Statement of Basis

Permit to Construct P-2008.0049
Project No. 60903

Hoku Materials, Inc.
Pocatello, Idaho

Facility ID No. 005-00058

Final

December 14, 2011
Dan Pitman, P.E.
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

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CAS No.	Chemical Abstracts Service registry number
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
GHG	greenhouse gasses
HAP	hazardous air pollutants
hp	horsepower
hr/yr	hours per year
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
m	meters
MMBtu	million British thermal units
NAAQS	National Ambient Air Quality Standard
NAICS	North American Industry Classification System
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
PAH	polyaromatic hydrocarbons
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
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
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
U.S.C.	United States Code
UTM	Universal Transverse Mercator
VOC	volatile organic compounds
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Hoku Materials (Hoku) will produce up to 4,000 metric tons per year purified silicon (polysilicon) in a process called chemical vapor deposition. Raw materials used in the production of polysilicon are metallurgical silicon, hydrochloric acid, and hydrogen. Emissions from handling metallurgical grade silicon will be controlled by a baghouse and emissions from the polysilicon production process will be controlled by wet scrubbers.

Metallurgical silicon and hydrochloric acid are reacted in a fluidized bed reactor to produce trichlorosilane (TCS); some silicon tetrachloride (STC) is also produced. TCS and STC are separated and stored. TCS is heated and mixed with hydrogen in a batch reactor, and polysilicon is produced by a process called chemical vapor deposition. Most of the reactor off-gases are recovered in a vent gas recovery system and recirculated back into the process. STC is reacted with hydrogen to produce TCS to be used in the batch reactors.

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).

August 14, 2007	PTC No. P-2007.0075 issued for initial construction of the polysilicon plant. (S)
August 26, 2008	DEQ granted pre-permit construction approval for P-2008.0049, this permit allowed an increase in production from 2,500 metric tons per year to 4,000 metric tons per year. (S)

Application Scope

This PTC is for a revision to an existing facility that has been issued a facility emission cap (FEC) permit.

The applicant has proposed to revise the permit to:

- Replace continuous HCL monitoring requirements with periodic source testing and parametric monitoring requirements.
- Removal of a silicon tetrahydride emission limit.
- Remove a nitric acid usage limit.
- Increase the hydrofluoric acid usage limit from 5 gallons per day to 6.7 gallons per day.

The application does not request an increase in the currently allowable emission rates specified by the existing FEC permit.

The facility is also making the changes listed below which are allowed under the FEC permit regulations (IDAPA 58.01.01.181.01) without a need for a permit revision. Section 181 allows for facility changes that are not included in the original FEC permit provided the potential emissions from those changes do not cause an exceedance of any ambient air quality standard, and the potential emissions from the facility do not exceed the existing FEC limits and the facility notifies DEQ.

- The facilities layout (location of stacks, buildings) changed from the original analysis.
- The facility added two 2,000 kW emergency generators
- The hot oil boiler rated input capacity increased from 55 MMBtu/hr of natural gas to 89.2 MMBtu/hr.
- The facility added two 8 MMBtu/hr natural gas fired boilers (Waste Water Boiler and HCL Boiler).
- The facility added a methane reformer (hydrogen generating plant) that consumes 12.5 MMBtu of natural gas of which approximately 6 MMBtu are combusted and the remainder is used to produce hydrogen.

Even though these changes may be made under the current FEC permit without a need for a permit revision they are included in the permit since the permit needed to be revised to include revisions discussed in the opening paragraphs of this section of the Statement of Basis.

Application Chronology

February 23, 2011	DEQ received an application fee.
July 25, 2011	DEQ received an application.
August 8 - 23, 2011	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
August 23, 2011	DEQ determined that the application was incomplete.
August 30, 2011	DEQ received supplemental information from the applicant.
September 13, 2011	DEQ determined that the application was complete.
November 21, 2011	DEQ received the permit processing fee.

TECHNICAL ANALYSIS

Emissions Units and Control Devices

Table 1 FACILITY EMISSIONS DESCRIPTION

Emissions Unit / Process	Emissions Control Device
Silicon Storage Bin	Baghouse
Primary Silicon Feed Bin	Baghouse
Secondary Silicon Feed Bin	Baghouse
Lime Silo	Baghouse
Polysilicon Production – 4,000 Metric Tons/Year • HCl storage and transfer • Trichlorosilane Production • Trichlorosilane Purification • Trichlorosilane Storage • Polysilicon Reaction • Silicon Tetrachloride storage and Hydrogenation • Vent Gas Recovery	Scrubbers
Hot Oil Heater - 89.2 MMBtu/hr, Natural Gas	None
HVAC Boiler – 10 MMBtu/hr, Natural Gas	None
Wastewater Boiler – 8 MMBtu/hr, Natural Gas	None
HCL Boiler – 8 MMBtu/hr, Natural Gas	None
Methane Reformer - consumes 12.5 MMBtu of natural gas of which approximately 6 MMBtu are combusted and the remainder is used to produce hydrogen	None
Emergency Generators (3 - 2,000 Kw each)	None
Diesel Firewater Pump – 400 Hp	None
Cooling Tower	None
Relief Vent Valves	Relief Vent Valve Scrubber
Laboratory	Laboratory Scrubber

Emissions Inventories

Post Project Potential to Emit

The facilities post project potential to emit for criteria air pollutants is equivalent to the FEC emission limits included in the permit. There is no increase in allowable emissions and the FEC emission limits remain the same.

The following table presents the post project Potential to Emit for criteria and includes greenhouse gas (GHG) pollutants from all emissions units at the facility as determined by DEQ staff. The GHG emission inventory may be seen in Appendix A.

Table 2 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Emissions Unit	PM/PM_{10}	SO_2	NO_X	CO	VOC	CO_2e
	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]	T/yr[a]
Post Project Totals	24.56	6.53	83.03	46.09	5.49	66,148

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

Non-Carcinogenic TAP Emissions

A summary of the estimated potential emissions increase of non-carcinogenic toxic air pollutants (TAP) is provided in the following table. Even though there is an increase in the potential to emit toxic air pollutants, there is not an increase in emissions that are specifically allowed by the permit.

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table. The emission inventory provided by Hoku may be seen in Appendix A.

Table 3 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

NON-CARCINOGENS							
Pollutant	CAS #	TAP Emissions (lb/hr)	2008 TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling ? (Y/N)	TAP Emissions (tpy)
Acrolein	107-02-8	2.56E-04	1.10E-04	1.45E-04	0.017	No	4.51E-05
Antimony	7440-36-0	0.00E+00	n/a	n/a	3.3E-02	No	0.00E+00
Barium	7440-39-3	5.36E-04	4.61E-04	7.55E-05	3.3E-02	No	2.25E-03
Chromium	7440-47-3	1.71E-04	1.47E-04	2.40E-05	3.3E-02	No	7.15E-04
Cobalt	7440-48-4	1.02E-05	8.80E-06	1.44E-06	3.3E-03	No	4.29E-05
Copper	7440-50-8	1.04E-04	8.90E-05	1.46E-05	6.7E-02	No	4.34E-04
Ethylbenzene	100-41-4	0.00E+00	n/a	n/a	2.9E+01	No	0.00E+00
Fluoride (as F) (Hydrogen Flouride)	16984-48-8	3.38E-01	n/a	n/a	1.67E-01	Yes	8.10E-01
Hexane	110-54-3	2.19E-01	1.89E-01	3.09E-02	1.2E+01	No	9.19E-01
Hydrogen Chloride	7647-01-0	1.71E+00	1.33E+00	3.79E-01	5.0E-02	Yes	4.78E+00
Manganese	7439-96-5	4.63E-05	3.98E-05	6.52E-06	3.33E-01	No	1.94E-04
Mercury	7439-97-6	3.17E-05	2.72E-05	4.46E-06	3.E-03	No	1.33E-04
Molybdenum	7439-98-7	1.34E-04	1.15E-04	1.89E-05	3.33E-01	No	5.62E-04
Naphthalene	91-20-3	2.74E-03	1.88E-03	8.55E-04	2.00E-06	Yes	6.66E-04
Nitric Acid	7697-37-2	5.22E-01	4.57E-03	5.17E-01	3.33E-01	Yes	1.25E+00
Pentane	109-66-0	3.17E-01	2.72E-01	4.46E-02	1.18E+02	No	1.33E+00
Phosphorous	7723-14-0	0.00E+00	n/a	n/a	7.E-03	No	0.00E+00
Selenium	7782-49-2	2.93E-06	2.51E-06	4.12E-07	1.3E-02	No	1.23E-05
1,1,1-Trichloroethane	71-55-6	0.00E+00	n/a	n/a	1.27E+02	No	0.00E+00
Toluene	108-88-3	6.58E-03	4.28E-03	2.30E-03	2.5E+01	No	2.61E-03
Xylene	1330-20-7	4.24E-03	2.70E-03	1.54E-03	2.9E+01	No	5.99E-04
Zinc	7440-66-6	3.54E-03	3.04E-03	4.97E-04	6.67E-01	No	1.48E-02

Modeling is required for fluoride, hydrogen chloride, naphthalene, and nitric acid because they exceed the screening ELs identified in IDAPA 58.01.01.586.

Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of carcinogenic toxic air pollutants (TAP) is provided in the following table. Even though there is an increase in the potential to emit toxic air pollutants, there is not an increase in emissions that are specifically allowed by the permit. The emission inventory provided by Hoku may be seen in Appendix A.

Table 4 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

CARCINOGENS							
Pollutant	CAS #	TAP Emissions (lb/hr)	2008 TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling ? (Y/N)	TAP Emissions (tpy)
Acetaldehyde	75-07-0	1.30E-03	n/a	n/a	3.00E-03	No	2.64E-04
Arsenic	7440-38-2	2.44E-05	2.10E-05	3.43E-06	1.5E-06	Yes	1.02E-04
Benzene	71-43-2	1.71E-02	1.11E-02	6.02E-03	8.0E-04	Yes	3.43E-03
Beryllium	7440-41-7	1.46E-06	1.26E-06	2.06E-07	2.8E-05	No	6.13E-06
Cadmium	7440-43-9	1.34E-04	1.15E-04	1.89E-05	3.7E-06	Yes	5.62E-04
Chromium VI	7440-47-3	0.00E+00	n/a	n/a	5.6E-07	No	0.00E+00
Formaldehyde	50-00-0	1.20E-02	8.96E-03	3.00E-03	5.1E-04	Yes	3.88E-02
Nickel	7440-02-0	2.6E-04	2.2E-04	3.6E-05	2.7E-05	Yes	1.1E-03
Benzo(a)pyrene	50-32-8	1.46E-07			2.0E-06	No	6.13E-07
Benz(a)anthracene	56-55-3	2.19E-07			2.0E-06	No	9.19E-07
Benzo(b)fluoranthene	205-82-3	2.19E-07			2.0E-06	No	9.19E-07
Benzo(k)fluoranthene	205-99-2	2.19E-07			2.0E-06	No	9.19E-07
Chrysene	218-01-9	2.19E-07			2.0E-06	No	9.19E-07
Dibenzo(a,h)anthracene	53-70-3	1.46E-07			2.0E-06	No	6.13E-07
Indeno(1,2,3-cd)pyrene	193-39-5	2.1945E-07			2.00E-06	No	9.1904E-07
Total PAHs		4.51E-03	6.41E-05	4.45E-03	2.00E-06	Yes	6.27E-04

Modeling is required for arsenic, benzene, cadmium, formaldehyde, and nickel because they exceed the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586.

Post Project HAP Emissions

Post project HAP emission limits remain the same as previously permitted (5.83 tons per year for any one HAP and 6.72 tons per year for all HAPs combined).

Ambient Air Quality Impact Analyses

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

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

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

Facility Classification AIRS/AFS

Uncontrolled emissions of PM, PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC and lead are below 100 tons per year; uncontrolled emissions of GHG are less than 100,000 tons per year. Uncontrolled emissions of HCL are greater than 10 tons per year. Since the facilities uncontrolled emissions are greater than major facility threshold for HAPs (greater than 10 Tons per year for HCL) and the permitted HCL emissions are 5.83 tons per year the facility is classified as a synthetic minor facility.

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 permit revisions. 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.

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

IDAPA 58.01.01.301 Requirement to Obtain Tier I Operating Permit

Permitted emissions are less than: 100 tons per year for PM_{10}, SO_2, NO_X, CO, and VOC; 10 tons per year for any one HAP or 25 tons per year for all HAPs combined; 100,000 tons per year for GHG. 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 that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr or greenhouse gas emissions that exceed 100,000 tons per year.

NSPS Applicability (40 CFR 60)

40 CFR 60.40c..... Standards of Performance for Small Industrial Steam Generating Units

The hot oil heater, HVAC boiler, Waste Water Boiler, and HCL are each affected emission units in accordance with 40 CFR 60.40c(a) because they have a design heat input of natural gas of between 10 and 100 MMBtu/hr and construction commenced after June 9, 1989. The hot oil heater is an affected steam generating unit, because as defined in 40 CFR 60.40c a steam generating unit is a device that combusts fuel to produces steam or heats water or any other heat transfer medium; oil is a heat transfer medium making the hot oil heater an affected emission unit.

The facility added two additional boilers, the Waste Water Boiler and HCL Boiler, each with a rated input capacity of 8 MMBtu/hr of natural gas. The capacity of the Hot Oil Boiler increased from 55 MMBtu/hr of natural gas to 89.2 MMBtu/hr, while the capacity of the HVAC Boiler decreased from 55 MMBtu/hr of natural gas to 10 MMBtu/hr. None of these changes alters the parts of the NSPS that are applicable. The NSPS requirements that are applicable are already included in the permit.

§ 60.40c Applicability and delegation of authority.

(a) Except as provided in paragraphs (d), (e), (f), and (g) of this section, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr).

As previously discussed, all of the boilers have rated input capacity of between 10 and 100 MMBtu/hr and construction commenced after June 9, 1989. None of the exceptions to applicability listed in paragraphs (d), (e), and (g) apply. Therefore the boilers are affected by 40 CFR 60.40c. Paragraph (d) provides an exception of applicability for boilers used in combustion research which Hoku is not under taking. Paragraph (e) provides an exception of applicability for boilers that are covered by Subpart KKK (onshore natural gas processing plants) which Hoku is not affected by. Paragraph (f) provides an exception of applicability for boilers that are covered by Subpart AAAA (small municipal waste combustors) which Hoku is not affected by.

§ 60.42c Standard for sulfur dioxide (SO_2).

Standards for sulfur dioxide are only applicable if the facility combusts coal or oil. Hoku boilers are natural gas fired, therefore the SO_2 standards do not apply.

§ 60.43c Standard for particulate matter (PM).

Standards for particulate matter are only applicable if the facility combusts coal, wood, or oil. The facility's boilers are natural gas fired, therefore the particulate matter standards do not apply.

§ 60.44c & 45c Compliance and performance test methods and procedures for sulfur dioxide & Particulate matter.

Performance testing is not required by the NSPS because the facility does not combust any of the fuels which would make the standards applicable.

§ 60.46c & 47c Emission monitoring for sulfur dioxide & particulate matter.

Emissions monitoring is not required by the NSPS because the facility does not combust any of the fuels which would make the standards applicable.

§ 60.48c Reporting and recordkeeping requirements.

(a) The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by §60.7 of this part. This notification shall include:

(1) The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

These notification requirements apply and have been included in the permit.

(2) If applicable, a copy of any federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under §60.42c, or §60.43c.

(3) The annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired.

(4) Notification if an emerging technology will be used for controlling SO_2 emissions. The Administrator will examine the description of the control device and will determine whether the technology qualifies as an emerging technology. In making this determination, the Administrator may require the owner or operator of the affected facility to submit additional information concerning the control device. The affected facility is subject to the provisions of §60.42c(a) or (b)(1), unless and until this determination is made by the Administrator.

The facility does not need to provide a notification or keep records listed in 60.48c(a)(2-4). The annual capacity factor does not affect the applicability of the NSPS to the boilers and the facility is not using emerging technology for controlling SO_2 emissions.

(b) The owner or operator of each affected facility subject to the SO_2 emission limits of §60.42c, or the PM or opacity limits of §60.43c, shall submit to the Administrator the performance test data from the initial and any subsequent performance tests and, if applicable, the performance evaluation of the CEMS and/or COMS using the applicable performance specifications in appendix B of this part.

The facility is not affected by the SO_2, PM or opacity limits of §60.42c and §60.43c, therefore this section does not apply.

(c) In addition to the applicable requirements in §60.7, the owner or operator of an affected facility subject to the opacity limits in §60.43c(c) shall submit excess emission reports for any excess emissions from the affected facility that occur during the reporting period and maintain records according to the requirements specified in paragraphs (c)(1) through (3) of this section, as applicable to the visible emissions monitoring method used.

The facility is not affected by the opacity limits of §60.43c, therefore this section does not apply.

(d) The owner or operator of each affected facility subject to the SO_2 emission limits, fuel oil sulfur limits, or percent reduction requirements under §60.42c shall submit reports to the Administrator.

(e) The owner or operator of each affected facility subject to the SO_2 emission limits, fuel oil sulfur limits, or percent reduction requirements under §60.42c shall keep records and submit reports as required under paragraph (d) of this section, including the following information, as applicable.

(f) Fuel supplier certification shall include the following information:

The facility is not affected by the SO_2 limits of §60.42c, therefore the preceding three sections do not apply.

(g)(1) Except as provided under paragraphs (g)(2) and (g)(3) of this section, the owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.

(2) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility that combusts only natural gas, wood, fuels using fuel certification in §60.48c(f) to demonstrate compliance with the SO_2 standard, fuels not subject to an emissions standard (excluding opacity), or a mixture of these fuels may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

(3) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility or multiple affected facilities located on a contiguous property unit where the only fuels combusted in any steam generating unit (including steam generating units not subject to this subpart) at that property are natural gas, wood, distillate oil meeting the most current requirements in §60.42C to use fuel certification to demonstrate compliance with the SO_2 standard, and/or fuels, excluding coal and residual oil, not subject to an emissions standard (excluding opacity) may elect to record and maintain records of the total amount of each steam generating unit fuel delivered to that property during each calendar month.

These requirements apply to the facility and have been included in the permit.

(h) The owner or operator of each affected facility subject to a federally enforceable requirement limiting the annual capacity factor for any fuel or mixture of fuels under §60.42c or §60.43c shall calculate the annual capacity factor

individually for each fuel combusted. The annual capacity factor is determined on a 12-month rolling average basis with a new annual capacity factor calculated at the end of the calendar month.

The facility is not limiting the annual capacity factor; therefore this section does not apply.

(i) All records required under this section shall be maintained by the owner or operator of the affected facility for a period of two years following the date of such record.

The general provisions of the permit require the facility to maintain records for a period of five years which is more stringent than the NSPS.

(j) The reporting period for the reports required under this subpart is each six-month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30th day following the end of the reporting period.

The facility is not subject to any periodic NSPS Subpart Dc reporting requirements.

40 CFR 60.4200..... Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Hoku is installing 4 compression ignition internal combustion engines. The engines are affected emission units in accordance with 40 CFR 60.4200(a)(2) because:

- The 3 emergency 2,000 kW generator engines are manufactured after April 1, 2006.
- The fire water pump engine is a certified National Fire Protection Association fire pump engine after July 1, 2006.

Emissions from the emergency generator must comply with the emission standards for new nonroad compression ignition engines in 40 CFR 60.4202 and 60.4205. These sections reference 40 CFR 89.112 and 40 CFR 89.113 where the actual emission limits are given. Emissions from fire pump engines must comply with the emission standards in Table 4 to 40 CFR 60.4200. The NSPS assumes that if an affected facility complies with operating requirements specified in the NSPS it will be in compliance with the emission limits.

Owners and operators of stationary compression ignition engines subject to emissions standards of 40 CFR 60.4205 shall achieve the emissions standards according the manufacturer's written instruction or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

These NSPS requirements are included in the permit.

NESHAP Applicability (40 CFR 61)

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

40 CFR 61, Subpart V National Emission Standards for Equipment Leaks (Fugitive Emission Sources)

§ 61.240 Applicability and Designation of sources

The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart.

Volatile hazardous air pollutant or *VHAP* means a substance regulated under 40 CFR 61 for which a standard for equipment leaks has been proposed and promulgated (40 CFR 61.241). Hoku does not generate or use a substance regulated by 40 CFR 61 for equipment leaks. Therefore the facility is not an affected facility

MACT Applicability (40 CFR 63)

The facility is not subject to any NESHAP requirements in 40 CFR 63.

§ 63.11195 Are any boilers not subject to this subpart?

The types of boilers listed in paragraphs (a) through (g) of this section are not subject to this subpart and to any requirements in this subpart.

(a) Any boiler specifically listed as, or included in the definition of, an affected source in another standard(s) under this part.

(b) Any boiler specifically listed as an affected source in another standard(s) established under section 129 of the Clean Air Act.

(c) A boiler required to have a permit under section 3005 of the Solid Waste Disposal Act or covered by subpart EEE of this part (e.g., hazardous waste boilers).

(d) A boiler that is used specifically for research and development. This exemption does not include boilers that solely or primarily provide steam (or heat) to a process or for heating at a research and development facility. This exemption does not prohibit the use of the steam (or heat) generated from the boiler during research and development, however, the boiler must be concurrently and primarily engaged in research and development for the exemption to apply.

(e) A gas-fired boiler as defined in this subpart.

The facility only combusts gaseous fuels in the boilers, therefore it is not an affected facility.

Permit Conditions Review

This section describes only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action. All permit conditions have been renumbered to accommodate the current permit to construct template.

Existing Permit Table 1.1

Table 1.1 included a summary of the regulated sources at the facility. Existing Table 1.1 has been renumbered and is now Table 1.

Revised Permit Table 1

The table has been updated to include two new boilers and a methane reformer (hydrogen generating plant).

Existing Permit Table 2.1

Table 2.1 included an emission listing along with the associated control device. This table has been renumbered and is now Table 2.

Revised Permit Table 2

Table 2 has been updated to more accurately list the emission units that are permitted. Specifically:

- The hot oil boiler capacity has increased from 55 MMBtu/hr of natural gas to 89.2 MMBtu/hr of natural gas.
- The HVAC boiler capacity has decreased from 55 MMBtu/hr of natural gas to 10 MMBtu/hr of natural gas.
- The facility added a Waste Water Boiler and a HCL Boiler, each with a capacity of 8 MMBtu/hr of natural gas.
- The facility added a Methane Reformer (hydrogen generating plant) with a total natural gas consumption of 12.5 MMBtu/hr; of the 12.5 MMBtu/hr of natural gas consumed approximately 6 MMBtu/hr is combusted the remainder is used to produce hydrogen.

- The fire water pump engines rated capacity has decreased from 800 Hp to 400 Hp.

Existing Permit Condition 2.2

This permit condition described how emissions are to be calculated from the boilers for the purpose of demonstrating compliance with the FEC limits. Existing Permit Condition 2.2 is now Permit Condition 8.

Revised Permit Condition 8

The permit condition has been updated to allow the use of manufacturer supplied emission factors for the purposes of estimating emissions.

Existing Permit Condition 2.4

This permit condition described how emissions are to be calculated from the internal combustion engines for the purpose of demonstrating compliance with the FEC limits. Existing Permit Condition 2.4 is now Permit Condition 10.

Revised Permit Condition 10

The permit condition has been updated to allow the use of manufacturer supplied emission factors for the purposes of estimating emissions.

Existing Permit Condition 2.6

This permit condition described how emissions were to be calculated from the polysilicon production process. Existing Permit Condition 2.6 is now permit condition 12.

Revised Permit Condition 12

This permit condition has been updated to describe that emissions from the polysilicon production process vent through the Process Vent Gas Scrubber or Acid Vent Gas Scrubber instead of through the Chlorsaline Scrubber as originally permitted. The existing permit condition required calculating emissions for the purposes of demonstrating compliance with the FEC limits by using HCL continuous emission monitoring (CEM) data. The applicant has requested to remove the requirement to install the HCL CEM. The facility is now required to perform periodic HCL emission testing. Revised Permit Condition 12 requires calculating emissions from the Process Vent Gas Scrubber and Acid Vent Gas Scrubber by using the results of the most recent source test.

Existing Table 4.1

This table listed the internal combustion engines used at the facility. This table has been renumbered and is now Table 5.

Revised Table 5

Instead of listing one 3,500 kW electrical generator set there are 3 electrical generator sets each are 2,000 kW. Also the Fire Pump Engine was listed as 800 Hp it is now listed as 400 Hp.

Existing Table 5.1

This table listed the emission units associated with polysilicon production and described that the control device for these emission units was a Chlorosilane Scrubber. Table 5.1 is now Table 6.

Revised Table 6

The emission units listed in the table remain the same though the description of the control device that is used has changed. Emissions from the polysilicon production process are either controlled by the Process Vent Gas Scrubber or the Acid Gas Vent Scrubber instead of the Chlorosilane Scrubber and the table has been updated to reflect this change.

Existing Permit Condition 5.3

This permit condition limited HCL emissions from the polysilicon process which vented through the Chlorosilane Scrubber to 8.88 pounds per day. Silicon tetrahydride emissions were limited to 0.47 pounds per hour. Existing Permit Condition 5.3 is now Permit Condition 35.

Revised permit Condition 35

Emissions from the polysilicon production process now vent through the Acid Vent Gas Scrubber and the Process Vent Gas Scrubber Stack instead of through the Chlorosilane Scrubber Stack as was originally permitted. Therefore the revised permit condition limits HCL emissions from the Acid Vent Gas Scrubber and Process Vent Gas Scrubber.

The existing permit limited HCL emissions from the chlorosilane stack to 8.88 pounds per day. This is equivalent to a pound per hour daily average emission rate of 0.37 pounds per hour. The revised permit now limits HCL emissions from the Acid Vent Gas Scrubber to 0.29 pounds per hour and limits emissions from the Process Vent Gas Scrubber to 0.04 pounds per hour, for a combined allowable emission rate of 0.33 pounds per hour. This is less than what was previously permitted. Compliance with the original daily emission rate limit was to be determined by a continuous emissions monitoring (CEM) system. Since compliance was determined by a CEM a daily emission rate limit could be practically enforced. The applicant has now requested to determine compliance through emissions testing. In order to have an emission rate limit that is practically enforceable from the results of an emissions test the emission rate limit needs to be expressed in pounds per hour. This explains why the emission rate limit was changed from a daily emission rate limit to an hourly emission rate limit.

Hoku has requested to remove the silicon tetrahydride emission rate limit from the permit. Hoku has stated that silicon tetrahydride is not produced or used as raw material at the plant; therefore it will not be emitted from the facility. The silicon in the polysilicon production process is in the chlorinated form and does not exist in the form of silicon tetrahydride. Therefore the silicon tetrahydride emission limit has been removed from the permit.

Existing Permit Condition 5.4

This condition limited polysilicon production the 4,000 metric tons per any consecutive 12 calendar months. Existing Permit Condition 5.4 is now Permit Condition 36.

Revised Permit Condition 36

The 4,000 metric ton per year annual limit has been changed to a daily production limit. The new daily limit was determined by dividing the existing annual production limit by the number of days in a year (4,000 metric tons/351 days/yr[1] = 11.4 metric tons per day). The annual production limitation was changed to a daily production limit in order to limit daily HCL emissions consistent with the new daily HCL emission rate limits. The permittee has requested to determine compliance with the HCL emission limits by conducting emission testing. In order to assure compliance between source tests, a daily production limit is required. The acceptable ambient concentration for HCL is a daily average concentration and the production limitation, which serves to inherently limit HCL emissions, cannot be of a longer duration than a daily average and still assure compliance with the daily standard.

New Permit Condition 37

This permit condition requires that emissions from the polysilicon production process be controlled by wet scrubbers.

New Permit Condition 38

This permit condition specifies that the Process Vent Gas Scrubbing System and Acid Vent Gas Scrubbing System shall consist of two stages of scrubbing. The first stage shall be a spray chamber and the next stage shall be a packed bed scrubber. This is consistent with the scrubbers performance criteria provided in the application.

New Permit Condition 39

This permit condition requires that the Process Vent Gas Spray Chamber use sodium hydroxide solution consistent with the spray chamber performance criteria provided in the application. It is also required that the solution flow rate and pH be maintained at a value equal to or at higher than that recorded during the most recent performance test.

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1) Hoku's process will be down 14 days each year for maintenance.

New Permit Condition 40

This permit condition requires that the Acid Vent Gas Spray Chamber use water consistent with the spray chamber performance criteria provided in the application. It is also required that the water flow rate be maintained at a value equal to or higher than that recorded during the most recent performance test.

New Permit Condition 41

This permit condition includes DEQ's standard language for packed bed scrubbers. The pressure drop across the packed bed scrubbers shall be maintained at 80% or higher than the value measured during the most recent source test, and the scrubbing media pH shall be maintained at a value equal to or greater than the value recorded during the most recent source test.

Consistent with the scrubbers performance criteria provided in the application,[2] the scrubbing media flow rate to the Acid Vent Gas Scrubber shall be equal to or greater than 231 gallons per minute and shall not be less than the value recorded during the most recent performance test. The scrubbing media flow rate to the Process Vent Gas Scrubber shall be equal to or greater than the value recorded during the most recent performance test.

With the exception that the minimum acceptable scrubbing media flow rate to the Acid Vent Gas Scrubber shall not be less than a minimum of 231 gallons per minute, the permittee may establish new scrubbing parameters through source testing. As an example, if the scrubbing media flow rate to the Acid Vent Gas Scrubber during the most recent test was 240 gallons per minute (which is greater than 231 gallons per minute) then the permittee is required to maintain the flow rate at or above 240 gallons per minute. The permittee may conduct additional source testing to change the required flow rate from 240 gallons per minute to a new value provided that value it is greater than 231 gallons per minute.

Existing Permit Condition 5.5

This permit condition required that each month the amount of polysilicon produced over the most recent consecutive 12-months be monitored and recorded. Existing Permit Condition 5.5 is now Permit Condition 42.

Revised Permit Condition 42

Polysilicon monitoring is now required each calendar day. This is to assure compliance with the new daily production limitation. The permittee may calculate the production rate, the amount of polysilicon produced is not physically measured until the chemical vapor deposition process is completed (usually in 5 days).

New Permit Conditions 43 & 44

These permit conditions require monitoring of all scrubbing parameters that are limited by this permit. These parameters are required to be monitored once each calendar week. Weekly monitoring is frequent enough to reasonably assure the scrubbers are continuously operated in an efficient manner. Should there be an unexpected excursion, the maximum period of time that may pass before the excursion is caught is 7 days. A longer period of time between monitoring events may result in an unacceptable period of time passing before the excursion is caught.

New Permit Condition 45

This permit condition requires periodic emissions testing for HCL from the Acid Vent Gas and Process Vent Gas Scrubber stacks. Testing is required within 180 days of startup and then at least once each five years. Testing is also required within 180 days after the addition of five polysilicon reactors (chemical vapor deposition systems) beyond what was in place during the most recent test. Hoku has proposed to add polysilicon reactors over time. Initially it is likely that only 12 reactors will be in place. In order to produce at the maximum allowed production rate, it is likely that 30 to 35 reactors[3] will be required. Therefore testing is required within 180 days of the addition of 5 reactors beyond what was in place during the most recent source test. Testing is required after the

2 See Process Data Sheet for the Acid Vent Gas Scrubber that was provided in the application, page 6 of 8 Section 6.2.
3 The permit does not limit the number of reactors that may be present, but does limit the daily production.

addition of each 5th reactor to assure that the facility continues to comply after the production capacity has increased.

Monitoring of the scrubber operating parameters is required during the test and the source test report must include those monitoring results.

Existing Table 6.1

This permit condition listed the natural gas fired hot oil heater and boiler that were permitted to be installed. Existing Table 6.1 is now Table 8.

Revised Table 8

Table 8 lists the heater and boiler that Hoku is permitted to install. The rated capacity of the Hot Oil Heater increased from 55 MMBtu/hr of natural gas to 89.2 MMBtu/hr. The rated capacity of the HVAC boiler decreased from 55 MMBtu/hr of natural gas to 10 MMBtu/hr. Two additional boilers were added – the Waste Water Boiler and the HCL Boiler – each with a rated capacity of 8 MMBtu/hr of natural gas.

Existing Permit Condition 7.3

This permit condition limited the use of nitric acid and hydrofluoric acid to 5 gallons per day. Existing Permit Condition 7.3 is now Permit Condition 54.

Revised Permit Condition 54

Hoku requested to remove the nitric acid limit from the permit. The basis of this request was that nitric acid is not a hazardous air pollutant (HAP) and does not count towards the facility's HAP FEC permit limit. The statement that nitric acid is not a HAP is true. However, the reason that there is a nitric acid limit in the permit is because it is a State regulated toxic air pollutant; the fact that nitric acid is not a HAP does not justify removing it from the permit. However, Hoku did model emissions that would result from the use of 7.4 gallons per day of nitric acid. Emissions that result from the use 7.4 gallons of nitric acid were determined to show compliance with the acceptable ambient concentration for nitric acid. Therefore, the nitric acid usage limitation was increased from 5 gallons per day to 7.4 gallons per day.

Hoku requested to increase the hydrofluoric acid usage limit from 5 gallons per day to 6.7 gallons per day. Air pollutant dispersion modeling provided by Hoku showed that emissions resulting from the use of 6.7 gallons of hydrofluoric acid per day caused ambient impacts that are in compliance with the acceptable ambient concentration for hydrofluoric acid. Therefore, the hydrofluoric acid usage limitation was increased from 5 gallons per day to 6.7 gallons per day.

Existing Permit Condition 7.4

This permit condition required the permittee to maintain documentation on site that the laboratory scrubber has a nitric acid and hydrofluoric acid removal efficiency of 90%. Existing permit condition 7.4 is now Permit Condition 55.

Revised Permit Condition 55

Hoku provided emission calculations for nitric acid and hydrofluoric acid using 85% for the scrubbers instead of 90%. These emissions were shown to be in compliance with the acceptable ambient concentrations. Therefore, the required control efficiency was changed from 90% to 85%.

All other permit existing permit conditions remain unchanged except that they were renumbered.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided between August 8 and August 23, 2011. However, in accordance with IDAPA 58.01.01.209.01.c an opportunity was not actually required because there is not an increase of emissions that are allowed by the permit. During this time, there were two requests for a public comment period on DEQ's proposed action. Because this permitting action does not authorize an increase in emissions, a public comment period is not required and therefore was not provided in accordance with IDAPA 58.01.01.209.04. On October 5, 2011 the parties that requested the comment period were notified that a comment period would not be provided.

APPENDIX A – EMISSIONS INVENTORIES

Hoku Corporation
FEC Permit Modification - July 2011
Emissions Inventory

Description	Critieria Pollutant Emission Summary											
	NOx Emissions		CO Emissions		PM-10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
HVAC Boiler	0.350	1.466	0.730	3.057	0.060	0.251	0.060	0.251	0.040	0.168	5.00E-06	2.19E-05
Waste Water Boiler	0.280	1.173	0.584	2.446	0.048	0.201	0.048	0.201	0.032	0.134	4.00E-06	1.75E-05
HCl Boiler	0.280	1.173	0.584	2.446	0.048	0.201	0.048	0.201	0.032	0.134	4.00E-06	1.75E-05
Hot Oil Heater	2.230	9.339	4.460	18.678	0.729	3.053	0.058	0.241	0.528	2.209	4.80E-05	2.10E-04
Emergency Generator #1	34.036	3.404	1.156	0.116	0.257	0.026	0.706	0.071	2.043	0.204		
Emergency Generator #2	38.164	5.725	2.053	0.308	0.184	0.028	1.302	0.195	2.269	0.340		
Emergency Generator #3	38.164	5.725	2.053	0.308	0.184	0.028	1.302	0.195	2.269	0.340		
Silicon Storage Bin					0.017	0.074						
Silicon Feed Hopper					0.109	0.476						
Dust Collection System in Post Processing					1.203	5.269						
Cooling Towers					0.22	0.97						
Acid Vent Scrubber					0.03	0.13						
Process Vent Scrubber												
Post Processing Vent Scrubber	0.74	0.92										
Emergency Vent Scrubber					1.00	0.05						
Fire Pump	4.224	1.056	2.288	0.572	0.132	0.033	0.1618	0.04045	0.282	0.0705		
Fugitives									0.46	2.0		
Total	***118.464***	***29.979***	***13.909***	***27.931***	***4.221***	***10.783***	***3.685***	***1.396***	***7.951***	***5.600***	***0.000***	***0.000***
FEC Limit		***83.03***		***46.09***		***24.56***		***6.53***		***5.49***		

Hoku Corporation
FEC Permit Modification - July 2011
Emissions Inventory
FACILITY POTENTIAL TO EMIT - TAPS

NON-CARCINOGENS

Pollutant	CAS #	TAP Emissions (lb/hr)	2008 TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Acrolein	107-02-8	2.56E-04	1.10E-04	1.45E-04	0.017	No	4.51E-05
Antimony	7440-36-0	0.00E+00	n/a	n/a	3.3E-02	No	0.00E+00
Barium	7440-39-3	5.36E-04	4.61E-04	7.55E-05	3.3E-02	No	2.25E-03
Chromium	7440-47-3	1.71E-04	1.47E-04	2.40E-05	3.3E-02	No	7.15E-04
Cobalt	7440-48-4	1.02E-05	8.80E-06	1.44E-06	3.3E-03	No	4.29E-05
Copper	7440-50-8	1.04E-04	8.90E-05	1.46E-05	6.7E-02	No	4.34E-04
Ethylbenzene	100-41-4	0.00E+00	n/a	n/a	2.9E+01	No	0.00E+00
Fluoride (as F) (Hydrogen Flouride)	16984-48-8	3.38E-01	n/a	n/a	1.67E-01	Yes	8.10E-01
Hexane	110-54-3	2.19E-01	1.89E-01	3.09E-02	1.2E+01	No	9.19E-01
Hydrogen Chloride	7647-01-0	1.71E+00	1.33E+00	3.79E-01	5.0E-02	Yes	4.76E+00
Manganese	7439-96-5	4.63E-05	3.98E-05	6.52E-06	3.33E-01	No	1.94E-04
Mercury	7439-97-6	3.17E-05	2.72E-05	4.46E-06	3.E-03	No	1.33E-04
Molybdenum	7439-98-7	1.34E-04	1.15E-04	1.89E-05	3.33E-01	No	5.62E-04
Naphthalene	91-20-3	2.74E-03	1.88E-03	8.55E-04	2.00E-06	Yes	6.66E-04
Nitric Acid	7697-37-2	5.22E-01	4.57E-03	5.17E-01	3.33E-01	Yes	1.25E+00
Pentane	109-66-0	3.17E-01	2.72E-01	4.46E-02	1.18E+02	No	1.33E+00
Phosphorous	7723-14-0	0.00E+00	n/a	n/a	7.E-03	No	0.00E+00
Selenium	7782-49-2	2.93E-06	2.51E-06	4.12E-07	1.3E-02	No	1.23E-05
1,1,1-Trichloroethane	71-55-6	0.00E+00	n/a	n/a	1.27E+02	No	0.00E+00
Toluene	108-88-3	6.58E-03	4.28E-03	2.30E-03	2.5E+01	No	2.61E-03
Xylene	1330-20-7	4.24E-03	2.70E-03	1.54E-03	2.9E+01	No	5.99E-04
Zinc	7440-66-6	3.54E-03	3.04E-03	4.97E-04	6.67E-01	No	1.48E-02

CARCINOGENS

Pollutant	CAS #	TAP Emissions (lb/hr)	2008 TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Acetaldehyde	75-07-0	1.30E-03	n/a	n/a	3.00E-03	No	2.64E-04
Arsenic	7440-38-2	2.44E-05	2.10E-05	3.43E-06	1.5E-06	Yes	1.02E-04
Benzene	71-43-2	1.71E-02	1.11E-02	6.02E-03	8.0E-04	Yes	3.43E-03
Beryllium	7440-41-7	1.46E-06	1.26E-06	2.06E-07	2.8E-05	No	6.13E-06
Cadmium	7440-43-9	1.34E-04	1.15E-04	1.89E-05	3.7E-06	Yes	5.62E-04
Chromium VI	7440-47-3	0.00E+00	n/a	n/a	5.6E-07	No	0.00E+00
Formaldehyde	50-00-0	1.20E-02	8.96E-03	3.00E-03	5.1E-04	Yes	3.88E-02
Nickel	7440-02-0	2.6E-04	2.2E-04	3.6E-05	2.7E-05	Yes	1.1E-03
Benzo(a)pyrene	50-32-8	1.46E-07			2.0E-06	No	6.13E-07
Benz(a)anthracene	56-55-3	2.19E-07			2.0E-06	No	9.19E-07
Benzo(b)fluoranthene	205-82-3	2.19E-07			2.0E-06	No	9.19E-07
Benzo(k)fluoranthene	205-99-2	2.19E-07			2.0E-06	No	9.19E-07
Chrysene	218-01-9	2.19E-07			2.0E-06	No	9.19E-07
Dibenzo(a,h)anthracene	53-70-3	1.46E-07			2.0E-06	No	6.13E-07
Indeno(1,2,3-cd)pyrene	193-39-5	2.1945E-07			2.00E-06	No	9.1904E-07
Total PAHs		4.51E-03	6.41E-05	4.45E-03	2.00E-06	Yes	6.27E-04

FACILITY POTENTIAL TO EMIT - HAPS

	PTE	FEC Limit
Individual HAP	4.78	5.83
Aggregate HAPs	6.54	6.72

Hoku Corporation
FEC Permit Modification - July 2011
Emissions Inventory

HVAC Boiler - Natural Gas

Boiler Capacity MMBtu/hr
10.0
Maximum[a] scf/hr
10,000
Maximum hrs/yr
8,376

	Pollutant					
	SO_2	NO_X	CO	PM/PM-10	VOC	Lead
Emission Factor[b], lb/MMBtu	0.006	0.035	0.073	0.006	0.004	0.0005
Emissions, lb/hr	0.0600	0.3500	0.7300	0.0600	0.0400	5.00E-06
Emissions, ton/yr	0.2513	1.466	3.057	0.251	0.168	2.19E-05

[a]Assumes Natural Gas LHV = 1,000 Btu/ft3
[b]Emissions provided by boiler manufacturer for SO2, NOx, CO, PM, and VOC. Emission factor for lead is from AP-42 Table 1.4-2, and is in units of lb/10^6 scf

Waste Water Boiler - Natural Gas

Boiler Capacity MMBtu/hr
8.0
Maximum[a] scf/hr
8,000
Maximum hrs/yr
8,376

	Pollutant					
	SO_2	NO_X	CO	PM/PM-10	VOC	Lead
Emission Factor[b], lb/MMBtu	0.006	0.035	0.073	0.006	0.004	0.0005
Emissions, lb/hr	0.0480	0.2800	0.5840	0.0480	0.0320	4.00E-06
Emissions, ton/yr	0.2010	1.173	2.446	0.201	0.134	1.75E-05

[a]Assumes Natural Gas LHV = 1,000 Btu/ft3
[b]Emissions provided by boiler manufacturer for SO2, NOx, CO, PM, and VOC. Emission factor for lead is from AP-42 Table 1.4-2, and is in units of lb/10^6 scf

HCl Boiler - Natural Gas

Boiler Capacity MMBtu/hr
8.0
Maximum[a] scf/hr
8,000
Maximum hrs/yr
8,376

	Pollutant					
	SO_2	NO_X	CO	PM/PM-10	VOC	Lead
Emission Factor[b], lb/MMBtu	0.006	0.035	0.073	0.006	0.004	0.0005
Emissions, lb/hr	0.0480	0.2800	0.5840	0.0480	0.0320	4.00E-06
Emissions, ton/yr	0.2010	1.1726	2.4458	0.2010	0.1340	1.75E-05

[a]Assumes Natural Gas LHV = 1,000 Btu/ft3
[b]Emissions provided by boiler manufacturer for SO2, NOx, CO, PM, and VOC. Emission factor for lead is from AP-42 Table 1.4-2, and is in units of lb/10^6 scf

Hoku Corporation
FEC Permit Modification - July 2011
Emissions Inventory

Hot Oil Heater - Natural Gas

Heater Capacity MMBtu/hr
89.2
Maximum[a] scf/hr
95,914
Maximum hrs/yr
8,376

	Pollutant					
	SO_2	NO_X[c]	CO[c]	PM/PM-10	VOC	Lead
Emission Factor[b], lb/10^6 scf	0.6	0.025	0.05	7.6	5.5	0.0005
Emissions, lb/hr	0.0575	2.23	4.46	0.73	0.53	4.80E-05
Emissions, ton/yr	0.24	9.34	18.68	3.05	2.21	2.10E-04

[a]Data from manufacturer based on a heat content of natural gas = 930 BTU/scf;
[b]Emission factors from AP-42 Table 1.4-2
[c]NOx and CO emission factor provided by manufacturer in lb/MMBtu

Hoku Corporation
FEC Permit Modification - July 2011
Emissions Inventory

TOXIC AIR POLLUTANTS (TAPs) COMBUSTION CALCULATIONS
NATURAL GAS

Emission Unit	Fuel Usage	Annual Operating Hours
HVAC Boiler	10,000.00 scf/hr	8,376
Wastewater Boiler	8,000.00 scf/hr	8,376
HCl Boiler	8,000.00 scf/hr	8,376
Hot Oil Heater	95,913.98 scf/hr	8,376
Total	***121,913.98 scf/hr***	8,376

NON-CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for NG Combustion (lb/10^6 scf)[a]	TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Antimony	7440-36-0	0.0E+00	0.00E+00	3.3E-02	No	0.00E+00
Barium	7440-39-3	4.4E-03	5.36E-04	3.3E-02	No	2.25E-03
Chromium	7440-47-3	1.4E-03	1.71E-04	3.3E-02	No	7.15E-04
Cobalt	7440-48-4	8.4E-05	1.02E-05	3.3E-03	No	4.29E-05
Copper	7440-50-8	8.5E-04	1.04E-04	6.7E-02	No	4.34E-04
Ethylbenzene	100-41-4	0.0E+00	0.00E+00	2.9E+01	No	0.00E+00
Fluoride (as F)	16984-48-8	0.0E+00	0.00E+00	1.67E-01	No	0.00E+00
Hexane	110-54-3	1.8E+00	2.19E-01	1.2E+01	No	9.19E-01
Manganese	7439-96-5	3.8E-04	4.63E-05	3.33E-01	No	1.94E-04
Mercury	7439-97-6	2.6E-04	3.17E-05	3.E-03	No	1.33E-04
Molybdenum	7439-98-7	1.1E-03	1.34E-04	3.33E-01	No	5.62E-04
Naphthalene	91-20-3	6.1E-04	7.44E-05	2.00E-06	Yes	3.11E-04
Pentane	109-66-0	2.6E+00	3.17E-01	1.18E+02	No	1.33E+00
Phosphorous	7723-14-0	0.0E+00	0.00E+00	7.E-03	No	0.00E+00
Selenium	7782-49-2	2.4E-05	2.93E-06	1.3E-02	No	1.23E-05
1,1,1-Trichloroethane	71-55-6	0.0E+00	0.00E+00	1.27E+02	No	0.00E+00
Toluene	108-88-3	3.4E-03	4.15E-04	2.5E+01	No	1.74E-03
o-Xylene	1330-20-7	0.0E+00	0.00E+00	2.9E+01	No	0.00E+00
Zinc	7440-66-6	2.9E-02	3.54E-03	6.67E-01	No	1.48E-02

CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for Natural Gas Combustion (lb/10^6 scf)[a]	TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Arsenic	7440-38-2	2.0E-04	2.44E-05	1.5E-06	Yes	1.02E-04
Benzene	71-43-2	2.1E-03	2.56E-04	8.0E-04	No	1.07E-03
Beryllium	7440-41-7	1.2E-05	1.46E-06	2.8E-05	No	6.13E-06
Cadmium	7440-43-9	1.1E-03	1.34E-04	3.7E-06	Yes	5.62E-04
Chromium VI	7440-47-3	0.0E+00	0.00E+00	5.6E-07	No	0.00E+00
Formaldehyde	50-00-0	7.5E-02	9.14E-03	5.1E-04	Yes	3.83E-02
Nickel	7440-02-0	2.1E-03	2.6E-04	2.7E-05	Yes	1.07E-03
Benzo(a)pyrene	50-32-8	1.2E-06	1.46E-07	2.0E-06	No	6.13E-07
Benz(a)anthracene	56-55-3	1.8E-06	2.19E-07	NA	No	9.19E-07
Benzo(b)fluoranthene	205-82-3	1.8E-06	2.19E-07	NA	No	9.19E-07
Benzo(k)fluoranthene	205-99-2	1.8E-06	2.19E-07	NA	No	9.19E-07
Chrysene	218-01-9	1.8E-06	2.19E-07	NA	No	9.19E-07
Dibenzo(a,h)anthracene	53-70-3	1.2E-06	1.46E-07	NA	No	6.13E-07
Indeno(1,2,3-cd)pyrene	193-39-5	1.8E-06	2.2E-07	NA	No	9.19E-07
Total PAHs		1.1E-05	1.39E-06	2.00E-06	No	5.82E-06

[a]EFs from AP-42, Tables 1.4-3 and 1.4-4, 7/98

[b]EFs from AP-42, Table 1.3-10, 9/98

Hoku Air Emission Estimates

	HCl			HF			HNO3		
Acid Vent Scrubber	0.290 lb/hr	6.96 lb/day	1.27 tpy						
Process Vent Scrubber	0.02 lb/hr	0.36 lb/day	0.07 tpy						
Post Processing Vent Scrubber				0.338 lb/hr	8.10 lb/day	0.810 tpy	0.522 lb/hr	12.53 lb/day	1.253 tpy
Emergency Vent Scrubber	0.63 lb/hr	15.00 lb/day	0.03 tpy						
Fugitive Emissions	0.78 lb/hr	18.72 lb/day	3.42 tpy						
Total	1.71 lb/hr	41.04 lb/day	4.78 tpy	0.338 lb/hr	8.10 lb/day	0.81 tpy	0.522 lb/hr	12.53 lb/day	1.25 tpy
EL	0.05 lb/hr			0.17 lb/hr			0.333lb/hr		

Notes:

HCl from AVS based on manufacturer data, 99.989% control (manufacturer guaranteed), plus 0.05 lb/day from the absorber, and maximum load. Buffer of 25% added to emissions

HCl from PVS based on manufacturer data, 99.989% control (manufacturer guaranteed), plus buffer of 50% added to emissions.

HF uncontrolled emission rate is 2.25 lb/hr, based on method shown in original FEC Statement of Basis, and using 6.7 gal HF per day. HF is a non-carcinogen. Contol = 85%. Buffer of 50% added to emissions

HNO_3 uncontrolled emission rate is 3.48 lb/hr, based on method shown in original FEC Statement of Basis, and using 6.7 gal HNO3 per day. HNO3 is a non-carcinogen. Control = 85%. Buffer of 50% added to emissions

Emergency vent scrubber emissions of 5 lb/day provided via email from Hoku. Increase to 15 lb/day for buffer

PPVS will operate a max of 200 days per year (24 hrs/day).

Hoku Corporation
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Emissions Inventory

Scrubber Emissions

	PM/PM-10 Emission Rate lb/hr	PM/PM-10 Emission Rate tpy[c]	SOx Emission Rate lb/hr	SOx Emission Rate tpy[c]	NOx Emission Rate lb/hr	NOx Emission Rate tpy[c]	HCl Emission Rate lb/hr	HCl Emission Rate tpy[c]	HNO3 Emission Rate lb/hr	HNO3 Emission Rate tpy[c]	HF Emission Rate lb/hr	HF Emission Rate tpy[c]
Post Processing Vent Scrubber[a,b]					0.74	0.92			0.522	1.25	0.338	0.810
Acid Vent Scrubber[a,c]	0.03	0.13					0.29	1.27				
Process Vent Scrubber[a,d]							0.02	0.07				
Emergency Vent Scrubber[a,c,e]	1.00	0.05					0.63	0.03				
Total	**1.03**	**0.18**	**0.00**	**0.00**	**0.74**	**0.92**	**0.93**	**1.37**	**0.52**	**1.25**	**0.34**	**0.81**

[a] Based on manufacturer data

[b] Value is from Slim Rod Etch Bench (915.88 lb/yr NO2) + Lab Etch Bench (23.73 lb/yr NO2), per batch. No other emissions of criteria pollutants. Lb/hr emission rate is based on running 2 batches per week @ 24 hrs/week/batch.

[c] Assumes PM emissions are equal to SiO_2 emissions

[d] Manufacturer data indicate that the emissions from the Process Vent scrubber will not contain any criteria pollutants

[e] The only expected emissions from the Emergency Vent Scrubber will be for maintenance purposes for about 4 days per year (assume 96 hr/yr)

[f] Annual production =8,760

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Emissions Inventory

Methane Reformer Stack Flue Gas

	Estimated[5]
	Lbs/MM Btu LHV
NO_x	0.085
SO_x[1]	0.6
CO	0.007
VOC	0.002
Particulates [2]	0.01
UBHC[3]	0.007

Natural gas LHV = 930 Btu/ft^3
Flow Rate = 70,200 scf/h

(1) This value is estimated from AP-42,units are lb/10^6 scf
(2) Particulate emissions are only for particulates created during the combustion process. It does not include particulates from the air or insulation.
(3) The above listed hydrocarbon emissions are based on hydrocarbons being defined as free methane as the result of incomplete combustion.
(4) All emission testing is done by the client.
(5) Emissions figures are estimates.

Reformer Stack Flue Gas

Estimated Emissions

	lb/hr	tpy
NO_x	5.54931	24.30598
Sox	0.04212	0.184486
CO	0.457002	2.001669
VOC	0.130572	0.571905
Particulates	0.65286	2.859527
UBHC	0.457002	2.001669

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Emissions Inventory

DIESEL GENERATOR EMISSIONS

Combustion Source	kW	MMBtu	hp	Hours of Operation	Emission Factors (g/hp-hr)					
					PM[3]	NOx[1]	SO_2[2,4]	CO[1]	VOC[3]	HC[1]
Emergency Standby Gen #1 (Cummins)	2000	6.824	2919.00	200	0.040	5.300	0.11000	0.160	0.0007	0.11
Emergency Standy Gen #2 (CAT)	2000	6.824	3218.40	300	0.026	5.390	0.00040	0.290	0.0007	0.11
Emergency Standy Gen #3 (CAT)	2000	6.824	3218.40	300	0.026	5.390	0.00040	0.290	0.0007	0.11

1. Manufacturer specific emisions factors. Generators are EPA Certified Tier 2
2. Emission Factor Reference for SO2: AP-42, 5th Edition, Table 3.4-1, 0.05% sulfur fuel, units are lb/hp-hr
3. Emission Factor Reference for VOC: AP-42, 5th Edition, Table 3.4-1, units are lb/hp-hr
4. SO2 emission factor supplied by manufacturer for Cummins generator, units are g/hp-hr

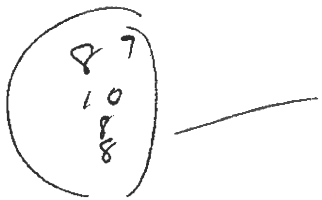
Combustion Source	kW	hp	Hours of Operation	Emission Rates											
				PM/PM_{10}		NOx		SO_2		CO		VOC		HC	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Emergency Standy Gen #1 (Cummins)	2000	2919.00	200	0.257	0.03	34.036	3.40	0.706	0.07	1.156	0.12	2.043	0.20	0.706	0.071
Emergency Standy Gen #2 (CAT)	2000	3218.40	300	0.184	0.03	38.164	5.72	1.302	0.20	2.053	0.31	2.269	0.34	0.779	0.117
Emergency Standy Gen #3 (CAT)	2000	3218.40	300	0.184	0.03	38.164	5.72	1.302	0.20	2.053	0.31	2.269	0.34	0.779	0.117
			Total	*0.625*	*0.091*	*110.363*	*14.853*	*3.310*	*0.461*	*5.263*	*0.732*	*6.581*	*0.885*	*2.264*	*0.304*

Generator HAPS

Combustion Source	kW	hp	Hours of Operation	Emission Factors (lb/MMBtu)								
				Benzene	CH2O	Toluene	Xylenes	Propylene	Acetald.	Acrolein	Total PAH	Napth.
Emergency Standy Gen #1 (Cummins)	2000	2919.00	200	7.76E-04	7.89E-05	2.81E-04	1.93E-04	2.79E-03	2.52E-05	7.88E-06	2.12E-04	1.30E-04
Emergency Standy Gen #2 (CAT)	2000	3218.40	300	7.76E-04	7.89E-05	2.81E-04	1.93E-04	2.79E-03	2.52E-05	7.88E-06	2.12E-04	1.30E-04
Emergency Standy Gen #3 (CAT)	2000	3218.40	300	7.76E-04	7.89E-05	2.81E-04	1.93E-04	2.79E-03	2.52E-05	7.88E-06	2.12E-04	1.30E-04

Emission Factor Reference AP-42, 5th Edition Table 3.4-3 and 3.4-4
CH2O = Formaldehyde

Combustion Source	kW	hp	MMBtu/hr	Hours of Operation	Emission Rates															
					Benzene		CH2O		Toluene		Xylenes		Propylene		Acetaldehyde		Acrolein		Total PAH		Napthalene	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Emergency Standy Gen #1 (Cummins)	2000	2919.00	6.82	200	0.005	0.001	0.001	0.000	0.002	0.000	0.001	0.000	0.019	0.002	0.000	0.000	0.000	0.000	0.001	0.0001	0.001	0.0001
Emergency Standy Gen #2 (CAT)	2000	3218.40	6.82	300	0.005	0.001	0.001	0.0001	0.002	0.000	0.001	0.000	0.019	0.003	0.000	0.000	0.000	0.000	0.001	0.0002	0.001	0.0001
Emergency Standy Gen #3 (CAT)	2000	3218.40	6.82	300	0.005	0.001	0.001	0.000	0.002	0.000	0.001	0.000	0.019	0.003	0.000	0.000	0.000	0.000	0.001	0.0002	0.001	0.0001
			Total	*600*	*0.016*	*0.002*	*0.002*	*0.000*	*0.006*	*0.001*	*0.004*	*0.001*	*0.057*	*0.008*	*0.001*	*0.000*	*0.000*	*0.000*	*0.004*	*0.001*	*0.003*	*0.0004*



Hoku Corporation
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Emissions Inventory

Fugitive Emission Calculations

Source	VOC (lb/hr)	VOC (tpy)	HCl (lb/hr)	HCl (tpy)
Valves and Fittings[a]			0.78	3.42
Cleaning[a]	0.46	2.0		

[a]Based on emissions from 1,800 Mton/yr polysilicon plant and revised to reflect actual operations at Pocatello facility.

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Emissions Inventory

DIESEL FIRE PUMP EMISSIONS

Combustion Source	MMBtu	hp	Hours of Operation	Emission Factors (g/hp-hr)				
				PM[3]	NOx[1]	SO_2[2]	CO[1]	VOC[3]
Fire Pump Engine	1.02	400.00	500	0.150	4.800	0.00040	2.600	0.0007

1. Emissions must comply with Table 4 to 40 CFR 60.4200 as required by permit.
2. Emission Factor Reference for SO2: AP-42, 5th Edition, Table 3.4-1, 0.05% sulfur fuel, units are lb/hp-hr
3. Emission Factor Reference for VOC: AP-42, 5th Edition, Table 3.4-1, units are lb/hp-hr

Combustion Source	MMBtu	hp	Hours of Operation	Emission Rates									
				PM/PM_{10}		NOx		SO_2		CO		VOC	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Fire Pump Engine	1.02	400.00	500	0.132	0.03	4.224	1.06	0.162	0.04	2.288	0.57	0.282	0.07
			Total	*0.132*	*0.033*	*4.224*	*1.056*	*0.162*	*0.040*	*2.288*	*0.572*	*0.282*	*0.071*

Fire Pump HAPS

Combustion Source	MMBtu	hp	Hours of Operation	Emission Factors (lb/MMBtu)								
				Benzene	CH2O	Toluene	Xylenes	Propylene	Acetald.	Acrolein	Total PAH	Napthalene
Fire Pump Engine	1.02	400.00	500	9.33E-04	1.18E-03	4.09E-04	2.85E-04	2.58E-04	7.67E-04	9.25E-05	1.68E-04	8.48E-05

Emission Factor Reference AP-42, 5th Edition Table 3.3-2
CH2O = Formaldehyde

Combustion Source	MMBtu/hr	hp	Hours of Operation	Emission Rates																	
				Benzene		CH2O		Toluene		Xylenes		Propylene		Acetaldehyde		Acrolein		Total PAH		Napthalene	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Fire Pump Engine	1.02	400.00	500	0.001	0.0002	0.001	0.0003	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.00004	0.000	0.00002
			Total	*0.001*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.00002*

Hoku Corporation
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Emissions Inventory

Cooling Tower Emissions

	Total Liquid Drift Factor (lb/1000 gal)[b]	TDS Content Fraction	Emission Factor (lb/1000 gal)	Evaporation Rate[c] (gal/hr)	PM/PM-10 (lb/hr)	PM/PM-10 (tpy)
Cooling Tower	1.7	0.001200	0.002040	108,000	0.22	0.97
Total					**0.22**	**0.97**

[a]PM-10 emission factor assumed to be equal to PM emission factor.
[b]AP-42 Table 13.4-1 Total liquid drift for induced draft tower
[c]Nine cells total 0.107 tpy PM-10 per cell
0.024 lb/hr PM-10 per cell
TDS content in water provided by Hoku as 1200 ppm

Hoku Corporation
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Emissions Inventory

Silicon Process Emissions

	Capacity ft^3	Exhaust Flow cfm	Control Efficiency gr/dscf[b]	PM/PM-10 Emission Rate lb/hr	PM/PM-10 Emission Rate tpy[a]	Silicon Emission Rate lb/hr	Silicon Emission Rate tpy[a]
Silicon Storage Bin	250	98	0.02	0.017	0.074	0.02	0.07
Silicon Feed Hopper	15	634	0.02	0.109	0.476	0.11	0.48
Dust Collection System in Post Processing	n/a	7017	0.02	1.203	5.269	1.20	5.27
Total				**1.33**	**5.82**	**1.33**	**5.82**

[a]PM-10/PM emissions are in the form of Silicon.
[b]Baghouse and fabric filter control efficiency

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: December 7, 2011

TO: Dan Pitman, P.E., Senior Permit Writer, Air Quality Division

FROM: Cheryl Robinson, P.E., Air Quality Engineer/Modeling Analyst, Air Quality Division

PROJECT NUMBER: P-2008.0049 PROJ 60903

SUBJECT: Modeling Review for Hoku Materials, Inc., Pocatello, Facility ID 005-00058
PTC/FEC to reflect as-built condition, modify existing HCl monitoring requirements

1.0 Summary

Hoku Materials, Inc., (Hoku) submitted a Permit to Construct (PTC) application with emissions inventories (EIs) and dispersion modeling updated to reflect the as-built plant condition, and to support requested revisions to hydrogen chloride (HCl) monitoring provisions in the current permit. The facility is located at 1 Hoku Way in Pocatello.

Is a compliance demonstration required for the 24-hour and annual $PM_{2.5}$, 1-hour NO_x, and 1-hour SO_2 National Ambient Air Quality Standards (NAAQS) that became effective after Hoku's initial FEC permit was issued on August 14, 2008?

Per Section 179.03 of the Rules (IDAPA 58.01.01) DEQ may reopen a FEC to reduce the FEC to reflect newly applicable federal requirements (for example, NSPS) with compliance dates after the issuance of the permit establishing the FEC, or to reduce the FEC consistent with any other requirement that is enforceable as a practical matter, and that the state may impose on the facility under the Idaho Environmental Protection and Health Act, Chapter 1, Title 39, Idaho Code, and these rules. DEQ has required a demonstration of compliance with the $PM_{2.5}$ standards for air quality permit applications submitted after January 3, 2011. The 1-hour NO_x and SO_2 standards became effective in Idaho on April 7, 2011.

In a January 28, 2011 email from Mike Simon, Stationary Source Permitting Manager, to permit writer Dan Pitman and NSR modeling coordinator Kevin Schilling, Mike noted that "Hoku would not need to address $PM_{2.5}$ until [the FEC] renewal [in 2012], unless Hoku needs to modify their existing PM_{10} FEC limit between now and renewal." Consistent with this guidance from the program manager, DEQ will not require Hoku to submit a compliance demonstration (i.e., dispersion modeling) for the $PM_{2.5}$, 1-hour NO_x, or 1-hour SO_2 NAAQS until the FEC is renewed, unless an increase in the FEC limit for PM_{10}, NO_x, or SO_2 is requested prior to the FEC expiration date of August 14, 2012. **Although dispersion modeling analyses were submitted for these criteria pollutants, DEQ did not review these as part of this project.**

Does this project request a change in any FEC limit?

Hoku's current permit includes the Facility Emission Cap (FEC) limits shown in Table A. As shown in the table, there are no changes in the existing permitted FEC limits as a result of this project.

Table A. COMPARISON OF JULY 2011 PTE WITH 2008 FEC LIMITS

Pollutant	PM/PM_{10} (TPY)	SO_2 (TPY)	NO_x (TPY)	VOC (TPY)	CO (TPY)	Individual HAP (TPY)	Aggregated HAPs (TPY)
FEC Limit	24.56	6.53	83.03	5.49	46.09	5.83	6.72
PTE, July 2011	10.78 (PM_{10} only)	1.40	29.98	5.45[a]	27.93	4.78	6.54
Is PTE > FEC Limit?	No	No	No	No[a]	No	No	No

[a] The submitted PTE calculations for the boilers were based on a natural gas heating value of 1,000 Btu/scf. Emissions from the hot oil heater were based on a natural gas heating value of 930 Btu/scf. Using 1,000 Btu/scf for the hot oil heater results in estimated VOC emissions of 2.05 TPY instead of 2.21 TPY, for a total VOC PTE = 5.45 TPY.

Does this project require notification to DEQ in accordance with Section 181.02 of the Rules?

In accordance with Section 181 of the Idaho Air Rules (IDAPA 58.01.01), "for facility changes that comply with the terms and conditions establishing the FEC, but are not included in the estimate of ambient concentration analysis approved for the permit establishing the FEC, the permittee shall review the estimate of ambient concentration analysis." The permittee is required to notify DEQ in accordance with Section 181.02 of the Rules if the facility change:

1. Results in a significant contribution above the design concentration determined in the analysis used to establish the FEC, or
2. Causes or significantly contributes to a violation of any ambient air quality standard.

A comparison of the ambient concentrations used to establish the FEC (P-2008.0049, issued August 26, 2008) and the results of the modeling submitted for this project is shown in Table B. The change in modeled concentrations is less than the significant contribution level (SCL) for the modeled pollutants except for annual average NO_2. Although the change in the modeled NO_2 impact exceeds the SCL, the results of the full impact analysis submitted for this project indicates that the ambient impacts from Hoku and the adjacent Great Western Malting facility, when combined with a background value of 32 $\mu g/m^3$, is 41.5 $\mu g/m^3$ or about 42% of the annual NO_2 NAAQS.

Table B. COMPARISON OF 2008 FEC AND 2011 MODELING RESULTS

Pollutant	Averaging Period	Modeled Concentration for 2008 FEC ($\mu g/m^3$)	2011 Modeled Concentration ($\mu g/m^3$)	Change in Modeled Concentration ($\mu g/m^3$)	Significant Contribution Level ($\mu g/m^3$)	Is increase in Modeled Impacts > SCL?
PM_{10}	24-hr	45.3	27.4	-17.9	5.0	No
	Annual	9.6	3.94	-5.7	1.0	No
NO_2	Annual	8.2	9.54	1.3	1.0	**Yes**
SO_2	3-hr	86.3	6.53 (1-hr)	-79.8	25	No
	24-hr	24.9	6.53 (1-hr)	-18.4	5.0	No
	Annual	0.5	0.273	-0.2	1.0	No

Does this project demonstrate compliance with state-only Toxic Air Pollutant (TAP) increments?

Air quality analyses involving atmospheric dispersion modeling of emissions associated with the facility were performed to demonstrate the facility would not cause a violation of Toxic Air Pollutant (TAP) increment (Idaho Air Rules Section 203.03). The application and modeling analyses conducted by JBR Environmental Consultants, Inc. (JBR) on Hoku's behalf were received on June 25, 2011. Revised modeling and emission inventory spreadsheets were received on August 25, 2011, with supplemental information received on August 31, 2011.

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, combined with DEQ's verification analyses, demonstrated to the satisfaction of the Department that operation of the proposed facility or modification will not cause a violation of applicable state-only TAPs increment 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 ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/ Assumption/ Result	**Explanation/Consideration**
• Routine monitoring should be conducted for point source and fugitive emissions of HCl.	Except for HCl, the increase in emissions of each TAP was either below the applicable screening emission level (EL) or the modeled ambient impact was less than 10% of the applicable acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) increment. The ambient impact associated with all emissions of HCl from point sources--a total of 0.93 lb/hr from the acid vent scrubber, process vent scrubber, and emergency vent scrubber, combined--was 39% of the ACC. Fugitive emissions of HCl—an estimated 0.78 lb/hr from leaking valves or seals—were not included in the modeling analyses. Because fugitive emissions may cause higher ground-level concentrations near their release point(s) and because the Hoku property is fairly narrow in the east-west direction (which may be affected by east-west drainage air flows from the hillside along the west side of the property), HCl emissions should be regularly monitored to ensure that ambient impacts remain at low levels. Note that the AAC increment for HCl was set at $1/20^{th}$ of an occupational health exposure level.

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 for this facility located at 1 Hoku Way (South Philbin Road) in Pocatello. Approximate UTM coordinates for the facility are 377.8 km Easting and 4,750.3 km Northing, in UTM Zone 12 (Datum WGS84).

2.1.1 Area Classification

The Hoku facility is located within Bannock County which is designated as an attainment or unclassifiable area for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone, particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), and sulfur oxides (SO_x). The county is in attainment but is being managed under a maintenance plan for particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), There are no Class I areas within 10 kilometers of this location.

2.1.2 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 (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 emissions increase 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.

In accordance with Section 210.20 of the Idaho Air Rules, a demonstration of compliance with state-only TAPs standards is not required for any TAP that is regulated at the time of permit issuance under 40 CFR Part 60 (New Source Performance Standards [NSPS]), 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants [NESHAP], or 40 CFR Part 63 (NESHAP for Source Categories / MACT standards).

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

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

3.1.1 Overview of Analyses

JBR performed air quality analyses using AERMOD in support of the submitted permit application. A brief description of parameters used in the modeling analyses is provided in Table 2.

Table 2. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 11103
Meteorological data	DEQ-Inkom, 1995	Surface data were collected at a DEQ met tower located in Inkom during 1995, with upper air National Weather Service (NWS) data collected during the same year at the Boise Airport. Rural dispersion was used based on current land use in the vicinity of the facility.
Terrain	DEM (NAD27)	AERMAP v. 11103, using USGS 7.5-minute DEM data (same DEM files used for the 2008 FEC analyses)
Building downwash	BPIP-PRIME v. 04274	Building downwash parameters were calculated using the BPIP PRIME algorithm (version 04274).
Receptor Grid	Receptors	Receptor locations were defined in UTM coordinates (NAD27) in a 10-km x 10-km grid.
	Grids	25-meter (m) spacing along the property boundary 50-m spacing from the property boundary to 100 m 100-m spacing from 100 m to 400 m 250-m spacing from 400 m to 1,000 m 500-m spacing from 1,000 m to 5,000 m

3.1.2 Modeling Protocol and Methodology

A modeling protocol received by DEQ on May 9, 2011 was approved with comment on June 22, 2011. The modeling protocol approval was delayed awaiting new guidance for the 1-hour NO_x and SO_2 NAAQS. Although EPA had issued guidance with regard to modeling for these new standards, there was still a lot of uncertainty regarding the best (or better) ways to model emissions from intermittent sources, including emergency generators. The modeler was advised on August 22, 2011 of the January 28, 2011 decision by program manager Mike Simon that modeling for criteria pollutants was not required unless Hoku requested an increase in the FEC limit for that pollutant. Modeling was generally conducted using data described in the protocol and methods described in the *State of Idaho Air Quality Modeling Guideline*. Default rural dispersion was used.

3.1.3 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). The refined, steady state, multiple source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. EPA provided a one-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 effects on dispersion.
- New vertical profiles of wind, turbulence, and temperature.

3.1.4 Meteorological Data

DEQ processed surface data collected at a DEQ met tower located in Inkom during 1995, with upper air National Weather Service (NWS) data collected during the same year at the Boise Airport using AERMET v. 11059. Surface characteristics were developed using 1992 National Land Cover Database (NLCD) information for a 1-kilometer radius centered on the Inkom met tower and AERSURFACE v. 08009.

3.1.5 Terrain Effects

Terrain effects on dispersion were considered in these analyses. JBR used AERMAP v. 11103 to extract the actual elevation of each receptor and determine the controlling hill height elevation from USGS 7.5-minute DEM data (the same DEM files used for the 2008 FEC analyses).

3.1.6 Facility Layout

The Hoku and adjacent Great Western Malting facility layout is shown in Figure 3-1.

3.1.7 Building Downwash

Plume downwash effects caused by structures present at the facility were accounted for in the submitted modeling analyses. The Building Profile Input Program with Plume RIse Model Enhancements (BPIP-PRIME) was used to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emission release parameters for input to AERMOD. Building parameters used in the submitted modeling are summarized in Table 3.

Table 3. BUILDING PARAMETERS

Building	Description	Building Height (m)	Base Elevation (m)	UTM Datum NAD27			
				Easting, X (m)	Northing, Y (m)	Easting, X (m)	Northing, Y (m)
Hoku Facility Structures							
CONTROL	Control Room/ Warehouse	7.24	1353.0	378126.8	4750078.4	378167.6	4750105.9
				378141.9	4750068.1	378152.5	4750116.2
ADMIN	Admin Bldg	17.07	1352.0	378104.2	4749998.8	378154.8	4749992.0
				378142.0	4749973.1	378117.0	4750017.7
REACT1	Reactor Bldg 1	24.48	1354.0	377910.1	4750231.2	378009.8	4750219.9
				378011.1	4750164.5	378005.3	4750213.1
				378036.2	4750202.6	377930.6	4750262.3
POSTPROC	Post Processing	9.60	1353.5	377859.4	4750163.8	377987.8	4750128.0
				377894.0	4750140.2	377977.6	4750134.8
				377902.7	4750153.4	377989.3	4750152.5
				377963.5	4750113.3	377910.7	4750204.4
				377974.3	4750129.7	377884.9	4750165.2
				377984.0	4750123.3	377868.3	4750173.7
BOILBLD	Boiler Bldg	5.36	1351.7	377538.0	4750559.2	377543.9	4750562.6
				377540.5	4750557.5	377541.3	4750564.3
CTBASE	Cooling Tower Bases	7.01	1351.3	377668.6	4750481.6	377695.7	4750510.2
				377674.3	4750477.9	377690.0	4750514.1
PRETREAT	Pretreatment Bldg	10.67	1352.8	377635.8	4750338.2	377661.4	4750350.5
				377648.0	4750330.1	377649.2	4750358.6
WWBLD		10.67	1353.0	377660.9	4750361.8	377695.6	4750360.8
				377685.5	4750345.5	377671.1	4750376.4
HVACSHED	HVAC Shed	8.48	1353.2	377938.4	4750263.0	377958.6	4750261.5
				377953.2	4750253.3	377943.8	4750271.2
POWDIST1	Power Distribution Bldg 1	6.93	1350.4	377637.8	4750517.4	377663.3	4750536.0
				377648.0	4750510.6	377653.1	4750542.7
POWDIST2	Power Distribution Bldg 2	6.93	1349.5	377653.1	4750513.5	377665.1	4750512.2
				377662.0	4750507.6	377656.2	4750518.1
POWDIST3	Power Distribution Bldg 3	6.93	1351.2	377635.1	4750502.9	377663.1	4750495.3
				377658.1	4750487.8	377639.4	4750509.4
Great Western Malting Facility Structures							
ELEVHDHS		70.71	1350.26	378557.4	4749892.5	378569.5	4749853.5
				378543.1	4749871.0	378583.4	4749875.4
RAILBAY		12.19	1350.26	378583.4	4749875.4	378561.2	4749898.7
				378590.9	4749887.4	378550.1	4749906.1
				378564.8	4749904.3	378545.9	4749900.2
MALTSILO		34.44	1350.26	378528.4	4749912.1	378543.1	4749871.0
				378513.8	4749891.3	378557.4	4749892.5
BRLYSILO		34.44	1350.26	378569.4	4749853.5	378612.6	4749854.9
				378599.3	4749833.8	378583.3	4749875.4

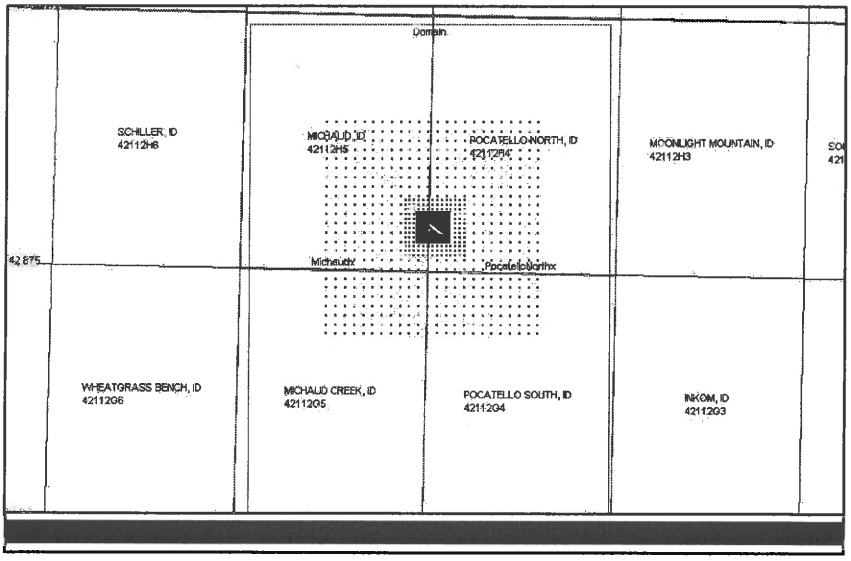
Table 3. BUILDING PARAMETERS							
Building	Description	Building Height (m)	Base Elevation (m)	UTM Datum NAD27			
				Easting, X (m)	Northing, Y (m)	Easting, X (m)	Northing, Y (m)
TRUCKBAY		7.32	1350.26	378532.4	4749869.7	378553.2	4749855.6
				378536.1	4749875.7	378550.3	4749850.6
				378565.5	4749856.1	378533.2	4749861.5
				378561.6	4749850.0	378536.6	4749866.9
SHOP		4.88	1350.26	378490.2	4749848.7	378513.0	4749847.3
				378497.3	4749858.5	378506.7	4749837.8
MLTHOUSE		25.3	1350.26	378609.9	4749812.7	378508.5	4749823.7
				378584.4	4749774.5	378533.2	4749861.5
OFFICE		7.62	1350.26	378628.8	4749791.8	378658.9	4749785.7
				378637.3	4749806.7	378650.2	4749770.0
				378659.0	4749793.5	378638.9	4749776.8
				378655.9	4749787.8	378642.4	4749782.8

3.1.8 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. The ambient air boundary for Hoku was defined as the Hoku property boundary, which is sketched in Figure 3-1.

3.1.9 Receptor Network

The receptor grids used for the submitted modeling analyses are summarized in Table 2, and shown graphically in Figure 3-2.



3.2 Emission Release Parameters

The emission release parameters used in the submitted analysis are shown in Table 4. The "default" modeled exit is vertical and uncapped. Note that the exhaust velocity for the emergency standby generator is probably unreasonably low at 2.21 m/s. The exhaust velocities for the two emergency generators and the diesel fire pump engine are greater than 50 m/s, and are likely unreasonably high. DEQ verification analyses used a nominal 50 m/s exhaust velocity for each of these four sources.

Table 4. EMISSION RELEASE PARAMETERS

Source ID	Description	UTM Zone 12 (NAD27)		Base Elevation (m)	Stack Height (m)	Stack Temp. (K)	Stack Dia. (m)	Stack Velocity (m/s)	Modeled Exit Type
		Easting (m)	Northing (m)						
Hoku Emission Sources									
HCLBOIL	HCL Boiler	377540.6	4750561.2	1351.57	12.253	572.04	0.4572	8.90	Default
WWBOIL	Wastewater Boiler	377688.5	4750361.5	1353.95	12.253	572.04	0.4572	8.90	Default
HVACBOIL	HVAC Boiler	377993.0	4750170.9	1353.63	9.7536	485.93	0.6096	5.64	Default
HOH	Hot Oil Heater	377782.3	4750367.9	1354.96	39.0144	513.15	2.3114	7.77	Default
SSB	Silicon Storage Bin	377584.3	4750468.3	1354.61	2.6822	308.15	0.2032	1.46	Default
SFH	Silicon Feed Hopper	377553.1	4750490.2	1353.73	7.62	308.15	0.1524	16.4	Default
PPDCS	Post Processing Dust Collection System	377903.6	4750193.5	1354	3.3528	294.26	0.4765	18.5	Default
CT1	Cooling Tower #1	377672.7	4750481.2	1351.07	7.0104	294.26	3.5814	14.9	Default
CT2	Cooling Tower #2	377675.0	4750485.1	1350.66	7.0104	294.26	3.5814	14.9	Default
CT3	Cooling Tower #3	377678.2	4750489.9	1350.2	7.0104	294.26	3.5814	14.9	Default
AVS	Acid Vent Scrubber	377741.5	4750300.4	1353.72	12.192	283.15	0.9144	12.5	Default
PVS	Process Vent Scrubber	377732.4	4750304.5	1353.5	12.192	301.48	0.3048	13.6	Default
PPVS	Post Process Vent Scrubber	377977.6	4750134.8	1353.2	2.3774	333.15	0.4572	8.75	Default
EVS	Emergency Vent Scrubber	377754.3	4750326.9	1354	12.192	372.04	0.762	29.3	Default
METHREF		377607.7	4750399.3	1352.49	18.288	457.59	0.3048	7.56	Default
STANDGEN	Emergency Standby Generator	377878.3	4750274.8	1353.96	5.1511	755.37	0.2032	**2.21**	Default
EMERGEN1	Emergency Generator #1	377885.9	4750269.8	1354	4.4196	678.15	0.4063	**55.2**	Default
EMERGEN2	Emergency Generator #2	377893.4	4750264.8	1354	4.4196	678.15	0.4063	**55.2**	Default
DFP	Diesel Fire Pump	378133.2	4750128.9	1353	1.524	853.71	0.127	**79.6**	Default
Great Western Malting Emission Sources (NOTE: NOT NEEDED FOR HOKU TAPS MODELING)									
BH1		378550.2	4749855.6	1350.26	7.32	288.7	0.001	0.001	---
BH2		378579.4	4749863.6	1350.26	34.44	288.7	0.001	0.001	---
BH3		378548.6	4749884.1	1350.26	34.44	288.7	0.001	0.001	---
KSE01		378546.2	4749846.6	1350.26	31.7	291.5	1.89	6.29	---
KSE02		378556.6	4749839.6	1350.26	31.7	291.5	1.89	6.29	---
KSE03		378567.4	4749832.6	1350.26	31.7	291.5	1.89	6.29	---
KSE04		378579.3	4749824.6	1350.26	31.7	291.5	1.89	6.29	---
KSE05		378589.6	4749817.1	1350.26	31.7	291.5	1.89	6.29	---
CS		378542	4749857.6	1350.26	29.41	310.9	0.001	0.71	---

Table 4. EMISSION RELEASE PARAMETERS									
Source ID	Description	UTM Zone 12 (NAD27)		Base Elevation (m)	Stack Height (m)	Stack Temp. (K)	Stack Dia. (m)	Stack Velocity (m/s)	Modeled Exit Type
		Easting (m)	Northing (m)						
BS1		378598.2	4749804.6	1350.26	34.14	449.8	5.32	0.89	---
BS2		378535.7	4749860.6	1350.26	10.36	477.6	0.001	0.001	---

m = meters K = Kelvin m/sec = meters per second

3.3 Emission Rates

The increases in emissions of toxic air pollutants (TAPs) associated with this project were compared to the screening emission levels (EL) listed in Sections 585 and 586 of the Idaho Air Rules. Modeling was conducted for TAPs with increased emissions that exceeded the applicable EL. TAPs emission rates used in the submitted analysis are shown in Table 5. **Note that the modeled emission rates are based on the total facility-wide emissions of each TAP, rather than the difference between the 2008 and 2011 potential to emit of each TAP.** Except for emissions of HCl, HF, and HNO_3, all values shown in the table were multiplied by 10^4 for input to the DEQ verification analyses, to avoid potential problems within AERMOD when doing calculations with very small numbers.

Table 5. MODELED TOXIC AIR POLLUTANT EMISSION RATES										
Emission Source	Hydrogen Chloride, HCl (lb/hr)	Fluoride (as F), Hydrogen Fluoride, HF (lb/hr)	Nitric Acid, HNO_3 (lb/hr)	Arsenic (lb/hr)	Cadmium (lb/hr)	Nickel (lb/hr)	Benzene (lb/hr)	Formaldehyde (lb/hr)	Naphthalene (lb/hr)	PAHs (lb/hr)
HCl Boiler	---	---	---	1.53E-06	8.45E-06	1.60E-05	1.60E-05	5.71E-04	4.66E-06	8.68E-08
Wastewater Boiler	---	---	---	1.53E-06	8.45E-06	1.60E-05	1.60E-05	5.71E-04	4.66E-06	8.68E-08
HVAC Boiler	---	---	---	1.91E-06	1.05E-05	2.01E-05	2.01E-05	7.17E-04	5.82E-06	1.09E-07
Hot Oil Heater	---	---	---	1.83E-05	1.00E-04	1.92E-04	1.92E-04	0.006849	5.59E-05	1.05E-06
Silicon Storage Bin	---	---	---	---	---	---	---	---	---	---
Silicon Feed Hopper	---	---	---	---	---	---	---	---	---	---
Post Processing Dust Collection System	---	---	---	---	---	---	---	---	---	---
Cooling Tower #1	---	---	---	---	---	---	---	---	---	---
Cooling Tower #2	---	---	---	---	---	---	---	---	---	---
Cooling Tower #3	---	---	---	---	---	---	---	---	---	---
Acid Vent Scrubber	0.29	---	---	---	---	---	---	---	---	---
Process Vent Scrubber	0.02	---	---	---	---	---	---	---	---	---

Table 5. MODELED TOXIC AIR POLLUTANT EMISSION RATES										
Emission Source	**Hydrogen Chloride, HCl (lb/hr)**	**Fluoride (as F), Hydrogen Fluoride, HF (lb/hr)**	**Nitric Acid, HNO_3 (lb/hr)**	**Arsenic (lb/hr)**	**Cadmium (lb/hr)**	**Nickel (lb/hr)**	**Benzene (lb/hr)**	**Formaldehyde (lb/hr)**	**Naphthalene (lb/hr)**	**PAHs (lb/hr)**
Post Process Vent Scrubber	---	0.338	0.522	---	---	---	---	---	---	---
Emergency Vent Scrubber	0.63	---	---	---	---	---	---	---	---	---
METHREF	---	---	---	---	---	---	---	---	---	---
Emergency Standby Generator	---	---	---	---[a]	---[a]	---	2.28E-04[a]	2.28E-05[a]	2.28E-05	4.57E-05
Emergency Generator#1	---	---	---	---[a]	---[a]	---	2.28E-04[a]	2.28E-05[a]	2.28E-05	4.57E-05
Emergency Generator#2	---	---	---	---[a]	---[a]	---	2.28E-04[a]	2.28E-05[a]	2.28E-05	4.57E-05
Diesel Fire Pump	---	---	---	---[a]	---[a]	---	4.57E-05[a]	6.85E-05[a]	4.57E-06	9.13E-06

[a] Emissions of acetaldehyde, arsenic, benzene, beryllium compounds, cadmium compounds, formaldehyde, and the EPA's 7-PAH group (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indenol (1,2,3,-cd)pyrene, and benzo(a)pyrene) are regulated under 40 CFR 63 Subpart ZZZZ for the three emergency engine-generators and the diesel fire pump engine (see Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, Final Rule, 73 FR 3568, January 18, 2008). Modeling was not in fact required for emissions of these pollutants from the four engines.

3.4 Results for Toxic Air Pollutant Analyses

As shown in Table 6, the maximum modeled impacts for all modeled TAPs were below the applicable TAPs increment. Note that the ambient impacts for emissions of benzene, formaldehyde, naphthalene, and PAHs include contributions from the four diesel engines, although these emissions were not required to be modeled.

Table 6. MODELED TOXIC AIR POLLUTANT AMBIENT IMPACTS						
Pollutant	**Averaging Period**	**Modeled Ambient Impact ($x10^4$ µg/m^3)**	**Modeled Ambient Impact (µg/m^3)**	**AAC/AACC Increment (µg/m^3)**	**Exceeds Increment?**	**Percent of AAC/AACC**
HCl	24-hr	---	147.6 (147.6)	375	No	39.4%
HF	24-hr	---	11.77 (11.77)	125	No	9.4%
HNO_3	24-hr	---	18.18 (18.18)	250	No	7.3%
Arsenic	Annual	0.07102	1.00E-05 (7.10E-06)	2.30E-04	No	4.3% (3.1%)
Cadmium	Annual	0.39083	4.00E-05 (3.91E-05)	5.60E-04	No	7.1% (7.0%)
Nickel	Annual	0.74462	7.00E-05 (7.45E-05)	4.20E-03	No	1.7% (1.8%)
Benzene	Annual	6.70537	9.20E-04 (6.71E-04)	1.20E-01	No	0.77% (0.6%)
Formaldehyde	Annual	30.41535	2.98E-03 (3.04E-03)	7.70E-02	No	3.9% (4.0%)
Naphthalene (a PAH)	Annual	0.74052	1.00E-04 (7.41E-05)	1.40E-02	No	0.7% (0.5%)
PAHs	Annual	1.27272	1.80E-04 (1.27E-04)	1.40E-02	No	1.3% (0.9%)

4.0 Conclusions

The submitted ambient air impact analyses, combined with DEQ's analyses, demonstrated to DEQ's satisfaction that emissions of state-regulated toxic air pollutants from this project at the Hoku facility will not cause impacts in excess of the applicable increment listed in Section 585 or 586 of the Idaho Air Rules.

APPENDIX C – 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: Hoku Materials
Address: One Hoku Way
City: Pocatello
State: Idaho
Zip Code: 83204
Facility Contact: Todd Kirkendall
Title: EHS Manager
AIRS No.: 005-00058

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: The facility is revising the existing permit. There is not an increase in emissions allowed by the permit