Hoku Materials, Inc.
Polysilicon Production Facility

Facility Emissions Cap Renewal/Modification Application

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1.0 INTRODUCTION

Hoku Materials, Inc. is proposing to renew their Facility Emissions Cap (FEC) Permit To Construct (PTC) at their polysilicon production facility located in Pocatello, Idaho. The facility is currently operating under an FEC permit (P-2008.0049) issued August 14, 2007 and subsequently modified August 28,2008 and December 14, 2011. The current FEC permit is set to expire on August 14, 2011.

The purpose of this permit renewal application is to establish a new FEC permit for the facility. During this application, Hoku would also like to take the opportunity to incorporate minor facility modifications into the new FEC permit. Given the change in National Ambient Air Quality Standards (NAAQS) since the issuance of the facility's previous FEC. This renewal process will also act as an opportunity to develop new FEC limits that ensure compliance with all NAAQS.

The purpose of this document is to present all necessary and applicable information regarding the proposed facility modifications and FEC revisions as well as a description of its impacts on facility emissions. The Hoku facility is and will continue to be a minor source for all Criteria and Toxic Air Pollutants. A site location map and plot plan are included in Appendix A for reference.

All applicable and required DEQ PTC forms and checklists are included in Appendix B. Revised forms have only been included for sources which are proposed for modification in association with the renewal action. No forms are included for existing sources.

2.0 FACILITY DESCRIPTION

Hoku Materials (Hoku) will produce up to 4,000 metric tons per year of 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 bag housebag houses 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 re-circulated back into the process. STC is reacted with hydrogen to produce TCS to be used in the batch reactors.

The Hoku facility is located on the western edge of Pocatello on approximately 45 acres along the Port Neuf River. The location of the facility is indicated on a regional satellite image in Figure 1 below.

Figure 1. Hoku Facility Location

3.0 PROPOSED PROJECT

Hoku's proposed project consists of two related permitting activities. The first is to incorporate proposed facility modifications into the facility's FEC permit and the second it to apply for a renewal of the FEC permit. Given that the renewal of an FEC permit requires an examination of all onsite emissions and the determination of new FEC limits based on onsite emissions, growth factors and ambient impact assessments, Hoku is proposing to incorporate the proposed facility modification into the FEC concurrently with the renewal assessment.

3.1 Facility Modifications

Hoku would like to introduce the following facility modifications in association with this permit action:

1. Install a storage silo for lime used onsite. The storage silo will include an associated bag house for process particulate emissions control;
2. Install a third silicon storage hopper to compliment the two already proposed for the facility. This will be identical to the two previously existing units, this will also revise the current Silicon Storage Bin (Bulk Bag Unloader);
3. Install a Methane Reformer at the north-east end of the facility property; and
4. Revise cooling tower emissions using a refined methodology.

3.2 Renew the Facility Emissions Caps

Hoku is seeking to renew their FEC permit. During this renewal, Hoku is seeking to maintain FEC limits that are as close to their existing FEC limits as is practical. As a result, Hoku has developed a revised emissions inventory for the current facility (including proposed modifications from 3.1). This inventory was used to determine current emissions. Combined with proposed growth factors, and the results of ambient impact analyses, Hoku is proposing to utilize these values as revised FEC limits for the permit renewal.

4.0 REGULATORY APPLICABILITY

A review of applicable State and Federal Rules for each emissions unit is provided in Sections 4.1 and 4.2 below.

4.1 State Regulatory Applicability

A review of applicable requirements of the Rules for the Control of Air Pollution in Idaho is provided in Table 4-1. Each regulation requiring additional description is detailed in the sections following the table.

Table 4-1 State Regulatory Applicability Summary

Regulation IDAPA 58.01.01.	Description	Applicable	Location of Information In Document or Comments
175	Procedures and Requirements for Permit Establishing A FEC	YES	Sections 3-5
176	Facility Emissions Cap	YES	Sections 3-5
177	Application Procedures	YES	Sections 3-5
178	Standard Contents of Permit Establishing FEC	YES	Applied to IDEQ
180	Revisions to FEC Permits	YES	Sections 3-5
181	Notice and Recordkeeping of Ambient Impacts	YES	Applied to permit
200	Procedures and Requirements for Permits to Construct	Yes	NA
201	Permit to Construct Required	Yes	NA
202	Application Procedures	Yes	Sections 1 - 5
203	Permit Requirements for New and Modified Stationary Sources	Yes	Sections 3 - 4
204	Permit Requirements for New Major Facilities or Major Modifications in Nonattainment Areas	No	NA – Hoku is not a new major source or modification
205	Permit Requirements for new Major Facilities or Major Modification in Attainment or Unclassifiable Areas	No	Not a major modification – Section 4
206	Optional Offsets for Permits to Construct	No	NA – Offsets are not required
207	Requirements for Emission Reduction Credit	No	NA
208	Demonstration of Air Quality Benefit	No	NA
209	Procedures for Issuing	Yes	See below

Regulation IDAPA 58.01.01.	Description	Applicable	Location of Information In Document or Comments
	Permits		
209.01	General Procedures	No	Pertains to IDEQ
209.02	Additional Procedures for Specified Sources	No	NA
209.03	Good Engineering Stack Height	No	NA
209.04	Revisions of Permits to Construct	Yes	Pertains to IDEQ
209.05	Permit to Construct Procedures	No	
209.06	Transfer of Permits	No	
210	Demonstration of Preconstruction Compliance with Toxic Standards	Yes	Section 3 - 4
211	Conditions for Permits to Construct	Yes	Pertains to IDEQ
211.01	Reasonable Conditions	Yes	Pertains to IDEQ
211.02	Cancellation	No	NA
211.03	Notification to the Department	No	Facility currently operating
211.04	Performance Test	No	Not associated with proposed modification
212	Obligation to Comply	Yes	See below
212.01	Responsibility to Comply with All Requirements	Yes	NA
212.02	Relaxation of Standards or Restrictions	No	NA –The proposed project does not ask for a relaxation of requirements
213	Pre-Permit Construction	No	NA
214	Demonstration of Preconstruction Compliance For New and Reconstructed Major Sources of Hazardous Air Pollutants	No	Not a major source

Regulation IDAPA 58.01.01.	Description	Applicable	Location of Information In Document or Comments
220-223	Exemptions	No	NA
224	Permit to Construct Application Fee	Yes	$1,000 fee was mailed on Feb 3, 2012. Any additional fees will be paid upon notice from DEQ.
225	Permit to Construct Processing Fee	Yes	NA
226	Payment of Fees for Permits to Construct	Yes	NA
227	Receipt and Usage of Fees	Yes	Pertains to IDEQ
228	Appeals	Yes	Generally applicable.
123	Certification of Documents	Yes	Section 4.1.1
510-515	Stack Heights and Dispersion Techniques	Yes	Incorporated into dispersion analysis (Appendix F)
550	Air Pollution Emergency Rule	No	NA
585-586	Toxic Air Pollutants	Yes	Section 4.1.2
590	New Source Performance Standards	Yes	40 CFR 60 Subpart III
591	National Emission Standards for Hazardous Air Pollutants	Yes	40 CFR 63 Subpart ZZZZ
625	Visible Emissions	Yes	4.1.7
650	Rules for Control of Fugitive Dust	Yes	4.1.8

4.1.1 Certification of Documents

IDAPA 58.01.01.123 requires all documents including application forms for permits to construct, records, and monitoring reports submitted to the Department shall contain a certification by a responsible official. Hoku will comply with this requirement and the appropriate certifications by a responsible official are being submitted with this application.

4.1.2 Demonstration of Preconstruction Compliance with Toxic Standards

IDAPA 58.01.01.210 establishes requirements for compliance with toxic standards. Hoku has complied with this rule by identifying and calculating the toxic pollutant emission rates changes

from the proposed facility modification.

As described in Section 5.0 Emission Summary, Hoku calculated Toxic Air Pollutant (TAP) emission rates for all onsite emissions. Each pollutant was then compared to IDEQ's emissions screening thresholds. TAPs emissions rates exceeded the TAP emissions thresholds set by IDEQ for 12 pollutants. Each pollutant was subsequently modeled for ambient impact and was found to be below the appropriate Idaho ambient threshold.

4.1.3 Ambient Air Quality Standards for Specific Air Pollutants

IDAPA 58.01.01.577 establishes ambient air quality standards for specific air pollutants including PM-10, PM-2.5, Sulfur Dioxide, Ozone, Nitrogen Oxide, Carbon Monoxide and Lead.

Based on a review of the change in FEC Potential to Emit (PTE) associated with the proposed facility modification/renewal, impact analysis thresholds were exceeded for PM-2.5, PM-10, Sulfur Dioxide and Nitrogen Oxide. As a result, modeled impact assessments were required for those pollutants. A formal modeling analysis was developed in association with this application. The final modeling report detailing that analysis is included in Appendix F of this document. No proposed FEC limits caused an exceedence to an ambient air quality standards.

4.1.4 Toxic Air Pollutants

IDAPA 58.01.01.585 and 586 establishes requirements for compliance with toxic air pollutants. Hoku calculated the change in TAPs emissions associated with the proposed modification. This analysis indicated that no calculated TAPs emissions increase exceeded the IDEQ TAPs emissions thresholds. The TAP Preconstruction Compliance Application Completeness Checklist, required by IDEQ, is included in Attachment B and TAPs emissions calculations are detailed in Section 5.0 below.

4.1.5 New Source Performance Standards

There is only one New Source Performance Standards (NSPS) that are potentially applicable to the proposed project:

- 40 CFR 60 Subpart IIII

A STATIONARY COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES - 40 CFR 60 SUBPART IIII (NO CORRESPONDING IDAHO RULE)

The onsite emergency generators and fire pump are subject to the requirements for Stationary Compression Ignition Internal Combustion Engines. Requirements include

emission standards, fuel specifications, work practice standards, notification, reporting, and recordkeeping.

4.1.6 National Emission Standards for Hazardous Air Pollutants

There is only one National Emissions Standard for Hazardous Air Pollutants (NESHAP) that is potentially applicable to the proposed project:

- 40 CFR 63 Subpart ZZZZ

A 4.5.1 STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - 40 CFR 63 SUBPART ZZZZ

The engine associated with the crusher is subject to 40 CFR 63 Subpart ZZZZ; however, compliance with 40 CFR 60 Subpart IIII meets the requirements of the NESHAP standard.

4.1.7 Visible Emissions

IDAPA 58.01.01.625 restricts discharge of air pollutants into the atmosphere which is greater than 20% opacity for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period. Hoku will comply with this rule by completing all routine onsite equipment maintenance and ensuring that the facility is operated within the standards of good engineering practices.

4.1.8 Rules for Control of Fugitive Dust

IDAPA 58.01.01.650 requires that all reasonable precautions be taken to prevent the generation of fugitive dust. Hoku will comply with this regulation by maintaining and following a Fugitive Dust Plan to address this rule.

4.2 Federal Regulatory Applicability

A review of applicable Federal Rules is provided in Table 4-2. Included in Appendix B is the completed federal regulatory applicability PTC form.

Table 4-2 Federal Regulatory Applicability Summary

Section	Description	Regulatory Citation	Applicable
4.2.1	National Ambient Air Quality Standards (NAAQS)- (dispersion modeling)	40 CFR Part 50	Yes
4.2.2	Title V Operating Permit	40 CFR Part 70	No
4.2.3	Air Pollutants (NESHAPs)	40 CFR Parts 61, 63	Yes
4.2.4	New Source Review (NSR)	40 CFR Part 52	No
4.2.5	New Source Performance Standards (NSPS)	40 CFR Part 60	Yes

4.2.1 National Ambient Air Quality Standards (NAAQS)

Primary National Ambient Air Quality Standards (NAAQS) are identified in 40 CFR Part 50 and define levels of air quality, which the United States Environmental Protection Agency (USEPA) deems necessary to protect the public health. Secondary NAAQS define levels of air quality, which the USEPA judges necessary to protect public welfare from any known, or anticipated adverse effects of a pollutant.

Specific standards for the following pollutants have been promulgated by USEPA: PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, O_3, and Pb. The Hoku facility will emit PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, and VOCs. The facility is classified as a minor source for all pollutants.

Additionally, as described in 4.1.3 it was determined that based on proposed project FEC limits, the facility would be required to complete dispersion modeling for this application. As a result, a full dispersion modeling analysis has been developed and included in Appendix F of this document.

4.2.2 Title V (Part 70) Operating Permit

Title V of the Clean Air Act (CAA) created the federal operating permit program. These permitting requirements are codified in 40 CFR Part 70. These permits are required for major sources with a PTE (considering federally enforceable limitations) greater than 100 tpy for any

criteria pollutant, 25 tpy for all Hazardous Air Pollutants (HAPs) in aggregate, or 10 tpy of any single HAP. After the renewal process, Hoku will remain a minor source because the potential to emit (and FEC limits) of any criteria pollutant is less than 100 tons per year, the potential to emit (and FEC limit) of all HAPs in aggregate is less than 25 tpy, and the potential to emit (and FEC limit) of any single HAP is less than 10 tpy. As a result, Title V does not apply to the Hoku facility.

4.2.3 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

National Emission Standards for Hazardous Air Pollutants are discussed in Section 4.1.6 above.

4.2.4 New Source Review (NSR) Requirements

Bannock County is designated as an attainment or maintenance area for all criteria pollutants. Therefore, the prevention of significant deterioration (PSD) regulations codified in 40 CFR Part 52 could potentially apply to the proposed facility. The PSD rule applies to: (1) a new major source that has the potential to emit 100 tons per year or more for any criteria pollutant for a facility that is one of the 28 industrial source categories listed in 40 CFR § 52.21(b)(1)(i)(a); or (2) a new major source that has the potential to emit 250 tons per year or more of a regulated pollutant if the facility is not on the list of industrial source categories; or (3) a modification to an existing major source that results in a net emission increase greater than a PSD significant emission rate as specified in 40 CFR § 52.21 (b)(23)(i); or (4) a modification to an existing minor source that is major in itself. As previously concurred by IDEQ, the Hoku facility does not fall under one of the 28 industrial source categories, nor will the PTE exceed 250 tpy for any regulated pollutant. Therefore, Hoku is not subject to PSD regulations.

4.2.5 New Source Performance Standards (NSPS)

New Source Performance Standards are discussed in Section 4.1.5.

5.0 EMISSIONS SUMMARY

This section includes a description of all project related criteria, hazardous and toxic air pollutant and calculations. A detailed emissions inventory including all emissions calculations is included in Appendix E for review. The calculation methodology used for each source and pollutant is described below. Emissions were determined for Potential To Emit as well as proposed Facility Emissions Caps.

5.1 Potential to Emit Calculations

Although emissions associated with FEC facilities renewals are typically developed utilizing actual baseline emissions, given that the Hoku facility continues to be revised and constructed, for the purposes of this renewal application Potential to Emit (PTE) emission were utilized to assess total facility impacts. The emissions were developed for all sources of onsite emissions and utilized the maximum design throughputs or proposed permit limitations as calculation inputs. The specific methods by which PTE emissions were calculated are detailed below.

Boilers and Hot Oil Heaters
The onsite boilers include the following:

1. HVAC boiler with a maximum capacity of 10MMBtu/hr.
2. Waste Water Boiler with a maximum capacity of 8MMBtu/hr.
3. HCL Boiler with a maximum capacity of 8MMBtu/hr.

In addition to the boilers, the facility operates a hot oil heater with a maximum design capacity of 89.2 MMBtu/Hr. All of the onsite boilers and heaters will operate on natural gas exclusively. Estimated emissions were developed using US EPA AP-42 (Section 1.4) or and manufacturer's guaranteed emissions rates where available. All boilers were assumed to be operated at maximum capacity for 8,376 hours per year. Hazardous and toxic air pollutant emissions for all onsite boilers and heaters were calculated using AP-42 (Sections 1.3 and 1.4) emission factors for the combustion of natural gas.

Silicon Bin/Primary Silicon Hopper/Secondary Silicon Hopper/Tertiary Silicon Hopper/Lime Silo
Emissions from storing and handling of metallurgical silicon and the lime silo are controlled by bag houses. There are five bag houses, one dedicated to the Silicon Storage Bin (Bulk Bag Unloader), one to the Primary Hopper(#1), one to the Secondary Hopper (#2), one to the Tertiary Hopper (#3) and one to the Lime Silo. PTE emission were estimated by assuming the bag houses would control emissions of PM and PM_{10} to 0.02 grains per dry standard cubic foot for the Lime Silo and Silicon Storage Bin (Bulk Bag Unloader) and 0.0041 grains per dry standard cubic foot for each of the three storage hoppers. This "grain loading" was multiplied by the flow rate of gas leaving each bag house to obtain the emission rate in pounds per hour.

Emissions for $PM_{2.5}$ was assumed to represent a mass fraction of 10% of the emitted PM_{10} for each of these sources. This is consistent with background documentation from AP-42 Chapter 13 for fugitive dust emissions sources.

Cooling Tower

Cooling tower emissions were estimated using the Reisman and Frisbie method presented in "Calculating Realistic PM10 Emissions from Cooling Towers", J. Reisman, G. Frisbie, Presented at the 2001 AWMA Annual Meeting. This emissions methodology was reviewed by IDEQ and approved for use in this project. The cooling tower emissions are determined using water flow, droplet size, solids mass and drift loss at the towers. The result emissions are specific to size category so emissions were directly calculated for PM_{10} and $PM_{2.5}$

Emergency Generator/Fire Water Pump Engines

The emergency generator and fire water pump are both powered by a diesel engine. Emissions were estimated using a combination of US EPA AP-42 (Section 3.3) emission factors and Manufacturer's guaranteed emissions rates where available. The generators engines were assumed to be used no more than 200 hours per year for the #1 generator and 300 hours per year for the #2 and #3 generator. The emergency fire pump was assumed to operate no more than 500 hours per year. Additionally, for the associated model impact assessment, the generators/fire pump were assumed to be tested for no more than 30 minutes of a single clock hour and for no more than 60 minutes total. During normal operations, the engines will only operate for maintenance and readiness preparedness (other than emergency situations). Hazardous and toxic air pollutant emissions from the onsite generators and fire pump were developed utilizing emissions factors from AP-42 (Section 3.4).

Facility Scrubbers

Onsite scrubbers include the Post Processing Vent Scrubber, Acid Vent Scrubber, Process Vent Scrubber and Emergency Vent Scrubber. Emissions from each scrubber utilized maximum design capacity as well as manufacture's guaranteed control efficiencies to determine maximum emissions. The scrubber emissions calculation methodology remained consistent with previously submitted and IDEQ approved emissions calculations for those sources. The emissions for the Emergency Vent Scrubber were based on a maximum operating period of 96 hours per year and the Post Process Vent Scrubber emissions were based on a maximum operating period of 200 days per year (24 hours/day).

Fugitive Emissions

Fugitive emissions are not included in PTE for minor non-listed source categories. However, fugitive emissions for process leaks at the facility were tabulated to include in the facility ambient impact assessment. Fugitive emissions were calculated in association with valves and fitting as well as cleaning activities. The detailed emissions are found in Appendix E.

Methane Reformer

The onsite Methane Reformer utilizes natural gas to produce hydrogen. The reformer is rated at a design combustion maximum of 12.5 MMBtu/hr. However, only 6MMBtu/Hr is combusted, the remaining natural gas is consumed in the hydrogen production cycle. As a result the reformer is more appropriately treated as a 6MMBtu/hr heater. Emissions from the Methane Reformer were calculated utilizing AP-42 (Section 1.4) emissions factors. The unit was assumed to operate 8760 hours per year at its realistic 6MMBtu/hr capacity.

5.2 Facility Emissions Cap Limitation Calculations

In addition to current proposed PTE emissions, Facility Emissions Cap emissions were developed for the facility on a pollutant by pollutant basis. The calculation of the proposed FEC emissions limits were completed utilizing the current proposed PTE emissions and the application of a growth factor. The growth factors for each pollutant were determined based on an analysis of potential facility expansion as well as the restrictions on growth associated with the revised NAAQS. In general the facility is seeking to maintain FEC at or near the FEC limits in their current permit to ensure ongoing construction and operational flexibility.

NOx

The previous facility FEC for NOx allowed for significant growth at the facility. Based on current PTE, the growth factor inherent to the current FEC would have been approximately 255%. This factor was significantly limited in the re-analysis by the amount of growth in emissions that would not produce a violation of the new 1-hr NO_2 NAAQS. As a result, the facility re-assessed the NO_X growth factor in light of the revised NAAQS. This analysis resulted in a new growth factor over 80% for the facility NO_X emissions. This growth factor was applied to all current sources and the resultant emissions were used to demonstrate NAAQS and TAPs compliance.

SO2

Similar to NOx, the introduction of the 1-Hr SOx NAAQS limited the future potential growth of SOx emissions for the facility. The current FEC limit allowed for approximately 450% growth of SOx emissions. The maximum growth factor for the facility for SOx in light of the revised NAAQS was determined to be 10%. This growth factor was applied to all current sources and the resultant emissions were used to demonstrate NAAQS and TAPs compliance.

PM10

The previous facility FEC growth rate for PM10 was approximately 12% based on PTE emissions. This allowed for sufficient flexibility for the facility. As a result, this growth is proposed to be maintained in the new FEC permit. This growth factor was applied to all current sources and the resultant emissions were used to demonstrate NAAQS and TAPs compliance.

PM2.5

The prior facility FEC limits did not include a limit for $PM_{2.5}$. However, given the strong relationship between PM_{10} and $PM_{2.5}$, the facility is proposing to utilize the same growth factor for PM2.5 as proposed for PM_{10}. This growth factor was applied to all current sources and the resultant emissions were used to demonstrate NAAQS and TAPs compliance.

CO

The previous facility FEC growth rate for CO was approximately 70% based on PTE emissions. This allowed for sufficient flexibility for the facility. As a result, this growth is proposed to be maintained in the new FEC permit. This growth factor was applied to all current sources.

VOC

The proposed facility modifications concurrent with this FEC renewal resulted in slightly larger VOC emissions that the current FEC limits. However, the previous FEC growth factor for VOC was approximately 10%. This growth factor will be maintained for the proposed FEC limits which will increase slightly from the previous levels.

Emissions summaries for FEC criteria, hazardous and toxic pollutant emissions are presented in the following sections.

5.3 **Criteria Pollutants Summary**

Electronic copies of the Excel spreadsheets used to calculate facility emissions (PTE and FEC) are included as Appendix E of this permit application.

Table 5-1 and 5-2 on the following pages show the proposed post renewal PTE and FEC emissions for criteria pollutants.

For NOx and SOx, FEC emissions decreased significantly from those under the previous FEC. Emissions for PM_{10} remained CO roughly the same and emissions for VOC and $PM_{2.5}$ increased. $PM_{2.5}$ emissions only increased because they were not previously permitted.

Table 5-1 Proposed Facility Criteria Pollutant Current Maximum PTE

Description	Critieria Pollutant Emission Summary - PTE													
	NOx Emissions		CO Emissions		PM-10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions		PM-25 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	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	0.000	0.000	0.060	0.251
Waste Water Boiler	0.280	1.173	0.584	2.446	0.048	0.201	0.048	0.201	0.032	0.134	0.000	0.000	0.048	0.201
HCl Boiler	0.280	1.173	0.584	2.446	0.048	0.201	0.048	0.201	0.032	0.134	0.000	0.000	0.048	0.201
Hot Oil Heater	2.230	9.339	4.460	18.678	0.729	3.053	0.058	0.241	0.528	2.209	0.000	0.000	0.729	3.053
Emergency Generator #1	34.036	3.404	1.156	0.116	0.257	0.026	0.706	0.071	2.043	0.204			0.257	0.026
Emergency Generator #2	38.164	5.725	2.053	0.308	0.184	0.028	1.302	0.195	2.269	0.340			0.184	0.028
Emergency Generator #3	38.164	5.725	2.053	0.308	0.184	0.028	1.302	0.195	2.269	0.340			0.184	0.028
Lime Silo					0.003	0.011							0.000	0.001
Silicon Storage Bin					0.109	0.476							0.011	0.048
Silicon Feed Hopper #1					0.003	0.015							0.000	0.002
Silicon Feed Hopper #2					0.003	0.015							0.000	0.002
Silicon Feed Hopper #3					0.003	0.015							0.000	0.002
Dust Collection System in Post Processing					1.203	5.269							0.120	0.527
Cooling Towers (3)					2.700	11.825							0.054	0.237
Acid Vent Scrubber					0.030	0.131							0.003	0.013
Process Vent Scrubber														
Post Processing Vent Scrubber	0.737	0.920												
Emergency Vent Scrubber					1.000	0.048							0.100	0.005
Methane Reformer	0.588	2.576	0.494	2.164	0.045	0.196	0.004	0.015	0.032	0.142	0.000	0.000	0.045	0.196
Fire Pump	4.224	1.056	2.288	0.572	0.132	0.033	0.162	0.040	0.282	0.071			0.132	0.033
Fugitives									0.457	2.000				
Total	***119.053***	***32.555***	***14.403***	***30.095***	***6.741***	***21.823***	***3.689***	***1.411***	***7.984***	***5.742***	***0.000***	***0.000***	***1.976***	***4.851***
Previous FEC Limit		***83.030***		***46.090***		***24.560***		***6.530***		***5.490***				

Table 5-2 Facility Criteria Pollutant FEC Maximum PTE

Description	Critieria Pollutant Emission Summary - FEC													
	NOx Emissions		CO Emissions		PM-10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions		PM-25 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	lb/hr	T/yr
HVAC Boiler	0.630	2.638	1.118	4.682	0.068	0.283	0.066	0.276	0.044	0.184	0.000	0.000	0.06753	0.28280
Waste Water Boiler	0.504	2.111	0.894	3.746	0.054	0.226	0.053	0.221	0.035	0.147	0.000	0.000	0.05402	0.22624
HCl Boiler	0.504	2.111	0.894	3.746	0.054	0.226	0.053	0.221	0.035	0.147	0.000	0.000	0.05402	0.22624
Hot Oil Heater	4.014	16.811	6.830	28.606	0.820	3.436	0.063	0.265	0.580	2.430	0.000	0.000	0.82038	3.43576
Emergency Generator #1	61.264	6.126	1.770	0.177	0.289	0.029	0.777	0.078	2.248	0.225			0.28909	0.02891
Emergency Generator #2	68.695	10.304	3.145	0.472	0.207	0.031	1.432	0.215	2.496	0.374			0.20718	0.03108
Emergency Generator #3	68.695	10.304	3.145	0.472	0.207	0.031	1.432	0.215	2.496	0.374			0.20718	0.03108
Lime Silo					0.003	0.013							0.00029	0.00127
Silicon Storage Bin					0.122	0.536							0.01223	0.05358
Silicon Feed Hopper #1					0.004	0.017							0.00039	0.00172
Silicon Feed Hopper #2					0.004	0.017							0.00039	0.00172
Silicon Feed Hopper #3					0.004	0.017							0.00039	0.00172
Dust Collection System in Post Processing					1.354	5.930							0.13539	0.59301
Cooling Towers					3.038	13.308							0.06077	0.26617
Acid Vent Scrubber					0.034	0.148							0.00338	0.01479
Process Vent Scrubber														
Post Processing Vent Scrubber	1.327	1.656												
Emergency Vent Scrubber					1.125	0.054							0.11254	0.00540
Methane Reformer	1.059	4.638	0.757	3.314	0.050	0.220	0.004	0.017	0.036	0.156	0.000	0.000	0.05031	0.22037
Fire Pump	7.603	1.901	3.504	0.876	0.149	0.037	0.178	0.044	0.310	0.078			0.14856	0.03714
Fugitives									0.502	2.200				
Proposed New FEC Total	***214.295***	***58.600***	***22.057***	***46.090***	***7.587***	***24.560***	***4.058***	***1.553***	***8.782***	***6.316***	***0.000***	***0.000***	***2.22406***	***5.45898***
Previous FEC Limit		***83.030***		***46.090***		***24.560***		***6.530***		***5.490***				

5.4 Toxic and Hazardous Air Pollutants

Emissions calculations were completed for the proposed facility PTE and FEC maximum PTE to determine the potential impact on Toxic and Hazardous Air Pollutants (TAPs) and (HAPs). In keeping with IDEQ guidelines, maximum PTE emissions for non-fugitive TAPs and HAPs were calculated for the proposed renewal/modification. TAP and HAP emissions are associated with the combustion and process activities. Given that the existing FEC is expiring in association with this renewal, all HAPs and TAPs emissions were assumed to be new. PTE emissions were calculated as described previously. For all HAPs and TAPs, the growth factor the facility was assumed to be 10%. The proposed project FEC emissions exceeded 11 Idaho TAPs screening emissions levels. These pollutants were included in the impact modeling analysis attached in Appendix G. No ambient impact thresholds were exceeded based on FEC maximum modeled impacts.

Table 5-3 and 5-4 below show the controlled facility-wide FEC Maximum PTE for TAPs and HAPs.

Table 5-3 Project Toxic Air Pollutant FEC Maximum PTE

NON-CARCINOGENS							
Pollutant	CAS #	TAP Emissions (lb/hr)	Pre-Project TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling ? (Y/N)	TAP Emissions (tpy)
Acrolein	107-02-8	2.81E-04	0.00E+00	2.81E-04	0.017	No	4.96E-05
Antimony	7440-36-0	2.85E-05	0.00E+00	n/a	3.3E-02	No	0.00E+00
Barium	7440-39-3	5.99E-04	0.00E+00	5.99E-04	3.3E-02	No	2.47E-03
Chromium	7440-47-3	1.88E-04	0.00E+00	1.88E-04	3.3E-02	No	7.86E-04
Cobalt	7440-48-4	1.68E-05	0.00E+00	1.68E-05	3.3E-03	No	4.72E-05
Copper	7440-50-8	1.14E-04	0.00E+00	1.14E-04	6.7E-02	No	4.77E-04
Ethylbenzene	100-41-4	0.00E+00	0.00E+00	n/a	2.9E+01	No	0.00E+00
Fluoride (as F) (Hydrogen Flouride)	16984-48-8	3.71E-01	0.00E+00	n/a	1.67E-01	Yes	8.91E-01
Hexane	110-54-3	2.41E-01	0.00E+00	2.41E-01	1.2E+01	No	1.01E+00
Hydrogen Chloride	7647-01-0	1.88E+00	0.00E+00	1.88E+00	5.0E-02	Yes	5.26E+00
Manganese	7439-96-5	5.26E-05	0.00E+00	5.26E-05	3.33E-01	No	2.13E-04
Mercury	7439-97-6	4.20E-05	0.00E+00	4.20E-05	3.E-03	No	1.46E-04
Molybdenum	7439-98-7	1.51E-04	0.00E+00	1.51E-04	3.33E-01	No	6.18E-04
Naphthalene	91-20-3	1.98E-02	0.00E+00	1.98E-02	2.00E-06	Yes	7.33E-04
Nitric Acid	7697-37-2	5.74E-01	0.00E+00	5.74E-01	3.33E-01	Yes	1.38E+00
Pentane	109-66-0	3.49E-01	0.00E+00	3.49E-01	1.18E+02	No	1.46E+00
Phosphorous	7723-14-0	1.55E-07	0.00E+00	n/a	7.E-03	No	0.00E+00
Selenium	7782-49-2	3.22E-06	0.00E+00	3.22E-06	1.3E-02	No	1.35E-05
Silicon	7440-21-3	1.45E+00	0.00E+00	1.45E+00	1.3E-02	Yes	6.37E+00
1,1,1-Trichloroethane	71-55-6	2.20E-05	0.00E+00	n/a	1.27E+02	No	0.00E+00
Toluene	108-88-3	7.24E-03	0.00E+00	7.24E-03	2.5E+01	No	2.87E-03
Xylene	1330-20-7	4.85E-03	0.00E+00	4.85E-03	2.9E+01	No	6.59E-04
Zinc	7440-66-6	3.89E-03	0.00E+00	3.89E-03	6.67E-01	No	1.63E-02

CARCINOGENS							
Pollutant	CAS #	TAP Emissions (lb/hr)	Pre-Project TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Acetaldehyde	75-07-0	1.43E-03	0.00E+00	n/a	3.00E-03	No	2.90E-04
Arsenic	7440-38-2	4.04E-05	0.00E+00	4.04E-05	1.5E-06	Yes	1.12E-04
Benzene	71-43-2	1.88E-02	0.00E+00	1.88E-02	8.0E-04	Yes	3.77E-03
Beryllium	7440-41-7	8.73E-06	0.00E+00	8.73E-06	2.8E-05	No	6.74E-06
Cadmium	7440-43-9	1.48E-04	0.00E+00	1.48E-04	3.7E-06	Yes	6.18E-04
Chromium VI	7440-47-3	4.85E-04	0.00E+00	n/a	5.6E-07	Yes	0.00E+00
Formaldehyde	50-00-0	1.32E-02	0.00E+00	1.32E-02	5.1E-04	Yes	4.27E-02
Nickel	7440-02-0	2.82E-04	0.0E+00	2.8E-04	2.7E-05	Yes	1.18E-03
Benzo(a)pyrene	50-32-8	1.73E-07	0.00E+00	1.73E-07	2.0E-06	No	6.74E-07
Benz(a)anthracene	56-55-3	2.53E-07	0.00E+00	2.53E-07	2.0E-06	No	1.01E-06
Benzo(b)fluoranthene	205-82-3	2.53E-07	0.00E+00	2.53E-07	2.0E-06	No	1.01E-06
Benzo(k)fluoranthene	205-99-2	2.53E-07	0.00E+00	2.53E-07	2.0E-06	No	1.01E-06
Chrysene	218-01-9	2.49E-07	0.00E+00	2.49E-07	2.0E-06	No	1.01E-06
Dibenzo(a,h)anthracene	53-70-3	1.73E-07	0.00E+00	1.73E-07	2.0E-06	No	6.74E-07
Indeno(1,2,3-cd)pyrene	193-39-5	3.15E-07	0.00E+00	3.15E-07	2.00E-06	No	1.01E-06
Total PAHs		4.96E-03	0.00E+00	4.96E-03	2.00E-06	Yes	6.90E-04

Table 5-3 Project Hazardous Air Pollutant FEC Maximum PTE

HAP Pollutants	FEC PTE (T/yr)
Acrolein	4.506E-05
Antimony	0.000E+00
Chromium	7.148E-04
Cobalt	4.289E-05
Ethylbenzene	0.000E+00
Fluoride (as F) (Hydrogen Flouride)	8.100E-01
Hexane	9.190E-01
Hydrogen Chloride	4.783E+00
Manganese	1.940E-04
Mercury	1.327E-04
Naphthalene	6.663E-04
Phosphorous	0.000E+00
1,1,1-Trichloroethane	0.000E+00
Toluene	2.607E-03
Xylene	5.994E-04
Zinc	1.481E-02
Acetaldehyde	2.641E-04
Arsenic	1.021E-04
Benzene	3.428E-03
Beryllium	6.127E-06
Cadmium	5.616E-04
Chromium VI	0.000E+00
Formaldehyde	3.881E-02
Nickel	1.072E-03
Total	6.58E+00

6.0 LIMITATIONS ON POTENTIAL TO EMIT

In association with the proposed renewal, Hoku utilized the following assumptions to develop facility emissions and to ensure compliance of ambient impacts. As a result, Hoku acknowledges that the following limitations must be included in the facility permit.

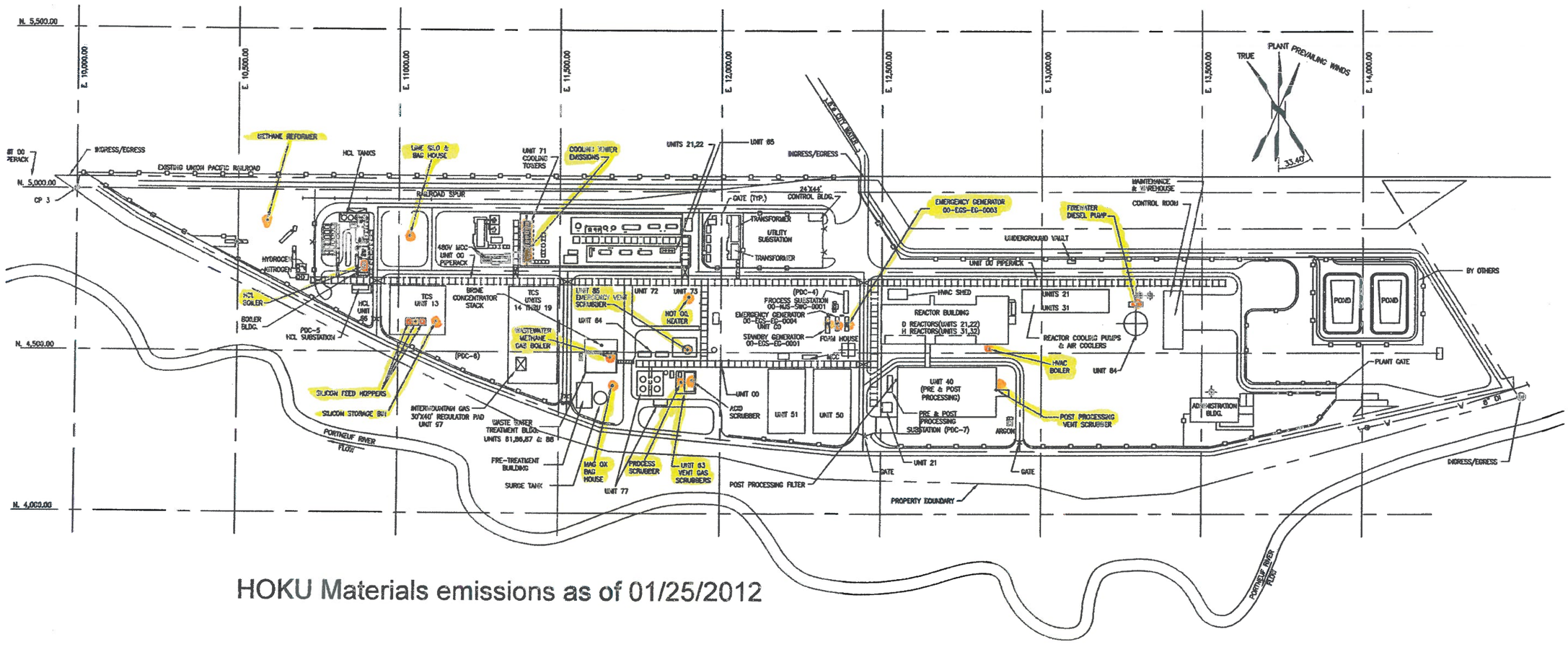
6.1 Operating Hours

- The onsite emergency generators and diesel fire pump must only be tested between the hours of Noon and 4 PM. Additionally, they must not be run for more than 30 minutes of any one clock hour for a total of no more than 60 minutes.
- Onsite boilers and heaters were assumed to operate 8,376 hours per year.
- The Emergency Vent Scrubber was assumed to operate only 96 hours per year.

APPENDIX A

Site Location Map and Plot Plan


Hoku Materials
© 2012 Google
Google
Date: 9/1/2011
1992
lat 42.892929° lon -112.494272 elev 4418 ft
Eye alt



HOKU Materials emissions as of 01/25/2012

APPENDIX B

DEQ PTC Forms and Checklists

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

General Information **Form GI**
Revision 7
2/18/10

Please see instructions on page 2 before filling out the form.

All information is required. If information is missing, the application will not be processed.

IDENTIFICATION

1. Company Name	2. Facility Name:
Hoku Materials, Inc.	Polysilicon Production Facility

3. Brief Project Description:	Renewal with modifications of facility's FEC permit.

FACILITY INFORMATION

4. Primary Facility Permit Contact Person/Title	Mr. Todd Kirkendall		EHS Manager	
5. Telephone Number and Email Address	(208) 235-6016		tkirkendall@hokucorp.com	
6. Alternate Facility Contact Person/Title				
7. Telephone Number and Email Address				
8. Address to Which the Permit Should be Sent	One Hoku Way			
9. City/County/State/Zip Code	Pocatello	Bannonck	Idaho	83204
10. Equipment Location Address (if different than the mailing address above)				
11. City/County/State/Zip Code				
12. Is the Equipment Portable?	☐ Yes ☒ No			
13. SIC Code(s) and NAICS Code	Primary SIC: 3339	Secondary SIC:	NAICS: 331419	
14. Brief Business Description and Principal Product	Polysilicon Production			
15. Identify any adjacent or contiguous facility that this company owns and/or operates	N/A			
16. Specify the reason for the application	☐ Permit to Construct (PTC) For Tier I permitted facilities only: If you are applying for a PTC then you must also specify how the PTC will be incorporated into the Tier I permit. ☐ Incorporate the PTC at the time of the Tier I renewal ☐ Co-process the Tier I modification and PTC ☐ Administratively amend the Tier I permit to incorporate the PTC upon your request (IDAPA 58.01.01.209.05.a, b, or c) ☐ Tier I Permit ☒ Tier II Permit ☐ Tier II/Permit to Construct			

CERTIFICATION

In accordance with **IDAPA 58.01.01.123 (Rules for the Control of Air Pollution in Idaho)**, I certify based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

17. Responsible Official's Name/Title	Tao Zhang	President	
18. Responsible Official's Signature		Date:	3/16/2012

19. ☒ Check here to indicate that you would like to review the draft permit prior to final issuance.

Department of Environmental Quality
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline - 1-877-5PERMIT

Department of Environmental Quality - Air Quality Division
Minor Source Permit to Construct Application Completeness Checklist

This checklist is designed to aid the applicant in submitting a complete permit to construct application.

I. Actions Recommended Before Submitting Application

☒ Refer to the Rule. Read the Permit to Construct requirements contained in IDAPA 58.01.01.200-228, Rules for the Control of Air Pollution in Idaho. The Rules are available on DEQ's website (go to http://adm.idaho.gov/adminrules/rules/idapa58/0101.pdf).

☒ Refer to DEQ's Permit to Construct Guidance Document. DEQ has developed a guidance document to aid applicants in submitting a complete permit to construction application. The guidance document is located on DEQ's website (go to http://www.deq.idaho.gov/air/permits_forms/permitting/ptc_prepermit_guidance.pdf).

☒ Consult with DEQ Representatives. It is recommended that the applicant schedule a pre-application meeting with DEQ to discuss application requirements before submitting the permit to construct application. The meeting can be in person or on the phone. Contact DEQ's Air Quality Hotline at **877-5PERMIT** to schedule the pre-application meeting.

☐ Submit Ambient Air Quality Modeling Protocol. It is strongly recommended that an ambient air quality modeling protocol be submitted to DEQ at least two (2) weeks before the permit to construct application is submitted. Contact DEQ's Air Quality Hotline at **877-5PERMIT** for information about the protocol.

II. Application Content

Application content should be prepared using the checklist below. The checklist is based on the requirements contained in IDAPA 58.01.01.202.

☒ Apply for a Permit to Construct. Submit a Permit to Construct application using forms available on DEQ's website at http://www.deq.idaho.gov/air/permits_forms/forms/ptc_general_application.pdf.

☒ Permit to Construct Application Fee. The permit to construct application fee of $1000 must be submitted at the time the original permit to construct application is submitted. Refer to IDAPA 58.01.01.224. If the permit to construct application is withdrawn or denied and a new application is submitted, a new $1,000 application fee is required to be submitted. The application fee is not transferable or refundable. The application fee can be paid by check, credit card or Electronic Funds Transfer (EFT). If you choose to pay by credit card or EFT, please refer to the following Access Idaho link:
https://www.accessidaho.org/secure/deq/payport/item.html?id=511
If you choose to pay by check, enclose the check with your permit to construct application.

☒ Process Description(s). The process or processes for which construction is requested must be described in sufficient detail and clarity such that a member of the general public not familiar with air quality can clearly understand the proposed project. A process flow diagram is required for each process.

☒ Equipment List. All equipment that will be used for which construction is requested must be described in detail. Such description includes, but is not limited to, manufacturer, model number or other descriptor, serial number, maximum process rate, proposed process rate, maximum heat input capacity, stack height, stack diameter, stack gas flowrate, stack gas temperature, etc. All equipment that will be used for which construction is requested must be clearly labeled on the process flow diagram.

☒ Potential to Emit. Submit the uncontrolled potential to emit (pre-control equipment emissions estimates) and the controlled potential to emit (post-control equipment emissions estimates) for all equipment for which construction is requested. Any limit on the equipment for which is construction is requested may become a

limit on that equipment in the permit to construct.

☒ Potential to Emit and Modeled Ambient Concentration for All Regulated Air Pollutants. All proposed emission limits and modeled ambient concentrations for all regulated air pollutants must demonstrate compliance with all applicable air quality rules and regulations. Regulated air pollutants include criteria air pollutants, toxic air pollutants listed pursuant to IDAPA 58.01.01.585 and 586, and hazardous air pollutants listed pursuant to Section 112 of the 1990 Clean Air Act Amendments (go to http://www.epa.gov/ttn/atw/188polls.html). Describe in detail how the proposed emissions limits and modeled ambient concentrations demonstrate compliance with each applicable air quality rule and regulation. It is requested that emissions calculations, assumptions, and documentation be submitted with sufficient detail so DEQ can verify the validity of the emissions estimates.

☒ Scaled Plot Plan. It is required a scaled plot plan be included in the permit to construct application and it must clearly label the location of each proposed process and the equipment that will be used in the process.

☒ List all Applicable Requirements. All applicable requirements must be cited by the rule or regulation section/subpart that applies for each emissions unit.

☒ Certification of Permit to Construct Application. The permit to construct application must be signed by the Responsible Official and must contain a certification signed by the Responsible Official. The certification must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. Refer to IDAPA 58.01.01.123.

☒ Submit the Permit to Construct Application. Submit the permit to construct application and application fee to the following address:

Air Quality Program Office – Application Processing
Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706-1255

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Cover Sheet for Air Permit Application – Permit to Construct **Form CSPTC**

Please see instructions on page 2 before filling out the form.

COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER

1. Company Name	Hoku Materials, Inc.		
2. Facility Name	Polysilicon Production Facility	3. Facility ID No.	005-00058
4. Brief Project Description - One sentence or less	Renewal with modifications of facility's FEC permit.		

PERMIT APPLICATION TYPE

5. ☐ New Source ☐ New Source at Existing Facility ☐ PTC for a Tier I Source Processed Pursuant to IDAPA 58.01.01.209.05.c
☐ Unpermitted Existing Source ☒ Facility Emissions Cap ☐ Modify Existing Source: Permit No.: Date Issued:
☐ Required by Enforcement Action: Case No.:____

6. ☒ Minor PTC ☐ Major PTC

FORMS INCLUDED

Included	N/A	Forms		DEQ Verify
☒	☐	Form CSPTC – Cover Sheet		☐
☒	☐	Form GI – Facility Information		☐
☒	☐	Form EU0 – Emissions Units General		☐
☐	☒	Form EU1– Industrial Engine Information	Please specify number of EU1s attached: ____	☐
☒	☐	Form EU2– Nonmetallic Mineral Processing Plants	Please specify number of EU2s attached: 1	☐
☐	☒	Form EU3– Spray Paint Booth Information	Please specify number of EU3s attached: ____	☐
☐	☒	Form EU4– Cooling Tower Information	Please specify number of EU3s attached: ____	☐
☐	☒	Form EU5 – Boiler Information	Please specify number of EU4s attached: ____	☐
☐	☒	Form CBP– Concrete Batch Plant	Please specify number of CBPs attached: ____	☐
☐	☒	Form HMAP – Hot Mix Asphalt Plant	Please specify number of HMAPs attached: ____	☐
☐	☒	PERF – Portable Equipment Relocation Form		☐
☐	☒	Form AO – Afterburner/Oxidizer		☐
☐	☒	Form CA – Carbon Adsorber		☐
☐	☒	Form CYS – Cyclone Separator		☐
☐	☒	Form ESP – Electrostatic Precipitator		☐
☐	☒	Form BCE– Baghouses Control Equipment		☐
☐	☒	Form SCE– Scrubbers Control Equipment		☐
☐	☒	Form VSCE – Venturi Scrubber Control Equipment		☐
☐	☒	Form CAM – Compliance Assurance Monitoring		☐
☒	☐	Forms EI– Emissions Inventory		☐
☒	☐	PP – Plot Plan		☐
☒	☐	Forms MI1 – MI4 – Modeling	(Excel workbook, all 4 worksheets)	☐
☒	☐	Form FRA – Federal Regulation Applicability		☐

Department of Environmental Quality - Air Quality Division
Toxic Air Pollutant (TAP) Preconstruction Compliance Application Completeness Checklist

This checklist is designed to aid the applicant in submitting a complete preconstruction compliance demonstration for toxic air pollutants (TAPs) in permit to construct applications. The applicant must place a check mark in the box for each section below that applies.

I. Actions Needed Before Submitting Application

☒ Refer to the Rule. Read the Demonstration of Preconstruction Compliance with Toxic Standards contained in IDAPA 58.01.01.210 (Rules Section 210) Rules for the Control of Air Pollution in Idaho (Rules). Toxic air pollutants (TAPs) are regulated in accordance with Rules Section 210 only from emission units constructed or modified on or after July 1, 1995.

Determine if a new (constructed after June 30, 1995) emission unit has the potential to emit a TAP listed in IDAPA 58.01.01.585 (Rules Section 585) or IDAPA 58.0101.586 (Rules Section 586). Potential toxic air pollutants can be determined by reviewing commonly available emission factors, such as EPA's AP-42, or calculating emissions using a mass balance. For TAPs that are emitted but not listed in Rules Section 585 and 586, contact the Air Permit Hotline at 877-5PERMIT.

Determine if the proposed construction or modification is exempt from the need to obtain a permit to construct in accordance with IDAPA 58.01.01.220-223. Use the Exemption Criteria and Reporting Requirements for TAPs IDAPA 58.01.01.223 checklist to assist you in the exemption determination. If the source does not qualify for an exemption in accordance with IDAPA 58.01.01.220-223 complete the following checklist and submit it with the permit application. Please note that fugitive TAP emissions are not included in the IDAPA 58.01.01.223 exemption determination, but fugitive TAP emissions are included in the analysis if a permit is required. Stated another way: if a source is required to obtain a Permit to Construct because it does not meet the exemption criteria for any reason all TAP emissions, including fugitive TAPs, are included in the compliance demonstration in the application for the permit to construct. Should you have any questions regarding the fact that all TAPs, including fugitive TAPs, are included in the TAP preconstruction compliance demonstration submitted with a permit to construct application you may call the Air Permit Hotline at 877-5PERMIT.

Will the new or modified source result in new or increased potential emissions of TAPs?

☒ Yes. If yes, continue to section II.

☐ No. If no, no further action is required.

II. Application Content

If a new source has the potential to emit a TAP, or if a modification to an existing source increases the potential to emit of a TAP, then one of the following methods (A-J) of demonstrating TAP preconstruction compliance must be documented for each TAP. Standard methods are one of A-C. The applicant may also use one of the specialized methods in D-J. Fugitive TAP emissions shall be included in the analysis. The compliance methods are based on the requirements of Rules Section 210. Applicants are often able to demonstrate preconstruction TAP compliance using a combination of methods A and B.

Emission Calculations

Emissions calculation methodologies used are dependent on whether a specific TAP is a non-carcinogen or a carcinogen and whether the compliance method chosen from the list below calls

for controlled or uncontrolled emissions. Non-carcinogens are regulated based on a 24-hour averaging period and emission rates used for comparison to the non-carcinogen screening emissions level (EL) should be the maximum controlled or uncontrolled emissions quantity during any 24-hour period divided by 24. Carcinogens are regulated as a long term increment and emission rates used for comparison to the carcinogen EL should be the maximum controlled or uncontrolled emissions quantity during any 1 year period divided by 8760.

Modeling Analyses

Atmospheric dispersion modeling is required when controlled TAP emissions rates exceed ELs. Modeling analyses should be conducted in accordance with IDAPA 58.01.01.210.03. Quantification of Ambient Concentrations and the State of Idaho Air Quality Modeling Guideline (http;//www.deq.idaho.gov/air/data_reports/publications.cfm#model). For non-carcinogen 24-hour increments, compliance is demonstrated using the maximum modeled 24-hour-averaged concentration from available meteorological data (typically a five-year data set). For carcinogen long-term increments, compliance is demonstrated using the maximum modeled average concentration for the duration of the data set (one-year to five-year data set).

A submitted modeling report should clearly specify modeled emissions rates and results. All electronic model input files should be submitted, including BPIP input files.

Poly aromatic Hydrocarbons

Questions often arise regarding polyaromatic hydrocarbons as they are listed in Rules Section 586 of the Rules. The following two points are provided for clarification.

1) The following group of 7 PAH's (i.e. named POM), shall be combined and considered as one TAP equivalent in potency to benzo(a)pryrene:

   Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a, h) anthrancene, chrysene, indeno(1,2,3,-cd) pyrene, benzo (a) pyrene

2) All other PAH's are considered as a single pollutant and the emission of each is compared the PAH increment listed in Rules Section 586.

Compliance Methods

Fill in letter(s) (A-J) from the list below for TAP compliance demonstration method(s) used: _____.

A. TAPs Compliance Using Uncontrolled Emissions (Rules Section 210.05)

☒ Calculate the uncontrolled emissions (Rules Section 210.05) of each TAP from new emissions units. Uncontrolled emission rates are emissions at maximum capacity without the effect of physical or operational limitations. See Quantification of Emission Rates (Rules Section 210.02). Show calculations and state all assumptions.

☒ Calculate the increase of TAP emissions from modified emissions units. Show calculations and state all assumptions. The increase in emissions for a modified emission unit is determined by subtracting the potential to emit the TAP before the modification from the uncontrolled potential to emit after the modification. In conducting this analysis please note the following for TAP emission rate increase determinations:

Uncontrolled emission rates after the modification are emissions at maximum capacity without the effect of physical or operational limitations.

When determining the emissions increase from existing permitted emissions units the emission rate before the modification is equivalent to the emission limits contained in the permit for the

TAPs or, if there no emission limits in the permit, by determining what the emission rate is under the physical or operational limitations contained in the permit.

☒ Aggregate the uncontrolled emissions for each TAP from all new emissions units with the increase in emissions from all modified emissions units.

☒ If the aggregated emissions increase for each TAP from the new and modified units, as determined above, are less than or equal to the respective TAP screening emissions level (EL) then preconstruction compliance with toxic standards has been demonstrated and no further analysis is required. Submit a table comparing the uncontrolled emissions rate to the applicable EL.

If aggregated emissions are greater than the respective screening emissions level (EL) for any pollutants, use another compliance demonstration method for those pollutants, such as methods B, C, or D.

B. TAP Compliance Using Uncontrolled Ambient Concentration (Rules Section 210.06)

☒ Determine the uncontrolled emissions of each TAP from new emission units and the increase in emissions from all modified emissions units as described above in compliance Method A. Show calculations and state all assumptions.

☒ Model the uncontrolled emissions of each TAP from new emissions units and the increase in emissions from all modified emissions units.

☒ If the uncontrolled ambient concentration is less than or equal to the acceptable ambient concentration increment listed in Rules Section 585 and 586 no further procedures for demonstrating preconstruction compliance will be required for that TAP as part of the application process. Submit a table comparing uncontrolled ambient concentrations to the applicable acceptable ambient concentration.

C. TAP Compliance Using Controlled Ambient Concentrations (Rules Section 210.08)

☐ Determine the controlled emissions from new emissions units and the controlled emission increase from modified emissions units. Show all calculations and state all assumptions, including the control methods.

☐ Model the controlled emissions of each TAP from new emissions units and the increase in controlled emissions from all modified emissions units.

TAP emissions levels (EL) included in Rules Section 585 and 586 are derived based on generic modeling. If the sum the of emissions from new and modified sources is below the EL compliance is demonstrated without the need to conduct site-specific dispersion modeling.

☐ If the controlled ambient concentration from emission increases from new emissions units and modified emissions units is less than the applicable acceptable ambient concentration no further procedures for demonstrating preconstruction compliance are required.

☐ The Department shall include an emission limit for the TAP in the permit to construct that is equal to or, if requested by the applicant, less than the emission rate that was used in the modeling (Rules Section 210.08.c).

In some instances the Department may consider a throughput limit or other inherently-limiting operational restriction in a permit as an effective emission limit for the TAP, rather than including a specific emission rate limit.. Note that the applicant may model uncontrolled emissions as described in compliance Method B in an attempt to avoid TAPs emissions limitations.

D. TAPs Compliance for NSPS and NESHAP Sources (Rules Section 210.20)

☐ If the owner or operator demonstrates that the TAP emissions from the source or modification is regulated by 40 CFR Part 60, 40 CFR Part 61 or 40 CFR Part 63, no further procedures for demonstrating preconstruction compliance will be required for that TAP.

☐ Provide a demonstration that the TAP is regulated under 40 CFR Part 60, 40 CFR Part 61 or 40 CFR Part 63. This demonstration must be specific for each TAP emitted.

E. TAP Compliance Using Net Emissions (Rules Section 210.09)

An applicant may use TAP net emissions to show preconstruction compliance; however this analysis may require more work than some of the others procedures available to demonstrate preconstruction compliance. When netting, all emissions increases and decreases of the TAP that have occurred within five years must be included in the analysis as described below..

☐ Determine the net emission increase for a TAP. A net emissions increase shall be an emission increase from a particular modification plus any other increase and decreases in actual emissions at the facility that are creditable and contemporaneous with particular modification (Rules Section 210.09). Show all calculations and state all assumptions.

☐ A creditable increase or decrease in actual emissions is contemporaneous with a particular modification if it occurs within five (5) years of the commencement of the construction or modification (Rules Section 210.09.a).

Actual emissions are (Rules Section 006.03):

- ☐ In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a two year period which precedes the particular date and which is representative of normal source operation. The Department shall allow the use of a different time period upon a determination that it is more representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, productions rates, and types of materials processed, stored, or combusted during the selected time period.

- ☐ The Department may presume that the source-specific allowable emissions for the unit are equivalent to actual emissions of the unit.

- ☐ For any emission unit (except electric utility steam generating units) that has not begun normal operations on the particular date, actual emissions shall equal the potential to emit of the unit on that date.

☐ Do not include emissions increases from emission units that have an uncontrolled emission rate that is 10% or less than the applicable screening emission level (EL) in Rules Section 585 and 586 (Rules Section 007.09.c.ii) and do not include emission increases from environmental remediation sources (Rules Section 007.09.c.iii). Show all calculations and state all assumptions.

☐ If the net emission increase is less than or equal to the applicable screening emissions level (EL) listed in Rules Section 585 and 586, no further procedures for demonstrating preconstruction compliance will be required (Rules Section 210.09.c).

☐ The Department shall include emission limits and other permit terms for the TAP in the permit to construct that will assure that the facility will be operated in the manner described in the preconstruction compliance demonstration (Rules Section 210.09.d).

In some instances the Department may consider a throughput limit or other inherently-limiting operational restriction in a permit as an effective emission limit for the TAP. rather than including a specific emission rate limit..

F. TAP Compliance Using Net Ambient Concentration (Rules Section 210.10)

☐ Determine the emission increase from the new source or modification, and all other creditable emission increases and decrease using the methods described above in compliance Method E.

☐ Model the emissions increases and decreases for each TAP. Modeling TAP decreases is accomplished by using negative valued emissions rates in the model input.

☐ If the net ambient concentration is less than or equal to the applicable ambient concentration increment listed in Rules Section 585 and 586, no further procedures for demonstrating preconstruction compliance are required.

☐ The Department shall include emission limits and other permit terms for the TAP in the permit to construct that will assure that the facility will be operated in the manner described in the preconstruction compliance demonstration (Rules Section 210.10.d).

In some instances the Department may consider a throughput limit or other inherently-limiting operational restriction in a permit as an effective emission limit for the TAP, rather than including a specific emission rate limit..

G. TAP Compliance Using T-RACT Ambient Concentration for Carcinogens (Rules Section 210.12)

The applicant may use T-RACT to demonstrate preconstruction compliance for TAPs listed in Rules Section 586 only.

T-RACT is an emissions standard based on the lowest emission of TAPs that a particular source is capable of meeting by application of control technology that is reasonably available, as determined by the Department, considering technological and economic feasibility. If control technology is not feasible, the emission standard may be based on the application of a design, equipment, work practice or operational requirement, or combination thereof (Rules Section 007.16).

T-RACT Submittal Requirements

☐ The applicant shall submit the following information to the Department identifying and documenting which control technologies or other requirements the applicant believes to be T-RACT (Rules Section 210.14).

The technical feasibility of a control technology or other requirements for a particular source shall be determined considering several factors including but not limited to:

- ☐ Process and operating procedures, raw materials and physical plant layout.
- ☐ The environmental impacts caused by the control technology that can not be mitigated, including but not limited to, water pollution and the production of solid wastes.
- ☐ The energy requirements of the control technology.

The economic feasibility of a control technology or other requirement, including the costs of necessary mitigation measures, for a particular source shall be determined considering several factors including, but not limited to:

- ☐ Capital costs.
- ☐ Cost effectiveness, which is the annualized cost of the control technology divided by the amount of emission reduction.
- ☐ The difference in costs between the particular source and other similar sources, if any, that have implemented emissions reductions.

☐ Compare the source's or modification's approved T-RACT ambient concentration to the applicable acceptable ambient concentration increment listed in Rules Section 586 multiplied by a factor of 10. If the sources approved T-RACT concentration is less than or equal to 10 times the applicable acceptable ambient concentration increment listed in Rules Section 586, no further procedures for demonstrating preconstruction compliance will be required.

☐ If an application is submitted to the Department without T-RACT and determined complete, and T-RACT is later determined to be applicable the completeness determination of the application will be revoked until a supplemental application is submitted and determined complete. When the supplemental application is determined complete, the timeline for agency action shall be reinitiated (Rules Section 210.13.b).

☐ If the Department determines that the source has proposed T-RACT, the Department shall develop emission standards to be incorporated into a permit to construct.

In some instances, the Department may consider a throughput limit or other inherently limiting operational restriction in a permit as an effective emission limit for the TAP, rather than including a specific emission rate limit..

H. TAP Compliance Using the Short Term Source Factor (Rules Section 210.15)

☐ For short term sources, the applicant may utilize a short term adjustment factor of ten (10) only for a carcinogenic pollutant listed in Rules Section 586. For a carcinogen listed in Rules Section 586 multiply either the applicable acceptable ambient concentration increment or the screening emission rate (EL), but not both, by ten (10) to demonstrate preconstruction compliance (Rules Section 210.15).

☐ A short term source is any new stationary source or modification to an existing source, with an operational life no greater than five (5) years from the inception of any operations to cessation of actual operations (Rules Section 210.15).

I. TAP Compliance for Environmental Remediation Sources (Rules Section 210.16)

☐ For remediation sources subject to or regulated by the Resource Conservation and Recovery Act and the Idaho Rules and Standard for Hazardous Waste, or the comprehensive Environmental Response, Compensation and Liability Act or a consent order, if the estimated ambient concentration is greater than the acceptable ambient impact increment listed in Rules Section 585 and 586, Best Available Control Technology shall be applied and operated until the estimated uncontrolled emission from the remediation source are below the applicable acceptable ambient concentration increment (Rules Section 210.16).

J. TAP Compliance Using Offset Ambient Concentration (Rules Section 210.11)

☐ Contact the Department prior to proposing to utilize Offset Ambient Concentrations to demonstrate preconstruction compliance.

☐ Emission offsets must satisfy the requirements for emission reduction credits (Rules Section 460).

- The proposed level of allowable emissions must be less than the actual emissions of the emissions units providing the offsets (Rules Section 460.01).
- An air quality permit must be issued that restricts the potential to emit of the emission unit providing the offset.
- Emission reduction imposed by local, state or federal regulations or permits shall not be allowed.

☐ Compare the source's or modifications approved emission offset ambient concentration to the applicable acceptable ambient concentration listed in Rules Section 585 and 586. If the source's or modifications approved offset concentration is less than the acceptable ambient concentration listed in Rules Section 585 and 586, no further procedures for demonstrating preconstruction compliance will be required.

☐ The Department shall include emission limits and other permit terms for the TAP in the permit to construct that will assure that the facility will be operated in the manner described in the preconstruction compliance demonstration (Rules Section 210.10.d).

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

AIR PERMIT APPLICATION

Revision 6
10/7/09

For each box in the table below, CTRL+click on the blue underlined text for instructions and information.

IDENTIFICATION	
1. Company Name: Hoku Materials, Inc.	2. Facility Name: Polysilicon Production Facility
3. Brief Project Description: Renewal with modifications of facility's FEC permit.	
APPLICABILITY DETERMINATION	
4. List applicable subparts of the New Source Performance Standards (NSPS) (40 CFR part 60). Examples of NSPS affected emissions units include internal combustion engines, boilers, turbines, etc. The applicant must thoroughly review the list of affected emissions units.	List of applicable subpart(s): 40 CFR 60 Subpart OOO is applicable for Nonmetallic Mineral Processing. 40 CFR 60 Subpart IIII .
5. List applicable subpart(s) of the National Emission Standards for Hazardous Air Pollutants (NESHAP) found in 40 CFR part 61 and 40 CFR part 63. Examples of affected emission units include solvent cleaning operations, industrial cooling towers, paint stripping and miscellaneous surface coating. EPA has a web page dedicated to NESHAP that should be useful to applicants.	List of applicable subpart(s): 40 CFR 63, Subpart ZZZZ
6. For each subpart identified above, conduct a complete a regulatory analysis using the instructions and referencing the example provided on the following pages. **Note** - Regulatory reviews must be submitted with sufficient detail so that DEQ can verify applicability and document in legal terms why the regulation applies. Regulatory reviews that are submitted with insufficient detail will be determined incomplete.	☑ A detailed regulatory review is provided (Follow instructions and example). ☐ DEQ has already been provided a detailed regulatory review. Give a reference to the document including the date.

Emissions Unit - General **Form EU0**

DEQ AIR QUALITY PROGRAM
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Air Permit Hotline – 1-877-5PERMIT

PERMIT TO CONSTRUCT APPLICATION

Revision 3
03/27/07

Please see instructions on page 2 before filling out the form.

IDENTIFICATION		
Company Name: Hoku Materials, Inc.	Facility Name: Polysilicon Plant	Facility ID No: 005-00058
Brief Project Description:	Renewal/Modification of FEC Permit	

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION	
1. Emissions Unit (EU) Name:	Lime Storage Silo
2. EU ID Number:	6
3. EU Type:	☐ New Source ☐ Unpermitted Existing Source ☒ Modification to a Permitted Source -- Previous Permit #:P-2007-0075 Date Issued: 8/14/07
4. Manufacturer:	TBD
5. Model:	TBD
6. Maximum Capacity:	900 CU. FT.
7. Date of Construction:	TBD
8. Date of Modification (if any)	MARCH 2012
9. Is this a Controlled Emission Unit?	☐ No ☒ Yes If Yes, complete the following section. If No, go to line 18.

EMISSIONS CONTROL EQUIPMENT			
10. Control Equipment Name and ID:	Lime Storage Silo Baghouse		
11. Date of Installation:	TBD	12. Date of Modification (if any):	MARCH 2012
13. Manufacturer and Model Number:	TBD		
14. ID(s) of Emission Unit Controlled:	6- Lime Storage Silo		
15. Is operating schedule different than emission units(s) involved?	☐ Yes ☒ No		
16. Does the manufacturer guarantee the control efficiency of the control equipment?	☐ Yes ☒ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency	0.02 gr/dscf	0.02 gr/dscf				

17. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. Equipment selected will meet above mentioned control efficiency

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)	
18. Actual Operation	8,760 HR/YR
19. Maximum Operation	8,760 hr/yr

REQUESTED LIMITS	
20. Are you requesting any permit limits?	☐ Yes ☒ No (If Yes, check all that apply below)
☐ Operation Hour Limit(s):	
☐ Production Limit(s):	
☐ Material Usage Limit(s):	
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports
☐ Other:	
21. Rationale for Requesting the Limit(s):	

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Air Permit Hotline – 1-877-5PERMIT

Emissions Units - Nonmetallic Mineral Processing Plant **Form EU2**
Revision 5
08/28/08

Please see instructions on page 2 before filling out the form.

This form requests information about equipment at a nonmetallic mineral processing plant, as defined in 40 CFR 60.671, that generates fugitive emissions only.

In addition, Form EU0 and appropriate control equipment forms should be used for each stack emission point from the same plant.

IDENTIFICATION		
1. Company Name:	2. Facility Name:	3. Facility ID No:
Hoku Materials, Inc.	Polysilicon Plant	005-00058
4. Brief Project Description:	Renewal/Modification of FEC Permit	

EQUIPMENT (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS					
5. Equipment Description	6. Construction Date	7. Serial Number	8. Equipment ID Number (company's)	9. Rated Capacity	10. Emission Control Type
Silicon Storage Bin (Bulk Unloader)	TBD	TBD	TBD	634 CFM	Filter
Silicon Storage Hopper	TBD	TBD	TBD	100 CFM	Filter

OPERATING SCHEDULE (hours/day, or hours/week, or months/year, or other)	
11 Actual Operation	
12. Maximum Operation	8760 Hr/Yr

IDEQ PTC Forms

Facility Wide Potential to Emit Emission Inventory (FEC Maximum)

Table 1. PRE PROJECT POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

*** Assumed to be Zero for FEC Renewal assessment.**

Table 2. POST PROJECT FEC MAXIMUM POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

	Critieria Pollutant Emission Summary - FEC													
	NOx Emissions		CO Emissions		PM-10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions		PM-25 Emissions	
Description	lb/hr	T/yr	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	0.630	2.638	1.118	4.682	0.068	0.283	0.066	0.276	0.044	0.184	0.000	0.000	0.068	0.283
Waste Water Boiler	0.504	2.111	0.894	3.746	0.054	0.226	0.053	0.221	0.035	0.147	0.000	0.000	0.054	0.226
HCl Boiler	0.504	2.111	0.894	3.746	0.054	0.226	0.053	0.221	0.035	0.147	0.000	0.000	0.054	0.226
Hot Oil Heater	4.014	16.811	6.830	28.606	0.820	3.436	0.063	0.265	0.580	2.430	0.000	0.000	0.820	3.436
Emergency Generator #1	61.264	6.126	1.770	0.177	0.289	0.029	0.777	0.078	2.248	0.225			0.289	0.029
Emergency Generator #2	68.695	10.304	3.145	0.472	0.207	0.031	1.432	0.215	2.496	0.374			0.207	0.031
Emergency Generator #3	68.695	10.304	3.145	0.472	0.207	0.031	1.432	0.215	2.496	0.374			0.207	0.031
Lime Silo					0.003	0.013							0.000	0.001
Silicon Storage Bin					0.122	0.536							0.012	0.054
Silicon Feed Hopper #1					0.004	0.017							0.000	0.002
Silicon Feed Hopper #2					0.004	0.017							0.000	0.002
Silicon Feed Hopper #3					0.004	0.017							0.000	0.002
Dust Collection System in Post Processing					1.354	5.930							0.135	0.593
Cooling Towers					3.038	13.308							0.061	0.266
Acid Vent Scrubber					0.034	0.148							0.003	0.015
Process Vent Scrubber														
Post Processing Vent Scrubber	1.327	1.656												
Emergency Vent Scrubber					1.125	0.054							0.113	0.005
Methane Reformer	1.059	4.638	0.757	3.314	0.050	0.220	0.004	0.017	0.036	0.156	0.000	0.000	0.050	0.220
Fire Pump	7.603	1.901	3.504	0.876	0.149	0.037	0.178	0.044	0.310	0.078			0.149	0.037
Fugitives									0.502	2.200				
Proposed New FEC Total	***214.295***	***58.600***	***22.057***	***46.090***	***7.587***	***24.560***	***4.058***	***1.553***	***8.782***	***6.316***	***0.000***	***0.000***	***2.224***	***5.459***
Previous FEC Limit		***83.030***		***46.090***		***24.560***		***6.530***		***5.490***				

Table 3. PROJECT CHANGE TO FEC MAXIMUM POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

	Critieria Pollutant Emission Summary - FEC													
	NOx Emissions		CO Emissions		PM-10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions		PM-25 Emissions	
Description	lb/hr	T/yr	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	0.630	2.638	1.118	4.682	0.068	0.283	0.066	0.276	0.044	0.184	0.000	0.000	0.068	0.283
Waste Water Boiler	0.504	2.111	0.894	3.746	0.054	0.226	0.053	0.221	0.035	0.147	0.000	0.000	0.054	0.226
HCl Boiler	0.504	2.111	0.894	3.746	0.054	0.226	0.053	0.221	0.035	0.147	0.000	0.000	0.054	0.226
Hot Oil Heater	4.014	16.811	6.830	28.606	0.820	3.436	0.063	0.265	0.580	2.430	0.000	0.000	0.820	3.436
Emergency Generator #1	61.264	6.126	1.770	0.177	0.289	0.029	0.777	0.078	2.248	0.225			0.289	0.029
Emergency Generator #2	68.695	10.304	3.145	0.472	0.207	0.031	1.432	0.215	2.496	0.374			0.207	0.031
Emergency Generator #3	68.695	10.304	3.145	0.472	0.207	0.031	1.432	0.215	2.496	0.374			0.207	0.031
Lime Silo					0.003	0.013							0.000	0.001
Silicon Storage Bin					0.122	0.536							0.012	0.054
Silicon Feed Hopper #1					0.004	0.017							0.000	0.002
Silicon Feed Hopper #2					0.004	0.017							0.000	0.002
Silicon Feed Hopper #3					0.004	0.017							0.000	0.002
Dust Collection System in Post Processing					1.354	5.930							0.135	0.593
Cooling Towers					3.038	13.308							0.061	0.266
Acid Vent Scrubber					0.034	0.148							0.003	0.015
Process Vent Scrubber														
Post Processing Vent Scrubber	1.327	1.656												
Emergency Vent Scrubber					1.125	0.054							0.113	0.005
Methane Reformer	1.059	4.638	0.757	3.314	0.050	0.220	0.004	0.017	0.036	0.156	0.000	0.000	0.050	0.220
Fire Pump	7.603	1.901	3.504	0.876	0.149	0.037	0.178	0.044	0.310	0.078			0.149	0.037
Fugitives									0.502	2.200				
Proposed New FEC Total	***214.295***	***58.600***	***22.057***	***46.090***	***7.587***	***24.560***	***4.058***	***1.553***	***8.782***	***6.316***	***0.000***	***0.000***	***2.224***	***5.459***
Previous FEC Limit		***83.030***		***46.090***		***24.560***		***6.530***		***5.490***				

NSR Regulated air Pollutants are defined[1] as: Particulate Matter (PM-10, PM-2.5), Carbon Monoxide, Lead, Nitrogen Dioxide, Ozone (VOC), Sulfur Dioxide, all pollutants regulated by NSPS (40 CFR 60)(i.e. TRS, fluoride, sulfuric acid mist) & Class I & Class II Ozone Depleting Substances (40 CFR 82)(i.e. CFC, HCFC, Halon, etc.) The Gem State facility is not a source of any pollutants regualted by NSPS other than NSR regulated air pollutants, nor is the facility a source of Class I or Class II Ozone Depleting Substances

** See spreadsheets prepared by JBR (included in Appendix E of the permit application for further information regarding emission factors and calculation assumptions.

IDEQ PTC Forms
Facility Wide Hazardous Air Pollutant Potential to Emit

HAP FEC MAXIMUM POTENTIAL TO EMIT EMISSIONS SUMMARY

HAP Pollutants	FEC PTE (T/yr)
Acrolein	4.506E-05
Antimony	0.000E+00
Chromium	7.148E-04
Cobalt	4.289E-05
Ethylbenzene	0.000E+00
Fluoride (as F) (Hydrogen Flouride)	8.100E-01
Hexane	9.190E-01
Hydrogen Chloride	4.783E+00
Manganese	1.940E-04
Mercury	1.327E-04
Naphthalene	6.663E-04
Phosphorous	0.000E+00
1,1,1-Trichloroethane	0.000E+00
Toluene	2.607E-03
Xylene	5.994E-04
Zinc	1.481E-02
Acetaldehyde	2.641E-04
Arsenic	1.021E-04
Benzene	3.428E-03
Beryllium	6.127E-06
Cadmium	5.616E-04
Chromium VI	0.000E+00
Formaldehyde	3.881E-02
Nickel	1.072E-03
Total	6.58E+00

* Maximum Individual HAP

** See spreadsheets prepared by JBR (included in Appendix E of the permit application for

IDEQ PTC Forms

Toxic Air Pollutant Emissions Inventory

Part 1. PRE- AND POST PROJECT NON-CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

NON-CARCINOGENS							
Pollutant	CAS #	TAP Emissions (lb/hr)	Pre-Project TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Acrolein	107-02-8	2.81E-04	0.00E+00	2.81E-04	0.017	No	4.96E-05
Antimony	7440-36-0	2.85E-05	0.00E+00	n/a	3.3E-02	No	0.00E+00
Barium	7440-39-3	5.99E-04	0.00E+00	5.99E-04	3.3E-02	No	2.47E-03
Chromium	7440-47-3	1.88E-04	0.00E+00	1.88E-04	3.3E-02	No	7.86E-04
Cobalt	7440-48-4	1.68E-05	0.00E+00	1.68E-05	3.3E-03	No	4.72E-05
Copper	7440-50-8	1.14E-04	0.00E+00	1.14E-04	6.7E-02	No	4.77E-04
Ethylbenzene	100-41-4	0.00E+00	0.00E+00	n/a	2.9E+01	No	0.00E+00
Fluoride (as F) (Hydrogen Flouride)	16984-48-8	3.71E-01	0.00E+00	n/a	1.67E-01	Yes	8.91E-01
Hexane	110-54-3	2.41E-01	0.00E+00	2.41E-01	1.2E+01	No	1.01E+00
Hydrogen Chloride	7647-01-0	1.88E+00	0.00E+00	1.88E+00	5.0E-02	Yes	5.26E+00
Manganese	7439-96-5	5.26E-05	0.00E+00	5.26E-05	3.33E-01	No	2.13E-04
Mercury	7439-97-6	4.20E-05	0.00E+00	4.20E-05	3.E-03	No	1.46E-04
Molybdenum	7439-98-7	1.51E-04	0.00E+00	1.51E-04	3.33E-01	No	6.18E-04
Naphthalene	91-20-3	1.98E-02	0.00E+00	1.98E-02	2.00E-06	Yes	7.33E-04
Nitric Acid	7697-37-2	5.74E-01	0.00E+00	5.74E-01	3.33E-01	Yes	1.38E+00
Pentane	109-66-0	3.49E-01	0.00E+00	3.49E-01	1.18E+02	No	1.46E+00
Phosphorous	7723-14-0	1.55E-07	0.00E+00	n/a	7.E-03	No	0.00E+00
Selenium	7782-49-2	3.22E-06	0.00E+00	3.22E-06	1.3E-02	No	1.35E-05
Silicon	7440-21-3	1.45E+00	0.00E+00	1.45E+00	1.3E-02	Yes	6.37E+00
1,1,1-Trichloroethane	71-55-6	2.20E-05	0.00E+00	n/a	1.27E+02	No	0.00E+00
Toluene	108-88-3	7.24E-03	0.00E+00	7.24E-03	2.5E+01	No	2.87E-03
Xylene	1330-20-7	4.85E-03	0.00E+00	4.85E-03	2.9E+01	No	6.59E-04
Zinc	7440-66-6	3.89E-03	0.00E+00	3.89E-03	6.67E-01	No	1.63E-02

Part 2. PRE- AND POST PROJECT CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

CARCINOGENS							
Pollutant	CAS #	TAP Emissions (lb/hr)	Pre-Project TAP Emissions (lb/hr)	Difference (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	TAP Emissions (tpy)
Acetaldehyde	75-07-0	1.43E-03	0.00E+00	n/a	3.00E-03	No	2.90E-04
Arsenic	7440-38-2	4.04E-05	0.00E+00	4.04E-05	1.5E-06	Yes	1.12E-04
Benzene	71-43-2	1.88E-02	0.00E+00	1.88E-02	8.0E-04	Yes	3.77E-03
Beryllium	7440-41-7	8.73E-06	0.00E+00	8.73E-06	2.8E-05	No	6.74E-06
Cadmium	7440-43-9	1.48E-04	0.00E+00	1.48E-04	3.7E-06	Yes	6.18E-04
Chromium VI	7440-47-3	4.85E-04	0.00E+00	n/a	5.6E-07	Yes	0.00E+00
Formaldehyde	50-00-0	1.32E-02	0.00E+00	1.32E-02	5.1E-04	Yes	4.27E-02
Nickel	7440-02-0	2.82E-04	0.0E+00	2.8E-04	2.7E-05	Yes	1.18E-03
Benzo(a)pyrene	50-32-8	1.73E-07	0.00E+00	1.73E-07	2.0E-06	No	6.74E-07
Benz(a)anthracene	56-55-3	2.53E-07	0.00E+00	2.53E-07	2.0E-06	No	1.01E-06
Benzo(b)fluoranthene	205-82-3	2.53E-07	0.00E+00	2.53E-07	2.0E-06	No	1.01E-06
Benzo(k)fluoranthene	205-99-2	2.53E-07	0.00E+00	2.53E-07	2.0E-06	No	1.01E-06
Chrysene	218-01-9	2.49E-07	0.00E+00	2.49E-07	2.0E-06	No	1.01E-06
Dibenzo(a,h)anthracene	53-70-3	1.73E-07	0.00E+00	1.73E-07	2.0E-06	No	6.74E-07
Indeno(1,2,3-cd)pyrene	193-39-5	3.15E-07	0.00E+00	3.15E-07	2.00E-06	No	1.01E-06
Total PAHs		4.96E-03	0.00E+00	4.96E-03	2.00E-06	Yes	6.90E-04

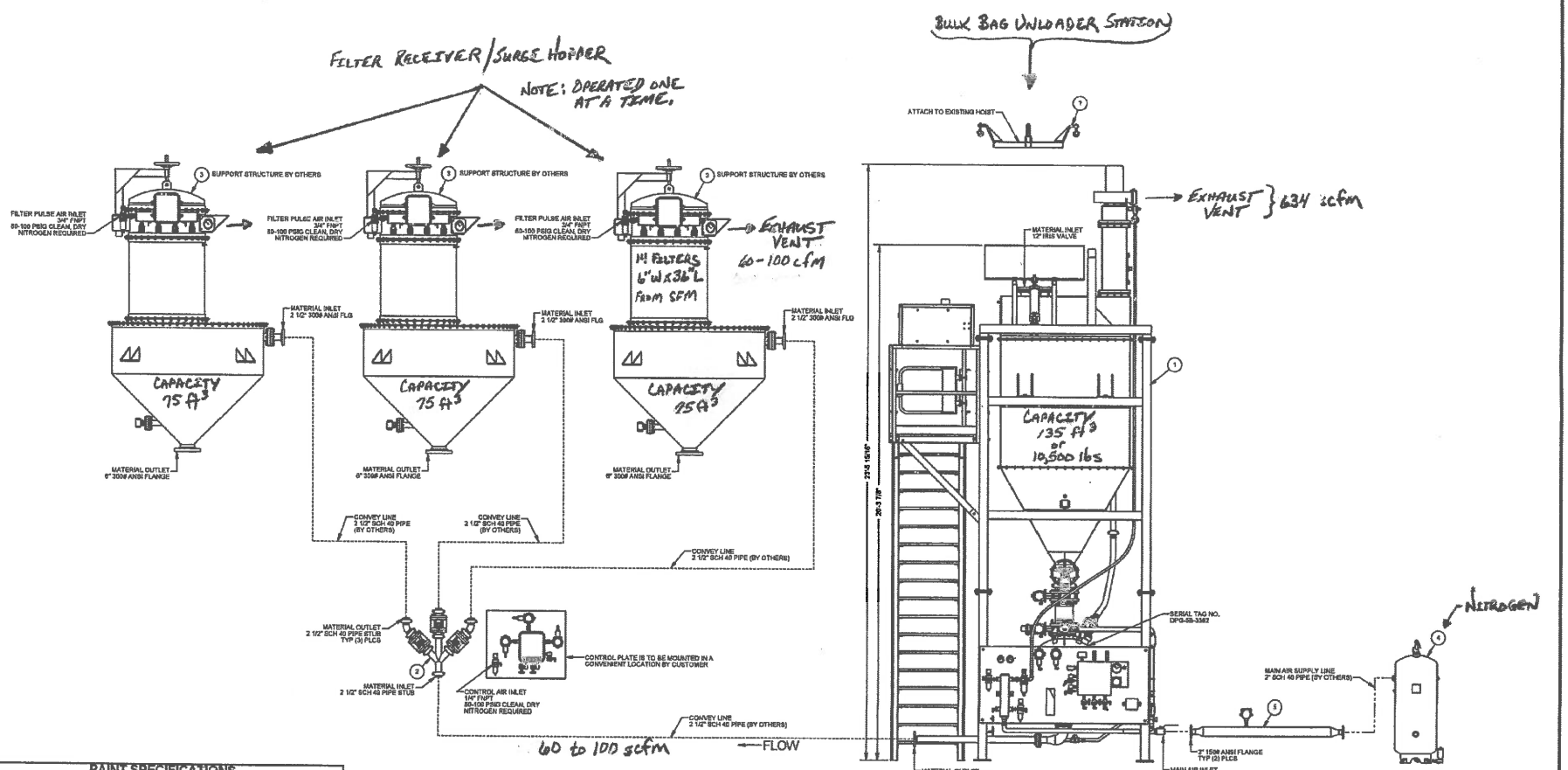
cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

** See spreadsheets prepared by JBR (included in Appendix E of the permit application for further information regarding emission factors and calculation assumptions.

APPENDIX C

Process Flow Diagrams

ITEM	QTY	DESCRIPTION	PART NO.	DWG NO.	ID	REV
1	1	BULK BAG STATION, 135 FT³ ACCESS HOPPER, DPG-SB STACKUP	-	24-0-4727	00	
2	1	PINCH DIVERTER ASSEMBLY, 2 1/2" X-PROOF, 3 WAY, CS	-	546-1200	00	
3	3	FILTER RECEIVER, FR-14 TOP REMOVABLE WITH BAGS ARRG BIG, CS	-	24-0-4713	00	A
4	1	AIR RECEIVER, 60 GAL, W/MET'N AUTO DRAIN BELT VALVE AND GAUGE	-	23-0-2335	00	A
5	1	FLOW METER CONTROL TUBE ASSEMBLY, CS	-	52-0-0804	00	
6	1	BULK BAG LIFTING FRAME WELDMENT, FOR LIFTING HOOKS, CS	-	23-2-2919	01	A



PAINT SPECIFICATIONS

ITEM NO.	DESCRIPTION	PAINT SPECIFICATION
ITEM #1	BULK BAG STATION, 135 FT³ ACCESS HOPPER, DPG-SB STACKUP	ALL EXPOSED CARBON STEEL TO BE PAINTED CYCLONAIRE BLUE WITH THG PLATFORM AND STAIRWAY (DWG NO. 24-0-4728) TO BE PAINTED OSHA SAFETY YELLOW
ITEM #2	PINCH DIVERTER VALVE ASSEMBLY	ALL EXPOSED CARBON STEEL TO BE PAINTED CYCLONAIRE BLUE
ITEM #3	FILTER RECEIVER, FR-14 ARRG BIG	ALL EXPOSED CARBON STEEL TO BE PAINTED CYCLONAIRE BLUE
ITEM #4	60 GALLON AIR RECEIVER	ALL EXPOSED CARBON STEEL TO BE PAINTED CYCLONAIRE BLUE
ITEM #5	FLOW METER CONTROL TUBE ASSEMBLY	ALL EXPOSED CARBON STEEL TO BE PAINTED CYCLONAIRE BLUE
ITEM #6	BULK BAG CARRIER	ALL EXPOSED CARBON STEEL TO BE PAINTED CYCLONAIRE BLUE

NOTES:
1) ANY PART NOT CALLED OUT IN THE BILL OF MATERIALS IS TO BE PROVIDED BY OTHERS
2) ALL SURFACES TO BE MILL FINISH AND WELDS UNGROUND UNLESS OTHERWISE NOTED
3) APPROXIMATE WEIGHT: 17,000 LBS
4) ATTACH SERIAL TAG NO. DPG-SB-3362 TO DPG-SB TANK

REV NO.	DRWN. BY	CHKD. BY	DATE
-			

SHEET SIZE: D
TYPE OF: G PENNER
SCALE: 1:24
CAD FILENAME: 24-0-4731
DATE:

cyclonaire
EQUIPMENT ID
HOKU MATERIALS
PROJECT 10373
DRAWING NO.: 24-0-4731
SHEET: 1 OF 1
REV:

APPENDIX D

Manufacturer Information For Modified Sources

cyclonaire®
PNEUMATIC CONVEYING SYSTEMS

PROPOSAL

#10373 Rev A

Presented to

Hoku Corporation

March 25, 2011

Cyclonaire Corporation · 2922 N. Division Avenue · P.O. Box 366 · York, NE 68467
800-445-0730 · 402-362-2000 · Fax 402-362-2001 · www.cyclonaire.com

To:	Joe Smith 1288 Al Moana Blvd, Suite 220 Honolulu, HI 96814	**Phone:** **Fax:** **E-mail:**	808-682-7800 x611 808-440-0357 jsmith@hokucorp.com
RE:	Metallurgical Grade Silicon Pneumatic Conveying System		

Dear Joe,

Thank you for your above-mentioned inquiry. Cyclonaire has 37+ years' experience in the material handling industry, with our primary focus on pneumatic conveying solutions. Based on your requirements and our experience, Cyclonaire is pleased to offer the following proposal for your review.

This revision includes the following changes:

- Three destinations
- Destination capacity increased to 75 ft^3
- 2-way diverter changed to 3-way diverter
- Dense Phase conveyor upsized to 5 ft^3 from 3 ft^3
- Surge hopper capacity above DPG increased to 10,500 lbs (135 ft^3)

Thank you again for allowing Cyclonaire to bid on this project. Please feel free to call us if you have questions, or to discuss our offering in greater detail. We are very interested in your business, and look forward to hearing from you in the near future.

Sincerely,

Doug Wilson
Applications Engineer
Cyclonaire Corporation
dwilson@cyclonaire.com

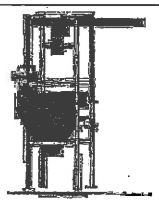
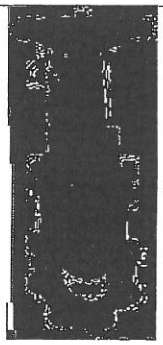
APPLICATION DATA SHEET

Material Data	
Product	Metallurgical Grade Silicon
Product Class	III
Bulk Density	78 pcf
Moisture	2% Surface moisture
Flowability	Good
Particle Size	200-2000 µm
Temperature	Ambient
Degradation	N/A
Segregation	N/A
Characteristics	Powder to Granular
Abrasiveness	High

Design Data	
Type of Conveying	Dense Phase
Type of Loading	Gravity
Full Line or Clear Line?	Clear
Injector Spacing	Not Required
Convey Rate	up to 5,000 pph
Conveyor Inlet Size	8-inch diameter
Convey Line Size	2½-inch diameter (by others)
Number of Elbows	(3) 90° sweeps (by others)
Actual Convey Distance	90 feet H + 75 feet V (maximum)
Effective Convey Distance	165 feet (maximum)

Site Description	
System Application	Bulk Bag Unload, Weigh and Transfer
Plant Location	Not Specified
Elevation	Not Specified
Material Source	Bulk Bag
Material Destination	3 Receiving bins

System Calculations	
Conveyor Capacity	5 ft³
Construction	Carbon Steel
Cycles per hour	12.8
Total Cycle Time	4.7 minutes
Average Nitrogen Consumption	60-100 scfm
Supply Pressure	100 psig
Convey Pressure	40 psig
Dust Collection	61 ft²
Air-to-Cloth Ratio	4.4:1 (using 2.7x surge factor)

Item	Qty		Description
1	1		**Cyclonaire Bulk Bag Unloader Station,** to include: • Heavy-duty square tubular framework, welded and bolted for stability and durability • Carbon steel construction on material contact points • Bag lifter frame for use with existing hoist • Iris valve, 12" I.D., manually-operated • Access/Surge hopper ➢ Hinged door with (2) toggle clamps & window ➢ Vent stub; for connection to dust collection ➢ Inlet and outlet flanges ➢ Grid ➢ 60° cone section with flanged outlet ➢ Sight glass ➢ Level sensor, capacitance-type ➢ 4"x6" aeration pads ➢ Approximately 135 ft^3 usable capacity (10,500 lb) • Integral dust collection / suppression system ➢ (3) Cartridge-type filter elements ➢ Reverse-pulse cleaning system with adjustable timer board ➢ Exhaust fan with damper and 1.5-hp, 230/460/60/3 electric motor ➢ NEMA 4 enclosure • Safety platform and stair assembly to allow access to Access Hopper door • Detailed equipment tag • 66" x 66" x 300"(height for total stack up: Bulk Bag Unloader, Surge Hopper and DPG-5B • Estimated Weight: 4,000 lbs. (Bulk Bag Unloader, Hoist and Surge Hopper) • Cyclonaire Blue paint
2	1		**DeZurik Manual Maintenance Gate,** to include: • Model KGN • 8-inch diameter • Cast body, 304SS, with integral metal seat • Gate, 304SS • Packing gland, 316SS • Packing gland hardware, carbon steel • Bolting / Hardware, carbon steel • Yoke Sleeve, aluminum bronze • Stem and Clip, 304SS • Handwheel and superstructure, carbon steel • Accessory brackets / fasteners, carbon steel

Item	Qty		Description
3	1		**Cyclonaire Dense Phase Conveyor,** to include: • Model DPG-5B • Carbon steel construction • 5 ft³ ASME-coded pressure vessel, rated at 150 psig • 8-inch diameter grooved pipe material inlet • Dual-stacked automatic inlet butterfly valve assembly for material loading, including pneumatic actuator and 115 VAC solenoid • Discharge elbow with 2½-inch diameter grooved pipe material outlet • Electronic vibratory-type level control for automatic sensing of HIGH and LOW level • Filter / Regulator • Pressure relief valve • Loss in weight transmitter • Flex connections on inlets and outlets • Nitrogen flowrate transmitter • Skid mounted • Detailed equipment tag • 68 inches tall, 24 inch diameter (height included in Bulk Bag Unloader dimension) • 510 lb • Cyclonaire Blue paint Cyclonaire Weighing Components: • One (1) Set load cells ➢ Cardinal brand ➢ Model THBC shear beam, tank-mount • Summing box, NEMA 4 NOTE: Load cells are shipped loose for on-site installation and calibration, all by others. Estimated nitrogen requirements for conveying product at capacity and distance specified are 60-100 scfm of clean, dry air supplied at 100 psig. Requires 3-5 scfm clean, dry nitrogen at 90-100 psig for butterfly valve actuators. Assembly is factory tested. It comes complete and ready for hook up to product supply, plant nitrogen supply, electrical supply and convey line supplied by others.

please provide power consumption.
zhu lejiang
Mar. 18. 2011

Item	Qty		Description
4	1		**Cyclonaire Junction Box,** to include: • U.L. listed • TYPE 4 junction box, 10" x 8" x 6" • All conveyor devices wired to terminal blocks • Sequence-of-Operation information • Ladder diagram(s) NOTE: PLC and programming are quoted separately, or are by others.
5	1		**Cyclonaire Industrial Nitrogen Receiver,** to include: • 60-gallon capacity • Carbon steel construction • ASME-coded vessel rated at 150 psig • Pressure gauge • Pressure relief valve • Automatic drain with 115 VAC solenoid • 50 inches tall, 20 inch diameter • Estimated weight: 200 lbs. • Detailed equipment tag • Cyclonaire Blue paint
6	1		**Cyclonaire Diverter Valve,** to include: • Carbon steel construction • 2½-inch diameter convey line size • Three (3) heavy-duty pinch valves, cast body, rubber sleeves • Divert "Y" section, 45°, with flanged connections for pinch valves and plain pipe connections for convey line • (3) 4-way, single coil, 115 VAC x-proof solenoid valves • (3) Pressure switches, 115 VAC, x-proof, to verify diverter position • Electrical enclosure, NEMA 7/9, pre-wired, for connection to control system • 48" x 34" x 12" tall • Estimated weight: 350 lbs. • Detailed equipment tag • Cyclonaire Blue paint 100 psig clean, dry nitrogen is required for proper pinch valve operation.

please provide power consumption
zhu Dejiang
Mar. 28. 2011

please provide power consumption
zhu Dejiang
Mar-28-2011

Item	Qty		Description
7	3		**Cyclonaire Filter Receiver/Surge Hopper,** each to include: • Model 36-FR-14, Arrangement IIIg • 10 gauge, welded and bolted, carbon steel construction • 61 ft^2 of filter area • Designed for 2 psig pressure • Dirty nitrogen plenum with 2½-inch inlet stub, 2 inch 300# RF flange (A3FA Pipe Spec.) • 75 ft^3 of storage capacity • 60° hopper with Vibra-Pad™ aeration kit to assist in product discharge • Vibratory-type sensor, NEMA 7/9 with 2 inch 300# RF flange (A3FA Pipe Spec.) for mounting • Outlet valve by others • (14) 16 oz. polyester felted filter bags • Carbon steel cages • Top-removal filter design with davit for removal of head • 304SS bag clamps • Safety grid • Gussets for support by others • Clean nitrogen plenum with vent hood and bird screen • Compressed nitrogen assembly for reverse pulse-jet filter cleaning, with timer board in NEMA 7/9 enclosure • Nitrogen Pressure gauge for indication of available nitrogen pressure for pulsing • ΔP gauge for indication of filter condition • 148" tall, 36" diameter (filter receiver), 72" diameter surge hopper • Estimated weight: 1600 lbs. • Detailed equipment tag • Cyclonaire Blue paint Requires 5-7 scfm of clean, dry nitrogen at 90 psig for pulse jet operation.
			Total System Price: $140,013

CYCLONAIRE STANDARD PAINT PROCEDURES AND SPECIFICATIONS

STEP 1: METAL PREPARATION

OPTION A: WET PROCESS

METAL	CLEANER	APPLICATION	REMOVAL
Carbon Steel	Mistic Mist Degreaser	Air Pressure	H.P. H_2O Spray
Stainless Steel	DeRustit SS-3	Brush	2150 PSI (both)

OPTION B: DRY PROCESS

STEP 2: APPLICATOR

OPTION A: SPRAY GUN (AIR) DeVilbiss model JGA-502
OPTION B: PRESSURE POT DeVilbiss model JGA-502

STEP 3: STANDARD PAINT

PRIMER	TOP COAT
1-2 Mils	1-2 Mils
Iowa Paint Gray #18743	2-part, Water Based Polyurethane
Iowa Paint Activator #16470	Blue River Coatings Cyclonaire Blue* "Part A"
	Blue River Coatings Catalyst "Part B"

STEP 4: PAINT PROCESS

A. Remove water or sand left from metal preparation process.
B. Apply Primer.
C. Allow 2 to 4 hours before applying Top Coat.
D. Apply Top Coat.
E. Allow 4 to 6 hours before handling.

*Other paints (color and/or type) may be available for an additional charge. Please consult factory for details.

CODES AND STANDARDS

All equipment/material furnished by Cyclonaire is designed in accordance with one or more of the following standards.

AGMA	American Gear Manufacturer's Association
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
FM	Factory Mutual
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electric Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
UL	Underwriters Laboratory

START-UP / SERVICE SCHEDULE FOR CYCLONAIRE TECHNICIANS

Start-Up is not included in the Total System Price of the proposal unless specifically stated as such. However, it is highly recommended that the customer purchase Start-Up from Cyclonaire Start-Up will be ordered via the customer's P.O. number prior to Cyclonaire's travel to the jobsite, and billed per the below schedule. For the purpose of estimating Start-Up / Service costs, we offer the following:

RATE SCHEDULE:

1.) Domestic (Including Canada and Mexico)

(a) Weekdays	$720.00 U.S. per day or $90.00 U.S. per hour
(b) Saturdays	$120.00 U.S. per hour
(c) Sundays/Holidays	$166.00 U.S. per hour

2.) International

(a) Weekdays	$1,000.00 U.S. per day or $125.00 U.S. per hour
(b) Saturdays	$175.00 U.S. per hour
(c) Sundays/Holidays	$200.00 U.S. per hour

3.) Travel Time (Domestic and International)

(a) $35.00 U.S. per hour weekdays
(b) $60.00 U.S. per hour weekends and holidays

NOTE: Minimum charge is one (1) 8-hour weekday. Additional days are based on four (4) hours minimum each.

TRAVEL EXPENSES:

The actual travel expenses incurred by our employees from the time they leave the Cyclonaire facility to the time they return to the facility will be billed at cost. Mileage will be charged at $0.50 per mile. Flights to destinations outside North America will be billed at cost using Business Class rates. Any fees, tariffs, permits, licenses, etc. will be added to the service billing at cost.

LIVING EXPENSES:

1. Will be billed at cost.

2. Meals will be billed at a flat fee of $50.00 U.S./day for domestic service. Meals outside the U.S. will be at $50.00/day or actual cost whichever is greater.

DELAY IN PERFORMANCE OF DUTIES:

If, because of local practices, strikes, construction delays, non-availability of convey material, or other reason(s) beyond Cyclonaire's control, a Cyclonaire Technician is prevented from his/her duties, charges at the applicable rate during idle hours will be incurred. In such a case, customer may either instruct him/her to return home, thereby minimizing additional charges **or** if you feel the situation will be of short duration, you may accept the extra expense of having him/her wait.

SUMMARY:

We suggest that, when a Cyclonaire Technician is working in your plant, you assign one of your employees to participate in the service and be instructed in the proper operation and maintenance of the Cyclonaire equipment. We want you, as a valued customer, to be fully satisfied with our service. Our Service Technician will cooperate with you in every way possible.

CYCLONAIRE GENERAL TERMS

PRICE: Prices quoted are in U.S. Dollars.

Prices of equipment not manufactured by CYCLONAIRE are based on quotations as valid today. Should these suppliers change their selling prices by the time an order is issued, CYCLONAIRE reserves the right to adjust them accordingly.

DELIVERY: **Two to Three (3-4) weeks for initial Approval Drawing submittal, plus**
One to Two (1-2) weeks for each re-submittal, as required, plus
Ten to Twelve (10-12) weeks after return of Final Approval Drawings.

BY OTHERS: High-pressure nitrogen supply and related piping, installation, wiring, motor starters, modifications to existing equipment and anything else not specifically identified as being provided by CYCLONAIRE.

GUARANTEES: Twelve (12) months from date of commissioning, or Eighteen (18) months from shipment. A Performance Guarantee will be offered after successful full-scale testing at CycloTech.

PAYMENT: 25% due with order; 75% due at time of shipment. 5% Net 10 applies to both installments.

FREIGHT: F.O.B. Jobsite – Pre-Pay & Bill.

TAXES / DUTIES: None included.

DOCUMENTS: Price includes two (2) sets of Operation & Maintenance Manuals – one a hard copy and one electronic copy – each including Drawings. Additional sets of Drawings or Manuals are available for an additional charge. All documents and drawings are created in English, and dimensioned in English units of measure, unless otherwise specified. Please notify CYCLONAIRE of specific requests.

CONDITIONS: Equipment quoted is built to standard CYCLONAIRE design and specifications unless specifically noted. Design changes by customer are subject to pricing review / revision by CYCLONAIRE.

MATERIAL DATA: Sizing of the system(s) included herein, including Convey Line Diameter, Air Requirements, Vessel Sizing, etc. is based on information on the enclosed Application Parameters Sheet(s). Any deviation in material type, bulk density, particle size, moisture content, temperature, etc. from these parameters may affect system sizing and will void any Performance Guarantees, written or implied.
NOTE: Compressed Nitrogen Supply is to be adequately dried and heated/cooled as required, especially for outdoor applications.

START-UP: The price for Start-Up is not included in the base proposal unless specifically noted. Please refer to CYCLONAIRE'S Start-Up / Service Schedule for purchase details of these additional project services on a per diem basis.

CONVEY LINE: CYCLONAIRE reserves the right to review and/or suggest modifications to the customer's convey line layout for the proposed system(s). Improper convey line layout (distance, orientation, elbows, connections, etc.) may adversely affect system performance and may void any Performance Guarantee unless modified.

CONVEY RATE:

The quoted Convey Rate for this proposal is based on delivery of material through the convey vessel and assumes that sufficient quantity of material is available to load the conveyor. CYCLONAIRE is not responsible for conditions outside of its control, such as restricted material flow from the material source, changing material source/destination, etc.

This system(s) has been sized based on our knowledge and experience with the material(s) and application(s). Experience has also shown that system performance can vary widely with changes to material and/or application. Any Performance Guarantee, written or implied, will be offered only after successful testing of representative material at CYCLONAIRE'S Test Facility. If testing indicates that changes in sizing are required, then CYCLONAIRE reserves the right to re-quote this system(s).

If there is no opportunity to test representative material, CYCLONAIRE can provide start-up services at our published rates. If equipment modifications are required, a separate quote will be offered for that work.

Conditions of Sale are attached.

WARRANTY:

CYCLONAIRE CORPORATION, York, NE U.S.A., 68467, warrants for a period of one (1) year from the date of shipment, its equipment to be free from defects in material and workmanship.

CYCLONAIRE CORPORATION'S obligation under this Warranty is limited to the repair or replacement, at its factory, of any part or parts of said equipment which shall be returned to CYCLONAIRE with transportation charges prepaid, and which the Company's examination shall disclose to its satisfaction to have been defective. This is CYCLONAIRE CORPORATION'S sole Warranty.

CYCLONAIRE COPRORATION MAKES NO OTHER WARRANTY OF ANY KIND WHATEVER, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY CYCLONAIRE CORPORATION AND EXCLUDED FROM THIS AGREEMENT. NO LIABILITY FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY NATURE IS ASSUMED BY OR SHALL BE IMPOSED UPON CYCLONAIRE CORPORATION BASED UPON ITS UNDERTAKINGS HEREIN.

CYCLONAIRE CORPORATION neither assumes nor authorizes any person to assume for it any other obligation in connection with the sale of such equipment. This Warranty shall not apply to any equipment which has been repaired or altered outside the Company's factory in any manner, so as, in the Company's judgement, to affect its serviceability, or which has been subjected to misuse, negligence or accident, or to equipment made by the Company which has been operated in a manner contrary to the Company's printed instructions. Under no circumstances shall CYCLONAIRE CORPORATION be liable for any loss, damage, cost of repair, or consequential damages of any kind in connection with the sale, use or repair of any equipment purchased from CYCLONAIRE.

In the event that any such equipment contains items purchased from other manufacturers by CYCLONAIRE, the warranty on such items is limited to the terms of the warranty furnished by the sellers thereof to CYCLONAIRE.

CYCLONAIRE GENERAL CONDITIONS

1.RESPONSIBILITY – CYCLONAIRE shall not be held responsible for any loss, damage or delay caused by fires, strikes, civil or military authority, or by insurrection or riot or any other cause which is unavoidable, or beyond the control of CYCLONAIRE or in any event for consequential damages. Authorization by CLIENT to ship the apparatus and equipment shall constitute a waiver of all claims for loss or damage due to delay.

The equipment, furnished hereunder, is to operate under conditions specified herein, which conditions CLIENT is to supply and for which conditions CLIENT is to assume full responsibility. CYCLONAIRE'S responsibility is limited to that specifically stated herein.

CLIENT will assume full responsibility for any loss or damage resulting from operation of the apparatus.

CYCLONAIRE assumes no responsibility for any auxiliary apparatus or work in connection therewith which is for use in connection with the equipment furnished hereunder. Notwithstanding that CYCLONAIRE may have submitted recommendations pertaining thereto.

2. MATERIAL & WORKMANSHIP – Unless otherwise stated herein, CYCLONAIRE will repair or replace, at its option, without charge F.O.B. point of shipment, any parts of its own manufacture proven under CYCLONAIRE'S examination to be defective in material or workmanship when furnished, provided claim is made within twelve (12) months after date of shipment. Deterioration or wear occasioned by chemical or abrasive actions or excessive heat shall not constitute defects. At the request and at the sole cost to the Buyer, CYCLONAIRE will supply labor to replace any such defective parts. Equipment and accessories not of CYCLONAIRE'S manufacture are warranted only to the extent that they are warranted by the manufacturer. THERE ARE NO OTHER WARRANTIES, EXPRESS, STATUTORY OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND OF FITNESS. No liability for any special, indirect or consequential damages of any nature is assumed by or shall be imposed upon CYCLONAIRE.

3. INDEMNITY – CYCLONAIRE agrees that it will, at its own expense, defend any suit brought against CLIENT based on a claim that the apparatus furnished by CYCLONAIRE under this agreement or any part thereof constitutes an infringement of any patent of the United States and will pay all damages and costs awarded therein against CLIENT, if notified promptly in writing of such suit and given authority, information and assistance (at the expense of CYCLONAIRE) for the defense of same; provided, however that CYCLONAIRE shall not be held liable for any claim of infringement based on the use of said apparatus or any part thereof in the production of a patented product or in connection with a patented process over which CYCLONAIRE has no control, and further provided that the liability of CYCLONAIRE under this agreement in no event exceed the amount paid CYCLONAIRE by CLIENT hereunder.

In case said apparatus or any part thereof is in such suit held to constitute infringement and its use is enjoined, CYCLONAIRE shall, at its own expense, either:
Procure for the CLIENT the right to continue using said apparatus; or replace same with non-infringing apparatus; or modify it so it becomes non-infringing; or remove said apparatus and refund the purchase price herein.

CYCLONAIRE is not to be held liable for any loss, damage, or costs, resulting from the installation of any material or apparatus not furnished by CYCLONAIRE hereunder, and nothing contained herein shall be considered as obliging CYCLONAIRE to hold CLIENT harmless from any such loss, damages or costs resulting from the installation of any such material or apparatus.

4. INSURANCE – CLIENT will, while any part of the purchase price of said installation remains unpaid, maintain sufficient fire insurance, including extended coverage endorsements, on apparatus and equipment shipped to CLIENT by CYCLONAIRE hereunder, to fully reimburse CYCLONAIRE in case of loss or damage by fire.

5. TITLE AND RISK OF LOSS – Title shall pass to the CLIENT upon delivery of the equipment to the carrier at point of shipment and the CLIENT shall assume all risk and loss or damage thereafter.

6. ACCESS – Authorized representative of CYCLONAIRE acceptable to CLIENT shall have access at all reasonable times to the installation for observing and adjusting the operation thereof.

7. TIME OF SHIPMENT – Statements as to expected dates of shipment represent CYCLONAIRE'S best judgement, but shipment on those dates is not guaranteed. The time of shipment shall be figured from date of receipt by CYCLONAIRE of all information necessary to enable CYCLONAIRE to proceed with its work.

8. DELAYED SHIPMENT – If the CLIENT cannot receive materials when ready for shipment, then CLIENT will immediately notify CYCLONAIRE to what point CYCLONAIRE shall make delivery. CLIENT will be invoiced for equipment, pay all storage charges on the material, will pay all charges for transporting the material from the point of storage to the erection site, and will also pay for any repairs due to damage to material while in storage and/or transportation from storage.

9. EXECUTION – This proposal is subject to revision any time after thirty (30) days from date hereof, provided it has not been accepted in writing by CLIENT. There are no agreements or representations, verbal or otherwise, outside of this proposal. This proposal shall become a binding contract upon the parties hereto and their successors and assigns only when accepted by CLIENT and executed by an officer of CYCLONAIRE at its home office, York, Nebraska, or by CYCLONAIRE'S written acceptance of CLIENT'S purchase order covering the equipment herein specified (the formation and performance of this contract shall be construed under the laws of Nebraska). Acceptance of such purchase order shall be with the mutual understanding that the terms and conditions of this proposal are a part thereof with the same effect as though signed by both parties named herein and shall prevail over any inconsistent provision of said purchase order.

10. CANCELLATION – Orders cannot be cancelled by Buyer under any circumstances without Seller's consent and upon terms which will indemnify Seller against all loss.

11. MISCELLANEOUS – All plans, specifications and like material attached hereto or furnished herewith are now, and shall remain, the exclusive property of Cyclonaire Corporation. You hereby agree that you receive such material on the understanding that you will keep confidential the features of any designs, drawings, engineering data or other technical or proprietary information. No part of said plans, specifications, blueprints or other like material shall be used or reproduced without the express written consent of Cyclonaire Corporation and signed by one of its officers.

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cyclonaire

PNEUMATIC CONVEYING SYSTEMS

BULK BAG UNLOADER

OVERVIEW

Cyclonaire's quality built bulk bag unloading station is the most flexible and most customizable choice for your demanding needs and cost conscious budget.

Start with our basic heavy duty, carbon steel box tubing frame, custom built to handle any weight or size of bulk bags. Add custom features for your needs—electric hoist, bag tensioners, bag massaging paddles, load cells or glove box—plus more.

Get the economy of bulk bag supply with the safety, convenience and affordability of Cyclonaire bulk bag unloaders.

Quality, custom built at competitive prices.

APPLICATIONS

- Any process requiring unloading/handling of bulk bags
- Option uses: weigh/batching via loss-in-weight, integrated conveying from point of discharge

MATERIALS / CHARACTERISTICS

- Any free flowing dry material in bulk bags

CAPACITY

- Custom built to accommodate your unloading needs

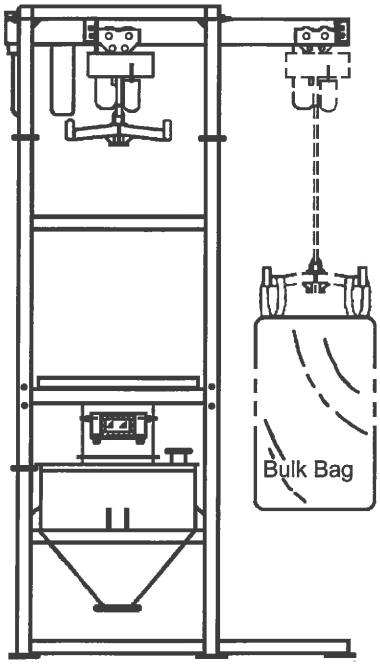
BENEFITS AND FEATURES

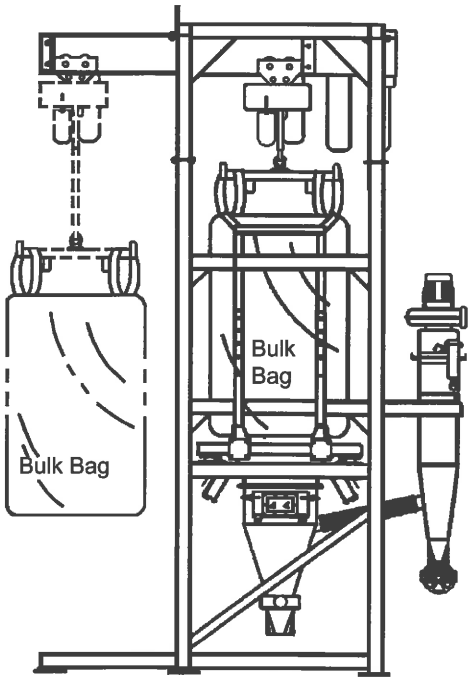
- Supports and seals any size or style bulk bag for discharge
- Unload without bag slippage, material dusting or spillage
- Safe, heavy-duty welded and bolted tubular steel frame
- Standard:
  - Carbon steel, welded and bolted tubular frame
- Specify:
  - Stainless steel
  - Piercing blade
  - Electric hoist or manual lift
  - Load cell for weigh/batching
  - Support trays and/or bag tensioners
  - Iris valve or pinch bars to meter flow
  - Bag massagers to assist discharge
  - Dust tight glow box hopper or access hopper
  - Integral dust suppression/collection

REQUIREMENTS

- 110 VAC, 50-60 Hz if electric hoist is chosen
- 90-100 PSIG @ 3-5 SCFM for dust control

BULK BAG UNLOADING STATION



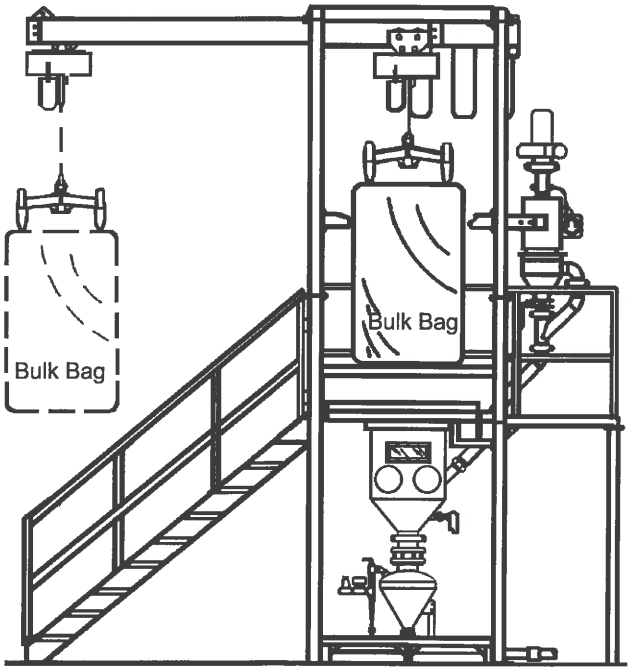


Standard Features:

- Carbon steel 2 ton frame and hopper tray
- Forklift-load capability
- Welded and bolted construction

Optional features:

- 304 Stainless Steel on material contact points
- Epoxy coated material contact points
- Manual, pneumatic or electric hoist
- Push or motorized trolley
- NEMA 7/9 controls
- Pneumatic bag massager system
- Glove box w/hand holes
- Discharge chute w/access door
- Dust collection/suppression system
- Integral hopper for material storage



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cyclonaire

PNEUMATIC CONVEYING SYSTEMS

FILTER RECEIVER

OVERVIEW

Cyclonaire brand filter receivers provide excellent filtration.

Automatic timers clean the filter media with pulse jet reverse flow air, dropping retained material into the process.

A wide array of sizes with custom sizing and features also available.

APPLICATIONS

- Air filtration and dust control

MATERIALS / CHARACTERISTICS

- Any dry Bulk material conveyed pneumatically

CAPACITY

- Up to 403 ft^2 of filter area (standard)
- Pressure rated to 2 PSIG, vacuum rated to 15" HG

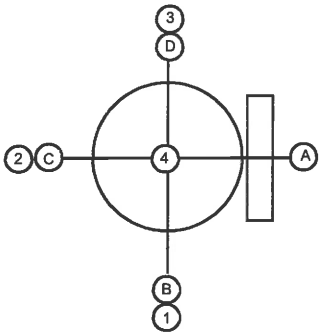
BENEFITS AND FEATURES

- Pulse jet cleaning to maintain media effectiveness
- Hinged door for easy bag access
- Differential pressure gauges for filter service indication
- Standard:
  - Carbon steel (10 gauge welded)
  - NEMA 4 timer controls
  - 16 oz. polyester bags
  - Removable bottom
  - Smooth wire cages and safety grid
  - Support legs and hopper
- Specify:
  - Stainless steel
  - NEMA 4x 7/9
  - Outlet size and style
  - Cartridge filter elements
  - Top removable design
  - Exhaust fan
  - High temperature design
  - Custom sizes and features

REQUIREMENTS

- 90-100 PSIG, 3-10 SCFM air
- 110 VAC, 50-60 Hz

FILTER RECEIVER



Orientation

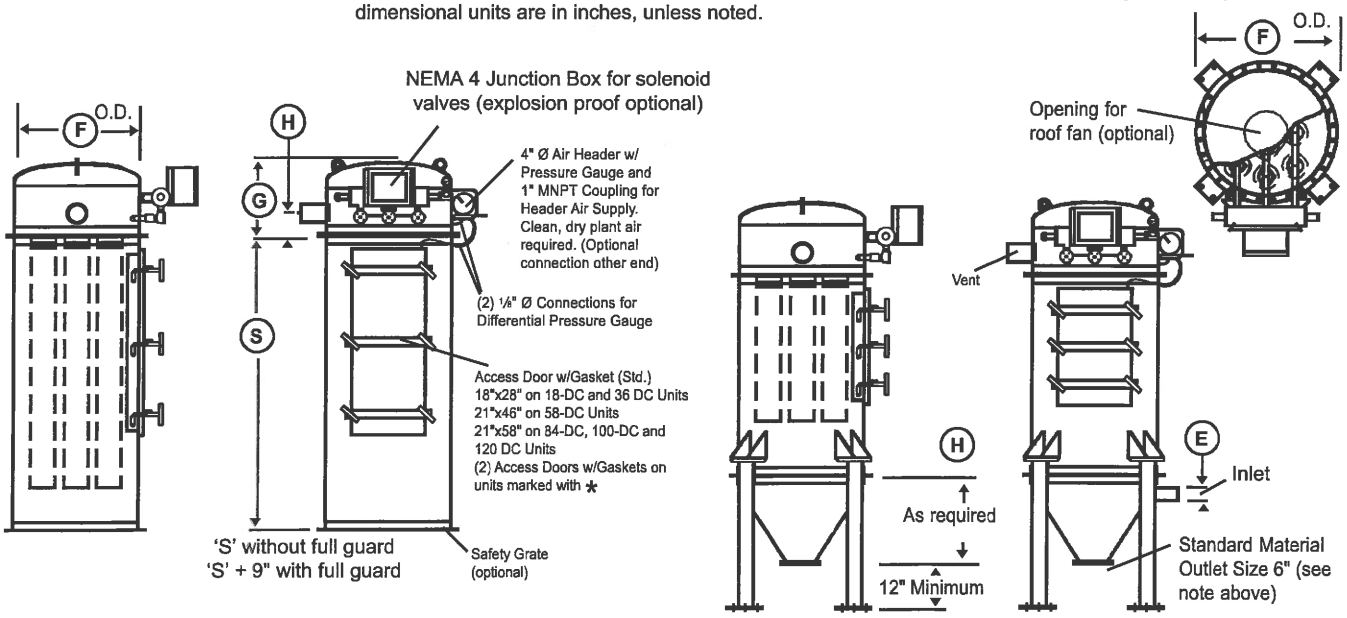
Locations Available					Std.
Access Door	A	B	C	D	A
Outlet	1	2	3	4	2
Weather Hood	1	2	3	4	2
Level Sensor	A	B	C	D	B
Hand Hole	A	B	C	D	B

Note:

1. 1,2,3 and 4 are in clean air plenum
2. A,B,C,and D are in dirt air plenum
3. Dim. E-choose size from table based on 3000-4000 ft./ min gas velocity
4. 6" material discharge is standard but not mandatory
5. Material inlet size is based on customer requirements

DATA						DIMENSIONS					
MODEL NO.	ARRG.	FILTER AREA SQ/FT.	NUMBER OF BAGS	BAG LENGTH	AIR REQ'D SCFM@ PSIG	E	F	G	H	S	WT
18-FR-8	II	15	8	18	4.0@50-60	3-4	30	17	5	20	450
	III	15	8	18	4.0@50-60	3-4	30	17	5	20	575
36-FR-8	II	35	8	36	4.2@70-80	4-5	30	17	6	38	560
	III	35	8	36	4.2@70-80	4-5	30	17	6	38	685
56-FR-8	II	58	8	58	4.5@90-100	4-6	30	17	7	63	675
	III	58	8	58	4.5@90-100	4-6	30	17	7	63	800
84-FR-8	II	85	8	84	5.0@90-100	4-8	30	17	8	89	825
	III	85	8	84	5.0@90-100	4-8	30	17	8	89	975
*18-FR-14	II	26	14	18	5.2@90-100	5-8	36	20	6	20	525
	III	26	14	18	5.2@90-100	5-8	36	20	6	20	675
*36-FR-14	II	61	14	36	5.5@90-100	5-6	36	20	8	38	525
	III	61	14	36	5.5@90-100	5-6	36	20	8	38	675
*58-FR-14	II	101	14	58	5.8@90-100	5-8	36	20	8	63	825
	III	101	14	58	5.8@90-100	5-8	36	20	8	63	975
*84-FR-14	II	148	14	84	6.2@90-100	6-10	36	20	9	89	1000
	III	148	14	84	6.2@90-100	6-10	36	20	9	89	1200
*18-FR-18	II	34	18	18	6.3@90-100	5-8	42	22	6	20	500
	III	34	18	18	6.3@90-100	5-8	42	22	6	20	700
*36-FR-18	II	79	18	36	6.5@90-100	6-8	42	22	8	38	600
	III	79	18	36	6.5@90-100	6-8	42	22	8	38	800
*84-FR-18	II	130	18	58	6.7@90-100	6-8	42	22	8	63	1000
	III	130	18	58	6.7@90-100	6-8	42	22	8	63	1200
*84-FR18	II	191	18	84	7.0@90-100	8-10	42	22	9	89	1225
	III	191	18	84	7.0@90-100	8-10	42	22	9	89	1450
*58-FR-24	II	173	24	58	7.5@90-100	8-10	48	24	9	63	1200
	III	173	24	84	7.5@90-100	8-10	48	24	9	63	1425
*84-FR-24	II	254	24	84	7.5@90-100	8-12	48	24	11	89	1450
	III	254	24	84	7.5@90-100	8-12	48	24	11	89	1675
*58-FR-30	II	216	30	58	8.0@90-100	8-10	54	26	9	63	1475
	III	216	30	58	8.0@90-100	8-10	54	26	9	63	1750
*84-FR-30	II	318	30	84	8.5@90-100	8-14	54	26	11	89	1700
	III	318	30	84	8.5@90-100	8-14	54	26	11	89	1975
*58-FR-36	II	274	36	58	9.0@90-100	10-12	60	28	10	63	1725
	III	274	36	58	9.0@90-100	10-12	60	28	10	63	2025
*84-FR-36	II	403	36	84	10.5@90-100	10-14	60	28	12	89	2025
	III	403	36	84	10.5@90-100	10-14	60	28	12	89	2325

NOTE: Dimensional data for reference only. Subject to change without notice. All weights are in pounds, all dimensional units are in inches, unless noted.



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Media Description Sheet

SB025™

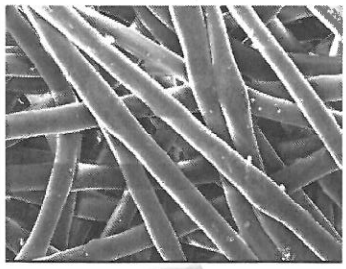
ETV
www.epa.gov/etv

Heavy-Duty Polyester Spunbonded nonwoven filter media at 260 g/m²

SB is a high-strength, 100% synthetic spunbonded media with excellent durability, particulate release and moisture resistance.
Continuous Operating Temperature 275°F

Common Applications

- Chemical Processes
- Pharmaceutical
- Pigment
- Powder Coating
- Plastics and Catalysts
- Food Processes
- Mineral Processes
- Metal Processes



SB Media Performance Dashboard*

Permeability = Air Flow

Permeability of 23 is moderate. The higher the permeability, the greater the airflow and throughput. Higher airflow leads to decreased energy costs.

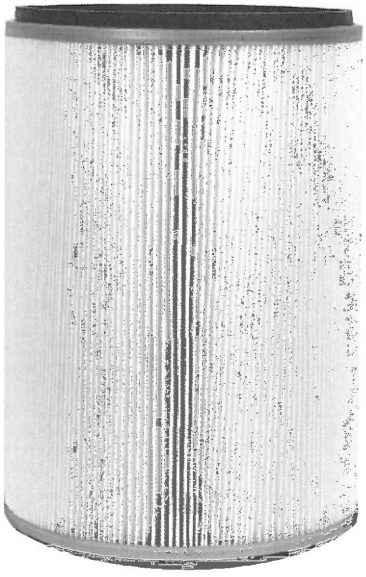
Dry Mullen = Strength

Dry Mullen of 388 PSI is extremely high. The higher the mullen burst, the stronger the media. Strength in media leads to longer filter life.

MERV = Initial Efficiency

Test results on a common cartridge configuration. Initial efficiency is moderate for below 3 microns, but should be only one of many factors to be considered when choosing the optimum media for an application.

Channel	E1	E2	E3
Range µm	0.3 - 1.0	1.0 - 3.0	3.0 - 10.0
Efficiency	20%	70%	94%



Proper media selection requires consideration of strength, permeability, MERV, application and cost.

Disclaimer: The EPA Environmental Technology Verification Program (ETV) Name and/or Logo does not imply approval or certification of this product, nor does it make any explicit or implied warranties or guarantees as to product performance. Information on the performance characteristics of SBTX can be found at www.epa.gov/etv or call Terry Kane at 630-410-6221 to obtain a copy of the ETV report.

TDC Filter
a midwesco® company

*See TDC's Specification Sheet for more details

2 Territorial Court, Bolingbrook, IL 60440 1-800-424-1910
International Phone 1-630-410-6200 Fax 1-630-410-6201
www.tdcfilter.com

SOUTHERN FILTER MEDIA LLC
P.O.BOX 5241
2401 BACHMAN STREET
CHATTANOOGA, TN 37406
Phone: 1-800-937-8988 Fax: 423-624-0274

TECHNICAL DATA SHEET

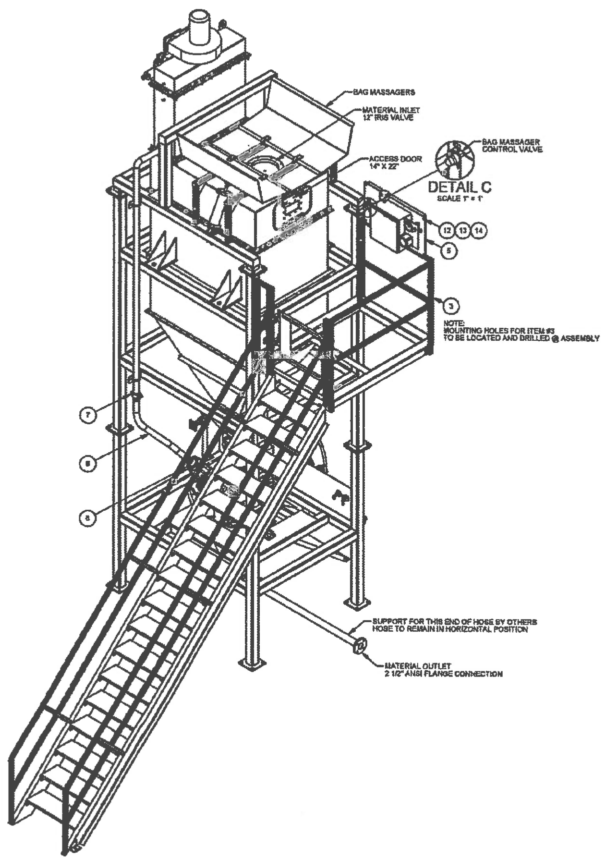
VERIFICATION TESTING OF BAGHOUSE FILTRATION PRODUCTS
SOUTHERN FELT SUMMARY OF RESULTS AT 2 M/MIN
ETS CONTRACT NUMBER: 02-934 DATE: 10/28/02

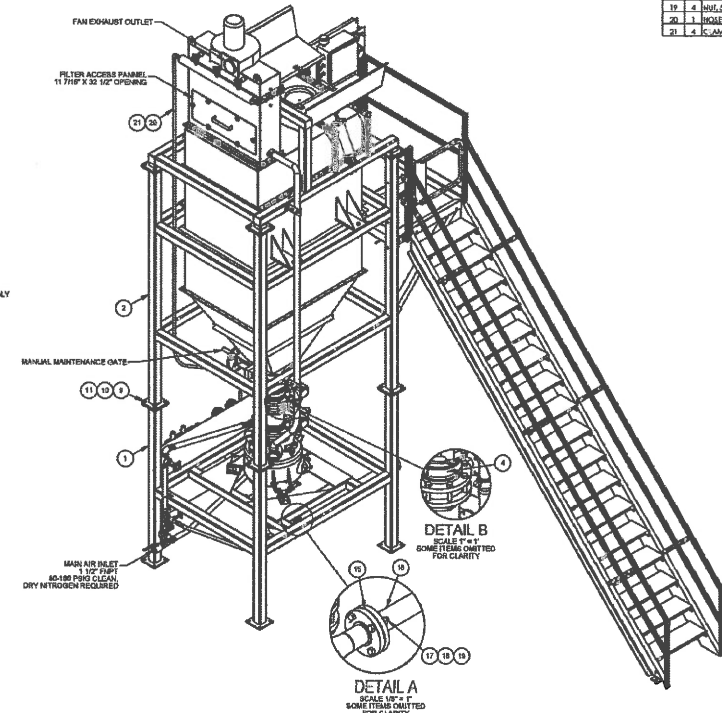
RUN ID.	934-1-1	934-2-1	934-3-1	934-4-1	934-5-1	934-6-1	934-7-1	934-8-1	934-9-1	934-10-1
FABRIC DESIGNATION	Fabric 1	Fabric 2	Fabric 3	Fabric 4	Fabric 5	Fabric 6	Fabric 7	Fabric 8	Fabric 9	Fabric 10
MANUFACTURER	Southern Felt	Southern Felt	Southern Felt	Southern Felt	Southern Felt	Southern Felt	Southern Felt	Southern Felt	Southern Felt	Southern Felt
DUST FEED	Pural NF	Pural NF	Pural NF	Pural NF	Pural NF	Pural NF	Pural NF	Pural NF	Pural NF	Pural NF
VERIFICATION TEST RESULTS										
Mean Outlet Particle Conc. PM 2.5 (g/dscm)	0.0002623	0.0001830	0.0000861	0.0001706	0.0014870	0.0004632	0.0011942	0.0019566	0.0000000	0.0004818
Mean Outlet Particle Conc. Total mass (g/dscm)	0.0002638	0.0001830	0.0000861	0.0001738	0.0015041	0.0004632	0.0011942	0.0019566	0.0000000	0.0004959
Initial Residual Pressure Drop (cm w.g.)	3.75	3.66	4.48	7.90	4.71	4.39	5.43	4.80	2.94	5.53
Change in Residual Pressure Drop (cm w.g.)	1.07	1.27	0.59	4.86	2.29	2.30	3.01	2.54	0.17	3.76
Average Residual Pressure Drop (cm w.g.)	4.41	4.45	4.83	11.02	6.18	5.98	7.36	6.60	3.03	7.83
Mass Gain of Filter Sample (g)	1.43	2.08	0.74	0.68	1.07	1.16	0.87	1.10	0.04	1.37
Average Filtration Cycle Time (s)	48	49	89	6	10	12	6	8	260	7
Number of Pulses	448	445	241	3599	2106	1768	3393	2823	83	3157
RESIDUAL PRESSURE DROP										
At Start of:										
Conditioning Period (cm w.g.)	0.12	0.15	0.30	0.20	0.16	0.15	0.18	0.10	1.29	0.09
Recovery Period (cm w.g.)	3.52	3.31	4.37	7.94	4.62	4.20	5.72	4.93	2.80	5.56
Performance Test Period (cm w.g.)	3.75	3.66	4.48	7.90	4.71	4.39	5.43	4.80	2.94	5.53
REMOVAL EFFICIENCY (%)										
Dust Conc (g/dscm)	16.70	17.70	16.90	17.00	17.30	16.50	16.90	17.10	15.60	16.00
PM 2.5 *	99.99819	99.99866	99.99934	99.99870	99.98889	99.99637	99.99086	99.98521	100.00000	99.99611
Total Mass **	99.99859	99.99897	99.99949	99.99898	99.99131	99.99719	99.99293	99.98856	100.00000	99.99690
	PE	PE/P84	PE/M	CAC/PE	LBDX 12	LBDX 16	LMBDX 12	LMBDX 16	PTFE MEMB	CTF

* (Dust Concentration * 0.7735) - PM 2.5 Outlet Concentration * 100
Dust Concentration * 0.7735

** Dust Concentration - Total Mass Outlet Concentration * 100
Dust Concentration

ITEM	QTY	DESCRIPTION	PART NO.	DWG NO.	ID	REV
1	1	DPG-5B, 6" DUAL BFV IN, 4" BFV OUT, WITH FRAME, CS	-	54-0-1189	00	A
2	1	[illegible] W/ DUST COLLECTION, CS	-	24-0-4714	00	
3	1	PLATFORM & STAIR ASSEMBLY, CS	-	24-0-4726	00	
4	1	COUPLER, 8" GROOVED PIPE, BLACK GASKET	905-10044			
5	1	CONTROL PLATE ASSY, X-PROOF BBU W/DUST COLLECTION, CS	-	22-0-2330	00	
6	1	HOSE ASSEMBLY, 2 1/2" GP X 2" GP X 56" LG, CS	-	22-0-2331	00	
7	1	COUPLER, 2" GROOVED PIPE, BLACK GASKET	905-10036			
8	1	COUPLER, 2 1/2" GROOVED PIPE, BLACK GASKET	905-10037			
9	16	BOLT, 3/4" X 2" UNC, HEX HEAD, PLTD	900-00247			
10	16	WASHER, 3/4" SPG LOCK, PLTD	900-10040			
11	16	NUT, 3/4" UNC, HEX, PLTD	900-0[illegible]37			
12	4	BOLT, 3/8" X 1" UNC, HEX HEAD, PLTD	900-00143			
13	4	WASHER, 3/8" SPG LOCK, PLTD	900-10015			
14	4	NUT, 3/8" UNC, HEX, PLTD	900-05006			
15	1	GASKET, 2 1/2" ANSI B.P., FULL FACE	905-03081			
16	1	HOSE, 2 1/2" X 60" LG W/150# FLG ENDS, TITAN SW319	905-05380			
17	4	BOLT, 5/8" X 3" UNC, HEX HEAD, PLTD	900-00232			
18	4	WASHER, 5/8" SPG LOCK, PLTD	900-10019			
19	4	NUT, 5/8" UNC, HEX, PLTD	900-05036			
20	1	HOSE, 3/4" X 20' LG, BLK (CUT TO FIT)	905-05049			
21	4	CLAMP, 3/4" HOSE, SS	900-38067			





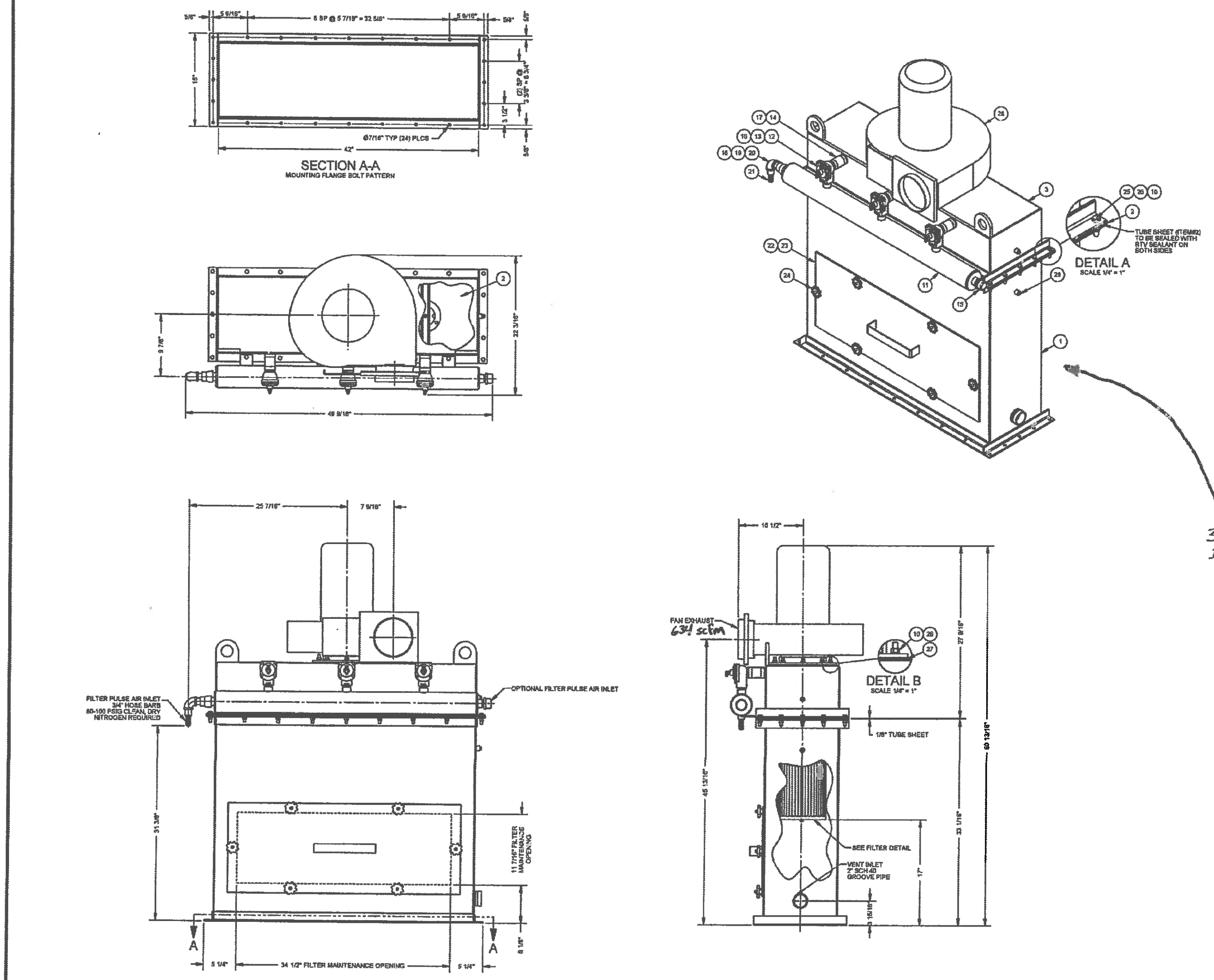
REV. NO.	DR'N. BY	CK'D. BY	DATE	SIZE	DRAWN BY	SCALE
				D	G PENNER	1:24
						24-0-4727

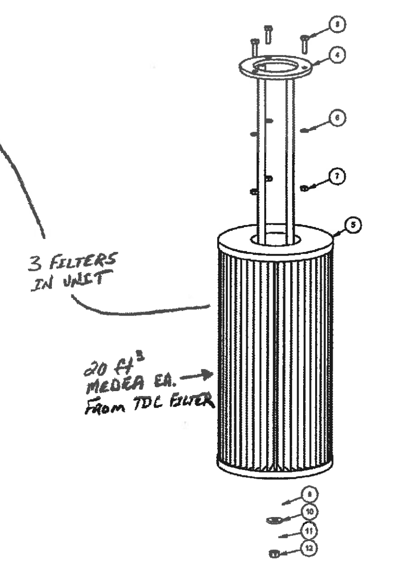
cyclonaire CORPORATION

BBU, 135 FT³ HOPPER, DPG-5B
STACK-UP WITH STAIRWAY
CS CONSTRUCTION

24-0-4727 | 2 OF 2

ITEM	QTY	DESCRIPTION	PART NO.	DWG NO.	ID	REV
1	1	WELDMENT, DIRTY AIR PLENUM, CS	-	24-2-3401	50	
2	1	TUBE SHEET, BBU DUST COLLECTOR, CS	-	22-3-0394	00	C
3	1	WELDMENT, CLEAN AIR PLENUM, CS	-	24-2-0946	50	F
4	3	WELDMENT, BASKET FOR Ø8" X 16" FILTER, CS	-	22-2-1489	50	E
5	3	[illegible]	904-01308			
6	9	WASHER, 1/4" SPG LOCK, PLTD	900-10011			
7	9	NUT, 1/4" UNC, HEX, PLTD	900-05000			
8	9	BOLT, 1/4" X 1" UNC, HEX HEAD, PLTD	900-00004			
9	3	WASHER, 3/8" FLAT, PLTD	900-10005			
10	35	NUT, 3/8" UNC, HEX, PLTD	900-05005			
11	1	HEADER, (3) ROW FOR BBU DUST COLLECTOR, CS	-	24-2-0947	50	D
12	3	VALVE, 1" SINGLE DIAPHRAGM FM25	905-01496A			
13	3	NIPPLE, HALF OF A 1" SCH 40 X 3" LG, CS	907-10156			
14	3	HOSE, 1 1/4" GENERAL PURPOSE X 3" LG	905-05085			
15	1	CAP, 1" PIPE, GALV	905-00336			
16	3	CONNECTOR, ELBOW 1/8" MNPT X 1/4" OD TUBE, 90° PLTD	905-04106			
17	6	CLAMP, 1 1/4" HOSE, SS	900-38111			
18	1	COUPLING, 1" FNPT X 3/4" FNPT BELL REDUCER, GALV	905-00334			
19	1	NIPPLE, 3/4" SCH 40 CLOSE, GALV	905-00[illegible]7			
20	1	ELBOW, 3/4" FNPT, 90° PIPE, GALV	905-00256			
21	1	HOSE BARB, 3/4" MNPT, GALV.	905-00266			
22	1	FOAM, 3/16" X 1 1/4" X 100" LG, BLK (CUT TO FIT)	906-00039			
23	1	WELDMENT, FILTER ACCESS DOOR, CS		[illegible]-2-0975	50	A
24	6	SPIN KNOB 1 1/2" X 3/8" UNC	905-09190			
25	24	BOLT, 3/8" X 1 1/2" UNC, HEX HEAD, PLTD	900-00136			
26	32	WASHER, 3/8" SPG LOCK, PLTD	900-10015			
27	1	GASKET, 1/8" X Ø11" OD X Ø7" ID, BLACK NEOPRENE	-	21-3-1268	00	
28	[illegible]	FAN, FB-12A, 1 1/2 HP 230/460V/[illegible] (X-PROOF)	904-09404			
29	2	PLUG, 1/4" MNPT, GALV.	905-00125			

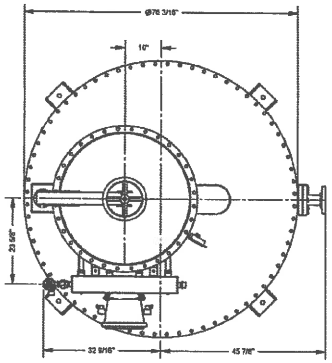


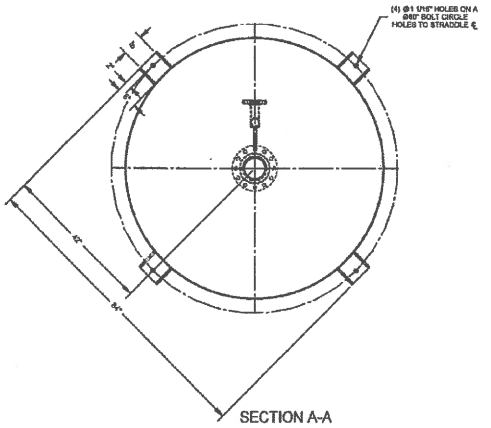


FILTER DETAIL
SCALE 1/4" = 1"

NOTES:
1) ANY PART NOT CALLED OUT IN THE BILL OF MATERIALS IS TO BE PROVIDED BY OTHERS
2) REFERENCE EQUIPMENT ID FOR PAINT SPECIFICATIONS
3) ALL SURFACES TO BE MILL FINISH AND WELDS UNGROUND UNLESS OTHERWISE NOTED
4) APPROXIMATE WEIGHT: 425 LBS

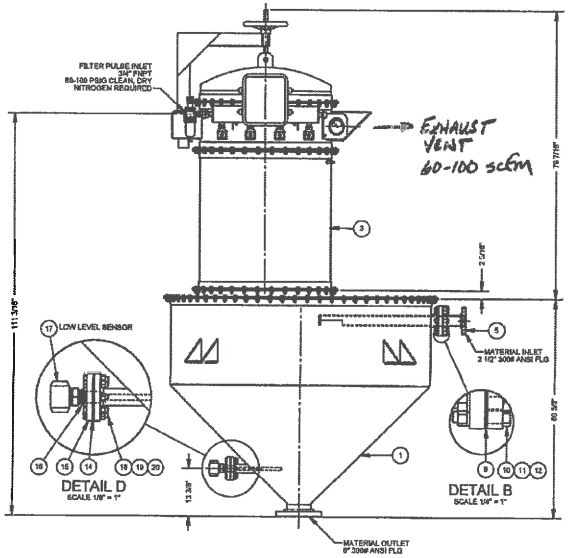
REV. NO.	DRN. BY	CKD. BY	DATE	SIZE D	DRAWN BY G PENNER	SCALE 1:8	cyclonaire
						24-0-4715	DUST COLLECTOR, CLASS I, DIV II GROUP B,C & D FOR BULK BAG STATION CS CONSTRUCTION
						24-0-4715	1 OF 1

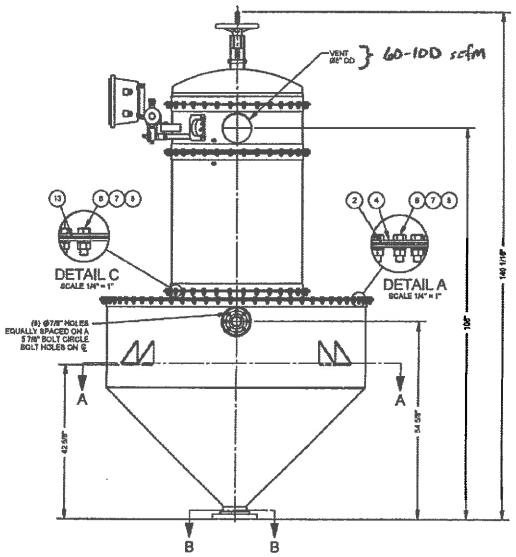


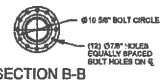


SECTION A-A

ITEM	QTY	DESCRIPTION	PART NO.	DWG NO.	ID	REV
[illegible]		[illegible]	-	24-2-3393	50	
2	1	GASKET, 74 3/16" O.D. X 723/16" I.D. X 1/8", BLK	905-03148			
3	1	FILTER RECEIVER, FR-14 TOP REMOVABLE WITH BAGS, CS	-	24-0-4711	00	
4	1	LID, Ø72" WITH FR-14 MOUNT, CS	-	23-2-3444	50	
5	1	DEAD HEAD, 2 1/2" PIPE WITH 3" 300# FLG	-	22-2-4097	50	
6	100	BOLT, 1/2" X 1 1/2" UNC, HEX HEAD, PLTD	900-00212			
7	100	WASHER, 1/2" SPG LOCK, PLTD	900-10017			
8	100	NUT, 1/2" UNC, HEX, PLTD	900-00007			
9	1	GASKET, 1/8" X 3" 300# ANSI RF	905-03170			
10	8	BOLT, 3/4" X 3 1/2" UNC, HEX HEAD, PLTD	900-00236			
11	8	WASHER, 3/4" SPG LOCK, PLTD	900-10040			
12	8	NUT, 3/4" UNC, HEX, PLTD	900-03737			
13	1	GASKET, 1/8" X Ø40 1/4" OD X Ø36 1/4" ID, BLACK NEOPRENE	-	21-3-0887	00	
14	1	GASKET, 1/8" X 2" 300# ANSI RF	905-03132			
15	1	FLANGE, 2" ANSI 300# THREADED, CS	906-001238			
16	1	BUSHING, 2" X 1 1/4" HEX REDUCING, CS	905-00060			
17	1	LEVEL SENSOR, VIBRATING, 13" PROBE, 20-253 VAC/DC	904-001798			
18	6	BOLT, 5/8" X 2" UNC, HEX HEAD, PLTD	900-00312			
19	8	WASHER, 5/8" SPG LOCK, PLTD	900-10019			
20	8	NUT, 5/8" UNC, HEX, PLTD	900-00034			







SECTION B-B

NOTES:
1) ANY PART NOT CALLED OUT IN THE BILL OF MATERIALS IS TO BE PROVIDED BY OTHERS
2) REFERENCE EQUIPMENT ID FOR PAINT SPECIFICATIONS
3) ALL SURFACES TO BE MILL FINISH AND WELDS UNGROUND UNLESS OTHERWISE NOTED
4) APPROXIMATE WEIGHT: 2,000 LBS. (EMPTY)

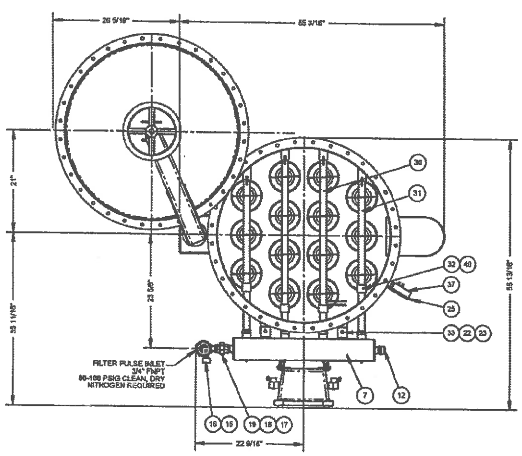
REV. NO.	DRN. BY	CHD. BY	DATE	
A	G.S.			ADDED DIMENSIONS TO SECTION A-A.

SIZE: D | DRN BY: J HABUTZEL | SCALE: 1:16 | CUSTOMER NAME: 24-0-4713

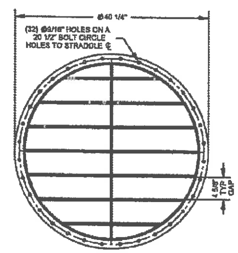
cyclonaire CORPORATION

FILTER RECEIVER
FR-14, ARRG IIIG
CS CONSTRUCTION

24-0-4713 | 1 OF 1 | A

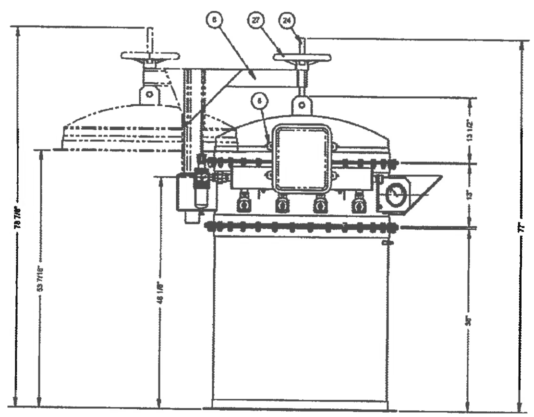


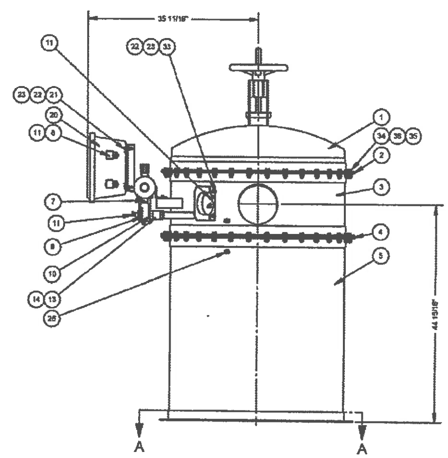
(ALTERNATE POSITION SHOWN FOR CLARITY)



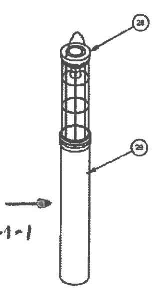
SECTION A-A

ITEM	QTY	DESCRIPTION	PART NO.	DWG NO.	ID	REV
1	1	HEAD WELDMENT, Ø36" W/DAVIT CONNECTION, CS	-	23-2-1572	50	C
2	3	GASKET, 1/8" X Ø40 1/4" OD X Ø36 1/4" ID, BLACK NEOPRENE	-	21-3-0887	00	
3	1	CLEAN AIR PLENUM, FR-14 TOP REMOVABLE CS	-	24-2-3392	50	
4	1	TUBESHEET, 36-FR-14 TOP REMOVABLE, CS	-	22-3-1206	00	A
5	1	DIRTY AIR PLENUM, FR-14 TOP REMOVABLE, CS	-	24-2-2718	50	A
6	1	DAVIT, FR-14 TOP REMOVABLE, CS	-	23-2-3465	50	
7	1	HEADER, DC-14 SERIES, NEMA 9, CS	-	23-2-3519	50	
8	4	VALVE, 1/8" SOLENOID, 2-WAY (SEE ELECTRICAL SCHEMATIC)	-			
9	4	VALVE, 1" SINGLE DIAPHRAGM FM25	905-01476A			
10	4	NIPPLE, HALF OF A 1" SCH 40 X 3" LG, CS	907-10156			
11	10	CONNECTOR, ELBOW 1/8" MNPT X 1/4" OD TUBE, 90° PLTD	905-04106			
12	1	CAP, 1" PIPE, GALV	905-00336			
13	4	HOSE, 1 1/4" X 3" LG, GENERAL PURPOSE	905-05085			
14	8	CLAMP, 1 1/4" HOSE, SS	900-28003			
15	1	FILTER REGULATOR, 3/4" FNPT	905-01255			
16	1	GAUGE, 0-160 PSI	905-09516			
17	1	BUSHING, 1" X 3/4", HEX REDUCER, GALV	905-00250			
18	1	NIPPLE, 3/4" SCH 40 CLOSE, GALV	905-00252			
19	1	UNION, 1"	905-00061			
20	1	ELECTRICAL ENCLOSURE (SEE ELECTRICAL SCHEMATIC)	-			
21	4	BOLT, 3/8" X 1 1/2" UNC, HEX HEAD, PLTD	900-00134			
22	8	WASHER, 3/8" SPG LOCK, PLTD	900-10015			
23	8	NUT, 3/8" UNC, HEX, PLTD	900-05005			
24	1	LIFT ROD WELDMENT, 1" UNC, CS	-	22-2-2816	50	A
25	1	DIFFERENTIAL PRESSURE GAUGE BRACKET, CS	-	21-3-0418	00	D
26	2	CONNECTOR, ELBOW 1/4" MNPT X 1/4" OD TUBE, 90° PLTD	905-04085			
27	1	HANDWHEEL, 1"-UNC, FOR TOP REMOVABLE RECEIVERS	905-090398	21-3-2097	00	
28	14	FILTER CAGE, 5 5/8" X 36" LG, TOP REMOVABLE, CS	904-01510			
[illegible]	[illegible]	FILTER BAG [illegible] X 36" LG, TOP REMOVABLE [illegible]	904-01509			
30	2	BLOW PIPE, FR-14-LONG, CS	-	22-2-6095	50	
31	2	BLOW PIPE, FR-14-SHORT, CS	-	22-2-6096	50	
32	4	SLIP COLLAR, 1" PIPE, M29413	905-09855			
33	4	BOLT, 3/8" X 1" UNC, HEX HEAD, PLTD	900-00143			
34	64	BOLT, 1/2" X 1 1/2" UNC, HEX HEAD, PLTD	900-00212			
35	64	WASHER, 1/2" SPG LOCK, PLTD	900-10017			
36	64	NUT, 1/2" UNC, HEX, PLTD	900-05007			
37	1	GAUGE, DIFFERENTIAL PRESSURE, 2030 (0-10" H2O)	905-090108			
38	1	TUBING Ø1/4" OD X Ø1/8" ID X 10' LG, BLK (NOT SHOWN)	905-05086			
39	1	ELECTRICAL SCHEMATIC	-	22-1-0373	04	
40	8	O-RING, 1" PIPE SLEEVE, #110011	905-07853			





FROM SFM →
RUN ID 934-1-1
FABRIC 1



FILTER DETAIL

NOTES:
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4) APPROXIMATE WEIGHT: 750 LBS

REV. NO.	DFN. BY	CKD. BY	DATE	SIZE	DRAWN BY	SCALE
				D	J HABLITZEL	1:12
						CAD FILE NAME: 24-0-4711

cyclonaire

FILTER RECEIVER
FR-14 TOP REMOVABLE WITH BAGS
CS CONSTRUCTION

DRAWING NO. 24-0-4711 SHEET 1 OF 1

APPENDIX E

Emissions Inventory

See Attached Electronic Data

APPENDIX F

Modeling Report

Hoku Corporation

Air Quality Modeling Report

Prepared for:
Hoku Corporation
1 Hoku Way
Pocatello, ID 83204-5079

Prepared by:
JBR Environmental Consultants, Inc.
7669 W Riverside Drive, Suite 101
Boise, ID 83714
Contact: David Strohm
208.853.0883

March 2012

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1.0 PURPOSE

This air quality modeling report describes modeling conducted to support a renewal (with facility modifications) to the Facility Emissions Cape Permit (FEC) issued to Hoku Materials, Inc. (Hoku) in 2007 and most recently revised on December 14, 2011(Permit No.: P-2008.0049).

This modeling analysis has been developed to ensure that the renewal of Hoku's FEC permit and its associated facility modifications will not result in the violation of any National Ambient Air Quality Standards (NAAQS) or Idaho Toxic Air Pollutant (TAP) thresholds.

The FEC permit renewal that modeling report support has two goals. The first is to establish revised FEC limits that will allow for the renewal of the facilities permit while complying with the NAAQS and TAPs thresholds. The second is to introduce new facility emissions sources into the permit allow for their installation and to ensure that the renewed FEC permit is as representative of the current facility operations as possible.

Given that the NAAQS standards have undergone significant revision since the issuance of Hoku's existing FEC permit, this permit renewal and modeling analysis will ensure that the facility is compliant with all current standards.

The Hoku facility is located on the Western edge of Pocatello Idaho. Figure 1 on the following page depicts a regional map that includes the facility location.

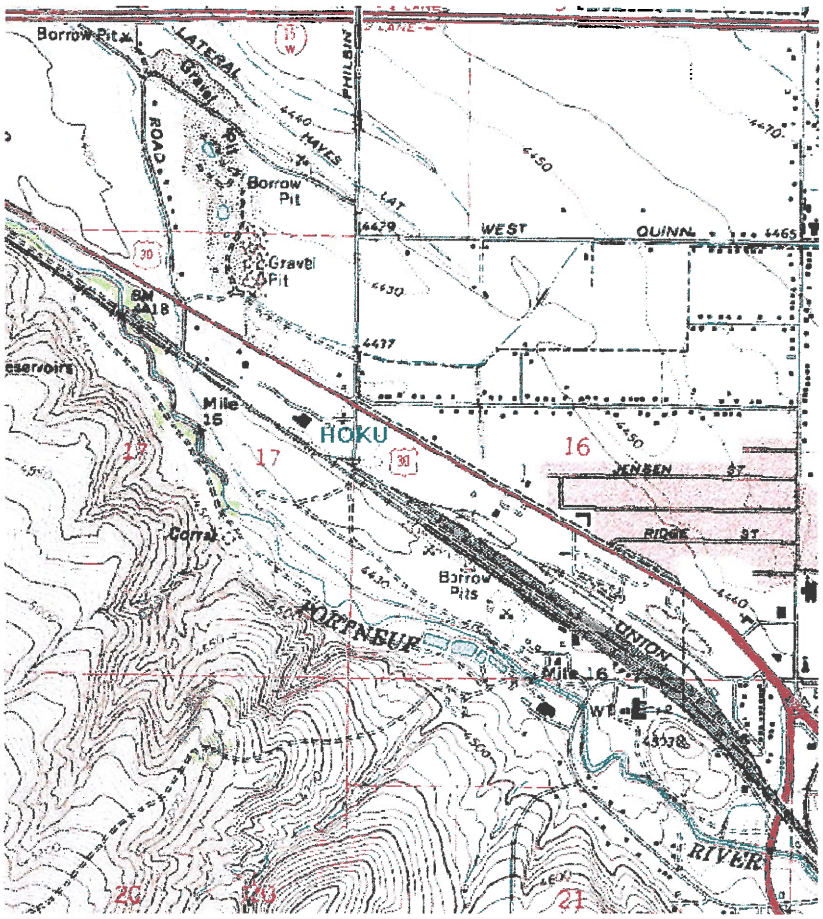

Figure 1 Hoku Corporation Facility Location

2.0 MODEL DESCRIPTION / JUSTIFICATION

The model used for this application is AERMOD (version 11353), the USEPA–approved model for near-field new source review. Based on EPA guidance AERMOD is the most appropriate of the EPA-approved models given the site's physical characteristics and the facility emission sources. AERMOD was applied as recommended in EPA's Guideline on Air Quality Models and consistent with guidance in IDEQ's Dispersion Modeling Guidelines. The Prime building downwash algorithm was applied for the facility. Terrain data from the facilities previous 2011 modeling effort was used for determining source and receptor elevations. This data was processed consistent with the IDEQ guidance and EPA guidance for AERMAP. Meteorological data recommended during the 2011 modeling effort was also utilized during this modeling analysis. The data was pre-processed and supplied by IDEQ.

Although the overall project utilized regulatory defaults, non-regulatory default options were employed for the processing of 1-hr NO_2; specifically the Ozone Limiting Method (OLM) was

employed as per USEPA guidance dated March 1, 2011. This is discussed in more detail in Section 4.

IDEQ requires modeling of criteria pollutants if emissions from the proposed source exceed the modeling thresholds set forth in the IDEQ Dispersion Modeling Guidelines. The criteria pollutants which exceed the modeling threshold at the Hoku facility are PM_{10}, PM2.5, NO_x and SO_2. In addition, several pollutants exceed the TAPs screening emission levels (ELs) in IDAPA 58.01.01.585 and 586.

Given that this project is associated with an FEC renewal, modeling applicability was determined using emissions from all onsite sources of emissions at their operating conditions, including a pollutant by pollutant growth factor. This ensured that modeling was completed for sources at their maximum potential FEC emissions limits.

3.0 EMISSION AND SOURCE DATA

Model sources were developed based on an assessment of all onsite emissions sources. This included all previously constructed sources as well as an assessment of proposed future sources. For sources that have yet to be installed, model source were based on the facility's proposed source locations and source characteristics. Were available, manufactures specifications were used in the development of pre-constructed sources. These files have been include with the project FEC renewal application.

Emission rates for each pollutant used in the modeling analysis are the maximum emissions under proposed operations over the duration of the standard for that pollutant. This results in different emission rates for the same pollutant for annual and shorter term averaging period analyses. Additionally, on a pollutant by pollutant basis, emissions include a growth factor to determine the proposed FEC limits. The growth factors were developed to allow for future facility expansion or alteration. Additionally, they utilized the facility's previous FEC limits to determine what final FEC limits would be best for the modification. The facility sought to maintain FEC limits similar to their existing limits where possible. The FEC limits proposed are based on the emissions used in the modeling analysis.

The emission inventory was developed consistent with maximum operational design capacity plus a growth factor consistent with current facility plans and new equipment proposed for installation at the facility. The facility emissions were conservatively estimated to exceed IDEQ modeling thresholds for criteria pollutants $PM_{2.5}$, PM_{10}, NO_x, SO_2, and increases in facility emissions of TAPs were estimated to exceed modeling thresholds for three IDAPA 58.01.01.585 TAPs and eight IDAPA 58.01.01.586 TAPs.

The new facility emissions and associated new FEC limits do not result in an increase over any of the currently permitted FEC limits for criteria pollutants. The revised emissions do however, result in a slight increase in the facility's aggregated Hazardous Air Pollutant (HAP) FEC limit.

In addition to the FEC renewal, the current project will introduce slight facility modifications. The modifications proposed during the permit renewal are as follows:

1. Install an storage silo for lime used onsite. The storage silo will include an associated bag house for process particulate emissions control;
2. Install a third storage hopper to compliment the two already proposed for the facility;
3. Install a Methane Reformer at the north-east end of the facility property; and
4. Revise cooling tower emissions using a refined methodology.

Emissions estimates for all of the proposed modifications have been include in the facility emissions inventory used in this analysis. The complete emissions inventory is included in Appendix A. For modified sources, manufacturers specification sheets are included in Appendix B.

Finally, emissions for onsite emergency generators and the emergency fire water pump were treated differently in the modeling and the emissions inventory. In order to ensure compliance with the 1-hr SO2 and NO2 NAAQS standards, the facility is proposing to test their generators for no more than thirty minutes out of each hour for no more than one continuous hour. As a result, in the modeling, short term emission rates for those source were reduce by half their maximum pound per hour rate since the sources would not be operating for more than 30 minutes out of every hour. These reduces rates are only for emergency source that will be tested. Additionally, these sources will only be tested between noon and 4 pm. As a result, those source have only been made active in the modeled simulations during those hours.

Tables 1 and 2 summarize the model source data consistent with the facility emissions sources as constructed.

Table 1 1-hr NO_2 and 1-hr SO_2 Model Source Data

POINT SOURCES										
Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temp. (K)	Exit Velocity (m/s)	Stack Diameter (m)	SO2 (lb/hr)	NO2 (lb/hr)
BH1	Western Malting Sources	378550.22	4749855.55	1350.26	7.32	288.7	0.001	0.001		
BH2	Western Malting Sources	378579.41	4749863.55	1350.26	34.44	288.7	0.001	0.001		
BH3	Western Malting Sources	378548.63	4749884.05	1350.26	34.44	288.7	0.001	0.001		
KSE01	Western Malting Sources	378546.22	4749846.55	1350.26	31.7	291.5	1.89	6.29		
KSE02	Western Malting Sources	378556.63	4749839.55	1350.26	31.7	291.5	1.89	6.29		
KSE03	Western Malting Sources	378567.41	4749832.55	1350.26	31.7	291.5	1.89	6.29		
KSE04	Western Malting Sources	378579.31	4749824.55	1350.26	31.7	291.5	1.89	6.29		
KSE05	Western Malting Sources	378589.63	4749817.05	1350.26	31.7	291.5	1.89	6.29		
CS	Western Malting Sources	378542.03	4749857.55	1350.26	29.41	310.9	0.001	0.71		
BS1	Western Malting Sources	378598.22	4749804.55	1350.26	34.14	449.8	5.32	0.89		
BS2	Western Malting Sources	378535.72	4749860.55	1350.26	10.36	477.6	0.001	0.001		
HCLBOIL	HCL Boiler	377540.61	4750561.22	1351.57	12.253	572.04	8.90016	0.4572	0.053	0.504
WWBOIL	Wastewater Boiler	377688.54	4750361.45	1353.95	12.253	572.04	8.90016	0.4572	0.053	0.504
HVACBOIL	HVAC Boiler	377993.01	4750170.92	1353.63	9.7536	485.93	5.6388	0.6096	0.066	0.63
HOH	Hot Oil Heater	377782.32	4750367.92	1354.96	39.0144	513.15	7.7724	2.3114	0.063	4.014
LIME	Lime Silo	377600.04	4750547.2	1354.61	10	0	0.1001406	0.3		
SSB	Bulk Unloader	377583.81	4750465.18	1354.61	7.3152	0	4.1007481	0.3048		
SFH2	Silicon Feed Hopper 2	377558.72	4750480.6	1353.73	6.096	0	2.5872228	0.1524		
SFH1	Silicon Feed Hopper	377569.07	4750475.27	1353.73	6.096	0	2.5872228	0.1524		
PPDCS	Post Processing Dust Collection System	377903.55	4750193.53	1354	3.3528	294.26	18.47088	0.4765		
CT1	Cooling Tower #1	377672.74	4750481.16	1351.07	7.0104	294.26	14.9352	3.5814		
CT2	Cooling Tower #2	377674.98	4750485.12	1350.66	7.0104	294.26	14.9352	3.5814		
CT3	Cooling Tower #3	377678.18	4750489.94	1350.2	7.0104	294.26	14.9352	3.5814		
AVS	Acid Vent Scrubber	377741.47	4750300.36	1353.72	12.192	283.15	12.548616	0.9144		
PVS	Process Vent Scrubber	377732.38	4750304.45	1353.5	12.192	301.48	13.587984	0.3048		
PPVS	Post Process Vent Scrubber	377977.62	4750134.75	1353.2	2.3774	333.15	8.74776	0.4572		1.327
EVS	Emergency Vent Scrubber	377754.28	4750326.88	1354	12.192	372.04	29.2608	0.762		

METHREF	Methane Reformer	377484.48	4750633.13	1352.49	18.288	457.59	7.55904	0.3048	0.004	1.059
STANDGEN	Emergency Standby Generator	377878.33	4750274.78	1353.96	5.1511	755.37	60.96	0.2032	0.388519	30.631986
EMERGEN1	Emergency Generator #1	377885.85	4750269.8	1354	4.4196	678.15	55.1688	0.4063	0.716014	34.347408
EMERGEN2	Emergency Generator #2	377893.39	4750264.82	1354	4.4196	678.15	55.1688	0.4063	0.716014	34.347408
DFP	Diesel Fire Pump	378133.22	4750128.86	1353	1.524	853.71	79.5528	0.127	0.08899	3.8016
SFH3	Silicon Feed Hopper	377548.13	4750490.17	1353.73	6.096	0	2.5872228	0.1524		

Table 2 Criteria and TAP Model Source Data

Part 1. Point Criteria

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temp. (K)	Exit Velocity (m/s)	Stack Diameter (m)	PMTEN (lb/hr)	PM25 (lb/hr)	PM25ANN (TPY)
BH1		378550.2	4749855.55	1350.3	7.320	288.700	0.001	0.001	6.630E-02	6.63E-03	2.90E-02
BH2		378579.4	4749863.55	1350.3	34.440	288.700	0.001	0.001	1.357E-01	1.36E-02	5.94E-02
BH3		378548.6	4749884.05	1350.3	34.440	288.700	0.001	0.001	8.413E-02	8.41E-03	3.69E-02
KSE01		378546.2	4749846.55	1350.3	31.700	291.500	1.890	6.290	1.698E-01	1.70E-02	7.44E-02
KSE02		378556.6	4749839.55	1350.3	31.700	291.500	1.890	6.290	1.698E-01	1.70E-02	7.44E-02
KSE03		378567.4	4749832.55	1350.3	31.700	291.500	1.890	6.290	1.698E-01	1.70E-02	7.44E-02
KSE04		378579.3	4749824.55	1350.3	31.700	291.500	1.890	6.290	1.698E-01	1.70E-02	7.44E-02
KSE05		378589.6	4749817.05	1350.3	31.700	291.500	1.890	6.290	1.698E-01	1.70E-02	7.44E-02
CS		378542.0	4749857.55	1350.3	29.410	310.900	0.001	0.710	3.302E-01	3.30E-02	1.45E-01
BS1		378598.2	4749804.55	1350.3	34.140	449.800	5.320	0.890	3.802E-01	3.80E-02	1.67E-01
BS2		378535.7	4749860.55	1350.3	10.360	477.600	0.001	0.001	1.900E-02	1.90E-03	8.31E-03
HCLBOIL	HCL Boiler	377540.6	4750561.22	1351.6	12.253	572.040	8.900	0.457	5.400E-02	5.40E-02	2.26E-01
WWBOIL	Wastewater Boiler	377688.5	4750361.45	1354.0	12.253	572.040	8.900	0.457	5.400E-02	5.40E-02	2.26E-01
HVACBOIL	HVAC Boiler	377993.0	4750170.92	1353.6	9.754	485.930	5.639	0.610	6.800E-02	6.75E-02	2.83E-01
HOH	Hot Oil Heater	377782.3	4750367.92	1355.0	39.014	513.150	7.772	2.311	8.200E-01	8.20E-01	3.44E+00
LIME	Lime Silo	377600.0	4750547.20	1354.6	10.000	0.000	0.100	0.300	3.000E-03	2.90E-04	1.27E-03
SSB	Bulk Unloader	377583.8	4750465.18	1354.6	7.315	0.000	4.101	0.305	1.220E-01	1.22E-02	5.36E-02
SFH2	Silicon Feed Hopper 2	377558.7	4750480.60	1353.7	6.096	0.000	2.587	0.152	4.000E-03	3.90E-04	1.72E-03
SFH1	Silicon Feed Hopper	377569.1	4750475.27	1353.7	6.096	0.000	2.587	0.152	4.000E-03	3.90E-04	1.72E-03
PPDCS	Post Processing Dust Collection System	377903.6	4750193.53	1354.0	3.353	294.260	18.471	0.477	1.354E+00	1.35E-01	5.93E-01
CT1	Cooling Tower #1	377672.7	4750481.16	1351.1	7.010	294.260	14.935	3.581	1.013E+00	2.03E-02	8.87E-02
CT2	Cooling Tower #2	377675.0	4750485.12	1350.7	7.010	294.260	14.935	3.581	1.013E+00	2.03E-02	8.87E-02
CT3	Cooling Tower #3	377678.2	4750489.94	1350.2	7.010	294.260	14.935	3.581	1.013E+00	2.03E-02	8.87E-02

AVS	Acid Vent Scrubber	377741.5	4750300.36	1353.7	12.192	283.150	12.549	0.914	3.400E-02	3.38E-03	1.48E-02
PVS	Process Vent Scrubber	377732.4	4750304.45	1353.5	12.192	301.480	13.588	0.305			
PPVS	Post Process Vent Scrubber	377977.6	4750134.75	1353.2	2.377	333.150	8.748	0.457			
EVS	Emergency Vent Scrubber	377754.3	4750326.88	1354.0	12.192	372.040	29.261	0.762	1.125E+00	1.13E-01	5.40E-03
METHREF	Methane Reformer	377484.5	4750633.13	1352.5	18.288	457.590	7.559	0.305	5.000E-02	5.03E-02	2.20E-01
STANDGEN	Emergency Standby Generator	377878.3	4750274.78	1354.0	5.151	755.370	60.960	0.203	1.445E-01	1.45E-01	1.45E-02
EMERGEN1	Emergency Generator #1	377885.9	4750269.80	1354.0	4.420	678.150	55.169	0.406	1.036E-01	1.04E-01	1.55E-02
EMERGEN2	Emergency Generator #2	377893.4	4750264.82	1354.0	4.420	678.150	55.169	0.406	1.036E-01	1.04E-01	1.55E-02
DFP	Diesel Fire Pump	378133.2	4750128.86	1353.0	1.524	853.710	79.553	0.127	7.428E-02	7.43E-02	1.86E-02
SFH3	Silicon Feed Hopper	377548.1	4750490.17	1353.7	6.096	0.000	2.587	0.152	4.000E-03	3.90E-04	1.72E-03

Part 2. Point TAPS

Source ID	BENZENE (TPY)	FORM. (TPY)	PAHS (TPY)	CADMIUM (TPY)	ARSENIC (TPY)	NICKEL (TPY)	HF (lb/hr)	HNO3 (lb/hr)	NAPTH (lb/hr)	HCL (lb/hr)	SILICON (lb/hr)
BH1											
BH2											
BH3											
KSE01											
KSE02											
KSE03											
KSE04											
KSE05											
CS											
BS1											
BS2											
HCLBOIL	7.74E-05	2.76E-03	4.20E-07	4.05E-05	7.37E-06	7.74E-05					
WWBOIL	7.74E-05	2.76E-03	4.20E-07	4.05E-05	7.37E-06	7.74E-05					
HVACBOIL	9.67E-05	3.45E-03	5.25E-07	5.07E-05	9.21E-06	9.67E-05					
HOH	9.28E-04	3.31E-02	5.04E-06	4.86E-04	8.84E-05	9.28E-04					
LIME											
SSB											1.20E-01
SFH2											3.84E-03
SFH1											3.84E-03
PPDCS											1.32E+00
CT1											
CT2											
CT3											
AVS										3.19E-01	
PVS										2.20E-02	
PPVS							3.72E-01	5.74E-01	0.00E+00		
EVS										6.93E-01	
METHREF	1.73E-05	2.13E-03	3.23E-07	3.12E-05	5.67E-06	5.95E-05					
STANDGEN	1.10E-03	5.92E-05	1.59E-04						9.76E-05		
EMERGEN1	1.10E-03	8.88E-05	2.39E-04						1.46E-04		

EMERGEN2	1.10E-03	8.88E-05	2.39E-04						1.46E-04		
DFP	2.20E-04	3.30E-04	4.71E-05						2.38E-05		
SFH3											3.84E-03

Part 3. Area and Volume Sources

AREA SOURCES										
Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Easterly Length (m)	Northerly Length (m)	Angle from North	Vertical Dimension (m)	HCl (lb/hr)
HCLVALVE	fugitive HCl from valves	377750	4750300	1354	1.52	45.72	51.82	35	2.44	8.58E-01

VOLUME SOURCES										
Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)	PMTEN (lb/hr)	PM25 (tpy)	PM25ANN (TPY)
TB		378547	4749863	1350.3	17.22	11.79	16.020	4.17E-01	4.17E-02	1.83E-01
RB		378573	4749889	1350.26	17.22	11.79	16.020	2.67E-01	2.67E-02	1.17E-01

*Sources with no source description are Great Western Malt off-site sources. GWM PM2.5 emissions assumed to be equivalent to 0.1PM10 emission rates provided by IDEQ.

Modeling analyses were performed for all pollutants listed in Table 1 and 2 to estimate maximum impacts during each averaging period for which an applicable ambient air quality impact limit exists, with one exception. All model sources have emissions understood to represent FEC maximum permitted emissions for each averaging period. This was done to ensure that impacts under the maximum allowable FEC emissions would remain in compliance with all appropriate ambient standards. The emissions release parameters represent either constructed actual parameters for existing sources or best engineering design for pre-construction sources. All model source data underwent quality assurance review by JBR Environmental, the engineers designing the facility, and the facility owners and representatives.

The facility is submitting this application in accordance with FEC sections of IDAPA 58.01.01.175 – 181. Consistent with FEC renewal requirements, this analysis is required to demonstrate compliance with all applicable ambient standards at maximum proposed facility operations, consistent with the revised FEC limits.

Building downwash was accounted for by including all current and proposed facility buildings in the AERMOD model and utilizing the Prime building downwash algorithm.

One potential co-contributing source was recommended for the analysis by IDEQ. The source, Great Western Malting, lies immediately to Hoku's Southeast and as included in the modeling analysis using data provided by IDEQ. The buildings at Great Western Malt were also included in the BPIP-Prime building downwash calculations for this analysis.

4.0 NON-REGULATORY DEFAULTS

As discussed above, the Ozone Limiting Method (OLM) was used to demonstrate compliance with 1-hr NO_2 impacts. The OLM was employed as recommended in the March 1, 2011 Memorandum to EPA Regional Air Division Directors from Tyler Fox, Air Quality Modeling Group Leader EPA Office of Air Quality Planning and Standards, titled "Additional Guidance Regarding the Application of Appendix W Modeling Guidance for the 1-hr NO_2 NAAQS" and IDEQ modeling guidelines. The OLM requires in-stack ratios of NO_2/NO_x emissions as well as hourly monitored background ozone (O_3) concentrations. The default in-stack NO_2/NO_x ratio of 0.1 was used for all equipment modeled. This was utilized based on an assessment of similar in stack ratios for emergency generators. Per DEQ and EPA guidance, 0.80 was used as the default ambient NO_2/NO_x ratio for the 1-hr NO_2 standard. Also as recommended in EPA guidance, the OLMGROUP ALL option was employed.

In addition to the NO_2/NO_x ratio, hourly background O_3 concentrations are required for the OLM analysis. Hourly ozone data was provided by DEQ. The data were taken from the 2007 study Ozone and its Precursors in the Treasure Valley, Idaho (final report, May 2008, Desert Research Institute); the hourly data was collected from Parma, Idaho from June 27, 2007 through October 12, 2007.

5.0 RECEPTOR NETWORK / MODEL DOMAIN

The property boundary / public access limit was used as the ambient air boundary for this analysis. Model receptors were placed from the public access limit out at least 5 kilometers in every direction. The AERMOD modeling domain from the 2011 modeling analysis was used and was conservatively calculated to include nearly the entire USGS quad for any receptor or any elevated point beyond the edge of the receptor network that meets the AERMAP / AERMOD guidance condition of 10% elevation gain.

The receptor density from the 2011 model was used and is 25 meters along the ambient air boundary, 50 meters for at least the first 100 meters, then 100 meters out to 400 meters away from the property boundary, 250 meters out to 1,000 meters from the ambient air boundary, 500 meters for the next 4 kilometers to 5 kilometers.

Figure 2 shows the facility and its ambient air boundary (the white spot in the middle of dense inner receptor network that show up as black in the center), the receptor network (the black dots around the denser inner model receptors), the model domain (green line just inside USGS quad lines around the receptor network), the latitude and longitude grids in the vicinity, and the USGS quad maps that cover the model domain.

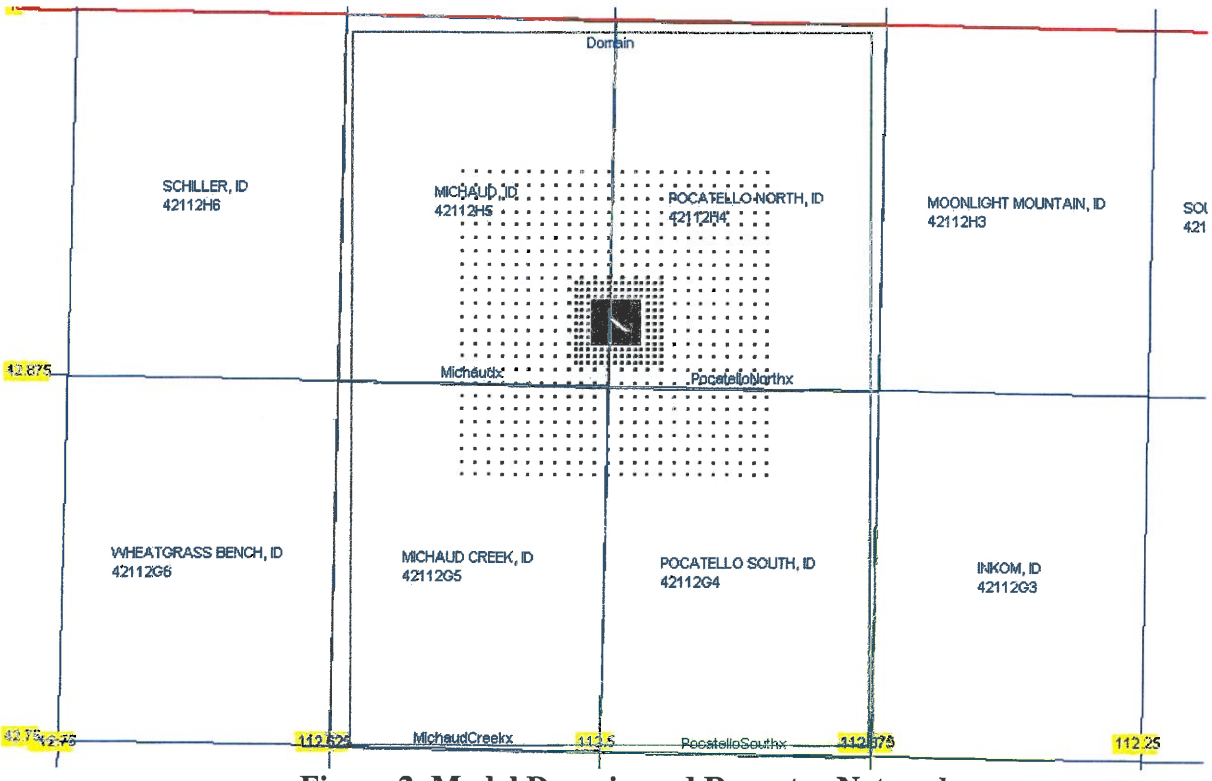

Figure 2 Model Domain and Receptor Network

The receptor networks employed ensure that the analysis meets or exceeds IDEQ receptor network requirements and captures the maximum impact from the facility. Therefore, no supplemental receptor network or expansion of the model domain will be required or included.

6.0 AERMAP INPUT AND ELEVATION DATA

All building and source base and receptor elevations were calculated from USGS 7.5-degree (30m or less horizontal resolution) DEM data (UTM NAD 27) downloaded from Geo Community (www.geocommunity.com), the USGS freeware download system, using the Bee-Line BEEST preprocessing system. That same DEM data was used in the AERMAP preprocessor to prepare the terrain data for the model domain to run the 2008 AERMOD model simulations. The anchor location and user location required by AERMAP are near the center of the Hoku facility. Electronic data files sufficient to review or duplicate the AERMAP model application are included with the model report.

7.0 METEOROLOGICAL DATA

Model meteorological data used in this analysis is the AERMOD –ready meteorological data set for Inkom for the year 1995, as recommended and provided by DEQ.

8.0 LAND USE CLASSIFICATION

The region surrounding the facility is primarily Urban in nature with mixed heavy and light industrial activties to the north , east and south. The region to the west of the facility is primarily elevated terrain that has little or no development. Further west, additional industrial activies occur in conjunction with Simplot's Don Plant. Although, the western boundary of the plant is less developed, the overall modeling domain is dominated by the Pocatello metropolitan area, as a result, the Urban mode for a single area was selected for use in AERMOD. The urban option requires a population variable and a surface roughness variable. The population for the Pocatello metropolitan area from the 2010 US Census was selected for use. This value, 55,000 was used in the analysis. Additionally, a default surface roughness of 1 meter was also selected for the analysis.

9.0 BACKGROUND CONCENTRATIONS

Background concentrations are required to complete a NAAQS analysis. Conservative background concentrations for this project were provided by IDEQ. The concentrations were based on monitoring data from the Pocatello area or other representative regions in Idaho. The background concentrations to be used for the analysis are tabulated in Table 3 on page 16. In addition to the static background values, IDEQ also provide hourly NO2 background concentrations in an Excel file based on monitoring data collected between June 2009 and June 2010 in Meridian, Idaho. This hourly background data was included in the AERMOD analysis

through the use of the BACKGROUND group, and is added to the modeled concentration in the ALL source group. This data was applied in determining the facility's 1-hr SO_2 impacts. For all other pollutants, a static background value was used.

10.0 EVALUATION OF COMPLIANCE WITH IMPACT STANDARDS

The impact limit standard applicable to this permit application are the National Ambient Air Quality Standards (NAAQS) for criteria pollutants, and the IDAPA 58.01.01.585 and 586 limits for TAPs listed in Table 2. Predicted total concentrations reported are the model predicted maximum ambient impacts during facility operation plus background concentrations for criteria pollutants. Model predicted maximum impacts reported will be the highest predicted impact for the annual average period, for 24-hr $PM_{2.5}$, and for all TAP analyses; the 8^{th} highest daily hourly maximum for the year modeled for 1-hr NO_2; the 4^{th} highest daily hourly maximum for the year modeled for 1-hr SO_2; and the highest second maximum for the 24-hr averaging period for PM_{10}.

Table 3 Background Concentrations, Ambient Impact Limits and Method of Comparison with Ambient Quality Standards

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Modeled Maximum Impact ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	IDEQ AAC or AACC ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Total Conc as % of Applicable Impact Limit
PM_{10}	24-hour	68	40.07	108.07	-	150	72.0
$PM_{2.5}$	24-hour	27.60	3.99	31.59	-	35	90.3
	Annual	7.80	1.41	9.21	-	15	61.4
NO_2	Annual	12	11.87	23.87	-	100	23.9
	1-hr	*	184.11	184.11	-	188	97.9
SO_2	1-hour	178	15.74	193.74	-	196	98.8
	3-hour		12.7	12.7	-	1300	1.0
HCl	24-hour	-	71.31	71.31	375.00		19.0
HFl	24-hour	-	9.70	9.70	125.00		7.8
Nitric Acid	24-hour	-	14.97	14.97	250.00		6.0
Silicon	24-hour	-	19.48	19.48	500.00		3.9
Arsenic	Annual	-	1.00E-05	1.00E-05	2.30E-04		4.3
Benzene	Annual	-	2.30E-04	2.30E-04	1.20E-01		0.2
Cadmium	Annual	-	4.00E-05	4.00E-05	5.60E-04		7.1
Formaldehyde	Annual	-	2.70E-03	2.70E-03	7.70E-02		3.5
Naphthalene**	Annual	-	2.00E-05	2.00E-05	1.40E-02		0.1
Nickel	Annual	-	8.00E-05	8.00E-05	4.20E-03		1.9
PAHs	Annual	-	4.00E-05	4.00E-05	1.40E-02		0.3

*Hourly NO_2 background concentrations were provided by DEQ and incorporated by AERMOD into the maximum modeled impact.

**DEQ has determined that naphthalene is a possible/probable carcinogen. Compliance is based on comparison to the EL and AACC for PAH.

Table 3 shows that predicted maximum ambient concentrations for criteria pollutants are below all applicable impact limits.

10.0 ELECTRONIC COPIES OF MODELING FILES

Electronic copies of all input, output, and support modeling files necessary to duplicate the model results accompany this submittal to IDEQ.

APPENDIX A

See Attached Electronic Data

APPENDIX B

See Attached Electronic Data

APPENDIX G

Modeling Data

See Attached Electronic Data