Statement of Basis

Permit to Construct P-2010.0005
Project No. 60672

Knife River, Inc.
Portable Hot Mix Asphalt Plant
GENCOR Industries 400 Ultra Plant; 400 Tons/hr Capacity
Proposed Location: Albion, Idaho

Facility ID No. 777-00472

Final

March 25, 2011
Ken Hanna
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
CFR	Code of Federal Regulations
CI	compression ignition
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
HAP	hazardous air pollutants
HMA	hot mix asphalt
hp	horsepower
hr/yr	hours per year
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
lb/qtr	pound per quarter
MACT	Maximum Achievable Control Technology
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
PAH	polyaromatic hydrocarbons
PERF	Portable Equipment Relocation Form
PM	particulate matter
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
RAP	recycled asphalt pavement
RFO	reprocessed fuel oil
Rules	Rules for the Control of Air Pollution in Idaho
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_X	sulfur oxides
T/yr	tons per consecutive 12-calendar month period
TAP	toxic air pollutants
T-RACT	Toxic Air Pollutant Reasonably Available Control Technology
VOC	volatile organic compounds
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Refer to the description provided in the February 10, 2010 Statement of Basis for PTC No. P-2010.0005, except that the last paragraph is revised to read as follows:

The counter flow Knife River hot mix asphalt (HMA) plant will have a maximum production rate of 10,000 T/day and a maximum annual production rate of 1,400,000 T/yr. The daily throughput limits will vary dependent on the time of year. The maximum rate of 10,000 T/day is allowed from April 1st through November 31st. Only a 5,000 T/day throughput is allowed for the remainder of the year, December 1st through March 31st. Both generator sets will have an hourly operational limits; 8 hr/day and 16 hr/day for the 125 kW and 910 kW generator sets respectively. The facility will also abide by a 512 foot setback distance. This HMA plant may also collocate and operate simultaneously (both within a given day), at a reduced production rate, with a rock crushing plant under the conditions specified in the permit.

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).

March 29, 2011	P-2010.0005, revised PTC issued to allow collocation with a crusher and increased daily production limit (A)
March 19, 2010	P-2010.0005, Initial PTC issued for this portable HMA plant, Permit status (S)

Application Scope

This PTC is for a revision, with no hourly or annual emission increases, at an existing minor facility. The applicant has proposed to:

- Add provisions to allow for collocation and operation of a rock crushing plant with the HMA plant.
- Increase the daily production limit from 8,000 to 10,000 tons/day from April 1 through November 30, and from 4,000 to 5,000 tons/day from December 1 through March 31.
- Revise the setback distance to match the requested changes.

Application Chronology

December 23, 2010	DEQ received an application and an application fee.
January 3 - 18, 2011	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
January 20, 2011	DEQ determined that the application was complete.
March 15, 2011	DEQ made available the draft permit and statement of basis for peer and regional office review.
March 17, 2011	DEQ made available the draft permit and statement of basis for applicant review.
March 17-18, 2011	Comments on the draft permit were received (refer to permit condition 33).
March 25, 2011	DEQ received the permit processing fee.

TECHNICAL ANALYSIS

Emissions Units and Control Devices

This information is not changed. Refer to the description provided in the February 10, 2010 Statement of Basis for PTC No. P-2010.0005.

Emissions Inventories

The maximum hourly and annual emissions from this source did not change. Refer to the February 10, 2010 Statement of Basis for details. For modeling purposes, the 24-hour average emission rates were recalculated for purposes of demonstrating compliance with the NAAQS and TAP requirements under the revised operating conditions. Refer to the modeling information for details.

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix A, the estimated emission rates of PM_{10}, SO_2, NO_X, CO, VOC, HAP, and TAPs from this project were re-evaluated to show that the revised permit would continue to meet applicable requirements according to State of Idaho Air Quality Modeling Guideline[1].

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 compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any applicable toxic air pollutants (TAP) acceptable ambient concentration (AAC), or acceptable ambient concentration for carcinogens (AACC), or for those TAPs using T-RACT the emissions increase will not exceed the allowable level specified in IDAPA 58.01.01.210.12. A An ambient air quality impact analyses 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 A).

REGULATORY ANALYSIS

The entire Regulatory Analysis for this PTC is unchanged by this PTC revision. For details, refer to the Regulatory analysis provided in the February 10, 2010 Statement of Basis for PTC No. P-2010.0005.

Permit Conditions Review

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

Revised Permit Condition 3

This permit condition was revised by changing the last paragraph to read as follows:

> *The counter flow Knife River HMA plant will have a maximum production rate of 10,000 T/day and a maximum annual production rate of 1,400,000 T/yr. This HMA plant may also collocate and operate simultaneously (both within a given day), at a reduced production rate, with a rock crushing plant under the conditions specified in this permit.*

---

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

Revised Permit Condition 9

Permit condition 9 was revised as follows to re-establish production limits that correspond to the NAAQS and TAP compliance demonstration as described in the modeling analyses:

Asphalt Production Limits

To demonstrate compliance with the emissions limits, the production rate of asphalt shall not exceed any of the following limits:

- *10,000 tons per day from April 1 through November 31.*
- *5,000 tons per day from April 1 through November 31 during any day during which a collocated rock crushing plant is also operated.*
- *5,000 tons per day from December 1 through March 31.*
- *2,500 tons per day from April 1 through November 31 during any day during which a collocated rock crushing plant is also operated.*
- *1,400,000 tons per any consecutive 12-calendar month period.*
- *Recycled Asphalt Pavement (RAP) may be used at a rate of up to 50% of the total production*

Revised Permit Condition 10

Permit condition 10 was revised as shown below to re-establish the setback distance requirements that correspond to the NAAQS and TAP compliance demonstration as described in the modeling analyses:

Setback Distance Requirements

Setback distance is defined as the minimum distance from any emission stack to property boundary. On days when the large (912 kW) generator is utilized to operate the HMA plant, the setback distance in any direction to the property boundary shall be greater than or equal to 512 feet (156 meters), ±6 feet. On days when line power is utilized to operate the HMA plant, the setback distance in any direction to the property boundary shall be greater than or equal to 476 feet (145 meters), ±6 feet.

Revised Permit Condition 16

Permit condition 16 was revised to remove the requirements for submittal of the Baghouse Filter System Procedures document "within 60 days" and to now specify this as an on-going requirement to "maintain and follow" this document instead.

Revised Permit Condition 33

Permit condition 33 was revised as shown below to set forth specific conditions under which the HMA plant may collocate and operate with a rock crushing facility. Refer to the modeling memorandum for additional information regarding collocation. Also as shown below, two comments were received from the facility with regard to the collocation requirements and how to measure the corresponding "setback distances". A sentence was added at the end of this permit condition for the purpose of clarifying the meaning of the term collocation.

Collocation

The emission sources listed in the Regulated Sources Table may not co-locate with any other operating emissions sources except for a rock crushing plant. Emissions sources are considered to be co-located if they are operating within 1,000 feet (305 meters) of each other. When collocated with a rock crushing plant, the hot mix asphalt plant may be operated simultaneously with the rock crushing plant (both within a given day) if the corresponding Asphalt Production Rate limits listed in this permit are complied with. If the rock crushing plant is located over 1000 feet from the HMA plant, then it is not considered to be collocated with the HMA plant.

Comment received from Knife River on March 17, 2011: The following comment was received from the facility with regard to this permit condition: "Just started reading the draft and I wanted to verify that if the rock crusher and hot plant are over 1000 feet away from each other on the site that we still have the ability to produce 10,000 tons of HMAC per day."

DEQ response to comment: Yes, this statement is correct. The intent in the modeling was that full production would be allowed if another plant, rock crusher, etc was located over 1000 ft from the HMA plant. To make this more clear, a statement to this effect was added as the last sentence to the collocation permit condition.

Comment received on March 18, 2011 from Knife River: "I wanted to inquire on the 1,000 foot requirement to further my understanding. As we intend to be collocated with a rock crusher at the Albion site, can you let me know where we measure from to determine the 1,000 feet? I was guessing either the center mass of the respective asphalt plant or crusher or perhaps the stack of the asphalt plant and the jaw of the crusher? Also is this distance line of site, or 1,000 feet on the ground? (the crusher and asphalt plant are at significantly different elevations.)

DEQ Response: The 1000 ft is between emissions points to emissions points by line of sight. The emissions points would be the dryer stack, storage silo, aggregate hopper, generator stack, or crusher unit. Conveyor transfers are not substantial emitters, and from a modeling standpoint we don't need to consider them in that distance. This interpretation applies to both the "1000 ft" distance and the "setback distance" as described in the permit.

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 – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM DRAFT

DATE: December 29, 2010

TO: Ken Hanna, Air Program

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

PROJECT: P-2010.0005 PROJ60672 PTC Application for a modification to the Knife River Portable Hot Mix Asphalt Plant

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs)

1.0 Summary

Knife River, Inc. (Knife River) submitted a Permit to Construct (PTC) application for modifications to their portable hot mix asphalt (HMA) plant operated in Idaho. Non-site-specific air quality impact analyses involving atmospheric dispersion modeling of emissions associated with the HMA plant were performed by DEQ to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and 203.03 [Idaho Air Rules Section 203.02 and 203.03]). Knife River submitted applicable information and data enabling DEQ to perform non-site-specific ambient air impact analyses.

DEQ performed non-site-specific air quality impact analyses to assure compliance with air quality standards for the proposed modification of the Knife River HMA plant. Results from DEQ's atmospheric dispersion modeling were used to establish minimum setback distances between emissions points and the property boundary of the site. The submitted information, in combination with DEQ's air quality analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all locations outside of the required setback distance (closest distance from pollutant emissions points to the property boundary). Table 1 presents key assumptions and results to be considered in the development of the permit.

Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 40 CFR 51, Appendix W (Guideline on Air Quality Models). Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted information, in combination with DEQ's analyses, demonstrated to the satisfaction of the Department that operation of the proposed facility or modification will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Maximum HMA throughput does not exceed 400 ton HMA/hour, 10,000 ton HMA/day, and 1,400,000 ton HMA/year.	Short-term and annual modeling was performed assuming these rates.
Maintain a 156 meter (512 foot) setback distance between emissions points and the nearest property boundary.	This setback distance is necessary to assure compliance with applicable air quality standards at all ambient air locations.
HMA production is half the stated value for the winter season (December 1 through March 31).	Substantially greater setback distances would be needed if full production was assumed for the winter season.
The HMA plant will not locate to a site where there are co-contributing emissions sources such as other HMA plants, concrete batch plants, or rock crushing plants within 1,000 feet of emissions points, except as noted below for a rock crushing plant. However, NAAQS compliance is assured for an HMA plant with a co-contributing rock crushing plant, provided it is not operated during any day when the HMA plant is operated.	Emissions are considered co-contributing if they occur within 1,000 feet (305 meters) of each other. Once the HMA plant is established at a specific site, that facility is not responsible for controlling other facilities from moving in nearby, provided they are not on the same property. Neighboring facilities would be required to account for the HMA impacts for their permitting analyses.
DEQ Modeling staff contend that NAAQS compliance is assured for an HMA plant operating simultaneously (both within a given day) with a crushing plant, provided HMA daily throughput for that day is limited to half that normally allowed.	Decreased HMA throughput will offset potential impacts of a nearby crushing plant.
Large diesel engines powering generators: powered by engines rated at >175 bph and have a combined power rating of less than 1,220 bhp.	Different combinations can be used if it is demonstrated that total emissions from generators are less than those modeled for these sources.
Small diesel engines powering generators: powered by engines having a combined power rating of less than 168 bhp.	Different combinations can be used if it is demonstrated that total emissions from generators are less than those modeled for these sources.
Fugitive emissions from material handling and vehicle traffic are controlled to a high degree.	Control of conveyor transfers and screening are equivalent to that achieved by a water spray.
The HMA plant may not locate in any non-attainment areas.	All analyses performed assumed the facility will be located in areas attaining air quality standards.
Emissions rates for applicable averaging periods are not greater than those used in the modeling analyses, as listed in this memorandum.	Emissions may vary according to available setback as indicated in this memo.
Stack heights for the drum dryer, tank heater, and generator are as listed in this memorandum or higher.	NAAQS compliance is still assured if actual stack heights are greater than those listed in this memo.
NAAQS compliance is assured provided stack parameters of exhaust temperature and flow rate 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.
T-RACT is used for all TAP emissions sources except diesel engines (which are not applicable for those TAPs modeled, since they are subject to 40 CFR 63.iiii or zzzz)	Setback distances would be substantially greater if DEQ does not concur that T-RACT was used to control TAP emissions. This was addressed in the application for the existing permit.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 *Area Classification*

The HMA plant will be a portable facility. The HMA plant will only locate in areas designated as attainment or unclassifiable for all criteria pollutants.

2.1.2 Significant and Cumulative NAAQS Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed facility exceed the significant impact levels (SILs) of Idaho Air Rules Section 006 (referred to as a significant contribution in Idaho Air Rules), then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and Idaho Air Rules Section 203.02. A cumulative NAAQS impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions, and emissions from any nearby co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled value that must be used for comparison to the NAAQS.

New source review requirements for assuring compliance with $PM_{2.5}$ standards have not yet been completed and promulgated into regulation. EPA has asserted through a policy memorandum (October 23, 1997) that compliance with $PM_{2.5}$ standards will be assured through an air quality analysis for the corresponding PM_{10} standard. DEQ allows a direct surrogate use of PM_{10} modeling results rather than the adjustments and justifications for surrogate use as suggested by the EPA March 23, 2010, Stephen Page Memo (Memorandum from Stephan Page, Director of Office of Air Quality Planning and Standards, EPA, *Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS*, March 23, 2010). Although the PM_{10} annual standard was revoked in 2006, compliance with the revoked PM_{10} annual standard must be demonstrated as a surrogate to the annual $PM_{2.5}$ standard.

New NO_2 and SO_2 short-term standards have recently been promulgated by EPA. The standards will not be applicable for permitting purposes in Idaho until they are incorporated by reference sine die into Idaho Air Rules (Spring 2011).

DEQ used non-site-specific full impact analyses to demonstrate compliance with Idaho Air Rules Section 203.02. Established setback distances are minimal distances between any emissions points and the ambient air boundary (usually the property boundary) needed to assure compliance with standards, considering the impact of the HMA plant and a conservative background value.

2.1.3 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.*

Permit requirements for toxic air pollutants 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. If DEQ determines T-RACT is used to control emissions of carcinogenic TAPs, then modeled concentrations of 10 times the AACC are considered acceptable, as per Idaho Air Rules Section 210.12.

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 Value Used[d]
PM_{10}[e]	Annual[f]	1.0	50[g]	Maximum 1st highest[h]
	24-hour	5.0	150[i]	Maximum 6th highest[j]
$PM_{2.5}$[k]	Annual	0.3	15[l]	Use PM_{10} as surrogate
	24-hour	1.2	35[m]	Use PM_{10} as surrogate
Carbon monoxide (CO)	8-hour	500	10,000[n]	Maximum 2nd highest[h]
	1-hour	2,000	40,000[n]	Maximum 2nd highest[h]
Sulfur Dioxide (SO_2)	Annual	1.0	80[g]	Maximum 1st highest[h]
	24-hour	5	365[n]	Maximum 2nd highest[h]
	3-hour	25	1,300[n]	Maximum 2nd highest[h]
	1-hour	3 ppb[o]	75 ppb[p]	Mean of maximum 4th highest[q]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[g]	Maximum 1st highest[h]
	1-hour	4 ppb[o]	100 ppb[r]	Mean of maximum 8th highest[s]
Lead (Pb)	Quarterly	NA	1.5[g]	Maximum 1st highest[h]
	3-month[t]	NA	0.15[g]	Maximum 1st highest[h]

a. Idaho Air Rules Section 006.
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.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers.
f. The annual PM_{10} standard was revoked in 2006. The standard is still listed because compliance with the annual $PM_{2.5}$ standard is demonstrated by a PM_{10} analysis that demonstrates compliance with the revoked PM_{10} standard.
g. Not to be exceeded in any calendar year.
h. Concentration at any modeled receptor.
i. Never expected to be exceeded more than once in any calendar year.
j. Concentration at any modeled receptor when using five years of meteorological data.
k. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
l. 3-year average of annual concentration.
m. 3-year average of the upper 98th percentile of 24-hour concentrations.
n. Not to be exceeded more than once per year.
o. Interim SIL established by EPA policy memorandum.
p. 3-year average of the upper 99th percentile of the distribution of maximum daily 1-hour concentrations.
q. Mean (of 5 years of data) of the maximum of 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled.
r. 3-year average of the upper 98th percentile of the distribution of maximum daily 1-hour concentrations.
s. Mean (of 5 years of data) of the maximum of 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled.
t. 3-month rolling average.

2.2 Background Concentrations

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. Table 3 lists appropriate background concentrations for rural Idaho areas.

Background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Background concentrations in the DEQ non-site-specific analyses were based on DEQ default values for rural/agricultural areas.

Table 3. BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
PM_{10}[b]	24-hour	73
	Annual	26
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO_2)	3-hour	34
	24-hour	26
	Annual	8
Nitrogen dioxide (NO_2)	Annual	17
Lead (Pb)	Quarterly	0.03

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

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

3.1.1 Overview of Analyses

DEQ performed non-site-specific analyses that were determined to be reasonably representative of the proposed HMA plant, and the results demonstrated compliance with applicable air quality standards to DEQ's satisfaction.

Because of the portable nature of HMA plants, DEQ performed non-site-specific modeling to establish setback distances between locations of emissions points and the property boundary of the modified HMA plant.

The proposed project is a modification to an existing permitted HMA plant that involves only an increase in 24-hour HMA allowable production and a request to allow co-location with a rock crushing plant. DEQ performed the air impact analyses for the existing plant in early 2010, establishing a 131 meter setback requirement between emissions points and the property boundary. Air impacts for 1-hour, 3-hour, and

---

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling.* Memorandum to Mary Anderson, March 14, 2003.

annual averaging periods were not affected by the modification; therefore, previously performed analyses are still valid and were not reassessed for this project.

Table 4 provides a brief description of parameters used in the DEQ modeling analyses.

Table 4. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description[a]**
General Facility Location	Portable	Can only locate in attainment or unclassifiable areas
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 09292
Meteorological Data	Multiple Data Sets	See Section 3.1.4
Terrain	Flat	The analyses assumed flat terrain for the immediate area
Building Downwash	Considered	A structure of 3 m X 2.5 m X 3 m high was assumed for downwash consideration, representing a large generator.
Receptor Grid	Grid 1	5-meter spacing along the property boundary out 100 meters
	Grid 2	10-meter spacing out to 200 meters

3.1.2 Modeling protocol and Methodology

A modeling protocol was not submitted to DEQ prior to the application because DEQ staff performed non-site-specific air quality impact analyses rather than the applicant. Non-site-specific modeling was generally conducted using data and methods described in the *State of Idaho Air Quality Modeling Guideline.*

Because of the portable nature of the HMA plant, DEQ performed non-site-specific modeling to establish setback distances between locations of emissions points and the property boundary for the modified HMA plant.

3.1.3 Model Selection

Idaho Air Rules Section 202.02 require 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. EPA provided a 1-year transition period during which either ISCST3 or AERMOD could be used at the discretion of the permitting agency. AERMOD must be used for all air impact analyses, performed in support of air quality permitting, conducted after November 2006.

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 offers the following improvements over ISCST3:

- Improved dispersion in the convective boundary layer and the stable boundary layer
- Improved plume rise and buoyancy calculations
- Improved treatment of terrain affects on dispersion
- New vertical profiles of wind, turbulence, and temperature

AERMOD was used for the DEQ analyses to evaluate impacts of the HMA plant.

3.1.4 Meteorological Data

Because of the portable nature of HMA plants, DEQ used seven different meteorological data sets from various locations in Idaho to assure compliance with applicable standards for the non-site-specific analyses. Table 5 lists the meteorological data sets used in the air impact analyses.

Table 5. METEOROLOGICAL DATA SETS USED IN MODELING ANALYSES		
Surface Data	**Upper Air Data**	**Years**
Boise	Boise	2001-2005
Aberdeen	Boise	2001-2005
Idaho Falls	Boise	2000-2004
Minidoka	Boise	2000-2004
Soda Springs	Boise	2004-2008
Lewiston	Spokane, Wa	1992-1995, 1997
Sandpoint	Spokane, Wa	2002-2006

Use of representative meteorological data is of greater concern when using AERMOD than when using ISCST3. This is because AERMOD uses site-specific surface characteristics to more accurately account for turbulence. To account for this uncertainty, the following measures were taken:

- Use the maximum of 2nd high modeled concentration to evaluate compliance with the 24-hour PM_{10} standard, rather than the maximum of 6th high modeled concentration typically used when modeling a five-year meteorological data set to demonstrate that the standard will not be exceeded more than once per year on average over a three year period.

- Use the maximum of 1st high modeled concentration to evaluate compliance with all pollutants and averaging times, except for 24-hour PM_{10}.

3.1.5 Terrain Effects

Terrain effects on dispersion were not considered in the non-site-specific analyses. Assuming flat terrain is not a critical limitation of the analyses because most emissions points associated with HMA plants 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 affect of surrounding terrain to influence the magnitude of maximum modeled impacts.

3.1.6 Facility Layout

DEQ's analyses used a conservative generic facility layout. This was done because the specific layout will vary depending upon product needs and specific characteristics of the site. To provide conservative results, DEQ used a tight grouping of emissions sources. Sources were positioned within 2.5 meters of the center of the facility.

3.1.7 Building Downwash

Downwash effects caused by the generator housing were accounted for by including the generator structure as a building with dimensions of 3.0 meter by 2.5 meter by 3.0 meter high.

Downwash effects from other structures at the site were not accounted for because of the following:

- Determining a building configuration is extremely difficult given the portable nature of the facility.
- Much of the equipment is porous with regard to wind, thereby minimizing downwash effects.

3.1.8 Ambient Air Boundary

DEQ's non-site-specific analyses, 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). Ambient air is any area where the general public (anyone not under direct control of the HMA plant) has access. The issued permit will specify throughput restrictions and an emissions point setback from ambient air.

3.1.9 Receptor Network and Generation of Setback Distances

Setback distances were determined by first modeling the plant using a dense receptor grid. Results were then reviewed to find the receptor furthest from any emissions source that shows an exceedance of the standard when combined with a background value. The setback distance was calculated as the maximum distance between the next furthest receptor and any emissions point.

A circular grid with 5.0 meter receptor spacing, extending out to at least 100 meters, was used in the non-site-specific modeling performed by DEQ. To establish a setback distance, the following procedure was followed for the requested production level and operational configuration:

1) Trigger values for the modeling analyses were determined. These are values, when combined with background concentrations, indicated an exceedance of a standard. They were calculated by subtracting the background value from the standard (because the model does not specifically include background in the results). The following are trigger values:

PM_{10}	24-hour	77 $\mu g/m^3$
	annual	24 $\mu g/m^3$
SO_2	3-hour	1266 $\mu g/m^3$
	24-hour	339 $\mu g/m^3$
	annual	72 $\mu g/m^3$
CO	1-hour	36400 $\mu g/m^3$
	8-hour	7700 $\mu g/m^3$
NO_2	annual	83 $\mu g/m^3$

2) For the operational configuration, pollutant, averaging period, and meteorological data set, all receptors with concentrations equal or greater than the trigger value were plotted. This effectively gave a plot of receptors where the standard could be exceeded for that pollutant and averaging period.

3) The controlling receptor for each pollutant, averaging period, and meteorological data set was identified. First, the receptor having a concentration in excess of the trigger value that was the furthest from any emissions source was identified. The controlling receptor was the next furthest downwind receptor from that point.

4) The minimum setback distance was calculated. This was the furthest distance between an emissions point and the controlling receptor.

Figure 1 shows an example of how setback distances are determined for a specific modeling run. Emissions points are grouped in a cluster at the center within a 5.0 meter square area. The outer-most contour line shows POM concentrations at the AACC for that TAP. POM would be the controlling pollutant if T-RACT were not implemented, and the resulting setback distance would be very large. Accounting for T-RACT results in a substantially smaller contour (allowable concentrations at a factor of ten larger), as indicated by the inner-most contour. The middle contour line shows the extent of modeled concentrations exceeding the trigger value for 24-hour PM_{10}. The point on the contour line that is the furthest from the emissions points is identified, and then the controlling receptor is identified as the next furthest receptor beyond that point. The distance is determined from the coordinates of the controlling receptor according to the following (with the center of the emissions sources at 0.0 m Northing and 0.0 m Easting):

$$\text{Distance} = \sqrt{\left(\left|\text{Northing Coordinate}\right| + 3\right)^2 + \left(\left|\text{Easting Coordinate}\right| + 3\right)^2}$$

The factor of 3 in the equation accounts for an emissions point located on the opposite side of the facility center from where the maximum impact is (at -2.5 meters Easting, -2.5 meters Northing if the maximum setback distance is in the direction of positive easting and northing coordinates).

3.2 Emission Rates

Emissions rates of criteria pollutants and TAPs were calculated for the modified HMA plant production rate and operational configuration for various applicable averaging periods.

3.2.1 Criteria Pollutant Emissions Rates

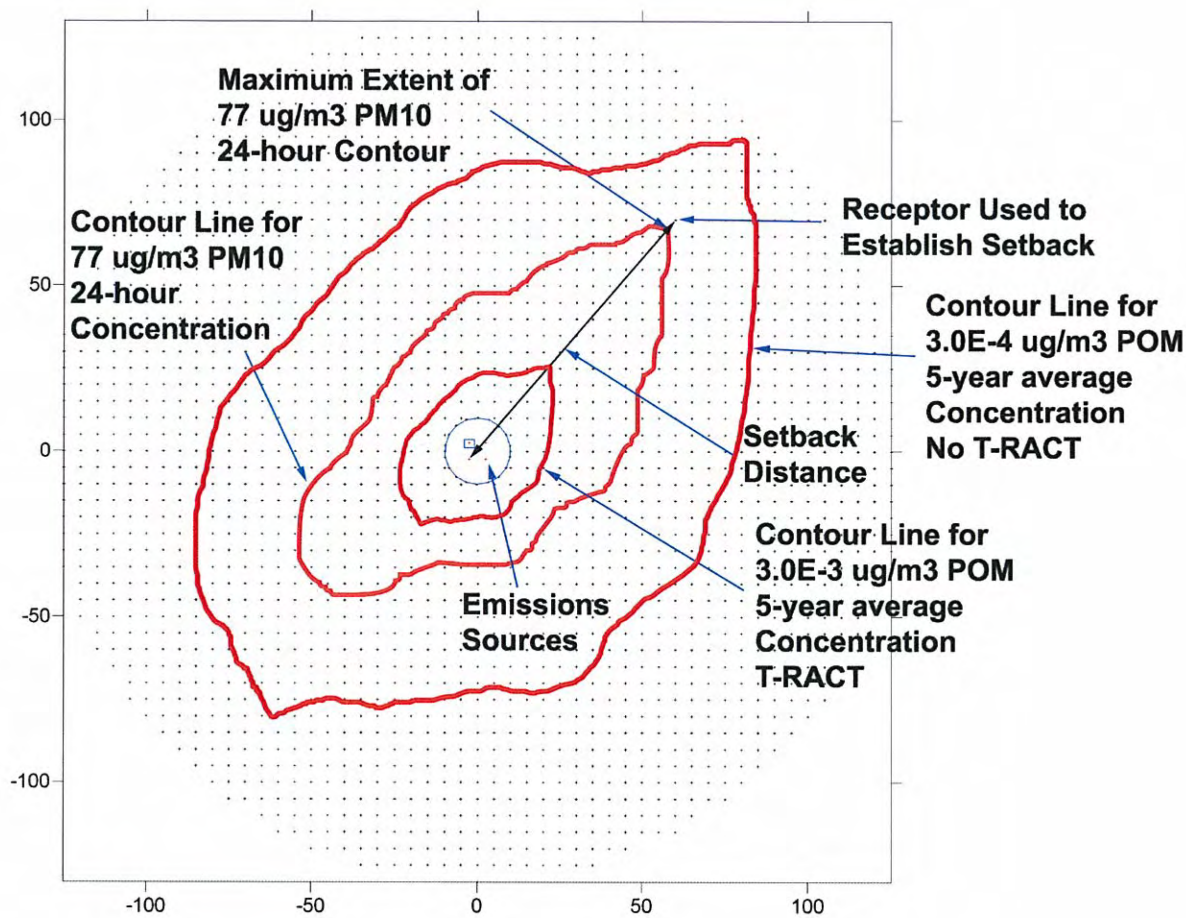
Table 6 lists criteria pollutant emissions rates used in the DEQ non-site-specific modeling analyses for the HMA plant production rate, operational configuration, and for all applicable averaging periods. Attachment 1 provides additional details of DEQ emissions calculations.

The proposed modification only involved a change in allowable 24-hour production rates. Other averaging periods were not assessed since they will be unchanged from the previously performed analyses used to support issuance of the existing permit. Previous air impact analyses indicated that 24-hour PM_{10} impacts were by far the most restrictive in determining setback distances.

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

Emissions from screening of aggregate and three conveyor transfers were combined into one source (emissions point CONVEY in the model). DEQ used emissions factors for controlled screening and conveyor transfers. Controlled emissions, based on use of water sprays, were used for screening and conveyor transfers because compliance with the 24-hour PM_{10} standard could not be demonstrated with a reasonable setback distance when using uncontrolled screening and conveyor transfer emissions.

Figure 1 - Determination of Setback Distance for a Modeling Run



DEQ's air impact analyses assumed that daily operations and resulting emissions during the period of December 1 through March 31 were at half those otherwise listed at the top of Table 6. The reductions in emissions were only applied to sources where emissions are a direct function of throughput. Reductions were not applied to generators and the asphalt oil tank heater.

Operations of the 1 MMBtu/hour asphalt oil tank heater were assumed to be 8.0 hour/day and 2,000 hour/year. This accounts for the intermittent nature of the heater – only operating a maximum of about 33 percent of the time while keeping asphalt oil at desired temperature.

Modeled emissions rates of 24-hour PM_{10} from the 1,220 bhp engine and 168 bhp engine were substantially greater than those estimated in the submitted application (0.30 lb/hr vs 0.04 lb/hr for the

1,220 bhp engine and 0.167 lb/hr vs 0.121 lb/hr for the 168 bhp eninge). DEQ analyzed the controlling setback scenario with the reduced emissions rate for the engine and found it did not change the final setback distance.

Table 6. EMISSIONS USED IN DEQ ANALYSES

Emissions Point in Model	Pollutant	Averaging Period	Emissions Rate (lb/hr) 10,000 ton/day[a]
DRYER – drum dryer/mixer - emissions controlled by a baghouse	PM_{10}	24-hour	9.583[a]
	SO_2	24-hour	4.583
SILO – asphalt storage silo[b]	PM_{10}	24-hour	0.2441[a]
LOAD – asphalt loadout	PM_{10}	24-hour	0.2175[a]
HOTOIL[c] – asphalt oil heater	PM_{10}	24-hour	8.027E-3
	SO_2	24-hour	0.1727
GEN1[d] – electrical generator	PM_{10}	24-hour	0.2960 (0.03945[e])
	SO_2	24-hour	9.547E-3
GEN2[f] – electrical generator	PM_{10}	24-hour	0.1668 (0.1212[e])
	SO_2	24-hour	0.1561
MATHNDHI[g] – aggregate handling by frontend loader	PM_{10}	24-hour	0.6117[a]
CONVEY – conveyors, scalping screen	PM_{10}	24-hour	0.3512[a]

a. During December 1 through March 31 throughput and resulting emissions levels will be half that listed.
b. Silo filling emissions are routed back to the drum dryer and will be emitted out the stack of the dryer baghouse.
c. Assumes 8 hr/day of actual operation.
d. Assumes 16 hr/day operation.
e. Revised emissions rate – used to evaluate whether the controlling setback would change.
f. Assumes 8 hr/day operation.
g Emissions are varied in the model according to wind speed category. Emissions listed are based on a 10 mph wind speed.

3.2.2 TAP Emissions Rates

The proposed modification of the HMA plant will not result in an increase in any TAP emissions. TAPs analyses performed for the previously issued permit indicated a setback of 68 meters would be needed to maintain compliance with AACs and AACCs.

3.3 Emission Release Parameters and Plant Criteria

Table 7 lists the characteristics of HMA plants used in DEQ's non-site-specific air impact analyses. Different scenarios were used to generate different setback distances depending upon throughput rates.

Table 8 provides emissions release parameters for the analyses including stack height, stack diameter, exhaust temperature, and exhaust velocity. Additional details are provided in Attachment 1.

Asphalt loadout was modeled as a point sources, rather than a volume sources, to account for thermal buoyancy of the emissions. Release parameters for asphalt loadout was based on the following:

- 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.

Emissions from silo loading were modeled assuming those emissions are routed back into the drum dryer. Combined dryer and silo filling emissions were modeled through the drum dryer stack.

Table 7. CHARACTERISTIC OF HMA PLANT USED IN DEQ ANALYSES	
Parameter	**Value or Description**
HMA Throughput Rates	400 ton/hr, 10,000 ton/day[a], 1,400,000 ton/yr
Co-Contributing Sources	The emissions points of the HMA plant are not be located within 1,000 feet of other permittable emissions sources. A rock crushing plant could be operated at the site provided it is not operated during any day when the HMA plant is operated. Alternatively, a rock crusher could be operated simultaneously (both operating in a given day) with the HMA plant provided the HMA throughput for that day does not exceed a value of half that otherwise allowed.
Drum Dryer	Drum dryer fueled by natural gas, diesel, or used oil, with a baghouse for emissions control.
Dryer Stack Parameters	Stack height ≥9.0 m, stack diameter ≈1.4 m, gas temp ≥ 422 K, flow velocity ≥20 m/sec.
Asphalt Silo Filling	All emissions are captured and routed back into the drum dryer.
Asphalt Loadout	Model as a point source. Stack height = 5 m, stack diameter = 3.0 m, gas temp = 346 K (163° F), flow velocity = 0.1 m/sec. These parameters were developed by the modeling group to represent the nature of released emissions from this source in most all applications.
Tank Heater	<1 MMBtu/hr heat input, using either natural gas or distillate. ≤8 hr/day and 2000 hr/yr operation.
Heater Stack Parameters	Stack height ≥4.0 m, stack diameter ≈0.27 m, gas temp ≥458 K, flow velocity ≥2.7 m/sec.
Electrical Power	Line power or diesel-fired generators with the following characteristics: 1) a large generator powered by a engine between 175 bhp and 1,220 bhp, burning 0.0015% sultur fuel, operating less than 16 hr/day; 2) a small generator powered by a engine of less than 168 bhp, burning 0.5% sulfur fuel, operating less than 8 hr/day. Other generators or combination of generators can be used provided the cumulative bhp rating of the engines do not exceed 168 bhp for smaller engines and 1,220 bhp for larger engines.
Large Generator Stack Parameters	Stack height ≥2.2 m, stack diameter ≈ 0.20 m, gas temp ≥500 K, flow velocity ≥60 m/sec.
Small Generator Stack Parameters	Stack height ≥2.1 m, stack diameter ≈ 0.10 m, gas temp ≥500 K, flow velocity ≥25 m/sec.
Conveyor Transfers	≤3 transfers for any given quantity of material processed. Emissions controlled to a point equivalent to use of a water spray.
Scalping Screen	≤1 screen for any given quantity of material processed. Emissions controlled to a point equivalent to use of a water spray.
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.
Seasonal Restriction	Throughput is restricted to half allowable rates during the period between December 1 and March 31.

[a] Half the listed value for December 1 through March 31.

Table 8. EMISSIONS RELEASE PARAMETERS

Release Point /Location	Source Type	Stack Height (m)[a]	Modeled Diameter (m)	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
DRYER	Point	9.0	1.4	422	20
LOADOUT	Point	5.0	3.0	346	0.1
HOTOIL	Point	4.0	0.27	458	2.7
GEN1	Point	2.2	0.2	500	60
GEN2	Point	2.1	0.10	500	25
Volume Sources					
Release Point /Location	**Source Type**	**Release Height (m)**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
MATHNDHI	Volume	2.5	4.65	1.16	
CONVY	Volume	5.0	4.65	1.16	

[a] Meters
[b] Kelvin
[c] Meters per second

3.4 *Results for Cumulative NAAQS Impact Analyses and TAPs Analyses*

DEQ determined modified setback distances from the non-site-specific modeling results for PM_{10} and SO_2 24-hour averaging periods. Setback distances are the closest distance between the property boundary and the emissions release point of any emissions source (HMA plant stack, asphalt loadout point, aggregate hoppers, generator stacks, scalping screen, or conveyor transfer points). A setback distance of 156 meters (512 feet) is necessary to assure compliance with NAAQS, with 24-hour PM_{10} impacts being the driver in the analyses.

3.5 Locating with Other Facilities/Equipment

The air impact analyses performed by DEQ assume there are no other emissions sources 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 a rock crushing plant, another HMA plant, a ready-mix concrete plant, or other permitted 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 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.

HMA plants commonly co-locate with rock crushing plants. Since the 24-hour PM_{10} impacts are the governing criteria for the Knife River facility (governing for criteria pollutants – contributions of TAPs from other facilities are not considered in permitting analyses for the HMA plant), simultaneously operation on an annual basis is not a large concern. DEQ modeling staff determined NAAQS compliance is still assured when a rock crushing plant co-locates with the HMA plant, provided the HMA plant does not operate during any day when the rock crushing plant is. DEQ modeling staff also determined NAAQS compliance is assured when operating the HMA plant during the same day as the rock crushing plant, provided the throughput of the HMA plant is half that assumed for the modeling analyses used to generate setback distances.

4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any ambient air quality standard.

ATTACHMENT 1

EMISSIONS CALCULATIONS AND MODELING PARAMETERS FOR

DEQ'S AIR IMPACT ANALYSES

HMA Plant Modeled Emissions Rates

Setback requirements are linked to throughput levels and the equipment configuration.

Drum Dryer Emissions

The DEQ HMA plant emissions calculation spreadsheet was used to generate emissions quantities for applicable averaging periods. Emissions calculations assume worst-case fuels of either used oil, diesel, natural gas, or LPG. Emissions also assume control by a baghouse.

Asphalt Loadout

The DEQ HMA plant emissions calculation spreadsheet was used to generate emissions quantities for applicable averaging periods.

Asphalt Silo Filling

The DEQ HMA plant emissions calculation spreadsheet was used to generate emissions quantities for applicable averaging periods.

Asphalt Tank Heater Emissions

The DEQ HMA plant emissions calculation spreadsheet was used to generate emissions quantities for applicable averaging periods.

Power Generator

The application indicated two diesel engines may be operated at the HMA plant to power electrical generators: 1) an EPA Tier II certified 1,220 bhp diesel engine operating up to 16 hr/day; 2) a 168 bhp diesel engine operating up to 8 hr/day. Emissions estimates were calculated assuming the 1,220 bhp engine will combust diesel with a maximum 0.0015% sulfur content and the 168 bhp engine will combust diesel with a maximum 0.5% sulfur content.

Aggregate Handling Emissions

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

PM_{10} 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	=	0.35 for PM_{10}
M	=	5% 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.

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 factor – use 10 mph wind: $0.35(0.0032)\frac{(10/5)^{1.3}}{(5/2)^{1.4}} = 7.646\text{ E}-4$ lb/ton

Adjustment factors to put in the model:

Cat 1: $(1.72/5)^{1.3}$ (3.105 E-4) = 7.756 E-5 lb/ton
Factor = 7.756 E-5/7.646 E-4 = 0.1014

Cat 2: $(5.18/5)^{1.3}$ (3.105 E-4) = 3.251 E-4 lb/ton
Factor = 3.251 E-4/ 7.646 E-4 = 0.4253

Cat 3: $(9.20/5)^{1.3}$ (3.105 E-4) = 6.861 E-4 lb/ton
Factor = 6.861 E-4/7.646 E-4 = 0.8974

Cat 4: $(14.95/5)^{1.3}$ (3.105 E-4) = 1.290 E-3 lb/ton
Factor = 1.290 E-3/7.646 E-4 = 1.687

Cat 5: $(21.28/5)^{1.3}$ (3.105 E-4) = 2.041 E-3 lb/ton
Factor = 2.041 E-3/7.646 E-4 = 2.669

Cat 6: $(27.74/5)^{1.3}$ (3.105 E-4) = 2.881 E-3 lb/ton
Factor = 2.881 E-3/7.646 E-4 = 3.768

For the operational scenario for 10,000 ton/day HMA emissions are as follows:

Daily PM_{10}:

7.646 E-4 lb PM_{10}	9600 ton	day	2 transfers	=	0.6117 lb
ton	day	24 hr			hr

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

These sources were modeled as a single volume source with a 20-meter square area, 5.0 meters thick, with a release height of 2.5 meters. The initial dispersion coefficients were calculated as follows:

σ_{yo} = 20 m / 4.3 = 4.65 m

σ_{zo} = 5 m / 4.3 = 1.16 m

Conveyors and Screens Emissions

These sources include the scalping screen and conveyor transfers. Controlled emissions factors for the conveyor transfers and the scalping screen were used, assuming the control measures used would be equivalent to the application of water sprays.

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

For the operational scenario for 10,000 ton/day HMA, emissions are as follows:

Scalping Screen (controlled emissions):

Daily PM_{10}:

$0.00074\ lb\ PM_{10}$	9600 ton	day	=	0.2960 lb
ton	day	24 hour		hr

Conveyor Transfers (controlled emissions):

Daily PM_{10}:

$4.60\ E\text{-}5\ lb\ PM_{10}$	9600 ton	day	3 transfers	=	0.05520 lb
ton	day	24 hour			hr

Total Daily Emissions (unloading, screening, conveyors) = 0.3512 lb/hr

These sources were modeled as a single volume source with a 20-meter square area, 5.0 meters thick, with a release height of 5.0 meters. The initial dispersion coefficients are calculated as follows:

$\sigma_{yo} = 20\ m / 4.3 = 4.65\ m$

$\sigma_{zo} = 5\ m / 4.3 = 1.16\ m$

HMA Plant Modeling Parameters

Dryer Baghouse Stack

Release height = 9.0 meters; effective diameter of release area = 1.4 meters;
typical stack gas temperature = 422K; typical flow velocity = 20 meters/second

Asphalt Silo Filling

Emissions from silo filling are routed back through the drum dryer.

Asphalt Loadout

DEQ modeled this source as a point source.
- release height of 5 meters (equal to height of silo)
- 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
- stack velocity of 0.1 m/sec to account for convective air flow.

Aggregate to and from Storage

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: two transfers, equivalent in emissions to that of a frontend loader, from the point of aggregate delivery to transfer to the HMA plant hopper.

Conveyor Transfers and Scalping Screen

Release emissions in model from a 20 m X 20 m area 5 m high, released at 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: all conveyor transfers associated with HMA operations

Asphalt Oil Heater

Parameters for the 1 MMBtu/hr diesel-fired boiler were provided by the applicant and are as follows:

Stack height = 4.0 m; stack diameter = 0.27 meters; stack gas temperature = 458 K; flow velocity = 2.7 meters/second

Power Generator

Stack gas temperatures and flow rates are often overestimated by permit applicants, likely because values reported by manufacturers are often based on values measured at the exhaust manifold rather than at the point of release to the atmosphere.

DEQ modeled all generator emissions at an exit gas temperature of 500 K. A 60 m/sec flow velocity for the 1,220 hp engine was based on an exhaust flow of 4,000 acfm at 500 K, and a 25 m/sec flow velocity for the 168 hp engine was based on an exhaust flow of 416 acfm.

The final point source parameters for the 1,220 hp engine were as follows:

Stack height = 2.2 m; stack diameter = 0.20 meters; stack gas temperature = 500 K; flow velocity = 60 meters/second.

The final point source parameters for the 168 hp engine were as follows:

Stack height = 2.1 m; stack diameter = 0.10 meters; stack gas temperature = 500 K; flow velocity = 25 meters/second.

APPENDIX B – PROCESSING FEE

PTC Fee Calculation

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, Inc, Albion HMA**
Address:	
City:	
State:	
Zip Code:	
Facility Contact:	**Zach O'Kelley**
Title:	**PTC No. P-2010.0005 Project 60672**
AIRS No.:	**777-00472**

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

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM10	0.0	0	0.0
VOC	0.0	0	0.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	**0.0**
Fee Due	**$ 1,000.00**		

Comments: Only a detailed modeling analysis was requried for this project to confirm that NAAQS and TAP requirements will continue to be met and to establish a new "setback distance" for the emission units.