(a)]: Stephens Manufacturing Model: SOS-1020 Cement supplement/fly ash storage silo Bin Vent Filter/ Baghouse Manufacturer[(a)]: Stephens Manufacturing Model: SOS-1020	Truck load-out shroud with water ring spray $PM_{10}/PM_{2.5}$ control efficiency: ≥80% Weigh batcher baghouse Manufacturer: Stephens Manufacturing Model: SV-20 Vent $PM_{10}/PM_{2.5}$ control efficiency: ≥99% Cement storage silo bin vent filter/baghouse Manufacturer: Stephens Manufacturing Model: SOS-1020 $PM_{10}/PM_{2.5}$ control efficiency: ≥99% Cement supplement/fly ash storage silo bin vent filter/baghouse Manufacturer: Stephens Manufacturing Model: SOS-1020 $PM_{10}/PM_{2.5}$ control efficiency: ≥99%
Boiler	Boiler Manufacturer: Sioux Model: HM 1.7 Manufacture Date: 2018 Heat input rating: 1.7 MMBtu/hr Fuel: Natural gas/LNG	None

a) Both the storage silo baghouse and supplement storage silo flyash baghouse are considered process equipment and therefore there is no associated control efficiency. Controlled PM_{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 120 yd^3/hour, 1,440 yd^3/day, and 375,000 yd^3/year (per the Applicant).
- Baghouse/cartridge filter 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, and water is used on-site to control the temperature of the aggregate. Particulate matter and PM_{10} emissions from the weigh batcher transfer point are controlled by a baghouse/cartridge filter, and truck mix load-out emissions are controlled by a boot. Capture efficiency of the truck mix load-out boot was estimated at 70%.
- Controlled emissions of particulate toxic air pollutants (TAPs) were estimated based on the presence of bin vent filters/baghouse controlling emissions from the cement/cement supplement silos, a baghouse controlling emissions from the weigh batcher, and 75% control for truck load-out emissions. Hexavalent chromium content was estimated at 20% of total chromium for cement, and 30% of total chromium for the cement supplement/fly ash. The hexavalent chromium percentages were taken from a University of North Dakota study, by the Energy and Environmental Research Center, Center for Air Toxic Metals. Detailed emissions calculations can be found in Appendix A of this document.
- Determining emissions from a concrete batch plant also includes transfer emissions from the number of drop points throughout the process. The PM_{10} emissions from truck-mix loading operations are defined by an equation which includes the wind speed at each drop point and the moisture content of cement and cement supplement and a number of exponents and constants defined by AP-42 Equation 11.12-1 (6/06). An average value of wind speed and moisture content are 7 mph, 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 98.4 yd^3/hr (0.82 x 120 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 up to 3 transfer points.

[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%.

- Any emissions unit outside a 1,000 ft radius from the concrete batch plant was not included in the emissions modeling analysis for this project.

Uncontrolled Potential to Emit

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

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

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

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC
	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources					
Concrete batch plant[(a)]	0.79	0.00	0.00	0.00	0.00
Boiler	0.06	0.01	0.73	0.62	0.05
Total, Point Sources	**0.85**	**0.01**	**0.73**	**0.62**	**0.05**

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	Chromium metal (II and III)	1.71E-04
	Cobalt metal dust, and fume	6.13E-07
	Hexane	1.31E-02
	Manganese as Mn (fume)	8.19E-04
	Mercury (alkyl compounds as Hg)	1.90E-06
	Methyl chloroform	3.00E-09
	Naphthalene	1.63E-03
	Phosphorous	5.32E-04
	Selenium	3.53E-05
	Toluene	2.48E-05
586	Arsenic	1.69E-040
	Benzene	3.50E-06
	Benzo(a)pyrene	2.00E-09
	Beryllium and compounds	3.89E-06
	Cadmium and compounds	1.31E-05
	Chromium (VI)	3.49E-05
	Formaldehyde	1.25E-04
	3-Methylcholanthrene	3.00E-09
	Nickel	1.78E-04
Not listed	Acenaphthene	3.00E-09
	Acenaphthylene	3.00E-09

	Anthracene	4.00E-09
	Benzo(b)fluoranthene	3.00E-09
	Benzo(k)fluoranthene	3.00E-09
	Benzo(e)pyrene	2.00E-09
	Benzo(g,h,i)perylene	2.00E-09
	Chrysene	3.00E-09
	Dibenzo(a,h)anthracene	2.00E-09
	Isooctane	0
	Total	**0.0168**

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.

The following table presents the pre-project potential to emit for all criteria pollutants from all emissions units at the facility/for the one unit being modified 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	1.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boiler	0.04	0.12	0.01	0.01	0.17	0.73	0.14	0.62	0.01	0.05
Pre-Project Totals	**1.96**	**0.20**	**0.01**	**0.01**	**0.17**	**0.73**	**0.14**	**0.62**	**0.01**	**0.05**

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	1.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boiler	0.04	0.12	0.01	0.01	0.17	0.73	0.14	0.62	0.01	0.05
Post Project Totals	**1.96**	**0.20**	**0.01**	**0.01**	**0.17**	**0.73**	**0.14**	**0.62**	**0.01**	**0.05**

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	1.96	0.20	0.01	0.01	0.17	0.73	0.14	0.62	0.01	0.05
Post Project Potential to Emit	1.96	0.20	0.01	0.01	0.17	0.73	0.14	0.62	0.01	0.05
Changes in Potential to Emit	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Non-Carcinogenic TAP Emissions

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)
Barium	7.33E-06	7.33E-06	0.0000	**2**	No
Chromium metal (II and III)	6.90E-05	6.90E-05	0.00000	**0.033**	No
Cobalt metal dust, and fume	1.40E-07	1.40E-07	0.0000000	**0.0033**	No
Copper (fume)	1.42E-06	1.42E-06	0.00000000	**0.013**	No
Hexane	3.00E-03	3.00E-03	0.0000	**12**	No
Manganese as Mn (fume)	2.65E-04	2.65E-04	0.0000	**0.067**	No
Mercury (alkyl compounds as Hg)	4.33E-07	4.33E-07	0.0000000	**0.001**	No
Methyl chloroform	3.00E-09	3.00E-09	0.0000	**127**	No
Molybdenum (soluble)	1.83E-06	1.83E-06	0.000000	**0.333**	No
Naphthalene (24-hour)	3.71E-04	3.71E-04	0.0000	**3.33**	No
Pentane	2.67E-03	2.67E-03	0.0000	**118**	No
Phosphorous	2.15E-04	2.15E-04	0.0000	**0.007**	No
Selenium	1.13E-05	1.13E-05	0.0000000	**0.013**	No
Toluene	5.67E-06	5.67E-06	0.000000	**25**	No
Vanadium as V_2O_5, (respirable dust and fume)	3.83E-06	3.83E-06	0.0000000	**0.003**	No
Zinc metal	4.83E-05	4.83E-05	0.000000	**0.667**	No

None of the PTEs for non-carcinogenic TAP were exceeded as a result of this project.

Carcinogenic TAP Emissions

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)
Arsenic	3.88E-05	3.88E-05	0.0000	1.5E-06	No
Benzene	3.50E-06	10	0.0000000	8.0E-04	No
Benzo(a)pyrene	2.00E-09	2.00E-09	0.0000000000	2.0E-06	No
Cadmium and compounds	4.40E-06	4.40E-06	0.000000	3.7E-06	No
Chromium (VI)	7.96E-06	7.96E-06	0.000000	5.6E-07	No
Formaldehyde	1.25E-04	1.25E-04	0.0000	5.1E-04	No
3-Methylcholanthrene	3.00E-09	3.00E-09	0.000000000	2.5E-06	No
Nickel	4.34E-05	4.34E-05	0.000000	2.7E-05	No
PAHs Total	1.90E-08	1.90E-08	0.0000	2.0E-06	No
POM Total[(a)]	1.90E-08	1.90E-08	0.00000000	2.0E-06	No
Non-Listed (in 586) PAHs*					
2-Methylnaphthalene	4.00E-08	4.00E-08	0.00000000	9.10E-05	No
Acenaphthene	3.00E-09	3.00E-09	0.00000000	9.10E-05	No
Acenaphthylene	3.00E-09	3.00E-09	0.00000000	9.10E-05	No
Anthracene	4.00E-09	4.00E-09	0.00000000	9.10E-05	No
Benzo(g,h,i)perylene	2.00E-09	2.00E-09	0.00000000	9.10E-05	No
Dichlorobenzene	2.00E-06	2.00E-06	0.00000000	9.10E-05	No
Fluoranthene	5.00E-09	5.00E-09	0.00000000	9.10E-05	No
Fluorene	4.67E-09	4.67E-09	0.00000000	9.10E-05	No
Naphthalene (Annual)	1.02E-06	1.02E-06	0.00000000	9.10E-05	No
Phenanathrene	2.83E-08	2.83E-08	0.00000000	9.10E-05	No
Pyrene	8.33E-09	8.33E-09	0.00000000	9.10E-05	No

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

None of the PTEs for carcinogenic TAP were exceeded as a result of this project.

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)
585/586	Chromium metal (II and III)	1.40E-04
	Cobalt metal dust, and fume	6.13E-07
	Hexane	1.31E-02
	Manganese as Mn (fume)	6.57E-04
	Mercury (alkyl compounds as Hg)	1.90E-06
	Naphthalene	1.02E-06
	Phosphorous	4.30E-04
	Selenium	2.84E-05
	Toluene	2.48E-05
	Arsenic	1.36E-04
	Benzene	3.50E-06
	Beryllium and compounds	3.24E-06
	Cadmium and compounds	1.30E-05
	Chromium (VI)	2.84E-05
	Formaldehyde	1.25E-04
	3-Methylcholanthrene	3.00E-09
	Nickel	1.47E-04
Not listed	Acenaphthene	3.00E-09
	Acenaphthylene	3.00E-09
	Anthracene	4.00E-09
	Benzo(b)fluoranthene	3.00E-09
	Benzo(k)fluoranthene	3.00E-09
	Benzo(g,h,l)perylene	2.00E-09
	Chrysene	3.00E-09
	Dibenzo(a,h)anthracene	2.00E-09
	Total	**0.0148**

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, HAP, and TAP from this project exceeded 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 ambient air impact analyses and other air quality analyses performed in support of the PTC application demonstrated to DEQ's satisfaction that emissions from the co-located Dixie River HMA, CBP, and rock crushing plant, when operating at the Dixie River site as described in the Modeling Memo in Appendix B will not cause or significantly contribute to a violation of any ambient air quality standard.

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

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).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Canyon 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.

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	0.85	0.12	**100**	B
PM_{10}	0.85	0.12	**100**	B
$PM_{2.5}$	0.85	0.08	**100**	B
SO_2	0.01	0.01	**100**	B
NO_X	0.73	0.73	**100**	B
CO	0.62	0.62	**100**	B
VOC	0.05	0.05	**100**	B
HAP (single)	0.017	0.017	**10**	B
Total HAPs	0.013	0.013	**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 Condition 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 120 y^3/hr, E is calculated as follows:

Proposed throughput = 4,024 lb per cubic yard x 120 y^3/hr = 482,880 lb/hr

Therefore, E is calculated as:

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

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

Permit Conditions Review

This section describes 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 1.2 states the old permit that is being replaced and its issue date.

Permit Condition 1.3 and Table 1.1 provide the regulated sources, the process, and the control devices used at the facility.

FACILITY-WIDE CONDITIONS

Permit Condition 2.3 establishes that the concrete batch plant can co-locate with a portable hot mix asphalt plant as requested by the applicant.

Permit Condition 2.7 Co-location Demonstration Recordkeeping was deleted based on information provided by the Ambient Air Quality Impact Analyses. Permit Condition 2.7 stated, "To demonstrate compliance with the collocation requirements at the site the permitted equipment operates, the permittee shall measure and record the minimum distances, to an accuracy of plus or minus six feet, from the exhaust stacks of the concrete weigh batcher baghouse and the boiler to the nearest concrete batch plant or rock crushing plant. This procedure shall be conducted each time the permitted portable equipment changes location. Measurements greater than 1,100 feet may be recorded as greater than 1,100 feet."

CONCRETE BATCH PLANT CONDITIONS

Permit Condition 3.5 establishes the rock crushing production limit when the HMA plant is co-located with the CBP.

Permit Condition 3.6 establishes the specified setbacks do not apply when the HMA plant is co-located with the CBP.

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 a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

Public Comment Period

A public comment period was made available to the public in accordance with IDAPA 58.01.01.209.01.c. No public comments were made.

APPENDIX A – EMISSION INVENTORIES

CRITERIA POLLUTANT EMISSION INVENTORY for Portable Concrete Batch Plant

Facility Information 3/3/20 11:57

Company:	**Dixie River dba River Rock Sand & Gravel**	**Assumptions Implied or Stated in Application:**	
Facility ID:	**027-00176**		
Permit and Project No.:	**P-2018.0021 Project 62350**	**See control assumptions**	
Source Type:	**Stationary Concrete Batch Plant**		
Manufacturer/Model:	**Stephens Manufacturing**	**Truck Mix (T) or Central Mix**	**T**

Production Rates[1]

Maximum Hourly Production Rate:	**120**	cy/hr		Per manufacturer
Proposed Daily Production Rate:	**1,440**	cy/day	**12.00**	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	**375,000**	cy/year		
Cement Storage Silo Capacity:	4540	ft^3 of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only:	65%	of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:	35%	of the silo capacity		

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		
	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]	**Control Assumptions:**
Aggregate delivery to ground storage		0.00096		0.0031	0.03	0.09	0.01	0.35	0.047	1.12	1.03E-02	4.50E-02	0.033	0.145	**75%** Water Sprays at Operator's Discretion
Sand delivery to ground storage		0.000225		0.0007	0.01	0.02	3.38E-03	0.08	0.011	0.25	2.41E-03	1.05E-02	0.008	0.033	**75%** Water Sprays at Operator's Discretion
Aggregate transfer to conveyor		0.00096		0.0031	0.03	0.09	0.01	0.35	0.047	1.12	1.03E-02	4.50E-02	0.033	0.145	**75%** Water Sprays at Operator's Discretion
Sand transfer to conveyor		0.000225		0.0007	0.01	0.02	3.38E-03	0.08	0.011	0.25	2.41E-03	1.05E-02	0.008	0.033	**75%** Water Sprays at Operator's Discretion
Aggregate transfer to elevated storage		0.00096		0.0031	0.03	0.09	0.01	0.35	0.047	1.12	1.03E-02	4.50E-02	0.033	0.145	**75%** Water Sprays at Operator's Discretion
Sand transfer to elevated storage		0.000225		0.0007	0.01	0.02	3.38E-03	0.08	0.011	0.25	2.41E-03	1.05E-02	0.008	0.033	**75%** Water Sprays at Operator's Discretion
Cement delivery to Silo (controlled EF)	**0.00003**		**0.0001**		3.60E-03	1.00E-02	**1.80E-03**	4.32E-02	**5.01E-03**	1.20E-01	1.28E-03	5.63E-03	3.57E-03	**1.56E-02**	**0.00%** Baghouse is process equipment, use controlled EF
Cement supplement delivery to Silo (controlled EF)	**0.000045**		**0.0002**		5.40E-03	2.15E-02	**2.70E-03**	6.48E-02	**1.07E-02**	2.57E-01	1.93E-03	8.44E-03	7.65E-03	**3.35E-02**	**0.00%** Baghouse is process equipment, use controlled EF
Weigh hopper loading (sand & aggregate batcher loading)		**0.001185**		**0.00395**	1.42E-03	4.74E-03	**7.11E-04**	1.71E-02	**2.37E-03**	5.69E-02	5.07E-04	2.22E-03	1.69E-03	**7.41E-03**	**99.0%** Sealed boot (vents back to silo) or baghouse.
Truck mix loading, Table 11.12-2, "0.310 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/ 2000 lb = 0.0874 lb/cy. 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		**0.0473**		**0.07874**	1.14E+00	1.89	**0.57**	13.62	**0.94**	22.68	4.05E-01	1.77E+00	0.67	**2.95**	**80.0%** 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		**0.0000**		**0.0000**	0.00E+00	0.00	**0.00**	0.00	**0.00**	0.00	0.00E+00	0.00E+00	0.00	**0.00**	**80.0%** Baghouse control
Point Sources Total Emissions		**4.86E-02**		**8.30E-02**	**1.15E+00**	**1.93E+00**	**5.73E-01**	**1.37E+01**	**9.63E-01**	########	**3.72E-03**	**1.63E-02**	**1.29E-02**	**5.66E-02**	
Process Fugitive Emissions		0.003555		0.0114	0.11	0.34	0.05	1.28	0.17	4.11	0.04	0.17	0.12	0.53	
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)				0.0944		2.27	0.63	15.03	1.13	27.22			0.14	0.59	

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6]		**Controlled EF**	**at**	**1,051,200 cy/yr**		**T/yr**	(controlled PTE @ 8,760)
Facility Classification Total PM[6]		**8.40E-03**				**4.42E+00**	
Facility Classification Total PM10[6,8]		**4.21E-03**				**2.22E+00**	

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 = 2,880 cy/day, and 1,051,200 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]	T/yr[4]	lb/hr qtrly avg[5]		**T/yr**
Cement delivery to silo [2]	**1.09E-08**	7.36E-07	3.21E-07	1.17E-04	1.00E-03	1.61E-07	Point Source	1.41E-06
Cement supplement delivery to Silo [3]	**5.20E-07**	ND	2.28E-06	8.31E-04	7.12E-03	1.14E-06	Point Source	9.98E-06
Truck Loadout (with 99.9% control) [8]		**3.62E-06**	2.45E-05	8.94E-03	7.66E-02	1.23E-05	Fugitive	1.07E-04
Central Mix (with l30% control)		**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	0.00E+00
Total			**2.71E-05**	**9.89E-03**	**0.085**		**Point Sources**	**1.14E-05**
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

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

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

3/3/2020 11:57

Facility Information

Company:	Dixie River dba River Rock Sand & Gravel
Facility ID:	027-00176
Permit No.:	P-2018.0021 Project 62350
Source Type:	Stationary Concrete Batch Plant
Manufacturer:	Stephens Manufacturing

Emissions estimates are based on EFs in AP-42, Table 11.12-8 (version 06/06) and the following composition of one yard of concrete:

Coarse aggregate		1865 pounds
Sand		1428 pounds
Cement		491 pounds
Cement supplement		73 pounds
Water		20 gallons
Concrete		**4024 pounds**

Truck Mix Loadout Factor: 1

Central Mix Batching Factor: 0

DEQ EI VERIFICATION WORKSHEET Version 032007

Tip: Blue text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

Concrete Production

Maximum Hourly Production Rate:	120	cy/hr	
Proposed Daily Production Rate:	1,440	cy/day	
Proposed Maximum Annual Production Rate:	375,000	cy/year	

Uncontrolled (Unlimited Production Rate)

		24	hrs/day,
2,880	cy/day	7	day/wk,
1,051,200	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)	6.02E-07	**1.22E-05**	1.04E-07	**2.44E-07**	9.06E-09	**3.42E-08**	4.10E-06	**1.14E-05**	2.08E-05	**6.12E-05**	4.78E-06	**1.19E-05**	1.23E-05	**3.84E-05**	1.13E-07	**2.62E-06**	**21.29%**
Central Mix Batching (NO boot or shroud)	0.00E+00	**0.00E+00**	ND	ND	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	ND	ND	**21.29%**

UNCONTROLLED TAP EMISSIONS **Note: Includes baghouses as process equipment.** **2,880 cy/day, and** **1,051,200 cy/yr**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI		
	lb/hr annual avg.	T/yr[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-07	5.47E-07	1.43E-08	6.27E-08	6.89E-06	3.02E-05	8.54E-07	3.25E-05	3.45E-06	1.51E-05	1.23E-06	5.39E-06	3.48E-04	1.52E-03	ND	ND	1.71E-07		
Cement supplement silo filling (with baghouse)	4.38E-06	1.92E-05	3.96E-07	1.73E-06	8.67E-10	3.80E-09	5.34E-06	2.34E-05	1.12E-06	4.91E-06	9.99E-06	4.37E-05	1.55E-05	6.79E-05	3.17E-07	1.39E-06	1.60E-06		
Truck loading (no boot or shroud)	4.13E-04	1.81E-03	8.26E-06	3.62E-05	1.16E-06	5.07E-06	3.86E-04	1.69E-03	2.07E-03	9.07E-03	4.03E-04	1.76E-03	1.30E-03	5.69E-03	8.87E-05	3.88E-04	8.21E-05		
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	Facility Classification: Total Annual HAPs Emissions	
Sources Total	**4.17E-04**	1.83E-03	**8.67E-06**	3.80E-05	**8.05E-06**	3.53E-05	**3.92E-04**	1.75E-03	**2.08E-03**	9.09E-03	**4.14E-04**	1.81E-03	**1.66E-03**	7.28E-03	**8.90E-05**	3.90E-04	**8.39E-05**	**2.22E-02**	**Tons per year**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07		
EXCEEDS EL?	**Yes**		No		Yes		No		No		**Yes**		No		No		**Yes**		

CONTROLLED TAP EMISSIONS **Note: Includes baghouses as process equipment.** **1,440 cy/day, and** **375,000 cy/year**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI		
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.		
Cement silo filling (with baghouse)[1]	4.46E-08	1.95E-07	5.11E-09	2.24E-08	2.46E-06	1.08E-05	4.27E-07	1.33E-06	1.72E-06	5.39E-06	4.39E-07	1.92E-06	ND	ND	ND	ND	6.10E-08		
Cement supplement silo filling (with baghouse)[2]	1.56E-06	6.84E-06	1.41E-07	6.19E-07	3.09E-10	1.36E-09	1.80E-05	8.35E-06	3.77E-06	1.75E-06	3.56E-06	1.56E-05	5.21E-05	2.42E-05	1.59E-07	4.95E-07	5.72E-07		
Truck loading (with baghouse)	2.95E-05	1.29E-04	5.89E-07	2.58E-06	8.26E-08	3.62E-07	3.86E-05	1.21E-04	2.07E-04	6.47E-04	2.87E-05	1.26E-04	1.30E-04	4.06E-04	8.87E-06	2.77E-05	5.86E-06	**80.00%**	Boot, enclosure, or equivalent or baghouse or boot w/water ring
Central Mix Batching (WITH boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	**80.00%**	Baghouse control
Sources Total	**3.11E-05**	1.36E-04	**7.35E-07**	3.22E-06	**2.54E-06**	1.11E-05	**5.70E-05**	1.30E-04	**2.13E-04**	6.54E-04	**3.27E-05**	1.43E-04	**1.82E-04**	4.30E-04	**9.02E-06**	2.82E-05	**6.49E-06**	**1.54E-03**	**Tons per year**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07		
Percent of EL	2070.84%		2.63%		68.71%		0.17%		0.0638%		121.23%		2.60%		0.0694%		1159.62%		
EXCEEDS EL?	**Yes**		No		No		No		No		Yes		No		No		**Yes**		

[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

Final Concrete Batch Plant Emissions Inventory

Listed Below are the emissions estimates for the units selected.

Company:	**Dixie River dba River Rock Sand & Gravel**
Facility ID:	**027-00176**
Permit No.:	**P-2018.0021 Project 62350**
Source Type:	**Stationary Concrete Batch Plant**
Manufacturer/Model:	**Stephens Manufacturing**

Production

Maximum Hourly Production Rate:	120	cy/hr
Proposed Daily Production Rate:	1440	cy/day
Proposed Maximum Annual Production Rate:	375000	cy/year

Tons/year

Emissions Units		$PM_{2.5}$	PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs	CO_2e
CBP Type:	**Truck Mix**	0.016	0.06	NA	NA	NA	NA	1.14E-05		N/A
Water Heater #1:	**1.7 MMBtu/hr Natural Gas Heater**	0.055	0.055	4.38E-03	0.730	0.613	0.040	3.65E-06		881
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**	**0.11**	**4.38E-03**	**0.73**	**0.61**	**0.04**	**1.50E-05**	**1.65E-02**	**881**
	BRC	**1.00**	**1.50**	**4.00**	**4.00**	**10.00**	**4.00**	**0.06**		

Pounds/hour

		$PM_{2.5}$	PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs
CBP Type:	**Truck Mix**	0.573	0.96	NA	NA	NA	NA	2.71E-05	
Water Heater #1:	**1.7 MMBtu/hr Natural Gas Heater**	0.013	0.013	1.00E-03	0.167	0.140	0.009	8.33E-07	
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)	**0.59**	**0.98**	**1.00E-03**	**0.17**	**0.14**	**0.01**	**2.79E-05**	**4.05E-03**

* 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	3.14E-05	1.36E-04	Annual	1.50E-06	Yes
Barium		X	7.33E-06	3.21E-05	24-hour	3.30E-02	No
Beryllium	X	X	7.55E-07	3.24E-06	Annual	2.80E-05	No
Cadmium	X	X	4.38E-06	1.30E-05	Annual	3.70E-06	Yes
Cobalt	X	X	1.40E-07	6.13E-07	24-hour	3.30E-03	No
Copper		X	1.42E-06	6.21E-06	24-hour	1.30E-02	No
Chromium	X	X	5.93E-05	1.40E-04	24-hour	3.30E-02	No
Manganese	X	X	2.13E-04	6.57E-04	24-hour	3.33E-01	No
Mercury	X	X	4.33E-07	1.90E-06	24-hour	N/A	No
Molybdenum (soluble)		X	1.83E-06	8.03E-06	24-hour	3.33E-01	No
Nickel	X	X	3.62E-05	1.47E-04	Annual	2.70E-05	Yes
Phosphorus	X	X	1.82E-04	4.30E-04	24-hour	7.00E-03	No
Selenium	X	X	9.06E-06	2.84E-05	24-hour	1.30E-02	No
Vanadium		X	3.83E-06	1.68E-05	24-hour	3.00E-03	No
Zinc		X	4.83E-05	2.12E-04	24-hour	6.67E-01	No
Chromium VI	X	X	6.49E-06	2.84E-05	Annual	5.60E-07	Yes
Non PAH Organic Compunds							
Pentane		X	2.67E-03	1.17E-02	24-hour	118	No
Methyl Ethyl Ketone		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	3.50E-06	3.50E-06	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	1.25E-04	1.25E-04	Annual	5.10E-04	No
Hexane	X	X	3.00E-03	1.31E-02	24-hour	12	No
Isooctane	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Methyl Chloroform	X	X	0.00E+00	0.00E+00	24-hour	127	No
Propionaldehyde	X	X	0.00E+00	0.00E+00	24-hour	2.87E-02	No
Quinone	X	X	0.00E+00	0.00E+00	24-hour	2.70E-02	No
Toluene	X	X	5.67E-06	2.48E-05	24-hour	25	No
o-Xylene	X	X	0.00E+00	0.00E+00	24-hour	29	No
PAH HAPs							
2-Methylnaphthalene	X	X	4.00E-08	4.00E-08	Annual	9.10E-05	No
3-Methylcholanthrene	X	X	3.00E-09	3.00E-09	Annual	2.50E-06	No
7,12-Dimethylbenz(a)anthracene	X		2.67E-08	1.17E-07	N/A	N/A	N/A
Acenaphthene	X	X	3.00E-09	3.00E-09	Annual	9.10E-05	No
Acenaphthylene	X	X	3.00E-09	3.00E-09	Annual	9.10E-05	No
Anthracene	X	X	4.00E-09	4.00E-09	Annual	9.10E-05	No
Benzo(a)anthracene	X	X	3.00E-09	3.00E-09	Annual	9.10E-05	No
Benzo(a)pyrene	X	X	2.00E-09	2.00E-09	Annual	2.00E-06	No
Benzo(b)fluoranthene	X	X	3.00E-09	3.00E-09	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	2.00E-09	2.00E-09	Annual	9.10E-05	No
Benzo(k)fluoranthene	X	X	3.00E-09	3.00E-09	Annual	2.00E-06	No
Chrysene	X	X	3.00E-09	3.00E-09	Annual	2.00E-06	No
Dibenzo(a,h)anthracene	X	X	2.00E-09	2.00E-09	Annual	2.00E-06	No
Dichlorobenzene	X	X	2.00E-06	2.00E-06	Annual	9.10E-05	No
Fluoranthene	X	X	5.00E-09	5.00E-09	Annual	9.10E-05	No
Fluorene	X	X	4.67E-09	4.67E-09	Annual	9.10E-05	No
Indeno(1,2,3-cd)pyrene	X	X	3.00E-09	3.00E-09	Annual	2.00E-06	No
Naphthalene (24-hour)	X	X	3.71E-04	1.63E-03	24-hour	3.33	No
Naphthalene (Annual)	X	X	1.02E-06	1.02E-06	Annual	9.10E-05	No
Perylene	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Phenanathrene	X	X	2.83E-08	2.83E-08	Annual	9.10E-05	No
Pyrene	X	X	8.33E-09	8.33E-09	Annual	9.10E-05	No
PAH HAPs Total	X	X	1.90E-08		Annual	2.00E-06	No
Polycyclic Organic Matter (POM)	X	X	1.90E-08	1.90E-08	Annual	2.00E-06	No
			Total HAP	1.65E-02			
			Max HAP	1.31E-02			
Total HAPs Emissions (lb/hr) and (T/yr):			**4.05E-03**	**1.65E-02**			
				1.31E-02	**Maximum Annual TAP (T/yr)**		

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

draft M E M O R A N D U M

DATE: February 26, 2020

TO: Joe Palmer, Permit Writer, Air Program

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

PROJECT: P-2018.0029 PROJ 62351, Modification of Permit to Construct (PTC) P-2018.0029 PROJECT 62351 for Dixie River dba River Rock Sand & Gravel Hot Mix Asphalt Plant; and modification of PTC P-2018.0021 PROJECT 62350 for Dixie River dba River Rock Sand & Gravel Concrete Batch Plant. Permit modifications will allow the two facilities to operate simultaneously at the Dixie River Pit.

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

Contents

1.0 Summary **5**

2.0 Background Information **7**

2.1 Project Description, Proposed Location, and Area Classification 7

2.2 Air Impact Analysis Required for All Permits to Construct 8

2.3 Significant Impact Level and Cumulative NAAQS Impact Analyses 8

2.4 Toxic Air Pollutant Analysis 10

3.0 Analytical Methods and Data 10

3.1 Emissions Source Data 11

3.1.1. Criteria Pollutant Emissions Rates and Modeling Applicability 11

3.1.2. Toxic Air Pollutant Emissions Rates 16

3.1.3. Emissions Release Parameters 17

3.2 Background Concentrations 19

3.3 Impact Modeling Methodology 19

3.3.1. General Overview of Analysis 20

3.3.2 Modeling Protocol and Methodology 20

3.3.3 Model Selection 20

3.3.4 Data and Parameters used for Modeling 1-Hour NO_2 with ARM2 21

3.3.5 Meteorological Data 21

3.3.6 Effects of Terrain on Modeled Impacts 21

3.3.7 Facility Layout 22
3.3.8 Effects of Building Downwash on Modeled Impacts 24
3.3.9 Ambient Air Boundary 24
3.3.10 Receptor Network and Generation of Setback Distances 25
3.3.11 Crucial HMA Plant Characteristics Affecting Air Quality Impacts 25
4.0 Impact Modeling Results **26**
4.1 Results for NAAQS Cumulative Impact Analyses 26
4.2 Results for TAP Impact Analyses 27
4.2 Locating with Other Facilities/Equipment 28
5.0 Conclusions **28**
References **29**
Attachment 1: Emission Calculations and Modeling Parameters for DEQ 's Air Impact Analyses **30**

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
As	Arsenic
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
CBP	Concrete Batch Plant
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
DEM	Digital Elevation Map
DEQ	Idaho Department of Environmental Quality
Dixie River	Dixie River dba River Rock Sand & Gravel
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
GB	Americrete Ready Mix dba GB Redi-Mix
GEP	Good Engineering Practice
hr	hours
IC	internal combustion
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
m	Meters
m/sec	Meters per second
MMBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
PAH	Polyaromatic Hydrocarbons
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
POM	Polycyclic Organic Matter

ppb	parts per million
PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit
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

Dixie River dba River Rock Sand & Gravel (Dixie River) submitted two Permit to Construct (PTC) applications to modify existing PTCs for operation of a portable hot mix asphalt (HMA) and a concrete batch plant (CBP) in 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. 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 emissions estimates was the responsibility of the DEQ permit writer and is primarily addressed in the main body of the DEQ Statement of Basis.

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

Summary of Submittals and Actions

- December 13, 2019: Applications received by DEQ.
- December 17, 2019: Regulatory start date.
- January 2, 2020: Application determined incomplete. A facility plot plan, showing equipment locations, was not provided.
- January 6, 2020: Dixie River provided a facility plot plan.
- February 5, 2020: Application determined complete by DEQ.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Key Conditions for Both Permits	
Existing Permit Conditions: Conditions in the existing PTC will be carried over for operation at the Dixie River Pit except as noted in this table.	The revised PTC will have specific conditions that will only apply when located at the Dixie River Pit.
Control of Vehicle Fugitive Emissions: Air impact analyses were performed assuming fugitive particulate emissions from vehicle traffic on unpaved roadways is negligible and could be reasonably accounted for in the background concentration used.	Emissions from vehicle traffic must be controlled to a high degree, otherwise compliance with particulate NAAQS has not been demonstrated.
Emission Rates: Emissions rates for applicable averaging periods are not greater than those used in the modeling analyses, as listed in this memorandum.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling analyses.
P-2018.0029 HMA Plant	
Existing Permit Conditions: Conditions in the existing PTC for the portable HMA plant will be carried over for operation at the Dixie River Pit except as noted in this table.	The revised PTC for the portable HMA plant will have specific conditions that will only apply when located at the Dixie River Pit.
Dixie River Pit Location: The HMA drum dryer was modeled at 519,091 meters Easting, 4,838,035 meters Northing, zone 11.	NAAQS is only demonstrated for the layout modeled. Locations of HMA plant sources will be considered representative provided the HMA drum dryer stack is positioned within 100 feet of the modeled location.
Operation with a Co-Contributing CBP and Rock Crushing Plant at the Dixie River Pit: The HMA Plant was modeled with simultaneous operation of the Dixie River CBP (Facility ID: 027-00176) as described in modified PTC P-2018.0021 Project 62016 for the Dixie River Pit. The HMA Plant was also modeled with simultaneous operation of a rock crushing plant with a 25,000 ton/month throughput and no operation of internal combustion (IC) engines powering generators.	The issued permit must specify that that only the referenced rock crushing plant, with permit restrictions on the processing rate and IC engine operation, may operate at the Dixie River Pit while the HMA Plant is located at the site with the stationary CBP.
Multiyear Continuous Operation: The HMA was modeled as a permanent source operating year around at specified production rates.	The existing permit restricted operations at any one site to 1 year. This restriction is not necessary when operating at the Dixie River Pit as described in this memorandum.
Source Setback from Ambient Air: Site-specific impact modeling was performed, using the ambient air boundary described by the applicant and planned specific locations of the HMA plant, CBP, and rock crushing plant.	Specified setbacks in the existing permit do not apply when the HMA plant is operated at the Dixie River Pit; however, emission sources must be located where they were represented in the air impact model.
Operation of Generators: No diesel-fired IC engines, powering electrical generators, were included in the air impact analyses.	Operation of generators is a substantial portion of emissions from an HMA plant. Since this source was excluded from the analyses, the permit must prohibit the use of generators by the HMA plant at the Dixie River Pit.
Reduced Production when Co-located with a Rock Crushing Plant: Air impact modeling was performed using full allowable production rates for the HMA plant with simultaneous operation of a rock crushing plant.	When the HMA plant is operating at the Dixie River Pit as described in the memorandum, it is not necessary to reduce HMA production when a rock crushing plant is also operating at the site.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Drum Dryer Stack Height: The drum dryer stack height must be as listed in this memorandum or higher.	NAAQS compliance is still assured if actual stack heights are greater than those listed in this memo.
Emission Release Parameters: NAAQS compliance is assured provided stack parameters of exhaust temperatures and flow rates are not less than about 75 percent of values listed in this memorandum.	Higher temperatures and flow rates increase plume rise, allowing the plume to disperse to a larger degree before impacting ground level.
Required Characteristics of Co-Contributing Rock Crushing Plant: The crushing plant must have a throughput of not more than 25,000 ton/month and not operate any IC engines powering electrical generators.	The permit must not allow operation of the HMA plant at the Dixie River site if the rock crushing plant does not meet the throughput and engine restrictions.
P-2018.0021 Concrete Batch Plant	
Criteria/Assumption/Result	**Explanation/Consideration**
Dixie River Pit Location: The CBP truck loadout source was modeled at 519,130 meters Easting, 4,837,832 meters Northing, zone 11.	NAAQS is only demonstrated for the layout modeled. Locations of sources will be considered representative provided the CBP loadout source is within 100 feet of the modeled location.
Operation with a Co-Contributing HMA Plant and Rock Crushing Plant at the Dixie River Pit: The CBP was modeled with simultaneous operation of the Dixie River HMA Plant (Facility ID: 777-00586) as described in modified PTC P-2018.0029 Project 62061 for the Dixie River Pit. The CBP was also modeled with simultaneous operation of a rock crushing plant with a 25,000 ton/month throughput and no operation of IC engines powering generators.	It is not necessary for the CBP PTC to preclude operation of a rock crushing plant within 1,000 feet of the CBP.
Source Setback from Ambient Air: Site-specific impact modeling was performed, using the ambient air boundary described by the applicant and planned specific locations of the HMA plant, CBP, and rock crushing plant.	Specified setbacks in the existing permit are no longer necessary because modeling was performed for the actual equipment configuration at the Dixie River site; however, emission sources must be located where they were represented in the air impact model.

2.0 Background Information

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

2.1 Project Description, Proposed Location, and Area Classification

This memo addresses two permitting projects, allowing co-location and simultaneous operation of a HMA Plant, CBP, and rock crushing plant at the Dixie River Pit, about 4 miles northwest of Caldwell, Idaho. The CBP is regulated by PTC P-2018.0021, also for location at the Dixie River Pit. The current permit does not allow simultaneous operation with a rock crushing plant within 1,000 feet. The HMA Plant is regulated by PTC P-2018.0029, allowing the plant to operate as a portable facility. The current permit does not allow simultaneous operation with a CBP or rock crushing plant, and the permit does not allow the plant to remain at any one site for more than 1 year. The existing PTCs for the HMA Plant and the CBP must be modified to provide special permit conditions when the three facilities are operating together at the Dixie River Pit.

2.2 Air Impact Analyses Required for All Permits to Construct

Criteria Pollutant and TAP Impact Analyses for a PTC are addressed in 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:

> ***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).*

2.3 Significant Impact Level and Cumulative NAAQS Impact Analyses

The SIL analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 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 emissions sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

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

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

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] (µg/m^3)[b]	Regulatory Limit[c] (µg/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 µg/m^3)	75 ppb[p] (196 µg/m^3)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 µg/m^3)	100 ppb[r] (188 µg/m^3)	Mean of maximum 8th highest[s]
	Annual	1.0	100[t]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[t]	Maximum 1st highest[n]
	Quarterly	NA	1.5[t]	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. The NAAQS was revised from 15 µg/m^3 to12 µg/m^3 on December 14, 2012. However, this standard will not be applicable for permitting purposes in Idaho until it is incorporated by reference *sine die* into Idaho Air Rules (Spring 2014).
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. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
s. 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.
t. Not to be exceeded in any calendar year.
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.

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] (see Section 3.1.1 of this memorandum); 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.

2.4 Toxic Air Pollutant Analyses

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

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

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

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

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

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

3.0 Analytical Methods and Data

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

3.1 Emission Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the three applicable facilities at the Dixie River Pit were calculated by DEQ for various applicable averaging periods. DEQ's HMA plant and CBP emission calculation spreadsheets were used to calculate emissions for the proposed configuration of the facilities, given the specified equipment and requested operational rates. Emissions from the rock crushing facility were modeled as a co-contributing source and emissions were calculated as described in this section and in Attachment 1 of this memorandum. DEQ air impact analyses assured that the estimated potential emissions rates were properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emissions inventory used in the DEQ Statement of Basis. All modeled criteria air pollutant and TAP emissions rates must be equal to or greater than the facility's potential emissions calculated in the PTC emissions inventory or proposed permit allowable emission rates. Emissions from the rock crushing plant were treated as a co-contributing facility, with emissions estimated at a level considered as reasonably conservative. The DEQ modeling group calculated emissions associated with the rock crushing plant based on information provided by the applicant and these calculations are described in more detail in Attachment 1.

3.1.1 Criteria Pollutant Emissions Rates and Modeling Applicability

Exclusion of BRC Sources from NAAQS Compliance Demonstration Requirements

A criteria pollutant-specific NAAQS compliance demonstration may not be required where facility-wide potential to emit (PTE) values for that criteria pollutant would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 (equal to 10 percent of the emissions defined as significant) if it were not for potential emissions of other criteria pollutants or TAPs. 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 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 DEQ emission inventory asserts that facility-wide controlled PTE emissions of certain criteria pollutants are above BRC levels, as listed in Table 3. The only emissions considered in this calculation are non-fugitive emissions from the three facilities, including: the drum dryer, asphalt heater, and asphalt silo loading for the HMA Plant; weigh-batcher baghouse, water heater, cement silo filling, and cement supplement silo filling for the CBP. Emissions from material handling of aggregate and asphalt, cement truck loadout, and rock crushing emissions are considered fugitive, and as such were excluded from permit-applicability PTE.

Table 4 lists criteria pollutant emission rates used in the DEQ site-specific impact modeling analyses for the specified HMA Plant. Table 5 lists criteria pollutant emission rates used in the analyses for the CBP, and Table 6 lists rates for the rock crushing plant. Attachment 1 provides additional details of DEQ emission calculations used in the impact modeling analyses.

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	2.2	Yes
$PM_{2.5}$[b]	1.0	2.1	Yes
Carbon Monoxide (CO)	10.0	12.1	Yes
Sulfur Dioxide (SO_2)	4.0	7.9	Yes
Nitrogen Oxides (NOx)	4.0	5.9	Yes
Lead (Pb)	0.06	0.0095	No
Ozone (as VOC)	4.0	2.9	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.

Table 4. HMA PLANT EMISSIONS USED IN DEQ ANALYSES			
Emissions Point in Model	**Pollutant**	**Averaging Period**	**Emissions Rate (lb/hr)[a]**
HMA_DRY – asphalt drum dryer/mixer - emissions controlled by a baghouse	$PM_{2.5}$	24-hour	1.673[b]
		Annual	0.4455[c]
	PM_{10}	24-hour	1.725[b]
	NOx	1-hour	8.250
		Annual	1.099[c]
	SO_2	1-hour	13.35
	CO	1-hour	19.50
HMA_SILOLOAD – loading of asphalt storage silo	$PM_{2.5}$	24-hour	0.04394[b]
		Annual	0.01170[c]
	PM_{10}	24-hour	0.04394[b]
	CO	1-hour	0.1770
HMA_ASP_LOAD – asphalt loadout from silo to truck	$PM_{2.5}$	24-hour	0.03915[b]
		Annual	0.01043[c]
	PM_{10}	24-hour	0.03915[b]
	CO	1-hour	0.2024
HMA_HEATER – asphalt oil heater	$PM_{2.5}$	24-hour	0.005619[b]
		Annual	0.005619[c]
	PM_{10}	24-hour	0.008392[b]
	NOx	1-hour	0.1751
		Annual	0.08997[c]
	SO_2	1-hour	0.05181
	CO	1-hour	0.03649
HMA_AGGHAND – aggregate handling by frontend loader and conveyor transfers	$PM_{2.5}$	24-hour	0.03920[b,d]
		Annual	0.01044[c,d]
	PM_{10}	24-hour	0.2589[b,d]
HMA_SCREEN – scalping screen	$PM_{2.5}$	24-hour	0.0009360[b]
		Annual	0.0002493[c]
	PM_{10}	24-hour	0.06264[b]

a. Pounds per hour emission rate used in impact modeling analyses for specified averaging periods.
b. Calculated by multiplying the daily throughput or daily operational hours by the emission factor, then dividing by 24.
c. Emissions rate is equal to annual emissions divided over 8,760 hours/year.
d. Emissions are varied in the model according to wind speed category (see Attachment 1). Emissions listed are based on a 10 miles/hour (mph) wind speed.

Fugitive particulate emissions from frontend loader handling of aggregate materials and three conveyor transfers for the HMA plant were designated as volume source emissions point HMA_AGGHAND in the model. Two transfers were included for the frontend loader source: 1) transfer of aggregate from truck unloading or other transfer means to a storage pile; 2) transfer of aggregate from the storage pile to a hopper. Three transfers were included with this source for aggregate conveyors. Emissions rates for HMA_AGGHAND are a function of wind speed and were varied in the model according to wind speed. Attachment 1 provides details on emissions calculations.

Table 5. CBP EMISSIONS USED IN DEQ ANALYSES

Emissions Point in Model	Pollutant	Averaging Period	Emissions Rate (lb/hr)[a]
CBP_CSILO – cement silo loading	$PM_{2.5}$	24-hour	0.001800[b]
		Annual	0.001284[c]
	PM_{10}	24-hour	0.005008[b]
CBP_SSILO – supplement silo loading	$PM_{2.5}$	24-hour	0.002700[b]
		Annual	0.001926[c]
	PM_{10}	24-hour	0.01073[b]
CBP_WEIGBATC – weigh batcher baghouse	$PM_{2.5}$	24-hour	0.0007110[b]
		Annual	0.0005073[c]
	PM_{10}	24-hour	0.002371[b]
CBP_WHEAT – hot water heater	$PM_{2.5}$	24-hour	0.01267[b]
		Annual	0.01267[c]
	PM_{10}	24-hour	0.01267[b]
	NOx	1-hour	0.1667
		Annual	0.1667[c]
	SO_2	1-hour	0.001000
	CO	1-hour	0.140
CBP_LOAD – truck loadout	$PM_{2.5}$	24-hour	0.5676[b]
		Annual	0.4050[c]
	PM_{10}	24-hour	0.9449[b]
CBP_GL_AGG – ground level sand and aggregate handling	$PM_{2.5}$	24-hour	0.01834[b,d]
		Annual	0.01309[c,d]
	PM_{10}	24-hour	0.1127[b,d]
CBP_EL_AGG – elevated sand and aggregate handling	$PM_{2.5}$	24-hour	0.009172[b,d]
		Annual	0.006543[c,d]
	PM_{10}	24-hour	0.05633[b,d]

a. Pounds per hour emission rate used in modeling analyses for specified averaging periods.
b. Calculated by multiplying the daily throughput or daily operational hours by the emission factor, then dividing by 24.
c. Emissions rate is equal to annual emissions divided over 8760 hours/year (hours in a year).
d. Emissions are varied in the model according to wind speed category. Emissions listed are based on a 10 mph wind speed.

Emissions from material handling associated with the CBP were grouped into two volume sources. CBP_GL_AGG is ground level material handling emissions and includes: 1) loader transfers of aggregate and sand to ground storage; 2) loader transfers of aggregate and sand to a hopper. CBP_EL_AGG is elevated material handling emissions and includes the transfer of aggregate and sand to elevated storage.

Table 6. ROCK CRUSHING PLANT EMISSIONS USED IN DEQ ANALYSES			
Emissions Point in Model	**Pollutant**	**Averaging Period**	**Emissions Rate (lb/hr)[a]**
RC_AREA1 – rock crushing plant (crushing, screening, and conveyors), section 1	$PM_{2.5}$	24-hour	0.001868[b]
		Annual	0.09201[c]
	PM_{10}	24-hour	1.236[b]
RC_AREA2 – rock crushing plant (crushing, screening, and conveyors), section 2	$PM_{2.5}$	24-hour	0.001868[b]
		Annual	0.09201[c]
	PM_{10}	24-hour	1.236[b]

a. Pounds per hour emission rate used in modeling analyses for specified averaging periods.

b. Calculated by multiplying the daily throughput or daily operational hours by the emission factor, then dividing by 24.

c. Emissions rate is equal to annual emissions divided over 8760 hours/year (hours in a year).

Emissions from the rock crushing plant were calculated based on 25,000 ton/month (the stated throughput obtained from the applicant). Daily emissions were based on double the monthly average throughput [(25,000 ton/month)(month/30 days)(2)] and annual emissions were based on 300,000 ton/year [(12 months)(25,000 ton/month)]. Emission generating activities associated with the crusher included: 1) 2 crushers; 2) 3 screens; 3) 4 conveyor transfers. Total emissions were evenly divided among two volume sources: RC_AREA1 and RC_AREA2.

Exclusion from Impact Analyses by Modeling Thresholds

DEQ may determine that reasonably expected impacts from specific criteria pollutant emissions, for those pollutants not excluded from analysis by DEQ's regulatory interpretation policy of exemption provisions (discussed above), are so minimal that NAAQS compliance is assured without the need to perform a project-specific impact analysis. Modeling applicability threshold emission values were established to evaluate the level below which NAAQS compliance is effectively assured. These thresholds are established in the *Idaho Air Quality Modeling Guideline*[2] (http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf). Modeling thresholds, for criteria pollutants other than Pb, were developed to ensure modeled impacts are less than the SIL for sources with good dispersion characteristics (at least as good as those associated with the source modeled for generation of the thresholds). The modeling threshold for Pb was set to assure compliance with the NAAQS, since there is no SIL for Pb.

Total project emissions are provided in Table 7 along with Level I and Level II Modeling Applicability Thresholds.

Estimated emissions exceed Level I Modeling Thresholds by a considerable margin. Level II Modeling Thresholds are not appropriate for PM_{10} and $PM_{2.5}$ because of the poor dispersion characteristics of fugitive particulate emissions. Level II Modeling Thresholds are questionably appropriate for CO, NOx, and SO_2 emissions from the dryer stack. As compared to parameters in the modeling used to develop Level II thresholds, the HMA sources have a slightly shorter stack height, but will still achieve good dispersion from the high volume of hot exhaust from the drum dryer. Emissions are also distributed among three different sources rather than a single, concentrated point. Additionally, the thresholds are designed to assure an impact below the SIL, and estimated emissions are facility-wide. Therefore, impacts slightly above the SIL would still almost certainly still result in a cumulative impact well below NAAQS. Allowable emissions of 1-hour CO and annual NOx were substantially below the Level II Modeling Threshold and project-specific air impact analyses were not performed for those pollutants.

Table 7. EMISSION COMPARISONS TO MODELING THRESHOLDS				
Pollutant / Averaging Period	**Emission Rate[a]**	**Level I Threshold[b]**	**Level II Threshold[c]**	**Project-Specific Air Impact Analyses Required**
PM_{10}[d] 24-hour	3.3 lb/hr	0.22 lb/hr	2.6 lb/hr	Yes
$PM_{2.5}$[d] 24-hour	2.44 lb/hr	0.054 lb/hr	0.63 lb/hr	Yes
$PM_{2.5}$[d] annual	4.1 ton/yr	0.35 ton/yr	4.1 ton/yr	Yes
CO[e] 1-hour, 8-hour	20 lb/hr	15 lb/hr	175 lb/hr	No[h]
NOx[f] 1-hour	8.59 lb/hr	0.20 lb/hr	2.4 lb/hr	Yes
NOx[f] annual	1.4 ton/yr	1.2 ton/yr	14 ton/yr	No[h]
SO_2[g] 1-hour	13.4 lb/hr	0.21 lb/hr	2.5 lb/hr	Yes

a. Emission rate in either pounds/hour (lb/hr) over the specified time period or ton/year (ton/yr) over the specified time period.
b. Level I Modeling Applicability Thresholds are unconditional.
c. Level II Modeling Applicability Thresholds require DEQ approval and are dependent on the use of parameters that would result in dispersion as good or better than parameters used in modeling used to generate Level II thresholds. DEQ determined Level II thresholds cannot be used for this project.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
f. Nitrogen oxides.
g. Sulfur dioxide.
h. DEQ determined Level II thresholds were appropriate for this pollutant.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.3.3) cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Addressing secondary formation of O_3 has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

Allowable emissions estimates of VOCs and NOx are below the 100 tons/year threshold, and DEQ determined it was not appropriate or necessary to require a quantitative source specific O_3 impact analysis.

Secondary Particulate Formation

The impact from secondary particulate formation resulting from emissions of NOx, SO_2, and/or VOCs was assumed by DEQ to be negligible on the basis of the magnitude of emissions and the short distance from emissions sources to modeled receptors where maximum PM_{10} and $PM_{2.5}$ impacts would be anticipated.

3.1.2 Toxic Air Pollutant Emissions Rates

TAP emissions regulations under Idaho Air Rules Section 220 are only applicable for new or modified sources constructed after July 1, 1995. The HMA plant and the CBP both operate under valid DEQ permits, and TAP analyses were performed for the permits issued. Table 8 lists emission rates used in the TAP impact analyses. The existing HMA plant permit required relocation every 12 months, thereby allowing use of a short-term AACC adjustment upward by a factor of 10, as directed by Idaho Air Rules Section 210.15. A TAP assessment was needed for this modification since the HMA plant will remain at the Dixie River site for more than a short-term period. The TAP impact analyses include carcinogenic TAPs from both the HMA plant and CBP.

Table 8. TAP EMISSIONS USED IN DEQ ANALYSES

HMA Plant

TAP	Averaging Period[a]	Emissions (lb/hr)[b]		
		HMA_DRY[c]	HMA_SILOLOAD[d]	HMA_ASP_LOAD[e]
Acetaldehyde	Annual	2.597E-2		
Benzene	Annual	7.791E-3	7.791E-5	4.320E-5
Formaldehyde	Annual	6.193E-2	1.680E-3	7.311E-5
Naphthalene	Annual	1.299E-2	9.231E-5	8.514E-5
Fluorene	Annual	2.197E-4	5.123E-5	5.244E-5
Phenanthrene	Annual	4.595E-4	9.130E-5	5.517E-5
POM	Annual	1.094E-5	1.349E-5	9.191E-6
Arsenic	Annual	1.119E-5		
Cadmium	Annual	8.191E-6		
Chromium 6+	Annual	8.990E-6		
Nickle	Annual	1.259E-3		

CBP

TAP	Averaging Period	CBP_LOAD[f]	CBP_CSILO[g]	CBP_SSILO[h]
Arsenic	Annual	2.946E-5	4.456E-8	1.563E-6
Cadmium	Annual	8.257E-8	2.459E-6	3.094E-10
Chromium 6+	Annual	5.861E-6	6.095E-8	5.719E-7
Nickle	Annual	2.873E-5	4.393E-7	3.563E-6

a. Maximum annual emissions are used for carcinogenic TAPs listed in Idaho Air Rules Section 586, and maximum 24-hour emissions are used for noncarcinogenic TAPs listed in Idaho Air Rules Section 585.
b. Maximum emissions for the averaging period of the TAP increment, expressed as pounds/hour.
c. Drum Dryer
d. Loading of asphalt storage silo.
e. Asphalt loadout from storage silo.
f. Truck loadout of aggregate, sand, and cement.
g. Cement silo loading.
h. Cement supplement silo loading.

3.1.3 Emissions Release Parameters

Table 9 provides emission release parameters for the HMA plant used in the analyses, including stack height, stack diameter, exhaust temperature, and exhaust velocity. Additional details are provided in Attachment 1. Table 10 provides release parameters for the CBP and Table 11 provides release parameters for the rock crushing plant.

Asphalt silo filling and loadout at the HMA plant were modeled as point sources, rather than volume sources, to account for thermal buoyancy of the emissions plume. Release parameters for asphalt silo filling and loadout were based on the following:

- Release point of asphalt silo filling was set to a typical height of a storage silo (30 feet) and the release point of asphalt loadout operations was set to correspond to the top of a truck bed.
- Stack diameter of 3.0 meters was used to approximately correspond to a typical silo. Model-calculated stack tip downwash will account for downwash affects potentially caused by the silo.
- Stack gas temperature of 346K was calculated by assuming the gas temperature would be half that of the default asphalt temperature of 325°F (1/2 of 325° F = 163° F = 346 K).
- Flow velocity of 0.1 m/sec was used to establish a reasonably conservative total flow from the source of 1,500 actual cubic feet per minute, caused by convection.

Table 9. HMA PLANT EMISSION RELEASE PARAMETERS

Release Point /Location	Source Type	Stack Height (m)[a]	Modeled Diameter (m)[a]	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
HMA_DRY	Point	6.1 (20 ft)	1.04 (3.4 ft)	408 (275 °F)	17.6 (58 fps)
HMA_HEATER	Point	2.4 (8.0 ft)	0.08 (0.3 ft)	436 (325 °F)	10.3 (34 fps)
HMA_SILOLOAD	Point	9.0 (30 ft)	3.0 (9.8 ft)	346 (163 °F)	0.1
HMA_ASP_LOAD	Point	3.5 (11.5 ft)	3.0 (9.8 ft)	346 (163 °F)	0.1
Volume Sources					
Release Point /Location	**Source Type**	**Release Height (m)[a]**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
HMA_AGGHAND	Volume	2.5 (8.2)	4.65	1.16	
HMA_SCREEN	Volume	3.0 (9.8)	0.93	2.33	

a. Meters. Values in parentheses are in feet.
b. Kelvin. Values in parentheses are in degrees Fahrenheit.
c. Meters per second. Values in parentheses are in feet/second.

Table 10. CBP EMISSION RELEASE PARAMETERS					
Release Point /Location	**Source Type**	**Stack Height (m)[a]**	**Modeled Diameter (m)[a]**	**Stack Gas Temp. (K)[b]**	**Stack Gas Flow Velocity (m/sec)[c]**
CBP_CSILO	Point	22.9 (75 ft)	0.61 (2.0 ft)	0.0	3.2 (20.5 ft/sec)
CBP_SSILO	Point	22.9 (75 ft)	0.61 (2.0 ft)	0.0	3.2 (20.5 ft/sec)
CBP_WHEAT	Point	1.31 (4.3 ft)	0.30 (1.0 ft)	450 (350 ^{o}F)	3.9 (12.8 ft/sec)
CBP_WEIGBATC	Point	3.0 (9.8 ft)	1.00 (3.3 ft)	0.0	1.0 (3.3 ft/sec)
Volume Sources					
Release Point /Location	**Source Type**	**Release Height (m)[a]**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
CBP_LOAD	Volume	3.75 (12.3 ft)	2.33	3.49	
CBP_GLAGG	Volume	2.0 (6.6 ft)	2.33	0.70	
CBP_ELAGG	Volume	5.0 (16.4 ft)	2.33	4.65	

a. Meters. Values in parentheses are in feet.
b. Kelvin. Values in parentheses are in degrees Fahrenheit.
c. Meters per second. Values in parentheses are in feet/second.

CBP emissions point release parameters were based on information provided by the applicant in the previous permitting analyses for permit P-2018.0021 Project 62016. Using the silo bin vent volumetric flow rate of 1,860 actual feet^3/minute (acfm) and an effective stack release diameter of 2.0 feet (square stack, 12 inches by 36 inches) as provided in the application, a stack exhaust flow velocity of 3.2 meters/second was calculated. The vents were modeled using an exhaust temperature of 0 Kelvin, which triggers the model to set the release temperature equal to the ambient air temperature. This eliminates thermal buoyancy of the plume. The accuracy of flow parameters (other than stack height) for these vents is not critical since emissions are relatively low and are emitted at a large height above groundlevel.

Emissions from truck loadout of dry concrete, fly ash, and aggregate were modeled as a volume source. The release height was set at 3.75 meters, the typical height of cement truck feed chutes. The initial horizontal dimension (σ_{yo}) was set at a value equal to the length of the source's side divided by 4.3, as directed by EPA guidance for AERMOD[3]. The length of side was set to 10 meters to represent the structure of the plant and any adjacent building, and σ_{yo} was calculated at 2.33 meters. The initial vertical dimension (σ_{zo}) was set at a value equal to the vertical extent of the source or the height of an adjacent building divided by 2.15, as directed by EPA guidance for AERMOD. The vertical extent of the volume source was set at two times the release height (7.5 meters), giving a σ_{zo} of 3.49 meters.

The heater exhaust release parameters of stack height, stack diameter, and exhaust temperature were provided by the applicant in the application forms. An exhaust temperature of 7,250 ^{o}F was provided on the forms. DEQ determined this was not reasonably accurate for the heater and used a value of 350 ^{o}F, which is more typical for these type of sources. DEQ calculated an exhaust flow of 600 acfm using a combustion evaluation calculation, assuming no excess air. A flow velocity of 3.9 meters/second (12.7 feet/second) was calculated by using the 600 acfm flow for the exhaust with the 1.0 feet stack diameter.

Table 11. ROCK CRUSHING PLANT EMISSION RELEASE PARAMETERS				
Release Point /Location	**Source Type**	**Release Height (m)**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**
RC_AREA1	Volume	3.0 (9.8 ft)	11.6	1.4
RC_AREA2	Volume	3.0 (9.8 ft)	11.6	1.4

[a.] Meters. Values in parentheses are in feet.

Operations of the rock crushing plant were modeled as two volume sources with dimensions of 50 meters X 50 meters, with a height of 6.0 meters. The release height of each volume source was set at 3.0 meters to reasonably account for emissions from elevated sources of crushers, screens, and conveyors.

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS. A background concentration tool was used to establish ambient air background concentrations for this project. The design value (DV) background concentration tool is accessed from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST: https://arcg.is/1jXmHH) using the project site coordinates. These background air pollutant levels are based on regional-scale air impact modeling of criteria pollutants in Washington, Oregon, and Idaho. The modeling was performed for years 2014-2017, using updated air pollutant emissions inventories and improved interpolation techniques. Modeled background values were adjusted by the tool according to available ambient monitoring data. The applicable background concentrations for the site are listed in Table 12.

Table 12. AMBIENT BACKGROUND CONCENTRATIONS AT THE LINKONE FACILITY.		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[a,b]**
$PM_{2.5}$[c]	24-hour	25.8
	Annual	7.4
PM_{10}[d]	24-hour	79.1
NO_2[e]	1-hour	58.5 (31.1 ppb[f])
SO_2[g]	1-hour	13.1 (5.0 ppb)

[a.] Micrograms per cubic meter, except where noted otherwise.
[b.] NW AIRQUEST ambient background lookup tool, 2014-2017.
[c.] Particulate matter with an aerodynamic diameter of 2.5 microns or less.
[d.] Particulate matter with an aerodynamic diameter of 10 microns or less.
[e.] Nitrogen dioxide.
[f.] Parts per billion by volume.
[g.] Sulfur dioxide.

3.3 Impact Modeling Methodology

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

3.3.1 General Overview of Analyses

DEQ performed non-site-specific analyses that were considered to be reasonably representative of the proposed site configuration of an HMA plant, CBP, and rock crushing plant. Results demonstrated compliance with applicable air quality standards to DEQ's satisfaction, provided emission points are located where indicated in the application and operational restrictions are maintained.

Site-specific modeling was used because of the co-location restrictions in the applicable HMA plant permit could not be met at the Dixie River site. Table 13 provides a brief description of parameters used in the impact modeling analyses.

Table 13. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Site-specific near Caldwell	Area not within non-attainment areas.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 19191
Meteorological Data	Boise	See Section 3.3.5
Terrain	considered	1/3 arc second National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 19191 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.5 for more details.
Building Downwash	Considered	No substantial structures were identified for the HMA plant or rock crushing plant in the application. Downwash for a CBP structure was considered in the analyses.
Receptor Grid	Grid 1	10-meter spacing along the ambient air boundary out to 50 meters.
	Grid 2	25-meter spacing out to 200 meters.
	Grid 3	50-meter spacing out to 500 meters.
	Grid 4	100-meter spacing out to 2,000 meters.
	Grid 5	200-meter spacing out to3,000 meters.
	Grid 6	500-meter spacing out to 5,000 meters.

3.3.2 Modeling protocol and Methodology

A modeling protocol was not submitted to DEQ prior to the application because DEQ performed the required air impact analyses. Site-specific modeling was generally conducted using data and methods described in the *State of Idaho Air Quality Modeling Guideline*.[2]

3.3.3 Model Selection

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

AERMOD version 19191 was used 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 Data and Parameters used for Modeling 1-Hour NO_2 with ARM2

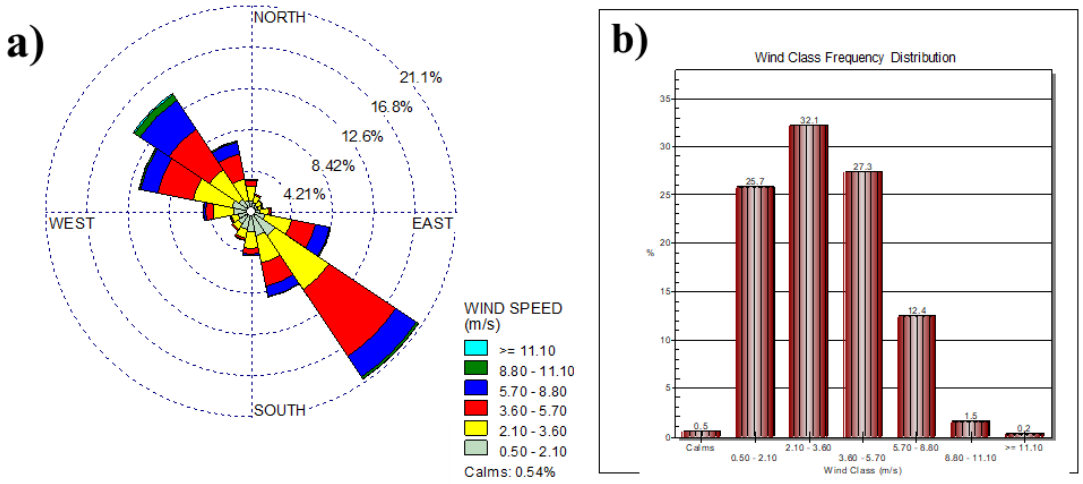
The Ambient Ratio Method 2 (ARM2) was used with AERMOD to provide a more refined estimate of 1-hour NO_2 concentrations at specific receptors. The default minimum ARM2 NO_2/NOx ratio of 0.5 used as well as the default maximum ratio of 0.9.

3.3.5 Meteorological Data

DEQ processed a meteorological dataset from Boise, Idaho (KBOI; station ID 726810-24131) covering the years 2014-2018. 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 13016. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on thirty years of Boise airport precipitation data. Conditions were determined to be "wet" for 2014 and 2017, and "average" for 2015, 2016, and 2018. Average moisture content is defined as within a 30 percentile of the 30-year mean of 11.3 inches.

Figure 1 shows a wind rose and wind speed histogram at Boise Airport. On average, winds are dominated by southeasterlies with magnitudes of between 2.10 and 3.60 meters/second. Calms were relatively low at 0.54 percent, and less than 1.0 percent of the data were missing from the five-year record.

Figure 1. (a) WIND ROSE AND (b) WIND SPEED HISTOGRAM AT BOISE AIRPORT IN IDAHO (2014-2018).



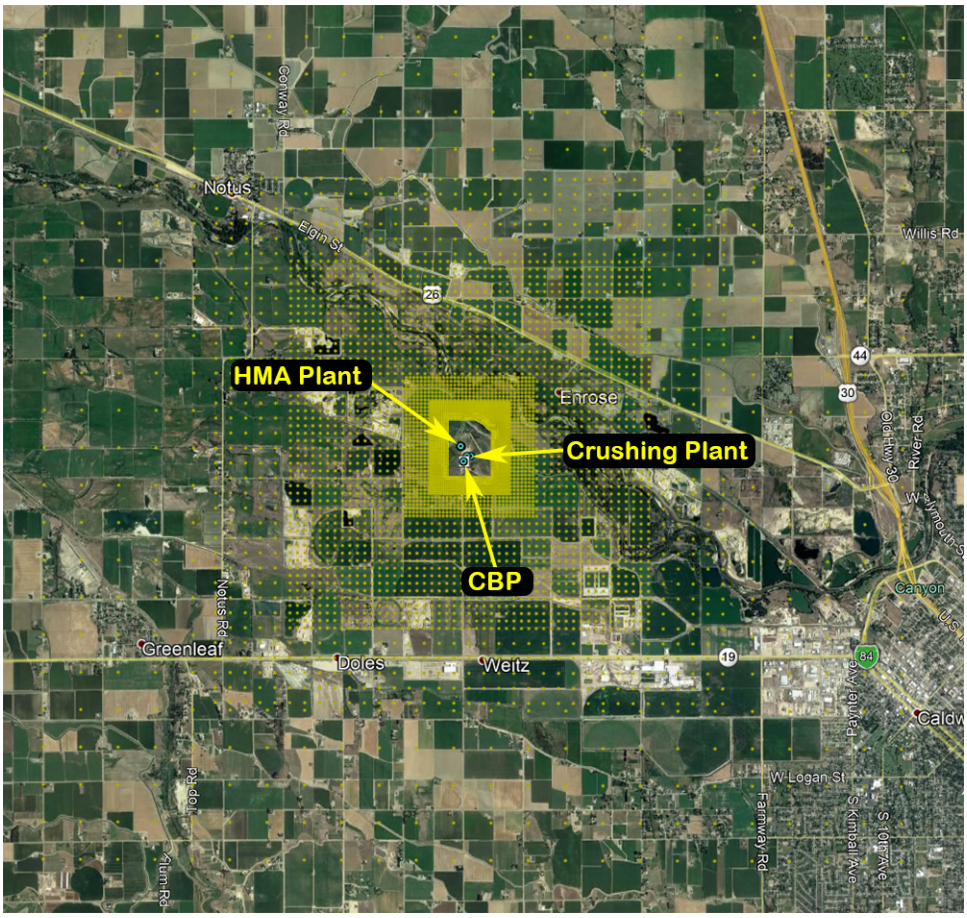
AERMINUTE version 15271 was used to process Automated Surface Observing Systems (ASOS) wind data for use in AERMET. AERMET version 19191 was used to process surface and upper air data and to generate a model-ready meteorological data input file. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions.

3.3.6 Effects of Terrain on Modeled Impacts

Ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) files.

The terrain preprocessor AERMAP version 18081 was used by DEQ to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 2 depicts the full receptor grid used in the impact modeling analyses, overlaid on a terrain image from Google Earth.

Figure 2. EMISSION SOURCE LOCATIONS AND AMBIENT AIR RECEPTOR LOCATIONS USED IN THE IMPACT MODELING ANALYSES.



3.3.7 Facility Layout

Dixie River provided at aerial photograph showing the area controlled by the facility owner and the locations on the property of the HMA plant, CBP, and rock crushing plant. DEQ used this figure to determine geographical coordinates of emission sources for model input. Location of emission sources is a critical parameter that substantially affects impacts to ambient air. Results of these impact analyses cannot be considered representative of reasonably conservative impacts if the locations of the plants are different from what was used in the impact modeling by more than 100 feet. Figure 3 shows the positioning of the HMA plant, CBP, and rock crushing plant at the site.

Figure 3. EMISSION SOURCE LOCATIONS AND AMBIENT AIR BOUNDARY USED IN THE IMPACT MODELING ANALYSES.

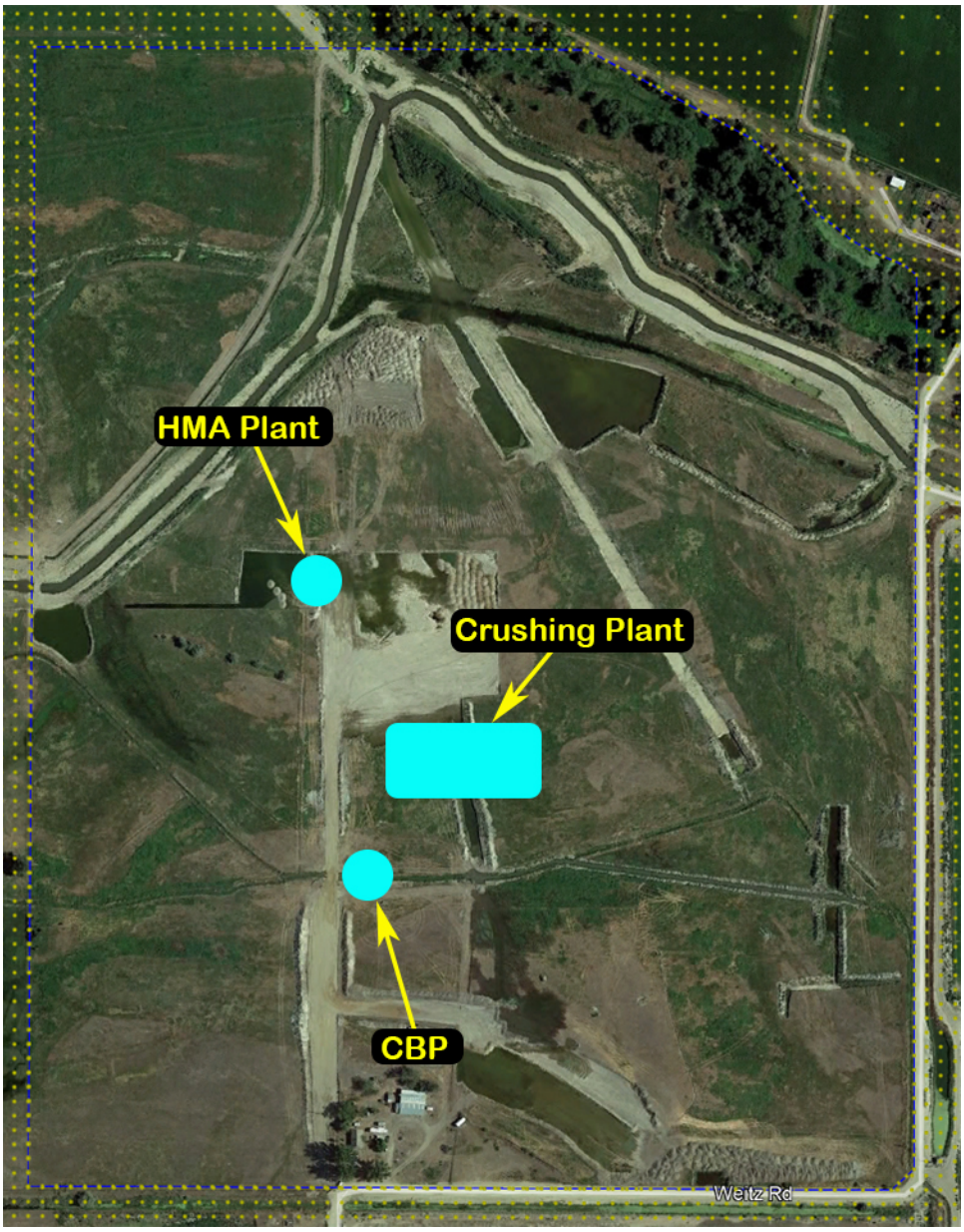


Table 14 lists coordinates of emission points used in the impact modeling analyses. The drum dryer stack of the HMA plant and the cement truck loadout point of the CBP were considered as the crucial points. defining the location of the plants. DEQ conservative modeled the sources of each plant in a rather tight grouping. This approach will likely result in greater overlap of impacts from individual sources. The drum dryer stack was established as the center of the HMA Plant, along with the volume source for aggregate handling by frontend loader and conveyors. The asphalt silo (silo loading and asphalt loadout), scalping screen, and the asphalt oil heater were located around the drum dryer stack, at only 7 meters from the dryer stack. The center of the truck loadout volume source was established as the center of the CBP, along with the weigh batcher baghouse stack and sand/aggregate handling to elevated storage. In a

similar manner to that used for the HMA plant, the other CBP sources of the cement silo, supplement silo, water heater, and sand/aggregate ground-level handling were position around the loadout point at distances of about 7 meters. The rock crushing plant was modeled as two volume sources immediately north of the CBP.

Table 14. UTM COORDINATES OF MODELED RELEASE POINTS

Release Point	Description	Source Type	UTM Coordinates[a]	
			Easting (m)	Northing (m)
HMA_DRY[b]	Asphalt drum dryer	Point	519091	4838035
HMA_SILOLOAD	Loading of asphalt storage siolo	Point	519086	4838040
HMA_ASP_LOAD	Asphalt loadout from silo to truck	Point	519086	4838040
HMA_HEATER	Asphalt oil heater	Point	519086	4838030
HMA_AGGHAND	Aggregate handling by loader/conveyors	Volume	519091[c]	4838035[c]
HMA_SCREEN	Scalping screen	Volume	519096[c]	4838030[c]
CBP_CSILO	Cement silo loading	Point	519125	4837837
CBP_SSILO	Supplement silo loading	Point	519125	4837827
CBP_WHEAT	Water heater	Point	519135	4837837
CBP_WBATCH	Weigh batcher baghouse	Point	519130	4837832
CBP_LOAD[b]	Cement truck loadout	Volume	519130[c]	4837832[c]
CBP_GL_AGG	Ground level sand/aggregate handling	Volume	519130[c]	4837837[c]
CBP_EL_AGG	Elevated sand/aggregate handling	Volume	519130[c]	4837832[c]
RC_AREA1[b]	Rock crusher plant – area 1	Volume	519170[c]	4837907[c]
RC_AREA2[b]	Rock crusher plant – area 2	Volume	519220[c]	4837907[c]

a. Universal Transverse Mercator coordinates in zone 11.
b. Key release point identifying the location of the plant. Actual location should not vary by more than 100 feet (30 meters)
c. Coordinates for volume sources are at the center point of the volume source.

3.3.8 Effects of Building Downwash on Modeled Impacts

Most of the emission sources associated with the plants are not housed in buildings and are not subject to plume downwash as caused by typical building structures. However, a 10-meter by 10-meter building, 10 meters high was included in the model, centered on the CBP truck loadout source. No other substantial structures were identified for the site. Downwash effects from equipment or other minor structures at the site were not accounted for because much of the equipment is porous to wind, thereby minimizing downwash effects

3.3.9 Ambient Air Boundary

Ambient air is any area where the general public (anyone not under direct control of the permittee) has access. Areas can only be excluded from consideration as ambient air if the permittee has the legal right and practical ability to exclude the general public. Dixie River provided a figure with the application that identified the boundary to areas excluded from ambient air. The applicant indicated that additional areas to the northwest of the site are under direct control and could be excluded from ambient air. DEQ did not exclude this area from ambient air because it would be more difficult to preclude public access from this area since it is further removed from the area immediately surrounding the plants. Also, impacts in this area are not likely to affect the NAAQS compliance demonstration results. It was verified that maximum modeled impacts did not occur in any areas originally excluded from ambient air by the applicant-provided figure.

3.3.10 Receptor Network

Table 13 describes the receptor network used in the impact modeling analyses. The full grid, along with the fenceline receptors, includes a total of 6,792 receptors (Figure 2). The receptor grids used in the model provided good resolution of the maximum design concentrations for the project and provided extensive coverage. DEQ determined that the receptor grid used in the analyses was adequate to resolve maximum modeled impacts.

The receptor grid used in the impact modeling analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*[2], and DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

3.3.11 Crucial HMA Plant Characteristics Affecting Air Quality Impacts

Table 15 lists characteristics of the HMA plant, CBP, and rock crushing plant that are critical to the NAAQS and TAPs compliance demonstrations.

Table 15. IMPORTANT CHARACTERISTIC OF HMA PLANT USED IN DEQ ANALYSES

Parameter	Value or Description
HMA Plant	
HMA Plant Throughput Rates	150 ton/hr, 1,800 ton/day, 175,000 ton/yr
Plant Location	When operating at the Dixie River Pit, the HMA plant will be located on the site as indicated in the figure provided with the application and shown in Figure 3 of this memorandum. The drum dryer stack is positioned at UTM coordinates 519,091 meters Easting, 4,838,035 meters Northing, Zone 11, NAD 83 datum. Actual location of the dryer stack should not vary from the modeled position by more than 100 feet (30 meters)
Co-Contributing Sources	When operating at the Dixie River Pit, operation with a co-located CBP and rock crushing plant was assumed as described in this memorandum.
Drum Dryer	Drum dryer fueled by natural gas, propane, diesel, or residual fuel oil (RFO) with a baghouse for emissions control.
Electrical Power	Line power will be used when the HMA is at the Dixie River Pit. Generators powered by diesel-fired IC engines will not be used at the site
Dryer Stack Parameters	Stack height ≥20 ft, stack diameter ≈41 in, gas temp ≥ 275° F, flow velocity ≥58 ft/sec.
Asphalt Silo Filling	It was conservatively assumed that emissions are not captured and routed back to the drum dryer.
Conveyor Transfers	≤3 transfers for any given quantity of material processed. Emissions controlled by 90%.
Scalping Screen	≤1 screen for any given quantity of material processed. Emissions controlled by 90%.
Frontend Loader Transfers	≤2 transfers for any given quantity of material processed. Typically involves: 1) aggregate to storage pile; 2) aggregate from pile to hopper.
Temporary Source	The HMA plant was modeled as a permanent source. The previous permit required that the HMA plant relocate to a different pit every 12 months. When operating at the Dixie River Pit, this requirement is not necessary.
Seasonal Restriction	No seasonal restrictions were considered in the analyses.
CBP	
CBP Throughput Rates	1,440 yard^3/day, 375,000 yard^3/year
Plant Location	The CBP is located on the site as indicated in the figure provided with the application and shown in Figure 3 of this memorandum. The truck loadout source is positioned at UTM coordinates 519,130 meters Easting, 4,837,832 meters Northing, Zone 11, NAD 83 datum. Actual location of the truck loadout point should not vary from the modeled position by more than 100 feet (30 meters)
Emission Controls	Shroud with water mist ring on truck loadout point must be used when cement/aggregate is transferred from the CBP to a cement truck.
Co-Contributing Sources	When operating at the Dixie River Pit, operation with a co-located HMA plant and rock crushing plant was assumed as described in this memorandum.

Table 15. IMPORTANT CHARACTERISTIC OF HMA PLANT USED IN DEQ ANALYSES	
Parameter	**Value or Description**
Rock Crushing Plant	
Rock Crushing Plant Throughput Rates	25,000 ton/month maximum. Modeling assumed daily throughput was twice the average daily, or about 1,670 ton/day.
Electrical Power	Line power will be used when the rock crushing plant is operating at the Dixie River Pit. Generators powered by diesel-fired IC engines will not be used at the site

4.0 Impact Modeling Results

4.1 Results for NAAQS Cumulative Impact Analyses

Table 16 provides site-specific air impact modeling results for NAAQS. DEQ determined NAAQS compliance is satisfactorily demonstrated. Although $PM_{2.5}$ impacts are very near the NAAQS, DEQ contends that impacts at that level would only happen if the maximum design value in background concentrations occurs simultaneously with maximum design value impacts from the plants modeled. It is highly unlikely that this condition would occur.

Table 16. RESULTS FOR CUMULATIVE IMPACT ANALYSES

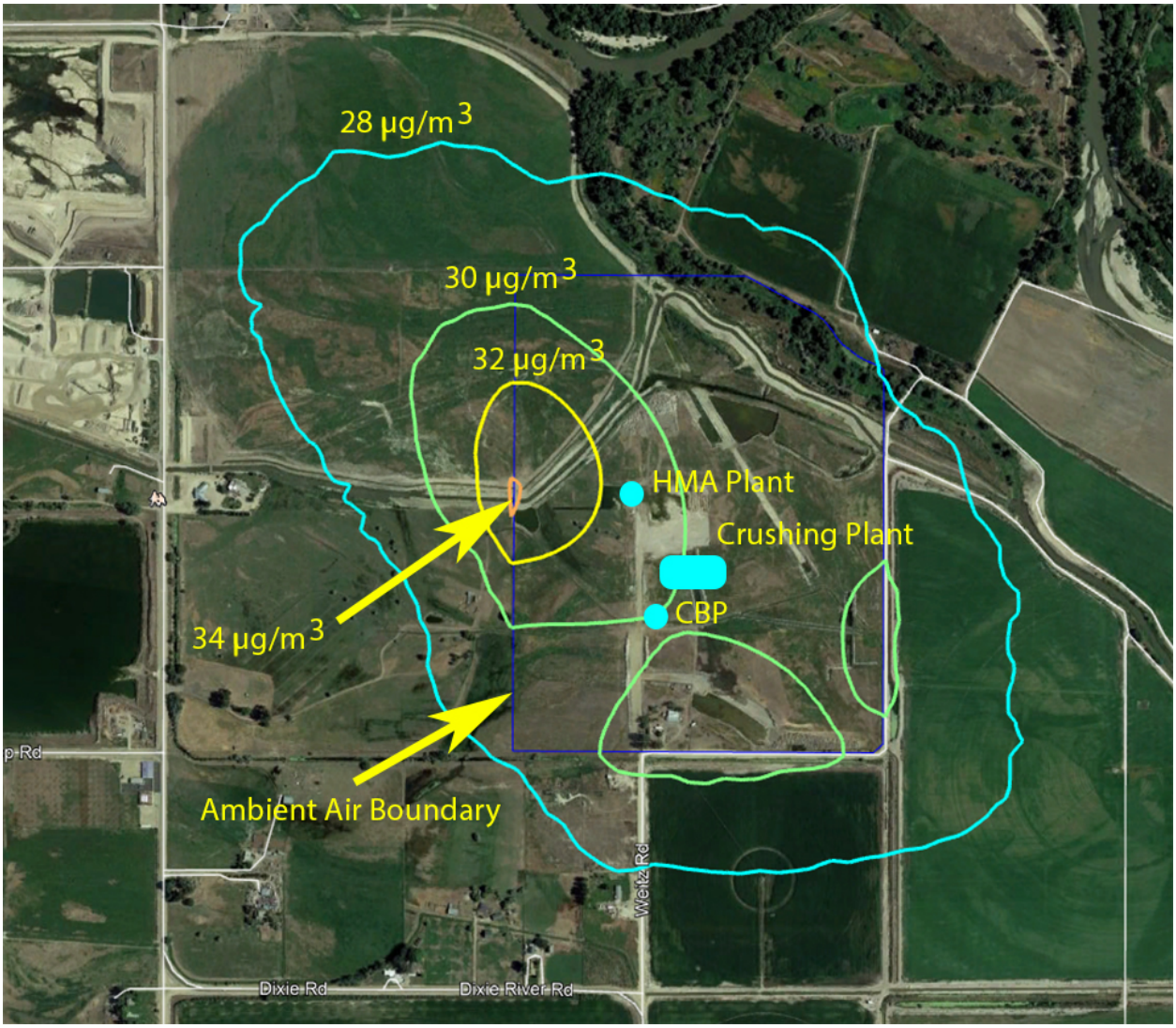
Pollutant	Averaging Period	Modeled Design Value ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[c]	24-hour	38.0[g]	79.1	117.1	150	78
$PM_{2.5}$[d]	24-hour	8.5[h]	25.8	34.3	35	98
	Annual	1.86[i]	7.4	9.26	12	77
NO_2[e]	1-hour	42.1[j]	58.5	100.6	188	54
SO_2[f]	1-hour	77.8[k]	13.1	90.9	196	46
	3-hour	88[l]	17	105	1,300	8

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
e. Nitrogen dioxide.
f. Sulfur dioxide.
g. Modeled design value is the maximum modeled value of 6th highest 24-hour maximum impacts for a 5-year meteorological dataset.
h. Modeled design value is the maximum modeled value of 5-year means of 8th highest 24-hour impacts for a 5-year meteorological dataset.
i. Modeled design value is the maximum modeled value of 5-year means of annual impacts for a 5-year meteorological dataset.
j. Modeled design value is the maximum modeled value of 5-year means of 8th highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset.
k. Modeled design value is the maximum modeled value of 5-year means of 4th highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset.
l. Modeled design value is the maximum modeled value of 2nd highest 3-hour maximum impacts for a 5-year meteorological dataset.

Figure 4 shows 24-hour $PM_{2.5}$ design value concentrations with a 25.8 $\mu g/m^3$ background level added to model impacts. Concentrations above 34 $\mu g/m^3$ (97 percent of the NAAQS) are limited to a small area along the site boundary, west of the plant locations. Impacts exceeding 32 $\mu g/m^3$ extend only as far as 200 feet west of the western site boundary; impacts exceeding 30 $\mu g/m^3$ extend out almost as far as 600 feet along western boundary and less than 200 feet from the

southern and eastern boundary. For concentrations to remain below 30 µg/m^3, impacts from the HMA plant, CBP, and rock crushing plant cannot exceed 9.2 µg/m^3 (because of the 25.8 µg/m^3 background).

Figure 4. $PM_{2.5}$ 24-HOUR DESIGN VALUE IMPACTS AT THE DIXIE RIVER SITE WITH BACKGROUND VALUES INCLUDED.



4.2 Results for TAP Impact Analyses

Results for site-wide TAP impact analyses are shown in Table 17. Maximum impacts of all TAPs are below applicable AACs and AACCs.

Table 17. RESULTS FOR TAPS IMPACT ANALYSES				
Pollutant	**Averaging Period[a]**	**Modeled Impact ($\mu g/m^3$)[b]**	**TAP Increment[c] ($\mu g/m^3$)**	**Percent of Increment**
Acetaldehyde	5-year	5.45E-3	4.5E-1	1
Benzene	5-year	2.14E-3	1.2E-1	2
Formaldehyde	5-year	2.05E-2	7.7E-2	27
Naphthalene (as a PAH)[d]	5-year	3.47E-3	1.4E-2	25
Fluorene (as a PAH)[d]	5-year	4.81E-4	1.4E-2	3
Phenanthrene (as PAH)[d]	5-year	7.15E-4	1.4E-2	5
POM[e]	5-year	9.80E-5	3.0E-4	33
Arsenic	5-year	1.04E-4	2.3E-4	45
Cadmium	5-year	2.91E-6	5.6E-4	0.5
Chromium 6+	5-year	2.12E-5	8.3E-4	3
Nickle	5-year	3.15E-4	4.2E-3	8

a. A 5-year averaging period is conservatively used for carcinogenic TAPs of Idaho Air Rules Section 586. A 24-hour averaging period is used for non-carcinogenic TAPs of Idaho Air Rules Section 585.
b. Micrograms per cubic meter.
c. AACs listed in Idaho Air Rules Section 585 and AACCs listed in Idaho Air Rules Section 586.
d. Polyaromatic Hydrocarbon (PAH) compounds are regulated individually and compared to the PAH increment.
e. Polycyclic Organic Matter (POM) taken as the impact of emissions from seven listed compounds in Idaho Air Rules 586.

4.3 Locating with Other Facilities/Equipment

The air impact analyses performed by DEQ assumed there are no other emission sources (other than what was included in the impact model) in the immediate area that measurably contribute to pollutant concentrations in a way not adequately accounted for by the background concentrations used. Such emissions sources could include another rock crushing plant, another HMA plant, another CBP, or other pollutant-emitting facility. DEQ modeling staff established a rule-of-thumb distance of 1,000 feet from emissions sources at the HMA plant where emissions from a nearby source/facility would need to be considered in the air impact analyses for the HMA plant. Emissions sources located beyond 1,000 feet are considered to be too distant to have a measureable impact on receptors substantially impacted by the HMA plant.

Once the HMA plant and CBP is established at a site, the plant has no control over other facilities locating on neighboring properties (this does not include facilities locating on the same property as the HMA plant and CBP). Cumulative impacts would be assessed in the permitting analyses performed for the neighboring facility. The 1,000 foot restriction assumption on off-property co-contributing sources only applies when a portable plant is relocating to a new area or a new source is added on-property.

5.0 Conclusions

The ambient air impact analyses and other air quality analyses performed in support of the PTC applications demonstrated to DEQ's satisfaction that emissions from the Dixie River HMA, the CBP, and rock crushing plant, when operating at the Dixie River site as described in this memorandum will not cause or significantly contribute to a violation of any ambient air quality standard.

References

1. *Policy on NAAQS Compliance Demonstration Requirements.* Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.

2. *State of Idaho Guideline for Performing Air Quality Impact Analyses.* Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.

3. *User's Guide for the AMS/EPA Regulatory Model – AERMOD.* U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division. EPA-454/B-03-001. September 2004. (Section 3.3.2.2).

ATTACHMENT 1

EMISSIONS CALCULATIONS AND MODELING PARAMETERS FOR

DEQ'S AIR IMPACT ANALYSES

HMA Plant Modeled Emissions Rates

Compliance determination is linked to throughput levels and the equipment configuration at the site.

Emissions from Drum Dryer, Asphalt Loadout, Asphalt Silo Filling, and Asphalt Tank Heater

DEQ's HMA plant spreadsheet to calculate emissions rates for various averaging periods.

Aggregate Handling Emissions

Emissions from aggregate handling were calculated for the following transfers: 1) aggregate to a storage pile by frontend loader; 2) aggregate from a pile to a hopper by frontend loader; 3) three conveyor transfers.

PM_{10} and $PM_{2.5}$ emissions associated with the handling of aggregate materials were calculated using emissions factors from AP42 Section 13.2.4.

Emissions were calculated using the following emissions equation:

$$E = k(0.0032)\left[\frac{(U/5)^{1.3}}{(M/2)^{1.4}}\right] \quad \text{lb/ton}$$

Where:

- k = 0.053 for $PM_{2.5}$, 0.35 for PM_{10}
- M = 3% for aggregate
- U = wind speed (mph)

A moisture content of 3% to 7% was estimated as a typical moisture content of aggregate entering the dryer, per STAPPA-ALAPCO-EPA, Emission Inventory Improvement Program, Volume II, Chapter 3, Preferred and Alternative Methods for Estimating Air Emissions from Hot Mix Asphalt Plants, Final Report, July 1996. The lower level of moisture combined with an additional 90% emissions control was applied to calculated emissions from the conveyor transfers to account for additional emissions control measures required by Idaho regulations and the permit.

In the model, emissions are varied as a function of windspeed, with the base emissions entered for a windspeed of 10 mph.

upper windspeeds for 6 categories: 1.54, 3.09, 5.14, 8.23, 10.8 m/sec

Median windspeed for each category (1 m/sec = 2.237 mph)

- Cat 1: (0 + 1.54)/2 = 0.77 m/sec ➢ 1.72 mph
- Cat 2: (1.54 + 3.09)/2 = 2.32 m/sec ➢ 5.18 mph
- Cat 3: (3.09 + 5.14)/2 = 4.12 m/sec ➢ 9.20 mph
- Cat 4: (5.14 + 8.23)/2 = 6.69 m/sec ➢ 14.95 mph
- Cat 5: (8.23 + 10.8)/2 = 9.52 m/sec ➢ 21.28 mph
- Cat 6: (10.8 + 14)/2 = 12.4 m/sec ➢ 27.74 mph

Base $PM_{2.5}$ factor – use 10 mph wind: $0.053\ (0.0032)\frac{(10/5)^{1.3}}{(3/2)^{1.4}} = 2.367\text{ E-4}$ lb/ton

Adjustment factors to put in the model:

Cat 1: $(1.72/5)^{1.3}$ (9.614 E-5) = 2.401 E-5 lb/ton
Factor = 2.401 E-5/2.367 E-4 = 0.1014

Cat 2: $(5.18/5)^{1.3}$ (9.614 E-5) = 1.007 E-4 lb/ton
Factor = 1.007 E-4 /2.367 E-4 = 0.4253

Cat 3: $(9.20/5)^{1.3}$ (9.614 E-5) = 2.124 E-4 lb/ton
Factor = 2.124 E-4/2.367 E-4 = 0.8974

Cat 4: $(14.95/5)^{1.3}$ (9.614 E-5) = 3.993 E-4 lb/ton
Factor = 3.993 E-4/2.367 E-4 = 1.687

Cat 5: $(21.28/5)^{1.3}$ (9.614 E-5) = 6.318 E-4 lb/ton
Factor = 6.318 E-4/2.367 E-4 = 2.669

Cat 6: $(27.74/5)^{1.3}$ (9.614 E-5) = 8.918 E-4 lb/ton
Factor = 8.918 E-4/2.367 E-4 = 3.768

For the operational scenario for 1,800 ton/day HMA and 175,000 ton/year HMA, emissions from the loader are as follows (daily and annual throughputs were based on aggregate being 96% of the total HMA production):

Daily $PM_{2.5}$:

$$\frac{2.367\text{ E-4 lb PM}_{2.5}}{\text{ton}} \left| \frac{1{,}728\text{ ton}}{\text{day}} \right| \frac{\text{day}}{24\text{ hr}} \left| \frac{2\text{ transfers}}{} \right. = \frac{0.03408\text{ lb}}{\text{hr}}$$

Annual $PM_{2.5}$:

$$\frac{2.367\text{ E-4 lb PM}_{2.5}}{\text{ton}} \left| \frac{168{,}000\text{ ton}}{\text{yr}} \right| \frac{\text{yr}}{8{,}760\text{ hour}} \left| \frac{2\text{ transfers}}{} \right. = \frac{0.009079\text{ lb}}{\text{hr}}$$

Emissions from the three conveyor transfers are as follows (with an additional 90% control):

Daily $PM_{2.5}$:

$$\frac{2.367\text{ E-4 lb PM}_{2.5}}{\text{ton}} \left| \frac{1{,}728\text{ ton}}{\text{day}} \right| \frac{\text{day}}{24\text{ hr}} \left| \frac{3\text{ transfers}}{} \right| \frac{(1\text{-}0.90)}{} = \frac{0.005113\text{ lb}}{\text{hr}}$$

Annual $PM_{2.5}$:

$$\frac{2.367\text{ E-4 lb PM}_{2.5}}{\text{ton}} \left| \frac{168{,}000\text{ ton}}{\text{yr}} \right| \frac{\text{yr}}{8{,}760\text{ hour}} \left| \frac{3\text{ transfers}}{} \right| \frac{(1\text{-}0.90)}{} = \frac{0.001362\text{ lb}}{\text{hr}}$$

Total aggregate handling emissions:

Daily $PM_{2.5}$: 0.03408 lb/hr + 0.005113 lb/hr = 0.03919 lb/hr
Annual $PM_{2.5}$: 0.009079 lb/hr + 0.001362 lb/hr = 0.01044 lb/hr

Screening Emissions

This HMA plant uses one scalping screen. A $PM_{2.5}$ factor for uncontrolled emissions was not available in AP42. A $PM_{2.5}$ factor was estimated by DEQ permit writers and entered into the HMA calculation spreadsheet. The uncontrolled emissions factor was used and a 90% reduction applied to calculated emissions to account for additional emissions control measures required by Idaho regulations and the permit.

Daily and annual throughputs were based on aggregate being 96% of the total HMA production.

For the operational scenario for 1,800 ton/day HMA and 175,000 ton/year HMA, emissions are as follows:

Scalping Screen (controlled emissions):

Daily $PM_{2.5}$:

$$\frac{0.000130 \text{ lb } PM_{10}}{\text{ton}} \left| \frac{1{,}728 \text{ ton}}{\text{day}} \right| \frac{\text{day}}{24 \text{ hour}} \left| (1\text{-}0.90) \right| = \frac{0.0009360 \text{ lb}}{\text{hr}}$$

Annual $PM_{2.5}$:

$$\frac{0.000130 \text{ lb } PM_{10}}{\text{ton}} \left| \frac{168{,}000 \text{ ton}}{\text{yr}} \right| \frac{\text{yr}}{8{,}760 \text{ hour}} \left| (1\text{-}0.90) \right| = \frac{0.0002493 \text{ lb}}{\text{hr}}$$

HMA Plant Modeling Parameters

Dryer baghouse Stack

Release height = 6.1 meters; effective diameter of release area = 1.04 meters;
typical stack gas temperature = 408 K; typical flow velocity = 17.6 meters/second

Asphalt Silo Filling

DEQ modeled this source as a point source.
- release height of 9 meters
- stack diameter of 3 meters, corresponding to the approximate diameter of the silo.
- gas temperature was estimated at half the AP42 default asphalt temperature: 325° F / 2 = 163° F (346 K)
- stack velocity of 0.1 m/sec to account for convective air flow.

Asphalt Loadout

DEQ modeled this source as a point source.
- release height of 3.5 meters
- stack diameter of 3 meters, corresponding to the approximate diameter of the silo.
- gas temperature was estimated at half the AP42 default asphalt temperature: 325° F / 2 = 163° F (346 K)
- stack velocity of 0.1 m/sec to account for convective air flow.

Aggregate to and from Storage and Conveyor Transfers

Release emissions in model from a 20 m X 20 m area 5 m high, released at 2.5 m

Initial dispersion coefficients:

σ_{y0} = 20 m / 4.3 = 4.65 m

σ_{z0} = 5 m / 4.3 = 1.16 m

Sources include: five transfers, equivalent in emissions to that of a frontend loader, from the point of aggregate delivery to transfer to the HMA plant hopper, and three conveyor transfers.

Scalping Screen

This source was modeled as a single volume source on or adjacent to a structure 5 m X 4 m, 5.0 meters thick, with a release height of 3.0 meters. The initial dispersion coefficients are calculated as follows:

σ_{yo} = 4 m / 4.3 = 0.93 m
σ_{zo} = 5 m / 2.15 = 2.33 m

Asphalt Oil Heater

Parameters were provided by Dixie River. Release height = 2.4 meters; effective diameter of release area = 0.091 meters; typical stack gas temperature = 436 K; typical flow velocity = 10.3 meters/second.

CBP Modeled Emissions Rates

Aggregate and Sand Handling Emissions

A DEQ-developed CBP spreadsheet was used to calculate emissions rates for various averaging periods.

Emissions from aggregate and sand handling were calculated for the following transfers: 1) groundlevel transfers including transfers to a storage pile and transfers to the CBP hopper; 2) transfers to elevated storage.

PM_{10} and $PM_{2.5}$ modeled emissions associated with the handling of aggregate materials were calculated using emissions factors from AP42 Section 13.2.4 *Aggregate Handling and Storage Piles*, then adjusting for the composition of concrete to generate a lb/yd^3 of concrete factor. $PM_{2.5}$ emissions used in this impact modeling analysis for these handling activities differed from DEQ's CBP emission calculation spreadsheet somewhat. DEQ's spreadsheet generated a $PM_{2.5}$ factor by multiplying the lb/yd^3 factor for total PM in AP-42, Section 11.12 *Concrete Batching*, by a $PM_{2.5}$ fraction obtained from AP-42, Appendix B.2 *Generalized Particle Size Distributions, Table B-2.2, Category 3*, using a $PM_{2.5}$ fraction of 0.15 (for aggregate handling $PM_{2.5}$ = (PM)(0.15) = (0.0064 lb/yd^3)(0.15) = 0.00096 lb/yd^3). This resulted in a different $PM_{2.5}/PM_{10}$ ratio than using particle size factors (k) from AP42, Section 13.2.4, which was used for similar material handling sources for the HMA spreadsheet (and the basis of both emission factors was listed AP42 Section 13.2.4). The $PM_{2.5}$ calculation for uncontrolled aggregate handling is shown below, and the generated $PM_{2.5}$ emission factors were 0.0004621 lb/yd^3 for aggregate and 0.0001493 lb/yd^3 for sand.

Emissions were calculated using the following emissions equation:

$$E = k(0.0032)\left[\frac{(U/5)^{1.3}}{(M/2)^{1.4}}\right] \quad \text{lb/ton}$$

Where:

k = 0.35 for PM_{10} and 0.053 for $PM_{2.5}$
M = moisture content % by weight of material: 1.77% for aggregate and 4.17% for sand
U = wind speed (mph)

In the model, emissions are varied as a function of windspeed, with the base emissions entered for a windspeed of 10 mph.

upper windspeeds for 6 categories: 1.54, 3.09, 5.14, 8.23, 10.8 m/sec

Median windspeed for each category (1 m/sec = 2.237 mph)

Cat 1: (0 + 1.54)/2 = 0.77 m/sec ➢ 1.72 mph
Cat 2: (1.54 + 3.09)/2 = 2.32 m/sec ➢ 5.18 mph
Cat 3: (3.09 + 5.14)/2 = 4.12 m/sec ➢ 9.20 mph
Cat 4: (5.14 + 8.23)/2 = 6.69 m/sec ➢ 14.95 mph
Cat 5: (8.23 + 10.8)/2 = 9.52 m/sec ➢ 21.28 mph
Cat 6: (10.8 + 14)/2 = 12.4 m/sec ➢ 27.74 mph

Base $PM_{2.5}$ factor for aggregate – use 10 mph wind:

$$0.053(0.0032)\frac{(10/5)^{1.3}}{(1.77/2)^{1.4}} = 4.955\text{ E-4} \quad \text{lb/ton}$$

The base PM_{10} emission factor of 3.272 E-3 lb/ton was calculated based on the same calculations as $PM_{2.5}$, except using the PM_{10} particle size multiplier of 0.35.

Adjustment factors (based on $PM_{2.5}$ emissions) to put in the model:

Cat 1: $(1.72/5)^{1.3}$ (2.012 E-4) = 5.026 E-5 lb/ton
Factor = 5.026 E-5 / 4.955 E-4 = 0.1014

Cat 2: $(5.18/5)^{1.3}$ (2.012 E-4) = 2.107 E-4 lb/ton
Factor = 2.107 E-4 / 4.955 E-4 = 0.4253

Cat 3: $(9.20/5)^{1.3}$ (2.012 E-4) = 4.446 E-4 lb/ton
Factor = 4.446 E-4 / 4.955 E-4 = 0.8974

Cat 4: $(14.95/5)^{1.3}$ (2.012 E-4) = 8.358 E-4 lb/ton
Factor = 8.358 E-4 / 4.955 E-4 = 1.687

Cat 5: $(21.28/5)^{1.3}$ (2.012 E-4) = 1.323 E-3 lb/ton
Factor = 1.323 E-3 / 4.955 E-4 = 2.669

Cat 6: $(27.74/5)^{1.3}$ (2.012 E-4) = 1.867 E-3 lb/ton
Factor = 1.867 E-3 / 4.955 E-4 = 3.768

1 yd^3 of concrete ≈ 4024 lbs, consisting of:

- 1865 lbs aggregate
- 1428 lbs sand
- 491 lbs cement
- 73 lbs supplement
- 20 gal of water

Fraction of aggregate = 1865 lb / 4024 lb = 0.4635

Base $PM_{2.5}$ factor for aggregate in terms of lb/yd^3

$$\frac{4.955\text{ E-4 lb } PM_{2.5}}{\text{ton}} \left| \frac{0.4635\text{ ton agg}}{\text{ton concrete}} \right| \frac{\text{ton}}{2{,}000\text{ lb}} \left| \frac{4{,}024\text{ lb conc.}}{yd^3} \right. = \frac{4.621\text{ E-4 lb } PM_{2.5}}{yd^3}$$

The PM_{10} factor for aggregate is 3.051 E-3 lb PM_{10}/yd^3.
Assume moderate fugitive dust controls reduce emissions by an additional 75%.

Base controlled PM_{10} factor in terms of lb/yd^3

$$\frac{4.621\text{ E-4 lb } PM_{2.5}}{yd^3} \left| (1\text{-}0.75) \right. = \frac{1.155\text{ E-4 lb } PM_{2.5}}{yd^3}$$

Controlled PM_{10} factors for aggregate handling are 7.628 E-4 lb PM_{10}/yd^3.

Using the same process for sand handling (using a moisture content of 4.17% for sand in the emission equation), the uncontrolled emission factors are 1.493 E-4 lb $PM_{2.5}/yd^3$ and 7.039 E-4 lb PM_{10}/yd^3.

Controlled factors for sand handling are 3.733 E-5 lb $PM_{2.5}/yd^3$ and 1.760 E-4 lb PM_{10}/yd^3.

There are two groundlevel transfers of aggregate and sand: 1) transfer to a storage pile; 2) transfer from a pile to the hopper.

For the operational scenario for 1,440 cy/day concrete and 375,000 cy/year concrete, $PM_{2.5}$ emissions from aggregate and sand transfers at groundlevel are as follows:

Daily $PM_{2.5}$:

$$\frac{1.155\text{ E-4 lb} + 3.733\text{ E-5 lb}}{yd^3\text{ - transfer}} \left| \frac{2\text{ transfers}}{} \right| \frac{1{,}440\ yd^3}{\text{day}} \left| \frac{\text{day}}{24\text{ hr}} \right. = \frac{0.01834\text{ lb } PM_{2.5}}{\text{hr}}$$

Annual $PM_{2.5}$:

$$\frac{1.155\text{ E-4 lb} + 3.733\text{ E-5 lb}}{yd^3\text{ - transfer}} \left| \frac{2\text{ transfers}}{} \right| \frac{375{,}000\ yd^3}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right. = \frac{0.01308\text{ lb } PM_{2.5}}{\text{hr}}$$

These sources were modeled as a single volume source in a 10-meter by 10-meter area with a 3-meter depth. The release height was set at 2.0 m. The initial dispersion coefficients were calculated using AERMOD guidance for volume sources as follows:

σ_{yo} = 10.0 m / 4.3 = 2.33 m
σ_{zo} = 3.0 m / 4.3 = 0.70 m

There is one elevated transfer of aggregate and sand: 1) transfer to elevated storage bin.
For the operational scenario for 1,440 cy/day concrete and 375,000 cy/year concrete, emissions from aggregate and sand transfers to elevated storage are as follows:

Daily $PM_{2.5}$:

1.155 E-4 lb + 3.733 E-5 lb / yd^3 - transfer	1 transfers	1,440 yd^3 / day	day / 24 hr	=	0.009170 lb $PM_{2.5}$ / hr

Annual $PM_{2.5}$:

1.155 E-4 lb + 3.733 E-5 lb / yd^3 - transfer	1 transfers	375,000 yd^3 / yr	year / 8760 hr	=	0.006542 lb $PM_{2.5}$ / hr

These sources were modeled as a single volume source on or adjacent to a 10-meter square building, 10.0 meters high, with a release height of 5.0 meters. The initial dispersion coefficients were calculated as follows:

σ_{yo} = 10 m / 4.3 = 2.33 m
σ_{zo} = 10.0 m / 2.15 = 4.65 m

Cement and Supplement Silo Filling Emissions

A DEQ-developed CBP spreadsheet was used to calculate emissions rates for various averaging periods. Emissions are controlled by a baghouse.

Stack parameters for the cement and supplement silo of the CBP were provided in the submitted application. DEQ conservatively modeled the release at 0.0 Kelvin to eliminate buoyancy flux. Other stack parameters of stack diameter and flow appeared to be reasonably conservative.

Weigh Hopper Loading Baghouse Emissions

A DEQ-developed CBP spreadsheet was used to calculate emissions rates for various averaging periods. Emissions are controlled by a baghouse.

Stack parameters for the weigh hopper loading baghouse of the CBP were provided in the submitted application but appeared to be of suspect accuracy. DEQ conservatively modeled the release with a 1.0 m diameter, a 1.0 m/sec velocity, and 0.0 Kelvin to eliminate buoyancy flux and minimize momentum flux. Since emission rates at this source are minimal compared to the truck loadout source, high accuracy of these parameters are not critical to modeled impacts.

Truck Loadout Emissions

A DEQ-developed CBP spreadsheet was used to calculate emissions rates for various averaging periods. Emissions from mixer truck loading are controlled by a shroud and water spray by 80 percent.

Emissions from truck loadout of dry concrete, fly ash, and aggregate were modeled as a volume source. The release height was set at 3.75 meters, the typical height of cement truck feed chutes. The initial horizontal dimension (σ_{yo}) was set at a value equal to the length of the source's side divided by 4.3, as directed by EPA guidance for AERMOD[3]. The length of side was set to 10 meters to represent the structure of the plant and any adjacent building, and σ_{yo} was calculated at 2.33 meters. The initial vertical dimension (σ_{zo}) was set at a value equal to the vertical extent of the source or the height of an adjacent building divided by 2.15, as directed by EPA guidance for AERMOD. The vertical extent was set at two times the release height or 7.5 meters, giving a σ_{zo} of 3.49 meters.

σ_{yo} = 10 m / 4.3 = 2.33 m
σ_{zo} = 7.5 m / 2.15 = 3.49 m

Rock Crushing Plant Modeled Emissions Rates

Compliance determination is linked to throughput levels and the equipment configuration at the site.

Emissions from Crushing, Screening, and Material Handling

Emissions from the rock crushing plant were calculated using methods as described in: *Guidance on Emission Factors for the Mining Industry*, Nevada Division of Environmental Protection (NDEP), Bureau of Air Pollution Control (BAPC), Permitting Branch, May 31, 2017. Rock crushing emission factors listed in the NDEP guidance were based on those presented in EPA's *AP-42: Fifth Edition Compilation of Air Pollutant Emissions Factors, Volume 1: Stationary Point and Area Sources* (AP-42), Chapter 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing.

AP-42 PM_{10} and $PM_{2.5}$ factors were not available for primary and secondary crushing, so PM_{10} emission factors for tertiary crushing were conservatively used. $PM_{2.5}$ factors were not available for sources listed in AP-42 Chapter 11.19.2, so $PM_{2.5}$ factors were based on the applicable PM_{10} factor multiplied by the $PM_{2.5}/PM_{10}$ fraction obtained from AP-42 Chapter 13.2.4 Aggregate Handling and Storage Piles ($PM_{2.5}$ = PM_{10}[0.053/0.35]).

Rock Crushing Plant Sources and Emission Factors			
Emission Source	**Emission Factor (lb/ton)**		**Number of Sources**
	PM_{10}	**$PM_{2.5}$**	
Crushing	0.0024[a]	0.0004[b]	2
Screening and Associated Transfers	0.0087[c]	0.0013[b]	3
Conveyor Transfers	0.0011[c]	0.00017[b]	4

a. AP-42, Chapter 11.19.2 factor for tertiary crushing
b. Factor based on PM_{10} factor multiplied by a $PM_{2.5}/PM_{10}$ ratio obtained from the ratio of particle size multipliers in AP-42 Chapter 13.2.4.
c. AP-42, Chapter 11.29.2 factor.

Throughput for the rock crushing plant was based on a claimed throughput of the plant at 25,000 ton/month. Annual throughput of 300,000 ton/year was based on 12 months of operation. Maximum daily throughput of 1,670 ton/day (about 70 ton/hour for continuous operation) was based on twice the average rate for 30 day/month operation. Total emissions from the rock crushing plant assumed operation of two crushers, three screens, and four conveyor transfers. Total emissions from the rock crushing plant were modeled from two volume sources.

Rock Crushing Plant Emissions			
Emission Source	**Emissions (lb/hour)**		
	24-hour PM_{10}[a]	**24-hour $PM_{2.5}$[a]**	**Annual $PM_{2.5}$[b]**
Crushing (2 sources)	0.336	0.0560	0.0274
Screening and Associated Transfers (3 sources)	1.827	0.273	0.1334
Conveyor Transfers (4 sources)	0.308	0.0476	0.0233
TOTAL Emissions	2.471	0.374	0.184
Emissions per Modeled Source (2 Sources)	1.236	0.187	0.092

a. Emissions based on 70 ton/hour throughput for 24 hours.
b. Emissions based on 34.2 ton/hour throughput for 8,760 hours (300,000 ton/year).

Emissions from the rock crushing plant were modeled as two side-by-side volume sources. Each volume source was 50 meters square and 6 meters thick, with a release height of 3 meters. Release parameters were calculated as described in AERMOD guidance for volume sources not on or adjacent to buildings.

σ_{yo} = 50 m / 4.3 = 11.6 m
σ_{zo} = 6.0 m / 4.3 = 1.40 m

APPENDIX C – FACILITY DRAFT COMMENTS

The facility had no comments.

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:	**Dixie River dba River Rock Sand & Gravel**
Address:	**22027 Weitz Road**
City:	**Caldwell**
State:	**ID**
Zip Code:	**83607**
Facility Contact:	**Lance Thueson**
Title:	**President**
AIRS No.:	**027-00176**

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	0.7	0	0.7
SO_2	0.0	0	0.0
CO	0.6	0	0.6
PM10	0.1	0	0.1
VOC	0.1	0	0.1
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	**1.6**
Fee Due	**$ 500.00**		

Comments: