Statement of Basis
Concrete Batch Plant General Permit

Permit to Construct No. P-2019.0022
Project ID 62222

Knife River Corporation – Mountain West - 00599
Portable throughout the State of Idaho

Facility ID 777-00599

Final

June 28, 2019
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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.

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
BMP	best management practices
CAS No.	Chemical Abstracts Service registry number
CBP	concrete batch plant
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
HAP	hazardous air pollutants
hr/yr	hours per consecutive 12 calendar month period
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
m	meters
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
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
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
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
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Knife River Corporation – Mountain West - 00599 has applied for a permit for an existing portable truck mix concrete batch plant consisting of aggregate stockpiles, a cement storage silo, a cement supplement (fly ash) storage silo, a weigh batcher, and conveyors. The facility combines aggregate, sand, fly ash, and cement and then transfers the mixture into a truck mixer, along with water, for in-transit mixing of the concrete. In addition, water heater(s) are used to heat the water in cold weather prior to use for the mixing of concrete.

The concrete batch plant will be fed a mixture of aggregates from a collocated crusher. The rock crusher will be permitted independently from the concrete batch plant. In the case of collocation of a concrete batch plant with an additional rock crushing plant (secondary to the one rock crushing plant allowed by the permit), the modeling completed by DEQ requires a minimum separation distance of 1,000 ft.

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

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

The Applicant has proposed concrete production rate throughput limits of 50 cubic yards per hour, 800 cubic yards per day, and 75,000 cubic yards per year.

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

Permitting History

This is the initial Permit to Construct (PTC) for an existing facility that does not have a permit or an exemption document thus there is no permitting history.

Application Scope

This is the initial PTC for an existing facility.

Application Chronology

April 17, 2019	DEQ received an application.
April 18, 2019	DEQ received an application fee and a processing fee.
April 23 – May 8, 2019	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
April 30, 2019	DEQ determined that the application was complete.
June 17, 2019	DEQ made available the draft permit and statement of basis for peer and regional office review.
June 21, 2019	DEQ made available the draft permit and statement of basis for applicant review.
June 28, 2019	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
Materials Handling	Material Transfer Points: Materials handling Concrete aggregate transfers Truck unloading of aggregate Aggregate conveyor transfers Aggregate handling	Fugitive emissions control as specified in the permit	N/A
Concrete Mixer	Concrete Batch Plant – Truck Mix: Manufacturer: Ideal MFG., Inc. Model: Fastway Batch Plant Manufacture Date: 1992 Max. production: 50 yd^3/hr Throughput limits: 800 yd^3/day, and 30,000 yd^3/yr Cement Storage Silo:[a] Storage capacity: 40 cubic yards (yd^3) Fly Ash Storage Silo:[a] Storage capacity: 52 cubic yards (yd^3)	Weigh Batcher Baghouse (vents through cement silo baghouse): Manufacturer: Ideal MFG or equivalent[b] Model: Si-Low-206 or equivalent[b] $PM_{10}/PM_{2.5}$ control efficiency: 99% Cement Storage Silo Bin Vent Filter/Baghouse: Manufacturer: Ideal MFG or equivalent[b] Model: Si-Low-206 or equivalent[b] $PM_{10}/PM_{2.5}$ control efficiency: 99% Fly Ash Storage Silo Bin Vent Filter/Baghouse: Manufacturer: Belgrade Steel Co. or equivalent[b] Model: Belle 225 DH or equivalent[b] $PM_{10}/PM_{2.5}$ control efficiency: 99% Truck Load-out A boot and water ring $PM_{10}/PM_{2.5}$ control efficiency: 80.0% Material Transfer Points: $PM_{10}/PM_{2.5}$ control efficiency: 75.0%	Cement Storage Silo Bin Vent Filter/Baghouse Exhaust: Exit height: 35 ft (10.7 m) Exit area: 3.53 ft^2 (0.33 m^2) Exit flow rate: 2450 acfm Exit temperature: ambient Fly Ash Storage Silo Bin Vent Filter/Baghouse Exhaust: Exit height: 45 ft (13.7 m) Exit area: 80 ft^2 (7.4 m^2) Exit flow rate: 675 acfm Exit temperature: ambient
Boiler	Boiler: Manufacturer: Sioux Model: D1000 Manufacture year: 1996 Heat input rating: 1.0 MMBtu/hr Fuel: Natural gas	N/A	Boiler Exhaust: Exit height: 6.5 ft (1.98 m) Exit diameter: 1.0 ft (0.3 m) Exit temperature: 400 °F (204 °C)

a) Both the storage silo baghouse and supplement storage silo flyash baghouse are considered process equipment and therefore there is no associated control efficiency. Controlled PM_{10} emission factors were used when determining PTE and for modeling purposes.

b) Equivalent means that the baghouse with different manufacturer, or different model shall provide the same level of control with the minimum control efficiency of 99%.

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 50 yd^3/hour, 800 yd^3/day, and 30,000 yd^3/year.
- Baghouse control efficiencies were assumed to be 99.0%.
- Fugitive emissions of particulate matter (PM), PM_{10}, and $PM_{2.5}$ from the concrete batch plant material transfer points were assumed to be controlled by manual water sprays, sprinklers, or spray bars, or an equivalent method that reduce PM emissions by an estimated 75%. The assumed 75% control efficiency is based on the Western Regional Air Partnership Fugitive Dust Handbook. According to the Handbook, water suppressant of material handling can range from 50-90% control. Assuming the average of 70% and including another 5% due to Best Management Practices required by the permit allow for 75% control to be a conservative estimate.
- Aggregate is washed before delivery to the concrete batch plant site, and water is used on-site to control the temperature of the aggregate. Truck mix load-out emissions are controlled by a boot and water ring. Capture efficiency of the truck mix load-out boot or equivalent was estimated at 80%.
- 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 and weigh batcher, and 80% control for truck load-out emissions with a boot and a water ring. 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 41 yd^3/hr (0.82 x 50 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 five 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%.

- Emissions from a portable rock crusher were included in the emissions modeling analysis with the assumption that when the collocated rock crusher is operating, the concrete batch plant is operating at half its maximum capacity.
- 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)]	0.06	0.00	0.00	0.00	0.00
Boiler	0.03	0.003	0.43	0.36	0.02
Total, Point Sources	**0.09**	**0.003**	**0.43**	**0.36**	**0.02**

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

Hazardous Air Pollutants	PTE (T/yr)
Acenaphthene	1.76E-09
Acenaphthylene	1.76E-09
Anthracene	2.35E-09
Benzene	2.06E-06
Benzo(a)anthracene	1.76E-09
Benzo(a)pyrene	1.18E-09
Benzo(b)fluoranthene	1.76E-09
Benzo(g,h,i)perylene	1.18E-09
Benzo(k)fluoranthene	1.76E-09
Chrysene	1.76E-09
Dibenzo(a,h)anthracene	1.18E-09
Dichlorobenzene	1.18E-06
7,12-Dimethylbenz(a)anthracene	4.58E-08
Fluoranthene	2.94E-09
Fluorene	2.75E-09
Formaldehyde	7.35E-05
Hexane	5.15E-03
Indeno(1,2,3-cd)pyrene	1.76E-09
2-Methylnaphthalene	2.35E-08
3-Methylcholanthrene	1.76E-09
Naphthalene (24-hour)	9.56E-04
Naphthalene (Annual)	5.98E-07
Phenanathrene	1.67E-08
Pyrene	4.90E-09
Polycyclic Organic Matter (POM)	1.12E-08
Toluene	9.73E-06
Arsenic	1.29E-05
Beryllium	3.12E-07
Cadmium	2.12E-06
Cobalt	2.4E-07
Chromium	1.62E-05
Manganese	6.22E-05
Mercury	7.44E-07
Nickel	1.54E-05
Phosphorus	4.02E-05
Selenium	2.7E-06
Chromium VI	2.65E-06
Total	**0.0063**

Pre-Project Potential to Emit

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

This is an existing facility without a permit. Therefore, pre-project emissions are set to zero for all criteria pollutants.

Post Project Potential to Emit

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

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

Table 4 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Concrete batch plant	0.53	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boiler	0.007	0.033	5.9E-04	2.6E-03	0.10	0.43	0.08	0.36	0.01	0.02
Post Project Totals	**0.54**	**0.04**	**5.9E-04**	**2.6E-03**	**0.10**	**0.43**	**0.08**	**0.36**	**0.01**	**0.02**

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 5 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Potential to Emit	0.54	0.04	5.9E-04	2.6E-03	0.10	0.43	0.08	0.36	0.01	0.02
Changes in Potential to Emit	**0.54**	**0.04**	**5.9E-04**	**2.6E-03**	**0.10**	**0.43**	**0.08**	**0.36**	**0.01**	**0.02**

TAP Emissions

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

Table 6 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR TOXIC AIR POLLUTANTS

Toxic Air Pollutants	Emissions Rates for Units at the Facility (lb/hr)	Emissions Rates for Units at the Facility (lb/hr)	Emissions Rates for Units at the Facility (lb/hr)	Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Pentane	0.0	1.05E-03	1.05E-03	118	No
Arsenic	0.0	3.10E-06	3.10E-06	**1.50E-06**	**Yes**
Beryllium	0.0	8.04E-08	8.04E-08	2.80E-05	No
Cadmium	0.0	1.32-06	1.32-06	3.70E-06	No
Chromium	0.0	3.26E-05	3.26E-05	3.30E-02	No
Manganese	0.0	1.18E-04	1.18E-04	6.70E-02	No
Nickel	0.0	5.11E-06	5.11E-06	2.70E-05	No
Selenium	0.0	5.03E-06	5.03E-06	1.30E-02	No
Chromium VI	0.0	6.06E-07	6.06E-07	**5.60E-07**	**Yes**

Some of the PTEs for TAP were exceeded as a result of this project. Therefore, modeling is required for Arsenic and Chromium VI because the screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of TAP from this project were 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.

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

An ambient air quality impact analysis document has been crafted by DEQ. DEQ performed the analysis using Rexburg metrology data to determine the allowed throughput at the current location in St. Anthony. That document is part of the final permit package for this permitting action (see Appendix B).

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

- The Emissions Limits permit condition;
- The Concrete Production Limits permit condition;
- The Reduced Concrete Production Limits permit condition;
- The Concrete Operation Setback Distance Requirements permit condition for the current location in St. Anthony, as well as for portable throughout the state; and
- The Relocation Requirement permit condition.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

This modeling analysis for this facility demonstrates compliance with applicable standards in attainment areas. However, because a separate modeling analysis was not provided to demonstrate compliance with applicable standards in non-attainment areas, this portable facility is not permitted for operation in non-attainment areas. This requirement is assured by Permit Conditions 2.5 and 2.9.

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 7 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	0.09	0.04	**100**	B
PM_{10}	0.09	0.04	**100**	B
$PM_{2.5}$	0.09	0.04	**100**	B
SO_2	0.003	0.003	**100**	B
NO_X	0.43	0.43	**100**	B
CO	0.36	0.36	**100**	B
VOC	0.02	0.02	**100**	B
HAP (single)	0.005	0.005	**10**	B
Total HAPs	0.01	0.01	**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 emissions source 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.

Registration Procedures and Requirements for Portable Equipment (IDAPA 58.01.01.500)

IDAPA 58.01.01.500..... Registration Procedures and Requirements for Portable Equipment

Section 01 requires that all existing portable equipment shall be registered within ninety (90) days after the original effective date of this Section 500 and at least ten (10) days prior to relocating, using forms provided by the Department, except that no registration is required for mobile internal combustion engines, marine installations and locomotives. This requirement is assured by Permit Condition 2.4.

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 2.7.

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; $E = 1.10 (PW)^{0.25}$

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 50 y^3/hr, E is calculated as follows:

Proposed throughput = 4,024 lb per cubic yard x 50 y^3/hr = 201,200 lb/hr

Therefore, E is calculated as:

- $E = 1.10 \times PW^{0.25} = 1.10 \times (201{,}200)^{0.25} = 23.3$ lb-PM/hr

As presented previously in the Emissions Inventories Section of this evaluation the post project PTE for this emissions unit is 0.68 lb-PM_{10}/hr. Assuming PM is 50% PM_{10} means that PM emissions will be 0.34 lb-PM/hr (0.68 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 2.6 and 2.10.

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

IDAPA 58.01.01.301..... Requirement to Obtain Tier I Operating Permit

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

PSD Classification (40 CFR 52.21)

40 CFR 52.21..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is/is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

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

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

The facility is not subject to any MACT requirements 40 CFR Part 63.

Permit Conditions Review

This section describes the permit conditions for this initial permit.

Permit Condition 1.1 establishes the permit to construct scope.

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

FACILITY-WIDE CONDITIONS

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

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

Permit Condition 2.3 establishes that the concrete batch plant may collocate with one rock crushing plant and shall not locate with 1,000 ft. of another rock crushing plant or a concrete batch plant as requested by the Applicant.

As discussed previously, Permit Condition 2.4 establishes that the permittee notify DEQ when the permitted portable equipment is relocated. This requirement is based upon imposing reasonable permit conditions for portable concrete batch plants.

Permit Condition 2.5 establishes a restriction on locating the portable concrete batch plant to non-attainment areas. The location restrictions are based upon parameters used during the ambient air quality modeling analysis performed for this project.

As discussed previously, Permit Condition 2.6 establishes that there are to be no emissions of odorous gases, liquids, or solids from the permit equipment into the atmosphere in such quantities that cause air pollution.

As discussed previously, Permit Condition 2.7 establishes that the permittee shall monitor fugitive dust emissions on a daily basis to demonstrate compliance with the facility-wide permit requirements.

Permit Condition 2.8 establishes that the permittee measure and record the distances to equipment that will be collocated with the concrete batch plant to demonstrate compliance with the Collocation Restrictions permit condition.

Permit Condition 2.9 establishes that the permittee record the date and location of the concrete batch plant each time it is relocated to demonstrate compliance with the Relocation Restriction permit condition.

As discussed previously, Permit Condition 2.10 establishes that the permittee monitor and record odor complaints to demonstrate compliance with the facility-wide permit requirements.

Permit Condition 2.11 establishes that the permittee shall maintain records as required by the Recordkeeping General Provision.

CONCRETE BATCH PLANT EQUIPMENT

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

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

Permit Condition 3.3 establishes hourly and annual emissions limits for $PM_{2.5}$, SO_2, NO_X, CO, and VOC emissions from the concrete production operation at this facility.

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

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

Permit Condition 3.6 establishes a daily concrete production limit for the concrete production operation when operated on days when a collocated portable rock crusher is operated. This requirement was based upon the air quality modeling analysis performed for this application.

Permit Condition 3.7 establishes setback distance restrictions for the concrete production operation when the facility is located at 405 North 2300 East, St. Anthony, or at any other location in the state. The setback distance restrictions are based upon the results of the Ambient Air Quality Modeling Analysis performed for this project.

Permit Condition 3.8 requires that the applicant employ a boot with a water ring to control emissions from the truck loadout operation as proposed by the applicant.

Permit Condition 3.9 requires the permittee to configure the weigh batcher so that emissions are controlled by the cement storage silo baghouse.

Permit Condition 3.10 requires that the applicant employ a baghouse to control emissions from the cement storage silo operation as proposed by the applicant.

Permit Condition 3.11 requires that the applicant employ a baghouse to control emissions from the fly ash silo operation as proposed by the applicant.

Permit Condition 3.12 requires that the applicant employ industry specific water sprays on material transfer points to control fugitive emissions as proposed by the applicant.

Permit Condition 3.13 establishes that the permittee monitor and record hourly and daily concrete production to demonstrate compliance with the Concrete Production Limits permit condition.

Permit Condition 3.14 establishes that the permittee measure and record concrete production equipment setback distances to demonstrate compliance with operating permit requirements.

Permit Condition 3.15 establishes that the permittee shall maintain records as required by the Recordkeeping General Provision.

PUBLIC REVIEW

Public Comment Opportunity

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

APPENDIX A – EMISSIONS INVENTORIES

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

APPENDIX C – 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: Knife River Corporation – Mountain West - 00599
Address: 4800 Wilkie Road
City: Missoula
State: MT
Zip Code: 59808
Facility Contact: Joseph Smith
Title: Regional Environmental Manager
AIRS No.: 777-00599

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	0.4	0	0.4
SO_2	0.0	0	0.0
CO	0.4	0	0.4
PM10	0.0	0	0.0
VOC	0.0	0	0.0
Total:			0.9
Fee Due	$ 500.00		

Comments:

APPENDIX A – EMISSIONS INVENTORIES

Final Concrete Batch Plant Emissions Inventory

Listed Below are the emissions estimates for the units selected.

Company:	**Knife River Corporation**
Facility ID:	**777-00599**
Permit No.:	**P-2019.0022 Project 62222**
Source Type:	**Portable/Staionary Concrete Batch Plant**
Manufacturer/Model:	**Ideal MFG/Fastway Batch Plant**

Production

Maximum Hourly Production Rate:	50	cy/hr
Proposed Daily Production Rate:	800	cy/day
Proposed Maximum Annual Production Rate:	30000	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**	0.001	0.00	NA	NA	NA	NA	4.74E-06		N/A
Water Heater #1:	**1 MMBtu/hr Natural Gas Heater**	0.033	0.033	2.58E-03	0.429	0.361	0.024	2.15E-06		518
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) *:		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)	**0.03**	**0.04**	**2.58E-03**	**0.43**	**0.36**	**0.02**	**6.89E-06**	**6.33E-03**	**518**

Pounds/hour

		$PM_{2.5}$	PM_{10}	SO_2	NO_x	CO	VOC	Lead	THAPs
CBP Type:	**Truck Mix**	0.318	0.53	NA	NA	NA	NA	1.13E-05	
Water Heater #1:	**1 MMBtu/hr Natural Gas Heater**	0.007	0.007	5.88E-04	0.098	0.082	0.005	4.90E-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) *:		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)	**0.33**	**0.54**	**5.88E-04**	**0.10**	**0.08**	**0.01**	**1.18E-05**	**1.74E-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	2.68E-06	1.11E-05	Annual	1.50E-06	Yes
Barium		X	2.88E-06	1.26E-05	24-hour	3.30E-02	No
Beryllium	X	X	7.06E-08	2.69E-07	Annual	2.80E-05	No
Cadmium	X	X	1.28E-06	1.97E-06	Annual	3.70E-06	No
Cobalt	X	X	5.49E-08	2.40E-07	24-hour	3.30E-03	No
Copper		X	5.56E-07	2.43E-06	24-hour	1.30E-02	No
Chromium	X	X	3.26E-05	1.44E-05	24-hour	3.30E-02	No
Manganese	X	X	1.18E-04	5.34E-05	24-hour	3.33E-01	No
Mercury	X	X	1.70E-07	7.44E-07	24-hour	N/A	No
Molybdenum (soluble)		X	7.19E-07	3.15E-06	24-hour	3.33E-01	No
Nickel	X	X	4.68E-06	1.35E-05	Annual	2.70E-05	No
Phosphorus	X	X	1.01E-04	3.44E-05	24-hour	7.00E-03	No
Selenium	X	X	5.03E-06	2.32E-06	24-hour	1.30E-02	No
Vanadium		X	1.50E-06	6.58E-06	24-hour	3.00E-03	No
Zinc		X	1.90E-05	8.30E-05	24-hour	6.67E-01	No
Chromium VI	X	X	5.20E-07	2.28E-06	Annual	5.60E-07	No
Non PAH Organic Compunds							
Pentane		X	1.05E-03	4.58E-03	24-hour	118	No
Methyl Ethyl Ketone	X	X	0.00E+00	0.00E+00	24-hour	39.3	No
Non-PAH HAPs							
Acetaldehyde	X	X	0.00E+00	0.00E+00	Annual	3.00E-03	No
Acrolein	X	X	0.00E+00	0.00E+00	24-hour	1.70E-02	No
Benzene	X	X	2.06E-06	2.06E-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	7.35E-05	7.35E-05	Annual	5.10E-04	No
Hexane	X	X	1.18E-03	5.15E-03	24-hour	12	No
Methyl Chloroform	X	X	0.00E+00	0.00E+00	24-hour	127	No
Propionaldehyde	X	X	0.00E+00	0.00E+00	24-hour	2.87E-02	No
Quinone	X	X	0.00E+00	0.00E+00	24-hour	2.70E-02	No
Toluene	X	X	2.22E-06	9.73E-06	24-hour	25	No
o-Xylene	X	X	0.00E+00	0.00E+00	24-hour	29	No
PAH HAPs							
2-Methylnaphthalene	X	X	2.35E-08	2.35E-08	Annual	9.10E-05	No
3-Methylcholanthrene	X	X	1.76E-09	1.76E-09	Annual	2.50E-06	No
7,12-Dimethylbenz(a)anthracene	X		1.05E-08	4.58E-08	N/A	N/A	N/A
Acenaphthene	X	X	1.76E-09	1.76E-09	Annual	9.10E-05	No
Acenaphthylene	X	X	1.76E-09	1.76E-09	Annual	9.10E-05	No
Anthracene	X	X	2.35E-09	2.35E-09	Annual	9.10E-05	No
Benzo(a)anthracene	X	X	1.76E-09	1.76E-09	Annual	9.10E-05	No
Benzo(a)pyrene	X	X	1.18E-09	1.18E-09	Annual	2.00E-06	No
Benzo(b)fluoranthene	X	X	1.76E-09	1.76E-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	1.18E-09	1.18E-09	Annual	9.10E-05	No
Benzo(k)fluoranthene	X	X	1.76E-09	1.76E-09	Annual	2.00E-06	No
Chrysene	X	X	1.76E-09	1.76E-09	Annual	2.00E-06	No
Dibenzo(a,h)anthracene	X	X	1.18E-09	1.18E-09	Annual	2.00E-06	No
Dichlorobenzene	X	X	1.18E-06	1.18E-06	Annual	9.10E-05	No
Fluoranthene	X	X	2.94E-09	2.94E-09	Annual	9.10E-05	No
Fluorene	X	X	2.75E-09	2.75E-09	Annual	9.10E-05	No
Indeno(1,2,3-cd)pyrene	X	X	1.76E-09	1.76E-09	Annual	2.00E-06	No
Naphthalene (24-hour)	X	X	2.18E-04	9.56E-04	24-hour	3.33	No
Naphthalene (Annual)	X	X	5.98E-07	5.98E-07	Annual	9.10E-05	No
Perylene	X		0.00E+00	0.00E+00	N/A	N/A	N/A
Phenanathrene	X	X	1.67E-08	1.67E-08	Annual	9.10E-05	No
Pyrene	X	X	4.90E-09	4.90E-09	Annual	9.10E-05	No
PAH HAPs Total	X	X	1.12E-08		Annual	2.00E-06	No
Polycyclic Organic Matter (POM)	X	X	1.12E-08	1.12E-08	Annual	2.00E-06	No

Total HAPs Emissions (lb/hr) and (T/yr): 1.74E-03 6.33E-03

Uncontrolled Criteria Pollutants

Source	PM10/PM2.5	SO2	NOx	CO	VOC
	T/yr	T/yr	T/yr	T/yr	T/yr
Concrete Batch Plant	6.32E-02	N/A	N/A	N/A	N/A
Water Heater #1	3.26E-02	2.58E-03	4.29E-01	3.61E-01	2.36E-02
Water Heater #2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Small Diesel Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Large Diesel Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: June 17, 2019

TO: Tom Burnham, Permit Writer, Air Program

FROM: Kevin Schilling, Air Quality Dispersion Modeling Supervisor, Air Program

PROJECT: P-2019.0022 Project 62222 – Knife River Corporation Permit to Construct (PTC) application for portable Concrete Plant, currently located in St. Anthony

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

Contents

Acronyms, Units, and Chemical Nomenclature

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
cy	cubic yards
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
GEP	Good Engineering Practice
hr	hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
Knife River	Knife River Corporation
m	Meters
m/sec	Meters per second
MMBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	parts per million
PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit

SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	tons per year
VOC	Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

Knife River Corporation (Knife River) submitted a Permit to Construct (PTC) application for their portable concrete batch plant (CBP), currently located near St Anthony, 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. NAAQS compliance demonstrations were not required for permit issuance because emissions of criteria pollutants were below levels defined as Below Regulatory Concern (BRC). TAP impact analyses were performed for applicable TAPs, demonstrating compliance with TAP increments. This memorandum provides a summary of the applicability assessments and analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

Knife River prepared the PTC application. DEQ calculated air pollutant emissions associated with the project, evaluated the need to perform air impact analyses, and performed impact analyses to demonstrate compliance with applicable NAAQS and TAP increments. DEQ review of submitted data and DEQ analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

The submitted information and analyses: 1) 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, or b) that criteria pollutant emissions increases resulting from the proposed project are below site-specific modeling applicability thresholds, developed to assure that emissions below such levels will not result in ambient air impacts exceeding Significant Impact Levels (SILs); 2) showed either a) that TAP emissions increases associated with the project are either below applicable emission screening levels (ELs) or are exempt from the requirement to assess impacts, or b) modeled TAP impacts to ambient air are below TAP increments of Idaho Air Rules.

Table 1 presents key assumptions should be considered in the permit writer's evaluation of the proposed project.

The submitted information and analyses demonstrated to the satisfaction of the Department that operation of the proposed project will not cause or significantly contribute to a violation of any applicable ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure emissions do not exceed applicable regulatory thresholds requiring further analyses.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Setback from Ambient Air Boundary. A minimum 55-meter (180 feet) separation must be maintained between the truck loadout source and the nearest point of public access (generally the property boundary) at the St. Anthony site (405 N. 2300 E., St. Anthony, Id). At other locations in Idaho, a setback of 60 meters (197 feet) must be maintained.	This setback is needed to assure compliance with the TAP AACCs.
Allowable Throughput. An annual throughput restriction of 30,000 cubic yards of concrete was used to demonstrate compliance with TAP increment standards.	An annual throughput restriction is also needed to ensure that annual emissions of criteria pollutants remain below BRC levels.
General Emissions Rates. Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling analyses.
Below Regulatory Concern for Criteria Pollutant Emissions. Maximum stationary, non-fugitive annual emissions of PM_{10}[a], $PM_{2.5}$[b], oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb) are below levels identified as below regulatory concern (BRC) as per Idaho Air Rules Section 221, and the project would be exempt from permitting if it were not for emissions of TAPs exceeding regulatory exemption criteria.	Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having a project-emissions increase that is less than BRC levels, provided the project would have qualified for a BRC permitting exemption except for the emissions levels of another criteria pollutant exceeding the ton/year BRC threshold.
Location with other pollutant emitting equipment. A rock crushing plant may operated with the CBP, provided the crushing plant is permitted by a DEQ Permit by Rule (PBR). No other stationary, non-fugitive emission sources may be operated within 1,000 feet of the truck loadout point of the CBP.	Emissions from a rock crushing plant are fugitive (as defined by Idaho Air Rules) and, as such, they do not contribute to the CBP potential to emit (PTE) for permit applicability and the requirement to demonstrate compliance with NAAQS. DEQ determined that equipment located beyond 1,000 feet will not be considered as co-contributing and can be excluded from air impact analyses.

[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.

2.0 Background Information

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

2.1 Project Description

The Knife River project is a portable concrete batch plant (CBP) currently located near St Anthony, Idaho. Pollutant-emitting processes conducted at the CBP will include material handling of cement, handling of cement supplements, handling of aggregate, and combustion of fuel in a water heater. The PTC addresses all air pollutant emitting activities associated with the CBP

2.2 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*
>
> ***02. NAAQS.*** *The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*
>
> ***03. Toxic Air Pollutants.*** *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

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

> ***02. Estimates of Ambient Concentrations.*** *All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.3 Significant Impact Level and Cumulative NAAQS Impact Analyses

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

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in Appendix W. Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

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

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

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

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.2	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

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

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. If project-specific impacts are below the SIL, then the project does not have a significant contribution to the specific violations.

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

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

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

3.0 Analytical Methods and Data

This section describes the methods and data used in analyses to demonstrate compliance with applicable air quality impact requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emissions Source Data

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

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

3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emissions Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant.[1]" The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (PTE) not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in cases where a PTC is required for the action regardless of emissions quantities, such as the modification of an existing emissions or throughput limit.

A NAAQS compliance demonstration is generally required to be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS. Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline*[2]. These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods.

NAAQS compliance demonstrations were not required for this project. The project qualified for the BRC NAAQS compliance demonstration exemption because the project's potential emission increases are below the BRC thresholds and the project would qualify for a BRC exemption if it were not for emissions of TAPs.

Table 3 provides results of the NAAQS compliance requirement applicability analysis.

Table 3. NAAQS COMPLIANCE DEMONSTRATION APPLICABILITY ANALYSIS RESULTS

Pollutant	Annual Allowable Emissions[a] (tons/year)	BRC Level (tons/year)[b]	NAAQS Compliance Demonstration Required
$PM_{2.5}$	0.034	1.0	No
PM_{10}	0.037	1.5	No
NOx	0.43	4	No
CO	0.36	10	No
SO_2	0.003	4	No
Pb	2.5 E-6	0.06	No

a. As calculated by DEQ for applicable emission sources.
b. BRC exemptions are based solely on annual emissions rates.

Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline*[2]. These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods.

Projects may be exempted from modeling requirements for criteria air pollutants based on Level I and Level II modeling thresholds contained in DEQ's *Modeling Guideline*[2]. If project-specific total emissions rate increases of a pollutant are below Level I Modeling Applicability Thresholds, then project-specific air impact analyses are not necessary for permitting. The Level I modeling thresholds are generally viewed as de minimis values and are applied for most projects. Use of Level II Modeling Applicability Thresholds are less conservative and their use is conditional, requiring DEQ approval. DEQ approval of the Level II modeling thresholds is based on dispersion-affecting characteristics of the emissions sources such as stack height, stack gas exit velocity, stack gas temperature, distance from sources to ambient air, presence of elevated terrain, and potential exposure to sensitive public receptors. Level I and Level II modeling thresholds for each criteria pollutant may have both short-term and annual average thresholds, based on the averaging periods of the SILs and NAAQS. For example, the current PM_{10} NAAQS is limited to a 24-hour averaging period, so only a short-term threshold based on a pound per hour value is relevant. The current NO_2 NAAQS are based on a 1-hour averaging period and an annual averaging period, so Level I and II modeling thresholds have been established for short-term and annual averaging periods, and applicability is evaluated independently for annual and short-term thresholds.

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

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

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

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 based on the magnitude of emissions and the short distance from emissions sources to locations where maximum PM_{10} and $PM_{2.5}$ impacts are anticipated.

3.1.2 Toxic Air Pollutant Emissions Rates

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

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

Table 4 lists the TAP modeled emissions rates for As.

Table 4. EMISSIONS RATES MODELED FOR TAP IMPACT ANALYSES

Source ID	Description	Annual Averaged Emission Rates (lb/hr[a])
		Arsenic
SILO[b]	Cement storage silo filling	4.16E-9
	Cement supplement (fly ash) storage silo filling	1.46E-7
UCTRKLOAD	Truck loadout	2.75E-6

a. Pounds per hour for listed averaging period.
b. Emissions associated with both cement and supplement silo filling were modeled from this single point.

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

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

3.1.3 Emissions Release Parameters

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

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.

Table 5. POINT SOURCE STACK PARAMETERS USED IN MODELING

Point Source Parameters

Release Point	Description	Stack Height (m)[a]	Stack Gas Flow Temp. (K)[b]	Stack Flow Velocity (m/sec)[c]	Stack Dia. (m)[d]
SILO[e]	Cement storage silo filling	10.7 (35 ft)	0[f]	0.01	0.01
SUPSILO	Cement supplement silo filling	13.7 (45 ft)	0[f]	0.01	0.01

Volume Source Parameters

Release Point	Description	Release Height (m)	Int. Horz. Dimension σ_{yo}[g] (m)	Int. Vert. Dimension σ_{zo}[h]
UCTRKLD	Truck loadout	3.75	2.33	3.49

a. Height in meters at the point of release. Values in parentheses are in feet.
b. Kelvin.
c. Meters per second.
d. Stack diameter in meters at the point of release to the atmosphere. Values in parentheses are in feet.
e. Modeled as a capped release in AERMOD.
f. Set to 0 to direct model to use a release temperature equal to the ambient air temperature specified in the meteorological data input file.
g. Initial horizontal dimension of plume.
h. Initial vertical dimension of plume.

3.2 Background Concentrations

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

3.3 Impact Modeling Methodology

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

3.3.1 General Overview of Impact Analyses

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

The Knife River CBP is a portable facility that may locate anywhere within Idaho. Therefore, site-specific data/characteristics used in air impact analyses, such as meteorological data, site layout, and terrain, cannot be represented as accurately as can be achieved for one fixed site. This increases the uncertainty in analytical results. DEQ used several methods to account for and offset this increased uncertainty, and these methods are described in subsequent sections of this memorandum. The general method used for portable sources was the following:

1. Use a polar receptor grid with the emission points located at the center in a conservatively tight grouping.

2. Run the model for numerous meteorological datasets, collected throughout Idaho.

3. For each model run and pollutant, identify the controlling receptor. The controlling receptor is the one just beyond (further from the emission points) the most distant receptor showing a concentration value over 90 percent of the applicable standard. Concentrations at 90 percent of the AACC is 2.07 E-4 $\mu g/m^3$ for As.

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

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

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

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

3.3.2 Modeling Methodology

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

Table 6. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description**
General Facility Location	Portable in Idaho	Air impact modeling was performed to determine a setback distance needed between emission sources and the nearest point of ambient air for any location where the CBP may locate.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 18081.
Meteorological Data	Multiple Areas	See Section 3.3.4 of this memorandum for additional details of the meteorological data.
Terrain	Not Considered	Flat terrain was assumed in the analyses.
Building Downwash	Considered	A 10 m X 10 m X 10 m structure was conservatively assumed at the center of the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD.
Receptor Grid	Polar Grid	Adequate to resolve maximum modeled impacts

3.3.3 Model Selection

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

AERMOD version 18081 was used by DEQ for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.4 Meteorological Data

DEQ air impact analyses used processed meteorological data from numerous locations throughout Idaho. DEQ determined that NAAQS compliance is reasonably assured for all areas of Idaho when compliance is demonstrated by multiple analyses using the following 12 meteorological datasets: Boise, Coeur d'Alene, Grangeville, Twin Falls, Pocatello, Idaho Falls, Rexburg, Burley, Lewiston, McCall, Pullman/Moscow, and Sandpoint. All data were processed using the option in AERMET to adjust the surface friction velocity (u*) to address AERMOD's tendency to over-predict concentrations from some sources under stable, low wind speed conditions.

3.3.5 Effects of Terrain on Modeled Impacts

Terrain effects on dispersion were not considered in the non-site-specific analyses. DEQ contends that assuming flat terrain is not a critical limitation of the analyses because most emissions points associated with CBPs are near ground-level and the immediate surrounding area is typically flat for dispersion modeling purposes. Emissions sources near ground-level typically have maximum pollutant impacts near the source, minimizing the potential effect of surrounding terrain to influence the magnitude of maximum modeled impacts.

3.3.6 Facility Layout

DEQ's analyses used a conservative generic facility layout. This was done because the specific layout will vary depending on product needs and specific characteristics of the site and equipment. To provide conservative results, DEQ used a tight grouping of emissions sources. Sources were positioned within 7 meters of the center of the facility. The truck loadout source was placed at the center of the facility. Because impacts are primarily driven by the truck loadout source, the positioning of other sources relative to the truck loadout is of lesser importance.

3.3.7 Effects of Building Downwash on Modeled Impacts

Potential downwash effects on emissions plumes were accounted for in the model by using building dimensions and locations (locations of building corners and building heights). A 10-meter-square building, 10 meters high, was used in the analysis to conservatively account for downwash. Dimensions and orientation of buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD. The primary source driving impacts in the analyses was the truck loadout, which was modeled as a volume source. Since downwash is not explicitly handled in AERMOD for volume sources, the accuracy of building parameters was not critical for model accuracy.

3.3.8 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." Ambient air is typically considered areas external to the identified property boundary where the facility is located, assuming that reasonable measures will be taken to preclude public access.

DEQ's non-site-specific analysis methods, using a generic facility layout, were used to generate minimum setback distances between emissions points and the property boundary or the established boundary to ambient air (if not the same as the property boundary). Setback distances were specified as the distance between the truck loadout source and the closest point of potential public access. The truck loadout source was used as the single source for setback determination because it overwhelmingly drives modeled impacts. Compliance with applicable air quality standards and increments is not demonstrated unless setback distances are maintained.

3.3.9 Receptor Network

A polar grid with 10-meter receptor spacing extending out to 100 meters (with a ring of receptors also established at 55 meters to refine the needed setback), 25-meter spacing extending out to 500 meters, 100-meter spacing extending out to 800 meters was used in the non-site-specific modeling performed by DEQ.

3.3.10 Good Engineering Practice Stack Height

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

$H = S + 1.5L$, where:

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

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

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

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

3.3.11 Crucial CBP Characteristics Affecting Air Quality Impacts

Table 7 lists characteristics of the CBP that are critical to the TAPs compliance demonstrations.

Table 7. IMPORTANT CHARACTERISTICS OF CBP USED IN DEQ ANALYSES	
Parameter	**Value or Description**
Concrete Production Rates	30,000 cy/year
Truck Loadout	Emissions will be controlled by a shroud and/or boot and a water spray ring.
Cement and supplement silo	Emissions are controlled by a fabric filter.
Seasonal Restriction	None were assessed.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

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

4.2 Results for TAPs Impact Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with facility-wide emissions exceeding emissions screening levels (ELs). DEQ determined required setback distances from the non-site-specific modeling results for each TAP with emissions exceeding the EL and for each meteorological data set identified in Section 3.3.4. Table 8 lists controlling setback distances for each TAP and meteorological dataset. Setback distances are the closest allowable distance between the property boundary and the center of the facility, which is taken to be the truck loadout location.

Table 8. SETBACK DISTANCES AS A FUNCTION OF TAP AND METEOROLOGICAL DATASET	
Meteorological Dataset	**Setback Distance in meters[a]**
	Arsenic
Rexburg	55 (180 ft)
Idaho Falls	40 (131 ft)
Burley	30 (98 ft)
Boise	40 (131 ft)
Lewiston (airport)	40 (131 ft)
Twin Falls	30 (98 ft)
Sandpoint	60 (197 ft)
Pocatello	30 (98 ft)
Pullman/Moscow	50 (164 ft)
McCall	40 (131 ft)
Coeur d'Alene	30 (98 ft)

[a] Setback in meters. Value in parentheses are in feet.

5.0 Conclusions

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

References

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

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

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

APPENDIX C – 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: Knife River Corporation – Mountain West - 00599
Address: 4800 Wilkie Road
City: Missoula
State: MT
Zip Code: 59808
Facility Contact: Joseph Smith
Title: Regional Environmental Manager
AIRS No.: 777-00599

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	0.4	0	0.4
SO_2	0.0	0	0.0
CO	0.4	0	0.4
PM10	0.0	0	0.0
VOC	0.0	0	0.0
Total:			**0.9**
Fee Due	$ 500.00		

Comments: