Statement of Basis

Permit to Construct No. P-2010.0183
Project ID 61406

Gem State Processing
Heyburn, Idaho

Facility ID 067-00038

Final

March 5, 2015
Dan Pitman, P.E.
Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

Btu	British thermal units
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
HAP	hazardous air pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
PAH	polyaromatic hydrocarbons
PCB	polychlorinated biphenyl
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
PW	process weight rate
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
VOC	volatile organic compounds

FACILITY INFORMATION

Description

Gem State Processing, LLC, Heyburn Facility (Gem State) is a potato processing company that processes, dehydrates, and packs various potato products. The Heyburn facility produces dehydrated potato flakes, seasoned agglomerated flakes, and other dehydrated potato products. Potatoes may be steam peeled, dry scrubbed, sorted, sliced, blanched, cooled, steam cooked, and dried. Products are dried to 8% moisture and are broken up and ground to customer specifications, packaged or stored, and then sold. The process includes natural gas fired boilers, steam drum dryers (flakers), fluidized bed dryers and pneumatic equipment to transport their products from production to storage or packaging.

Permitting History

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

February 21, 2014	P-2010.0183 PROJ 61247, revised permit includes an option to either vent each Drum Dryer and each Bubble Sheet Dryer separately or to combine the emissions from all of these sources into one larger stack (S)
March 22, 2013	P-2010.0183 PROJ 61132, revised PTC to shift allowable throughput from Bubble Sheet Dryer No. 2 to Bubble Sheet Dryer No. 1, and to increase allowable snifter stack emissions limits and decrease main stack emissions limits for all six drum dryers; Permit Status (S)
April 1, 2011	P-2010.0183 PROJ 60669, initial PTC, Permit status (S)

Application Scope

This PTC is for a minor modification at an existing minor facility.

The applicant has proposed to:

- Install and operate two new dehydrators equipped with Low NO_x combustors.
- Install and operate two new 9 MMBtu/hr natural gas fired air makeup units equipped with Low NO_x combustors.
- Combine the existing main drum dryer stack with the drum dryer snifter stack on all 6 drum dryers.
- Limit natural gas combustion to keep carbon dioxide equivalent emissions less than 100,000 tons per year to avoid Tier I permitting requirements.

All of the applicants requests were processed except for the last one listed, which was a request to limit carbon dioxide equivalent emissions less than 100,000 tons per year to avoid Tier I permitting requirements. On June 23, 2014 the United States Supreme Court issued a decision regarding greenhouse gas emissions and stationary source permitting. In short the court found that GHG emissions alone cannot cause a facility to be subject to Title V (Tier I) permitting requirements. This is also consistent with EPA's July 4, 2014 guidance. Therefore the requested limit on natural gas combustion to keep carbon dioxide equivalent emissions less than 100,000 tons per year is not required to avoid Title V (Tier I) permitting requirements.

Application Chronology

August 4, 2014	DEQ received an application and an application fee.
August 11 – August 26, 2014	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.

October 6, 2014	DEQ determined that the application was complete.
December 1, 2014	DEQ made available the draft permit and statement of basis for peer and regional office review.
December 4, 2014	DEQ made available the draft permit and statement of basis for applicant review.
December 9, 2014	DEQ received the permit processing fee.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 lists the proposed new equipment to be added to the facility.

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Sources	Control Equipment	Emission Point ID No.
Air Makeup Units (2): Manufacturer: Reyco Model: GASPAC 1250 Burner Model: Winnox Heat input rating: 9.0 MMBtu/hr Fuel: Natural Gas	Control Device Name: Low NOx burner	Multiple Points – See Modeling Memorandum
Dehydrators (2): Manufacturer: Wolverine Model: GASPAC 1250 Burner Model: Winnox – 3 stage Heat input rating: 18, 6, & 2.2 MMBtu/hr Fuel: Natural Gas	Control Device Name: Manufacturer: Winnox Low NOx	Multiple Points – See Modeling Memorandum

Emissions Inventories

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Post Project Potential to Emit

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

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

Table 2 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_x		CO		VOC	
	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Boiler #1 (1200 hp)	0.048	0.206	0.027	0.113	1.742	7.422	1.936	8.247	0.194	0.825
Boiler #2 (1200 hp)	0.048	0.206	0.027	0.113	1.742	7.422	1.936	8.247	0.194	0.825
Boiler #3 (1600 hp)	0.065	0.275	0.035	0.151	2.323	9.896	2.581	10.996	0.258	1.100
Reyco AMU #1 850	0.067	0.177	0.005	0.014	0.441	1.163	0.741	1.953	0.049	0.128
Reyco AMU #2 1000	0.067	0.177	0.005	0.014	0.441	1.163	0.741	1.953	0.049	0.128
Reyco AMU #3 1000	0.067	0.177	0.005	0.014	0.441	1.163	0.741	1.953	0.049	0.128
Reyco AMU #4 1250	0.075	0.196	0.006	0.016	0.490	1.292	0.824	2.170	0.054	0.142
Reyco AMU #5 1250	0.067	0.177	0.005	0.014	0.441	1.163	0.741	1.953	0.049	0.128
Reyco AMU #6 1250	0.067	0.177	0.005	0.014	0.441	1.163	0.741	1.953	0.049	0.128
Silo Bin Vent Baghouse #1	0.06	0.26	0	0	0	0	0	0	0	0
Silo Bin Vent Baghouse #2	0.06	0.26	0	0	0	0	0	0	0	0
Silo Bin Vent Baghouse #3	0.06	0.26	0	0	0	0	0	0	0	0
Silo Bin Vent Baghouse #4	0.06	0.26	0	0	0	0	0	0	0	0
Plant Receiver Baghouse #1	0.07	0.31	0	0	0	0	0	0	0	0
Plant Receiver Baghouse #2	0.07	0.31	0	0	0	0	0	0	0	0
Plant Receiver Baghouse #3	0.06	0.26	0	0	0	0	0	0	0	0
Plant Receiver Baghouse #4	0.06	0.26	0	0	0	0	0	0	0	0
Plant Receiver Baghouse #5	0.07	0.31	0	0	0	0	0	0	0	0
Plant Receiver Baghouse #6	0.06	0.26	0	0	0	0	0	0	0	0
Truck Loadout Baghouse	0.06	0.26	0	0	0	0	0	0	0	0
Rail Load Baghouse	0.06	0.26	0	0	0	0	0	0	0	0
Pneumatic Conveying Line Baghouse	0.06	0.26	0	0	0	0	0	0	0	0
Nuisance Dust Collector	0.0003	0.0014	0	0	0	0	0	0	0	0
Drum Dryer #1	0.73	3.1	0	0	0	0	0	0	0	0
Drum Dryer #2	0.73	3.1	0	0	0	0	0	0	0	0
Drum Dryer #3	0.73	3.1	0	0	0	0	0	0	0	0
Drum Dryer #4	0.73	3.1	0	0	0	0	0	0	0	0
Drum Dryer #5	0.73	3.1	0	0	0	0	0	0	0	0
Drum Dryer #6	0.73	3.1	0	0	0	0	0	0	0	0
Bubble Sheet Dryer #1	0.76	4.06	0.0041	0.02	0.69	2.92	0.58	2.46	0.038	0.16
Bubble Sheet Dryer #2	0	0	0	0	0	0	0	0	0	0
Dehydrator #1	0.85	3.61	0.01	0.04	0.58	2.45	1.18	5.04	0.09	0.37
Dehydrator #2	0.85	3.61	0.01	0.04	0.58	2.45	1.18	5.04	0.09	0.37
Post Project Totals	**8.22**	**35.18**	**0.14**	**0.56**	**10.35**	**39.67**	**13.92**	**51.97**	**1.16**	**4.43**

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

Non-Carcinogenic TAP Emissions

All non-carcinogenic TAP emissions from the new emissions units at the facility are below the screening emission level listed in IDAPA 58.01.01.585. A summary of the TAP emission inventory may be seen in Appendix A of the application.

Carcinogenic TAP Emissions

Arsenic, cadmium, formaldehyde, and nickel emissions exceed their respective screening emissions level for carcinogenic air pollutants listed in IDAPA 58.01.01.586. Gem State demonstrated preconstruction compliance by showing that these TAPs cause ambient concentrations that are below their respective acceptable ambient concentrations listed in IDAPA 58.01.01.586. A summary of the TAP emission inventory may be seen in Appendix A of the application.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility as verified by DEQ staff. HAP emissions originate solely from natural gas combustion.

Table 3 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

Hazardous Air Pollutants	PTE (T/yr)
Chromium	8.49E-04
Cobalt	5.09E-05
Hexane	1.09E+00
Manganese	2.30E-04
Mercury	1.58E-04
Naphthalene	3.70E-04
Selenium	1.46E-05
Toluene	2.06E-03
Arsenic	1.21E-04
Benzene	1.27E-03
Beryllium	7.28E-06
Cadmium	6.67E-04
Formaldehyde	4.55E-02
Nickel	1.27E-03
Totals	**1.14**

Ambient Air Quality Impact Analyses

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP).

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

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

Facility Classification

"Synthetic Minor" classification for criteria pollutants is defined as the uncontrolled Potential to Emit for criteria pollutants are above the applicable major source thresholds and the Potential to Emit for criteria pollutants fall below the applicable major source thresholds. Therefore, the following table compares the uncontrolled Potential to Emit and the Potential to Emit for criteria pollutants to the Major Source thresholds to determine if the facility will be "Synthetic Minor."

Table 4 UNCONTROLLED PTE AND PTE FOR REGULATED AIR POLLUTANTS COMPARED TO THE MAJOR SOURCE THRESHOLDS

Pollutant	Uncontrolled PTE (T/yr)	PTE (T/yr)	Major Source Thresholds (T/yr)	Uncontrolled PTE Exceeds the Major Source Threshold and PTE Exceeds the Major Source Threshold?
$PM_{10}/PM_{2.5}$	<100	35.2	100	No
SO_2	<100	0.56	100	No
NO_x	<100	39.7	100	No
CO	<100	52	100	No
VOC	<100	4.4	100	No
CO_2e	>100,000	99,955	100,000	No

As demonstrated in Table 4, the facility has an uncontrolled potential to emit for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, and VOC less than the Major Source thresholds of 100 T/yr for each pollutant. Greenhouse gases, on a carbon dioxide equivalent basis, are limited to less than 100,000 tons per year and are not subject to regulation. In addition, the facility has uncontrolled potential HAP emissions of less than the Major Source threshold of 10 T/yr and for all HAP combined less than the Major Source threshold of 25 T/yr. Therefore, this facility is not designated as a Synthetic Minor facility.

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 ..... Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the proposed new emissions sources. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 ..... Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 ..... Visible Emissions

The sources of visible emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. In accordance with IDAPA 58.01.01.625.03, the opacity standard shall not apply when the presence of uncombined water, nitrogen oxides and/or chlorine gas are the only reason(s) for the failure of the emission to comply with the requirements of this Rule.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676 ..... Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. Sources that combusting natural gas in boilers, as is the case with Gem State Processing, are inherently in compliance with his standard and there is no need for emissions control. The air makeup units and bubble sheet dryers are direct heat transfer units and the standard does not apply to them.

Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)

IDAPA 58.01.01.701 ..... Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment's process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 and IDAPA 58.01.01.702 establish PM emission limits for equipment that commenced operation on or after October 1, 1979 and for equipment operating prior to October 1, 1979, respectively. In accordance with IDAPA 58.01.01.700.02 no source shall be required to meet an emission limit of less than one pound per hour. All process equipment at Gem State are estimated to emit less than one pound per hour, therefore preconstruction compliance is demonstrated.

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

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

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, VOC, or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

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

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

NSPS Applicability (40 CFR 60)

This permitting action does not change the applicability and requirements of NSPS for this facility. The facility is subject to the requirements of 40 CFR 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. For convenience purposes, the regulatory analysis presented in the Statement of Basis for PTC No. P-2010.0183, issued on April 1, 2011 is shown below.

40 CFR 60, Subpart Dc — **Standards of Performance for Small Industrial–Commercial–Institutional Steam Generating Units**

All three boilers at this facility only combust natural gas as fuel as required by a permit condition. Therefore, the only Sections of this subpart that are applicable to the three boilers at this facility are the Applicability and Delegation of Authority specified in § CFR 60.40c(a), the Recordkeeping requirements of § CFR 60.48c(g) and (i), and the Reporting requirements of § CFR 60.48c(a), (a)(1), and (a)(3).

§ 60.40c — Applicability and Delegation of Authority

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

The three Johnston Boiler Company natural gas-fired boilers are rated at between 10 MMBtu/hr and 100 MMBtu/hr and were constructed after June 9, 1989. Therefore, these three natural gas fired boilers are subject to some of the requirements of this subpart.

§ 60.41c Definitions

The definitions of this section apply to the three natural gas fired boilers at this facility.

§ 60.48c Reporting and Recordkeeping Requirements

In accordance with 40 CFR 60.48c(a), the permittee shall submit notification of the date of construction or reconstruction, and actual startup as required by 40 CFR 60.7 for the boilers. The notification shall include the following:

- The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.
- The annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired.

Notification shall be submitted to EPA and DEQ.

U.S. EPA Region 10
Office of Air Quality
1200 Sixth Avenue
Seattle, WA 98101
Phone: 206.553.1200

Air Quality Permit Compliance
Twin Falls Regional Office
Idaho Department of Environmental Quality
1363 Fillmore
Twin Falls, ID 83301
Phone: 208.736.2190

In accordance with 40 CFR 60.48c(g)(1) except as provided under 40 CFR 60.48c(g)(2) and (g)(3) of this section, the owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.

In accordance with 40 CFR 60.48c(g)(2) as an alternative to meeting the requirements 40 CFR 60.48c(g)(1), the owner or operator may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

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

On March 21, 2011, EPA promulgated the "Boiler MACT" for area, or minor sources. Boilers fired by natural gas are not affected by this regulation. Because all of the boilers at Gem State are natural gas fired, this regulation does not affect Gem state. 40 CFR 63.11195(e) specifically lists gas fired boilers as not being subject to this regulation.

Permit Conditions Review

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

Permit Condition 2.1

Provides a description of the current permitting action which is to add two new dehydrators, two new air makeup units, and to change the permitted stack configuration on the Drum Dryers.

Table 1.1

The emissions controls listed in the previous permit for the Drum Dryers depended upon whether there were separate or combined stacks. If the Drum Dryers had two stacks then the drums "snifter" was to be equipped with a cyclone, if a single stack configuration was chosen then the cyclone was not listed as being required. The permit has been updated to specify that the Drum Dryer's snifter section will be controlled by a cyclone. The Drum Dryers will be served by a single stack instead of the previous two stack configuration; and a cyclone is required to be used on the snifter section of each dryer.

Two new Wolverine Dehydrators were added to the equipment list with Low NOx burners as the emissions controls for the multistage natural gas combustors.

The emissions control listing for the Air Makeup Units was corrected to list that they shall be equipped with Low NOx burners consistent with the emission inventory that has been provided with the application.

Permit Condition 3.6

The previous permit allowed the source 365 days after permit issuance to install taller stacks on the Bubble Sheet Dryer. That permit condition was included in the Drum Dryer section of the permit. It has now been moved to this section of the permit for the Bubble Sheet Dryer and instead of requiring the stack height to be raised within 365 days of permit issuance (that translated to February 21, 2015) the permit now says the stack shall be raised by May 22, 2015 which is consentient with the extension to the deadline granted by DEQ[1] on February 10, 2015.

The remaining permit conditions have been renumbered to accommodate the addition of the above described permit condition.

Permit Condition 3.8 (previous Permit Condition 3.7)

This permit condition is a modification of the existing permit condition which had included source testing requirements depending on the selected stack configurations for the Bubble Sheet Dryer and Drum Dryers. Gem State has elected to have single stack serving the Bubble Sheet Dryer and the permit has been modified to reflect this change. Source testing is still required by September 21, 2016 consistent with the existing permit. Also, the previous permit required that source testing protocol be submitted prior to testing, this modified permit does not require a protocol be submitted though it encourages that one be submitted.

Permit Condition 4.1

The process description for the Drum Dryers has been updated to provide that emissions from the drum snifters are controlled by a cyclone. Table 4.1 was also updated to include this.

Permit Condition 4.5

This permit condition has been modified to read as follows:

The total weight of the product after drying in the 6 dryers combined, including whatever moisture is present, shall not exceed 162 tons per calendar day.

The previous permit limited throughput to each dryer to 27 tons per day and a total combined throughput to the dryers to 162 tons per day. The 27 tons per day throughput limit to each dryer has been removed. Each of sources stacks has similar dispersion characteristics and are located in close proximity, a combined throughput limit is sufficient instead of a throughput limit for each individual dryer.

Permit Condition 4.6

This permit condition has been modified to include the new proposed stack parameters for the Drum Dryers. Gem State has proposed to combine the Drum Dyer main stack with the Drum Dryer snifter stack, which is different than either scenario listed in the existing permit. The previous permit allowed 365 days from permit issuance to

1 February 10, 2105 Letter from Bobby Dye, DEQ Regional Manager to Eric Clark, Stantec (TRIM record # 2015AAG171)

install the stacks proposed in the application, under that permit 365 after permit issuance translates to February 21, 2015. Instead of requiring the stack height to be raised within 365 days of permit issuance (or by February 21, 2015) the permit now says the stack shall be raised by May 22, 2015 which is consentient with the extension to the deadline granted by DEQ on February 10, 2015.

Permit Condition 4.7

This permit condition requires monitoring of the production rate of all the Drum Dryers combined in order to demonstrate compliance with the combined throughput limitation. It has been modified to require monitoring of the throughput of all dryers combined instead of the throughput of each individual dryer. Also the permit now specifies that the permittee may either directly or indirectly monitor dryer throughput. Directly monitoring would entail monitoring directly at the output of the dryer, indirectly monitoring could include determining the dried material output based a mass balance about the dryers. Monitoring shall be conducted in accordance with General Provision 9, including keeping records of the analytical techniques or methods used to determine dryer output. All monitoring records and support information shall be retained for a period of at least five years.

Permit Condition 4.8

The previous permit condition required source testing depending on the stack configuration of the Drum Dryers. The modified permit condition includes only the stack configuration that is proposed in the application which is to reconfigure the drum dryer exhaust system and combine all emissions into one stack instead of having two stacks. Since the drum dryer exhaust system is being reconfigured a source test is required within 365 days of the change in configuration.

This permit condition has also been modified to include the following requirement:

"If water is injected into the cyclone during the test the permittee shall describe how the quantity and frequency of water injection is consistent with "worst case normal conditions". Gem State has indicated water is intermittently injected to the cycle to prevent it from plugging, indicating that if continuous use of water injection was to occur during the test it would not be representative of "worst case normal" conditions.

Also, the previous permit required that the total dry weight at 8% moisture be determined after the dryer, the modified permit requires determining the dry weight of product that is produced after the dryer at whatever moisture content is present which is consistent with the dryer throughput limitation.

Section 5 of the Permit

These permit conditions are new permit conditions for the two new dehydrators.

Permit Condition 5.1 & 5.2

These permit conditions provide a process description and state that emissions from the dehydrators combustors are controlled by Low NO_x combustors.

Each of the two dehydrators will have 3 "stages" of drying, each stage with its own natural gas fired combustion unit. Stage A is rated at 18.0 MMBtu/hr, Stage B is rated at 6.0 MMBtu/hr, and Stage C is rated at 2.2 MMBtu/hr. Each dehydrator will have 4 stacks, 2 stacks serving Stage A, and 1 stack serving Stage B and one stack serving Stage C.

Permit Condition 5.3

This permit condition includes a reference to Table 7.1 that includes a $PM_{10}/PM_{2.5}$ emission limit for each dehydrator. Each dehydrator has 4 stacks and the emission limit included in Table 7.1 is an emission limit for all stacks combined. Each stack is the same height, is located in close proximity to the other stacks, and each stack has very similar temperature and stack gas velocity; therefore it is not necessary to limit the emissions from each individual stack because they all have similar dispersion characteristics. The combined emission limit gives the permittee flexibility in determining compliance with emission standards; one stack may emit more than they had estimated and another stack may emit less than estimated. This variation in emissions rates can be accommodated with the combined emission limitation, if individual stack emission limits were included a violation would have be occurring.

As a source of reference Gem State estimated $PM_{10}/PM_{2.5}$ emissions from each stack as follows (the same estimates are provided for each dryer):

Stage A Stack 1 – 0.38 lb/hr

Stage A Stack 2 – 0.21 lb/hr

Stage B Stack 3 – 0.14 lb/hr

Stage C Stack 4 – 0.12 lb/hr

Total – 0.85 lb/hr

Permit Condition 5.4

The weight of product out of each dehydrator (including whatever moisture is present) of both dehydrators combined shall not exceed 21.7 tons per calendar day. This is consistent with the emission inventory provided in the application. Those calculations are based on an hourly throughput of 902.8 pounds per hour, which is 21.7 tons per day.

Permit Condition 5.5

This permit condition limits the natural gas combustion in the dehydrators to the rate Gem State used to estimate emissions. This rate is less than the rated input capacity of the combustors. Gem State estimated that 31,946 standard cubic feet per hour would be combusted; at rated capacity 51,373 standard cubic feet per hour would be combusted. Since particulate matter emissions are the limiting pollutant using this method of calculating emissions and since particulate matter ambient standard is a 24-hr standard natural gas usage is limited to a daily usage rate rather than hourly (31,946*24=766,704).

Permit Condition 5.6

This condition requires that the stack height of all the dehydrators shall be at least 42 feet consistent with the air pollution dispersion model that was submitted.

Permit Condition 5.7

This condition requires monitoring the combined throughput of the two new dehydrators in tons per day.

Permit Condition 5.8

This permit condition requires monitoring and recording the combined amount of natural gas consumed in the two dehydrators each calendar day.

Permit Condition 5.9

This condition requires source testing of all stacks on one of the dehydrators to assure compliance with the combined emission limit. Source testing is warranted for several reasons. The emission factor that was used to estimate emissions was from a different type of emission unit than the one the emission estimate was provided for. Also, the applicant did not provide an argument of why the emission factor developed based on a source test on a different type of emission unit would be representative of actual emissions. Additionally, predicted $PM_{2.5}$ impacts are greater than 93% of the ambient standard. And finally, the consultant for Gem State indicated that a source test was warranted during a telephone conversation.

Testing is required on all four stacks on the dehydrator. This is because there is a combined emission limit for all these stacks instead of individual limits. The combined emission limit gives the permittee flexibility in determining compliance with emission standards; one stack may emit more than Gem State had estimated and another stack may emit less than estimated. This variation in emissions rates can be accommodated with the combined emission limitation; if individual stack emission limits were included a violation could be occurring.

Section 6 of the modified permit remains the same as the existing permit conditions except the conditions have been renumbered.

Section 7

Table 7.1 includes the emission limits for the facility. They are based on the modeled emission rates that showed compliance with ambient standards. The two emission rate limits for each drum dryer have been added together to provide one limit consistent with fact that Gem State is combining the two stacks into one.

Section 9

The requirement of this Section was changed as follows to provide clarity to which emissions units the condition applies to.

Permitted exhaust vents shall vent vertically and shall not be capped.

The condition now references "permitted exhaust stacks" instead of "roof top exhaust vents".

PUBLIC REVIEW

Public Comment Opportunity

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

APPENDIX A – EMISSIONS INVENTORIES

Gem State Processing, LLC
Heyburn Facility

CRITERIA EMISSIONS - UNCONTROLLED NATURAL GAS COMBUSTION (lb/hr)

Emission Factors

NOx	0.036 lb/MMBtu	Manufacturer specific emission factor for 30 ppm A-FGR low NOx burner on boiler
CO	0.04 lb/MMBtu	Manufacturer specific emission factor for boiler
PM-10	0.001 lb/MMBtu	Manufacturer specific emission factor for boilers
SOx	0.00055 lb/MMBtu	Manufacturer specific emission factor for boilers
VOC	0.004 lb/MMBtu	Manufacturer specific emission factor for boilers
NOx	100 lb/10^6 scf	AP-42, Table 1.4-1, 1998
CO	84 lb/10^6 scf	AP-42, Table 1.4-1, 1998
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CO2	120,000 lb/10^6 scf	AP-42, Table 1.4-2, 1998
N2O	2.2 lb/10^6 scf	AP-42, Table 1.4-2, 1998, Low-NOx burner
CH4	2.3 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description	Capacity (MMBtu/hr)	Throughput (scf/hr)	Pounds per Hour					
			NOx Emissions (lb/hr)	CO Emissions (lb/hr)	PM2.5/PM-10 Emissions (lb/hr)	SOx Emissions (lb/hr)	VOC Emissions (lb/hr)	Lead Emissions (lb/hr)
Boiler #1[a] (1200 hp)	49.37	48,398	4.8398	1.9746	0.0494	0.0272	0.1975	0.0000242
Boiler #2[a] (1200 hp)	49.37	48,398	4.8398	1.9746	0.0494	0.0272	0.1975	0.0000242
Boiler #3[a] (1600 hp)	65.82	64,530	6.4530	2.6328	0.0658	0.0362	0.2633	0.0000323
Reyco AMU #1 850	9.0	8,824	0.8824	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #2 1000	9.0	8,824	0.8824	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #3 1000	9.0	8,824	0.8824	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #4 1250	10.0	9,804	0.9804	0.8235	0.0745	0.0059	0.0539	0.0000049
Reyco AMU #5 1250	9.0	8,824	0.8824	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #6 1250	9.0	8,824	0.8824	0.7412	0.0671	0.0053	0.0485	0.0000044
Bubble Sheet Dryer #1	7.0	6,863	0.6863	0.5765	0.0522	0.0041	0.0377	0.0000034
Bubble Sheet Dryer #2	7.0	6,863	0.6863	0.5765	0.0522	0.0041	0.0377	0.0000034
TOTAL	**233.6**	**228,972.3**	**22.90**	**12.26**	**0.68**	**0.13**	**1.03**	**1.14E-04**

[a]The boilers will be equipped with Low NOx Burners; however the calculations shown in this spreadsheet are the uncontrolled emissions using emissions factors from AP-42 for NOx and CO emissions from the boilers. Boiler capacity and throughput based on manufacturer specific information

Gem State Processing, LLC
Heyburn Facility

CRITERIA EMISSIONS - CONTROLLED NATURAL GAS COMBUSTION (lb/hr)

Emission Factors

NOx	0.036 lb/MMBtu	Manufacturer specific emission factor for 30 ppm A-FGR low NOx burner on boiler
CO	0.04 lb/MMBtu	Manufacturer specific emission factor for boiler
PM-10	0.001 lb/MMBtu	Manufacturer specific emission factor for boilers
SOx	0.00055 lb/MMBtu	Manufacturer specific emission factor for boilers
VOC	0.004 lb/MMBtu	Manufacturer specific emission factor for boilers
NOx	100 lb/10^6 scf	AP-42, Table 1.4-1, 1998
NOx	50 lb/10^6 scf	AP-42, Table 1.4-1, 1998, Low NOx
CO	84 lb/10^6 scf	AP-42, Table 1.4-1, 1998
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CO2	120,000 lb/10^6 scf	AP-42, Table 1.4-2, 1998
N2O	0.64 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CH4	2.3 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description	Capacity (MMBtu/hr)	Throughput (scf/hr)	Pounds per Hour					
			NOx Emissions (lb/hr)	CO Emissions (lb/hr)	PM2.5/PM-10 Emissions (lb/hr)	SOx Emissions (lb/hr)	VOC Emissions (lb/hr)	Lead Emissions (lb/hr)
Boiler #1[a] (1200 hp)	48.40	48,398	1.7423	1.9359	0.0484	0.0266	0.1936	0.0000242
Boiler #2[a] (1200 hp)	48.40	48,398	1.7423	1.9359	0.0484	0.0266	0.1936	0.0000242
Boiler #3[a] (1600 hp)	64.53	64,530	2.3231	2.5812	0.0645	0.0355	0.2581	0.0000323
Reyco AMU #1 850	9.0	8,824	0.4412	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #2 1000	9.0	8,824	0.4412	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #3 1000	9.0	8,824	0.4412	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #4 1250	10.0	9,804	0.4902	0.8235	0.0745	0.0059	0.0539	0.0000049
Reyco AMU #5 1250	9.0	8,824	0.4412	0.7412	0.0671	0.0053	0.0485	0.0000044
Reyco AMU #6 1250	9.0	8,824	0.4412	0.7412	0.0671	0.0053	0.0485	0.0000044
Bubble Sheet Dryer #1	7.0	6,863	0.6863	0.5765	0.0522	0.0041	0.0377	0.0000034
Bubble Sheet Dryer #2	7.0	6,863	0.6863	0.5765	0.0522	0.0041	0.0377	0.0000034
TOTAL	**230.33**	**228,973.06**	**9.88**	**12.14**	**0.68**	**0.13**	**1.02**	**1.14E-04**

[a]Utilize Low NOx Burners, capacity and throughput based on manufacturer specific information

Gem State Processing, LLC
Heyburn Facility

CRITERIA EMISSIONS - UNCONTROLLED NATURAL GAS COMBUSTION (tpy)

Emission Factors

NOx	0.036 lb/MMBtu	Manufacturer specific emission factor for 30 ppm A-FGR low NOx burner on boiler
CO	0.04 lb/MMBtu	Manufacturer specific emission factor for boiler
PM-10	0.001 lb/MMBtu	Manufacturer specific emission factor for boilers
SOx	0.00055 lb/MMBtu	Manufacturer specific emission factor for boilers
VOC	0.004 lb/MMBtu	Manufacturer specific emission factor for boilers
NOx	100 lb/10^6 scf	AP-42, Table 1.4-1, 1998
CO	84 lb/10^6 scf	AP-42, Table 1.4-1, 1998
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CO2	120,000 lb/10^6 scf	AP-42, Table 1.4-2, 1998
N2O	0.64 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CH4	2.3 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description	Capacity (MMBtu/hr)	Throughput (scf/hr)	Ton per Year					
			NOx Emissions (T/yr)	CO Emissions (T/yr)	PM2.5/PM-10 Emissions (T/yr)	SOx Emissions (T/yr)	VOC Emissions (T/yr)	Lead Emissions (T/yr)
Boiler #1[a] (1200 hp)	48.40	48,398	20.62	8.41	0.21	0.12	0.84	1.03E-04
Boiler #2[a] (1200 hp)	48.40	48,398	20.62	8.41	0.21	0.12	0.84	1.03E-04
Boiler #3[a] (1600 hp)	64.53	64,530	27.49	11.22	0.28	0.15	1.12	1.37E-04
Reyco AMU #1 850	9.0	8,824	2.33	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #2 1000	9.0	8,824	2.33	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #3 1000	9.0	8,824	2.33	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #4 1250	10.0	9,804	2.58	2.17	0.20	0.02	0.14	1.29E-05
Reyco AMU #5 1250	9.0	8,824	2.33	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU#6 1250	9.0	8,824	2.33	1.95	0.18	0.01	0.13	1.16E-05
Bubble Sheet Dryer #1	7.0	6,863	2.92	2.46	0.22	0.02	0.16	1.46E-05
Bubble Sheet Dryer #2	7.0	6,863	2.92	2.46	0.22	0.02	0.16	1.46E-05
TOTAL	**230.33**	**228,973.06**	**88.78**	**44.89**	**2.23**	**0.51**	**3.91**	**4.4E-04**

[a]The boilers will be equipped with Low NOx Burners; however the calculations shown in this spreadsheet are the uncontrolled emissions using emissions factors fr
AP-42 for NOx and CO emissions from the boilers. Boiler capacity and throughput based on manufacturer specific information
Ton per year emissions based on 5270.4 hours of operation/yr for the AMUs and 8520 hrs/year for all other listed equipment.

Gem State Processing, LLC
Heyburn Facility

CRITERIA EMISSIONS - CONTROLLED NATURAL GAS COMBUSTION (tpy)

Emission Factors

NOx	0.036 lb/MMBtu	Manufacturer specific emission factor for 30 ppm A-FGR low NOx burner on boiler
CO	0.04 lb/MMBtu	Manufacturer specific emission factor for boiler
PM-10	0.001 lb/MMBtu	Manufacturer specific emission factor for boilers
SOx	0.00055 lb/MMBtu	Manufacturer specific emission factor for boilers
VOC	0.004 lb/MMBtu	Manufacturer specific emission factor for boilers
NOx	100 lb/10^6 scf	AP-42, Table 1.4-1, 1998
NOx	50 lb/10^6 scf	AP-42, Table 1.4-1, 1998, Low NOx
CO	84 lb/10^6 scf	AP-42, Table 1.4-1, 1998
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CO2	120,000 lb/10^6 scf	AP-42, Table 1.4-2, 1998
N2O	0.64 lb/10^6 scf	AP-42, Table 1.4-2, 1998
CH4	2.3 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description	Capacity (MMBtu/hr)	Throughput (scf/hr)	Ton per Year					
			NOx Emissions (T/yr)	CO Emissions (T/yr)	PM2.5/PM-10 Emissions (T/yr)	SOx Emissions (T/yr)	VOC Emissions (T/yr)	Lead Emissions (T/yr)
Boiler #1[a] (1200 hp)	48.40	48,398	7.42	8.25	0.21	0.11	0.82	1.03E-04
Boiler #2[a] (1200 hp)	48.40	48,398	7.42	8.25	0.21	0.11	0.82	1.03E-04
Boiler #3[a] (1600 hp)	64.53	64,530	9.90	11.00	0.27	0.15	1.10	1.37E-04
Reyco AMU #1 850	9.0	8,824	1.16	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #2 1000	9.0	8,824	1.16	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #3 1000	9.0	8,824	1.16	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #4 1250	10.0	9,804	1.29	2.17	0.20	0.02	0.14	1.29E-05
Reyco AMU #5 1250	9.0	8,824	1.16	1.95	0.18	0.01	0.13	1.16E-05
Reyco AMU #6 1250	9.0	8,824	1.16	1.95	0.18	0.01	0.13	1.16E-05
Bubble Sheet Dryer #1	7.0	6,863	2.92	2.46	0.22	0.02	0.16	1.46E-05
Bubble Sheet Dryer #2	7.0	6,863	2.92	2.46	0.22	0.02	0.16	1.46E-05
TOTAL	**230.3**	**228,973.1**	**37.7**	**44.3**	**2.2**	**0.5**	**3.9**	**4.4E-04**

[a]Utilize Low NOx Burners, capacity and throughput based on manufacturer specific information

Ton per year emissions based on 5270.4 hours of operation/yr for the AMUs and 8520 hrs/year for all other listed equipment.

Gem State Processing, LLC
Heyburn Facility

UNCONTROLLED PARTICULATE EMISSIONS - DRYERS, FLAKERS, AND BAGHOUSE EQUIPMENT

Description	Throughput (scfm)	Emission Factor (grain/scf)	EF Reference	PM Emissions (lb/hr)	PM Emissions (T/yr) [a]	PM-2.5/10 Emissions (lb/hr)	PM-2.5/10 Emissions (T/yr) [a]
Silo Bin Vent Baghouse #1	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Silo Bin Vent Baghouse #2	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Silo Bin Vent Baghouse #3	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Silo Bin Vent Baghouse #4	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #1 (Multi-Purpose)	1,200	0.007	Manufacturer Guarantee	0.07	0.31	0.07	0.31
Plant Reciever Baghouse #2 (Off-Spec)	1,200	0.007	Manufacturer Guarantee	0.07	0.31	0.07	0.31
Plant Reciever Baghouse #3 (Sack/Tote Pacing)	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #4 (Bag Packing)	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #5 (Pet Food)	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #6 (Off-Spec #2)	1,200	0.007	Manufacturer Guarantee	0.07	0.31	0.07	0.31
Truck Loadout Baghouse	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Rail Load Baghouse	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Pneumatic Conveying Line[b]	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Nuisance Dust Collector	See note f	See note f	Manufacturer Guarantee	0.324	1.380	0.324	1.380

Description	Throughput (lb/hr dry)	Emission Factor (lb/ton)	EF Reference	PM Emissions (lb/hr)	PM Emissions (T/yr) [a]	PM-2.5/10 Emissions (lb/hr)	PM-2.5/10 Emissions (T/yr) [a]
Drum Dryer Drum Fan Hood #1[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum#1[d]	1.125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #2[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #2[d]	1.125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #3[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #3[d]	1.125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #4[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #4[d]	1.125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #5[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #5[d]	1.125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #6[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #6[d]	1.125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Bubble Sheet Dryer #1[f]	3300	0.43	Performance Test Results[h]	0.71	3.02	0.71	3.02
Bubble Sheet Dryer #2[f]	0	0.43	Performance Test Results[h]	0.00	0.00	0.00	0.00
TOTAL[e]	30,407			6	26	6	26

[a] Ton per year emissions based on 8,520 hours of operation/yr

[b] The Pneumatic Conveying Line includes the baghouse on each drum dryer used to convey product to the packaging recievers.

[c] Based on engineering judgement from review of various references, drum fan hood emissions comprise approximately 90.6% of drum dryer emissions. Snifter fan drum emissions comprise approximately 9.4% of drum dryer emissions; the emission factor (lb/ton) was calculated to reflect this ratio.

[d] The total lb/hr emission rate from the Drum Dryer Snifter Fans was determined based on model sensitivity analysis. This is the maximum emission rate the snifter fans can emit in order for the facility to be in compliance with the PM10 NAAQs standards.

[e] Only one of the four Silo Bin Vents will operate at one time.

[f] The nuisance dust collector will collect fugitive dust from other emissions sources that discharge inside the building including the reject silo baghouse, plant reciever baghouses, and truck loadout baghouse.

[g] Emission Factor was established by June 20-21, 2011 Performance Test

[h] Emission Factor was established by September 21, 2011 Performance Test

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[i] A total of 18% of the flakes will flow through the fluidized bed dryers (9% each)

Gem State Processing, LLC
Heyburn Facility

CONTROLLED PARTICULATE EMISSIONS - DRYERS, FLAKERS, AND BAGHOUSE EQUIPMENT

Description	Throughput (scfm)	Emission Factor (grain/scf)	EF Reference	PM Emissions (lb/hr)	PM Emissions (T/yr) [a]	PM-10/PM2.5 Emissions (lb/hr)	PM-10/PM-2.5 Emissions (T/yr)
Silo Bin Vent Baghouse #1	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Silo Bin Vent Baghouse #2	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Silo Bin Vent Baghouse #3	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Silo Bin Vent Baghouse #4	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #1 (Multi-Purpose)	1,200	0.007	Manufacturer Guarantee	0.07	0.31	0.07	0.31
Plant Reciever Baghouse #2 (Off-Spec)	1,200	0.007	Manufacturer Guarantee	0.07	0.31	0.07	0.31
Plant Reciever Baghouse #3 (Sack/Tote Pacing)	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #4 (Bag Packing)	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Plant Reciever Baghouse #5 (Pet Food)	1,200	0.007	Manufacturer Guarantee	0.07	0.31	0.07	0.31
Plant Reciever Baghouse #6 (Off-Spec#2)	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Truck Loadout Baghouse	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Rail Load Baghouse	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Pneumatic Conveying Line[b]	1,000	0.007	Manufacturer Guarantee	0.06	0.26	0.06	0.26
Nuisance Dust Collector	See note f	See note f	Manufacturer Guarantee	0.0003	0.001	0.0003	0.001

Description	Throughput (lb/hr dry)	Emission Factor (lb/ton)	EF Reference	PM Emissions (lb/hr)	PM Emissions (T/yr)	PM-10/PM2.5 Emissions (lb/hr)	PM-10/PM-2.5 Emissions (T/yr)
Drum Dryer Drum Fan Hood #1[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum#1[d]	1,125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #2[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #2[d]	1,125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #3[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #3[d]	1,125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #4[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #4[d]	1,125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #5[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #5[d]	1,125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Drum Dryer Drum Fan Hood #6[c]	2250	0.63	Performance Test Results[g]	0.71	3.02	0.71	3.02
Drum Dryer Snifter Fan Drum #6[d]	1,125	0.02	Performance Test Results[g]	0.020	0.08520	0.02000	0.08520
Bubble Sheet Dryer #1[i]	3300	0.43	Performance Test Results[h]	0.71	3.02	0.71	3.02
Bubble Sheet Dryer #2[i]	0	0.43	Performance Test Results[h]	0.00	0.00	0.00	0.00
TOTAL[a]	30,407			6	24	6	24

[a] Ton per year emissions based on 8,520 hours of operation/yr

[b] The Pneumatic Conveying Line includes the baghouse on each drum dryer used to convey product to the packaging recievers.

[c] Based on engineering judgement from review of various references, drum fan hood emissions comprise approximately 90.6% of drum dryer emissions. Snifter fan drum emissions comprise approximately 9.4% of drum dryer emissions; the emission factor (lb/ton) was calculated to reflect this ratio.

[d] The total lb/hr emission rate from the Drum Dryer Snifter Fans was determined based on model sensitivity analysis. This is the maximum emission rate the snifter fans can emit in order for the facility to be in compliance with the PM10 NAAQs standards.

[e] Only one of the four Silo Bin Vents will operate at one time.

[f] The nuisance dust collector will collect fugitive dust from other emissions sources that discharge inside the building including the reject silo baghouse, plant reciever baghouses, and truck loadout baghouse.

[g] Emission Factor was established by June 20-21, 2011 Performance Test

[h] Emission Factor was established by September 21, 2011 Performance Test

[i] A total of 18% of the flakes will flow through the fluidized bed dryers (9% each)

Gem State Processing, LLC
Heyburn Facility

UNCONTROLLED CRITERIA POLLUTANTS POTENTIAL TO EMIT

Description	Fuel Combustion of Natural Gas											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Boiler #1 (1200 hp)	4.840	20.617	1.975	8.412	0.049	0.210	0.027	0.116	0.197	0.841	0.000	0.000
Boiler #2 (1200 hp)	4.840	20.617	1.975	8.412	0.049	0.210	0.027	0.116	0.197	0.841	0.000	0.000
Boiler #3 (1600 hp)	6.453	27.490	2.633	11.216	0.066	0.280	0.036	0.154	0.263	1.122	0.000	0.000
Reyco AMU #1 850	0.882	2.325	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #2 1000	0.882	2.325	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #3 1000	0.882	2.325	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #4 1250	0.980	2.584	0.824	2.170	0.075	0.196	0.006	0.016	0.054	0.142	0.000	0.000
Reyco AMU #5 1250	0.882	2.325	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #6 1250	0.882	2.325	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Bubble Sheet Dryer #1	0.686	2.924	0.576	2.456	0.052	0.222	0.004	0.018	0.038	0.161	0.000	0.000
Bubble Sheet Dryer #2	0.686	2.924	0.576	2.456	0.052	0.222	0.004	0.018	0.038	0.161	0.000	0.000

Description	Particulate Equipment											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Silo Bin Vent Baghouse #1					0.06	0.26						
Silo Bin Vent Baghouse #2					0.06	0.26						
Silo Bin Vent Baghouse #3					0.06	0.26						
Silo Bin Vent Baghouse #4					0.06	0.26						
Plant Reciever Baghouse #1					0.07	0.31						
Plant Reciever Baghouse #2					0.07	0.31						
Plant Reciever Baghouse #3					0.06	0.26						
Plant Reciever Baghouse #4					0.06	0.26						
Plant Reciever Baghouse #5					0.06	0.26						
Plant Reciever Baghouse #6					0.07	0.31						
Truck Loadout Baghouse					0.06	0.26						
Rail Load Baghouse					0.06	0.26						
Pneumatic Conveying Line Baghouse					0.06	0.26						
Nuisance Dust Collector					0.32	1.38						
Drum Dryer Drum Fan Hood #1					0.71	3.02						
Drum Dryer Snifter Fan Drum #1					0.02000	0.0852						
Drum Dryer Drum Fan Hood #2					0.71	3.02						
Drum Dryer Snifter Fan Drum #2					0.02000	0.0852						
Drum Dryer Drum Fan Hood #3					0.71	3.02						
Drum Dryer Snifter Fan Drum #3					0.02000	0.0852						
Drum Dryer Drum Fan Hood #4					0.71	3.02						
Drum Dryer Snifter Fan Drum #4					0.02000	0.0852						
Drum Dryer Drum Fan Hood #5					0.71	3.02						
Drum Dryer Snifter Fan Drum #5					0.02000	0.0852						
Drum Dryer Drum Fan Hood #6					0.71	3.02						
Drum Dryer Snifter Fan Drum #6					0.02000	0.0852						
Bubble Sheet Dryer #1					0.71	3.02						
Bubble Sheet Dryer #2					0.00	0.00						

	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
TOTAL	22.90	88.78	12.26	44.89	6.72	27.95	0.13	0.51	1.03	3.91	0.0001	0.0001

Gem State Processing, LLC
Heyburn Facility

CONTROLLED CRITERIA POLLUTANTS POTENTIAL TO EMIT

Description	Fuel Combustion of Natural Gas											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Boiler #1 (1200 hp)	1.742	7.422	1.936	8.247	0.048	0.206	0.027	0.113	0.194	0.825	0.000	0.000
Boiler #2 (1200 hp)	1.742	7.422	1.936	8.247	0.048	0.206	0.027	0.113	0.194	0.825	0.000	0.000
Boiler #3 (1600 hp)	2.323	9.896	2.581	10.996	0.065	0.275	0.035	0.151	0.258	1.100	0.000	0.000
Reyco AMU #1 850	0.441	1.163	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #2 1000	0.441	1.163	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #3 1000	0.441	1.163	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #4 1250	0.490	1.292	0.824	2.170	0.075	0.196	0.006	0.016	0.054	0.142	0.000	0.000
Reyco AMU #5 1250	0.441	1.163	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Reyco AMU #6 1250	0.441	1.163	0.741	1.953	0.067	0.177	0.005	0.014	0.049	0.128	0.000	0.000
Bubble Sheet Dryer #1	0.686	2.924	0.576	2.456	0.052	0.222	0.004	0.018	0.038	0.161	0.000	0.000
Bubble Sheet Dryer #2	0.686	2.924	0.576	2.456	0.052	0.222	0.004	0.018	0.038	0.161	0.000	0.000
Dehydration Units	1.150	4.899	2.442	10.403	0.243	1.034	0.019	0.082	0.176	0.748	0.000	0.000

Description	Particulate Equipment											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Silo Bin Vent Baghouse #1					0.06	0.26						
Silo Bin Vent Baghouse #2					0.06	0.26						
Silo Bin Vent Baghouse #3					0.06	0.26						
Silo Bin Vent Baghouse #4					0.06	0.26						
Plant Reciever Baghouse #1					0.07	0.31						
Plant Reciever Baghouse #2					0.07	0.31						
Plant Reciever Baghouse #3					0.06	0.26						
Plant Reciever Baghouse #4					0.06	0.26						
Plant Reciever Baghouse #5					0.07	0.31						
Plant Reciever Baghouse #6					0.06	0.26						
Truck Loadout Baghouse					0.06	0.26						
Rail Load Baghouse					0.06	0.26						
Pneumatic Conveying Line Baghouse					0.06	0.26						
Nuisance Dust Collector					0.0003	0.0014						
Drum Dryer Drum Fan Hood #1					0.71	3.02						
Drum Dryer Snifter Fan Drum #1					0.02000	0.08520						
Drum Dryer Drum Fan Hood #2					0.71	3.02						
Drum Dryer Snifter Fan Drum #2					0.02000	0.08520						
Drum Dryer Drum Fan Hood #3					0.71	3.02						
Drum Dryer Snifter Fan Drum #3					0.02000	0.08520						
Drum Dryer Drum Fan Hood #4					0.71	3.02						
Drum Dryer Snifter Fan Drum #4					0.02000	0.08520						
Drum Dryer Drum Fan Hood #5					0.71	3.02						
Drum Dryer Snifter Fan Drum #5					0.02000	0.08520						
Drum Dryer Drum Fan Hood #6					0.71	3.02						
Drum Dryer Snifter Fan Drum #6					0.02000	0.08520						
Bubble Sheet Dryer #1					0.71	3.02						
Bubble Sheet Dryer #2					0.00	0.00						
Dehydration Units					1.45	6.18						
Total of Drum Dryer, snifter, Bubble sheet					**5.13**	**21.87**						

	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
TOTAL	11.03	42.59	14.58	54.74	8.27	34.55	0.15	0.58	1.19	4.60	0.00	0.00

Gem State Processing, LLC
Heyburn Facility

TOXIC AIR POLLUTANTS (TAPs) COMBUSTION CALCULATIONS
GEM STATE

Emission Unit	Fuel Usage
Reyco AMU #5 1250	8,823.53 scf/hr
Reyco AMU #6 1250	8,823.53 scf/hr

NON-CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for NG Combustion (lb/10^6 scf)[a]	TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)
Antimony	7440-36-0	0.0E+00	0.00E+00	3.3E-02	No
Barium	7440-39-3	4.4E-03	7.76E-05	3.3E-02	No
Chromium	7440-47-3	1.4E-03	2.47E-05	3.3E-02	No
Cobalt	7440-48-4	8.4E-05	1.48E-06	3.3E-03	No
Copper	7440-50-8	8.5E-04	1.50E-05	6.7E-02	No
Ethylbenzene	100-41-4	0.0E+00	0.00E+00	2.9E+01	No
Fluoride (as F)	16984-48-8	0.0E+00	0.00E+00	1.67E-01	No
Hexane	110-54-3	1.8E+00	3.18E-02	1.2E+01	No
Manganese	7439-96-5	3.8E-04	6.71E-06	3.33E-01	No
Mercury	7439-97-6	2.6E-04	4.59E-06	3.E-03	No
Molybdenum	7439-98-7	1.1E-03	1.94E-05	3.33E-01	No
Naphthalene	91-20-3	6.1E-04	1.08E-05	3.33E+00	No
Pentane	109-66-0	2.6E+00	4.59E-02	1.18E+02	No
Phosphorous	7723-14-0	0.0E+00	0.00E+00	7.E-03	No
Selenium	7782-49-2	2.4E-05	4.24E-07	1.3E-02	No
1,1,1-Trichloroethane	71-55-6	0.0E+00	0.00E+00	1.27E+02	No
Toluene	108-88-3	3.4E-03	6.00E-05	2.5E+01	No
o-Xylene	1330-20-7	0.0E+00	0.00E+00	2.9E+01	No
Zinc	7440-66-6	2.9E-02	5.12E-04	6.67E-01	No

CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for Natural Gas Combustion (lb/10^6 scf)[a]	Max 1-hr TAP Emissions (lb/hr)	Annual Average (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)
Arsenic	7440-38-2	2.0E-04	3.53E-06	2.12E-06	1.5E-06	Yes
Benzene	71-43-2	2.1E-03	3.71E-05	2.23E-05	8.0E-04	No
Beryllium	7440-41-7	1.2E-05	2.12E-07	1.27E-07	2.8E-05	No
Cadmium	7440-43-9	1.1E-03	1.94E-05	1.17E-05	3.7E-06	Yes
Chromium VI	7440-47-3	0.0E+00	0.00E+00	0.00E+00	5.6E-07	No
Formaldehyde	50-00-0	7.5E-02	1.32E-03	7.96E-04	5.1E-04	Yes
Nickel	7440-02-0	2.1E-03	3.71E-05	2.23E-05	2.7E-05	No
Benzo(a)pyrene	50-32-8	1.2E-06	2.12E-08	1.27E-08	2.0E-06	No
Benz(a)anthracene	56-55-3	1.8E-06	3.18E-08	1.91E-08	NA	No
Benzo(b)fluoranthene	205-82-3	1.8E-06	3.18E-08	1.91E-08	NA	No
Benzo(k)fluoranthene	205-99-2	1.8E-06	3.18E-08	1.91E-08	NA	No
Chrysene	218-01-9	1.8E-06	3.18E-08	1.91E-08	NA	No
Dibenzo(a,h)anthracene	53-70-3	1.2E-06	2.12E-08	1.27E-08	NA	No
Indeno(1,2,3-cd)pyrene	193-39-5	1.8E-06	3.18E-08	1.91E-08	NA	No
Total PAHs		1.1E-05	2.01E-07	1.21E-07	2.00E-06	No

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

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

Gem State Processing, LLC
Heyburn Facility

AIR MAKEUP UNITS - EXHAUST STACK EMISSIONS DISTRIBUTION

Area	Emissions Sources	Emissions				
		PM2.5/10 (lb/hr)	PM2.5/10 (tpy)	NOx (lb/hr)	NOx (tpy)	SO2 (lb/hr)
Zone #1	AMU-1	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03
	AMU-2	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03
	AMU-3	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03
	Total	*2.01E-01*	*5.30E-01*	*1.32E+00*	*3.49E+00*	*1.59E-02*
Zone #2	AMU-4	7.45E-02	1.96E-01	4.90E-01	1.29E+00	5.88E-03
	Total	*7.45E-02*	*1.96E-01*	*4.90E-01*	*1.29E+00*	*5.88E-03*
Zone #3	AMU-5	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03
	AMU-6	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03
	Total	*1.34E-01*	*3.53E-01*	*8.82E-01*	*2.33E+00*	*1.06E-02*

Area	Exhaust Stack	Exhaust Flow (acfm)	% of Flow	Emissions								
				PM2.5/10 (lb/hr)	PM2.5/10 (tpy)	NOx (lb/hr)	NOx (tpy)	SO2 (lb/hr)	As (lb/hr)	Cd (lb/hr)	Form (lb/hr)	Ni (lb/hr)
Zone #1	EX-1	24225	0.217889908	4.36E-02	1.16E-01	2.86E-01	7.60E-01	3.46E-03				
	EX-2	24225	0.217889908	4.36E-02	1.16E-01	2.86E-01	7.60E-01	3.46E-03				
	EX-3	24225	0.217889908	4.36E-02	1.16E-01	2.86E-01	7.60E-01	3.46E-03				
	EX-4	7140	0.064220183	1.29E-02	3.40E-02	8.50E-02	2.24E-01	1.02E-03				
	EX-5	7140	0.064220183	1.29E-02	3.40E-02	8.50E-02	2.24E-01	1.02E-03				
	EX-6	24225	0.217889908	4.36E-02	1.16E-01	2.86E-01	7.60E-01	3.46E-03				
	Total	*111180*	*1*	*2.01E-01*	*5.30E-01*	*1.32E+00*	*3.49E+00*	1.59E-02				
Zone #2	EX-7	4000	0.037394011	2.79E-03	7.34E-03	1.83E-02	4.83E-02	2.20E-04				
	EX-8	7000	0.06543952	4.88E-03	1.28E-02	3.21E-02	8.45E-02	3.85E-04				
	EX-9	7000	0.06543952	4.88E-03	1.28E-02	3.21E-02	8.45E-02	3.85E-04				
	EX-10	17281	0.161551478	1.20E-02	3.17E-02	7.92E-02	2.09E-01	9.50E-04				
	EX-11	17281	0.161551478	1.20E-02	3.17E-02	7.92E-02	2.09E-01	9.50E-04				
	EX-12	17281	0.161551478	1.20E-02	3.17E-02	7.92E-02	2.09E-01	9.50E-04				
	EX-13	18563	0.173536258	1.29E-02	3.41E-02	8.51E-02	2.24E-01	1.02E-03				
	EX-14	18563	0.173536258	1.29E-02	3.41E-02	8.51E-02	2.24E-01	1.02E-03				
	Total	*106969*	*1*	*7.45E-02*	*1.96E-01*	*4.90E-01*	*1.29E+00*	5.88E-03				
Zone #3	EX-15	12050	0.166666667	2.24E-02	5.89E-02	1.47E-01	3.88E-01	1.76E-03	3.54E-07	1.95E-06	1.33E-04	3.72E-06
	EX-16	12050	0.166666667	2.24E-02	5.89E-02	1.47E-01	3.88E-01	1.76E-03	3.54E-07	1.95E-06	1.33E-04	3.72E-06
	EX-17	12050	0.166666667	2.24E-02	5.89E-02	1.47E-01	3.88E-01	1.76E-03	3.54E-07	1.95E-06	1.33E-04	3.72E-06
	EX-18	12050	0.166666667	2.24E-02	5.89E-02	1.47E-01	3.88E-01	1.76E-03	3.54E-07	1.95E-06	1.33E-04	3.72E-06
	EX-19	12050	0.166666667	2.24E-02	5.89E-02	1.47E-01	3.88E-01	1.76E-03	3.54E-07	1.95E-06	1.33E-04	3.72E-06
	EX-20	12050	0.166666667	2.24E-02	5.89E-02	1.47E-01	3.88E-01	1.76E-03	3.54E-07	1.95E-06	1.33E-04	3.72E-06
	Total	*72300*	*1*	*1.34E-01*	*3.53E-01*	*8.82E-01*	*2.33E+00*	*1.06E-02*	*2.12E-06*	*1.17E-05*	*7.96E-04*	*2.23E-05*

Gem State Processing, LLC
Heyburn Facility

HAZARDOUS AIR POLLUTANTS (HAPs) COMBUSTION CALCULATIONS
GEM STATE

Emission Unit	Fuel Usage	
Boiler #1[a] (1200 hp)	48,398.00 scf/hr	247,980.35
Boiler #2[a] (1200 hp)	48,398.00 scf/hr	11,764.71
Boiler #3[a] (1600 hp)	64,530.00 scf/hr	259,745.06
Reyco AMU #1 850	8,823.53 scf/hr	
Reyco AMU #2 1000	8,823.53 scf/hr	95.47%
Reyco AMU #3 1000	8,823.53 scf/hr	4.53%
Reyco AMU #4 1250	9,803.92 scf/hr	
Reyco AMU #5 1250	9,803.92 scf/hr	
Reyco AMU #6 1250	9,803.92 scf/hr	
Bubble Sheet Dryer #1	5,882.35 scf/hr	
Bubble Sheet Dryer #2	5,882.35 scf/hr	
Dryer #1 Stage A Stack 1 &	11,052.00 scf/hr	
Dryer #1 Stage B Stack 3	3,747.00 scf/hr	
Dryer #1 Stage C Stack 4	1,174.00 scf/hr	
Dryer #2 Stage A Stack 1 &	11,052.00 scf/hr	
Dryer #2 Stage B Stack 3	3,747.00 scf/hr	

Pollutant	CAS #	EF for NG Combustion (lb/10^6 scf)[a]	HAP Emissions (lb/hr)
Chromium	7440-47-3	1.4E-03	3.64E-04
Cobalt	7440-48-4	8.4E-05	2.18E-05
Hexane	110-54-3	1.8E+00	4.68E-01
Manganese	7439-96-5	3.8E-04	9.87E-05
Mercury	7439-97-6	2.6E-04	6.75E-05
Naphthalene	91-20-3	6.1E-04	1.58E-04
Selenium	7782-49-2	2.4E-05	6.23E-06
Toluene	108-88-3	3.4E-03	8.83E-04
Arsenic	7440-38-2	2.0E-04	5.19E-05
Benzene	71-43-2	2.1E-03	5.45E-04
Beryllium	7440-41-7	1.2E-05	3.12E-06
Cadmium	7440-43-9	1.1E-03	2.86E-04
Formaldehyde	50-00-0	7.5E-02	1.95E-02
Nickel	7440-02-0	2.1E-03	5.45E-04

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

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

Description	Capacity (MMBtu/hr)	Throughput (scf/hr)	Pounds per Hour		
			CO_2 Emissions (lb/hr)	N_2O Emissions (lb/hr)	CH_4 Emissions (lb/hr)
Boiler #1[a] (1200 hp)	49.37	48,398	5807.7120	0.0310	0.1113
Boiler #2[a] (1200 hp)	49.37	48,398	5807.7120	0.0310	0.1113
Boiler #3[a] (1600 hp)	64.53	64,530	7743.6000	0.0413	0.1484
Reyco AMU #1 850	9.0	8,824	1058.8235	0.0194	0.0203
Reyco AMU #2 1000	9.0	8,824	1058.8235	0.0194	0.0203
Reyco AMU #3 1000	9.0	8,824	1058.8235	0.0194	0.0203
Reyco AMU #4 1250	10.0	9,804	1176.4706	0.0216	0.0225
Reyco AMU #5 1250	9.0	8,824	1058.8235	0.0194	0.0203
Reyco AMU #6 1250	9.0	8,824	1058.8235	0.0194	0.0203
Bubble Sheet Dryer #1	7.0	6,863	823.5294	0.0151	0.0158
Bubble Sheet Dryer #2	7.0	6,863	823.5294	0.0151	0.0158
Dryer #1 Stage A Stack 1 & 2[a]	18.0	11,052	1326.2400	0.0071	0.0254
Dryer #1 Stage B Stack 3[a]	6.0	3,747	449.6400	0.0024	0.0086
Dryer #1 Stage C Stack 4[a]	2.2	1,174	140.8800	0.0008	0.0027
Dryer #2 Stage A Stack 1 & 2[a]	18.0	11,052	1326.2400	0.0071	0.0254
Dryer #2 Stage B Stack 3[a]	6.0	3,747	449.6400	0.0024	0.0086
Dryer #2 Stage C Stack 4[a]	2.2	1,174	140.8800	0.0008	0.0027
TOTAL	**284.7**	**260,918.3**	**31,310.2**	**0.27**	**0.60**

[a]The boilers and dehydrators will be equipped with Low NOx Burners; and controlled emissions using emissions factors from AP-42 for N2O emissions from the boilers. Boiler capacity and throughput based on manufacturer specific information

Description	Capacity (MMBtu/hr)	Throughput (MMscf/yr)	Tons per Year			
			CO_2 Emissions (T/yr)[b]	N_2O Emissions (T/yr)[b]	CH_4 Emissions (T/yr)[b]	CO_2e Emission (metric T/yr)[c,d]
Boiler #1[a] (1200 hp)	49.37	412	24740.8531	0.1320	0.4742	22490.59
Boiler #2[a] (1200 hp)	49.37	412	24740.8531	0.1320	0.4742	22490.95
Boiler #3[a] (1600 hp)	64.53	550	32987.7360	0.1759	0.6323	29987.87
Reyco AMU #1 850	9.00	47	2790.2118	0.0827	0.0865	2555.55
Reyco AMU #2 1000	9.00	47	2790.2118	0.0827	0.0865	2555.55
Reyco AMU #3 1000	9.00	47	2790.2118	0.0827	0.0865	2555.55
Reyco AMU #4 1250	10.00	52	3100.2353	0.0919	0.0961	2839.50
Reyco AMU #5 1250	9.00	47	2790.2118	0.0827	0.0865	2555.55
Reyco AMU #6 1250	9.00	47	2790.2118	0.0827	0.0865	2555.55
Bubble Sheet Dryer #1	7.00	58	3508.2353	0.0643	0.0672	3201.53
Bubble Sheet Dryer #2	7.00	58	3508.2353	0.0643	0.0672	3201.53
Dryer #1 Stage A Stack 1 & 2[a]	18.00	94	5649.7824	0.0301	0.1083	5136.00
Dryer #1 Stage B Stack 3[a]	6.00	32	1915.4664	0.0102	0.0367	1741.28
Dryer #1 Stage C Stack 4[a]	2.20	10	600.1488	0.0032	0.0115	545.57
Dryer #2 Stage A Stack 1 & 2[a]	18.00	94	5649.7824	0.0301	0.1083	5136.00
Dryer #2 Stage B Stack 3[a]	6.00	32	1915.4664	0.0102	0.0367	1741.28
Dryer #2 Stage C Stack 4[a]	2.20	10	600.1488	0.0032	0.0115	545.57
TOTAL	**284.7**	**2,047.8**	**122,868.00**	**1.16**	**2.56**	**111,835.44**

[a]The boilers and dehydrators will be equipped with Low NOx Burners; and controlled emissions using emissions factors from AP-42 for N2O emissions from the boilers. Boiler capacity and throughput based on manufacturer specific information

[b]All natural gas combustion units with the execption of AMUs are assumed to opperate 8,520 hours per year as was previously assumed in the last permitting action. AMU's are operational for 5270.4 hr/yr

[c]The greenhouse gas emissions calcuations uses carbon dioxide equivalent in metric tons rather than short tons. Therefore the conversion of 1 short ton equal to 0.90718474 metric tons was applied. This is consistent with EPA guidance and calculation methods.

[d]Note that the global warming potential values used in the CO2e calculation were derived from Table A-1 of the Appendix within Part 98 of the Manadory GHG Reporting Rule.

Proposed Natural Gas Limitation

	lb/MMscf	MMscf/yr	metric T/yr	GWP	CO2e
CO2	120,000	1825	99364.79129	1	99364.79129
N2O Low	0.64		0	298	0
N2O	2.2		1.82168784	298	542.8629764
CH4	2.3		1.904491833	25	47.61229583
					99,955.27

% of Low NOx	0
% of NOx	1

IDEQ PTC Forms
Facility Wide Potential to Emit Emission Inventory

Table 1. POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

Emissions Unit	EU ID #	NSR Pollutant[a]							
		PM	PM-10	PM2.5	CO	Pb	NOx	VOC	SO2
		T/yr[b]	T/yr[b]	T/yr[b]	T/yr[b]	T/yr[b]	T/yr[b]	T/yr[b]	T/yr[b]
Point Sources									
Boiler #1 (1200 hp)	EU-1	0.21	0.21	0.21	8.25	1.03E-04	7.42	0.82	0.11
Boiler #2 (1200 hp)	EU-2	0.21	0.21	0.21	8.25	1.03E-04	7.42	0.82	0.11
Boiler #3 (1600 hp)	EU-3	0.27	0.27	0.27	11.00	1.37E-04	9.90	1.10	0.15
Bubble Sheet Dryer #1	EU-4	3.24	3.24	3.24	2.456	1.46E-05	2.92	0.16	0.02
Bubble Sheet Dryer #2	EU-5	0.22	0.22	0.22	2.456	1.46E-05	2.92	0.16	0.02
Reyco AMU #1 850	EU-6	0.18	0.18	0.18	1.953	1.16E-05	1.16	0.13	0.01
Reyco AMU #2 1000	EU-7	0.18	0.18	0.18	1.953	1.16E-05	1.16	0.13	0.01
Reyco AMU #3 1000	EU-8	0.18	0.18	0.18	1.953	1.16E-05	1.16	0.13	0.01
Reyco AMU #4 1250	EU-9	0.20	0.20	0.20	2.170	1.29E-05	1.29	0.14	0.02
Reyco AMU #5 1250	EU-10	0.18	0.18	0.18	1.953	1.16E-05	1.16	0.13	0.01
Reyco AMU #6 1250	EU-11	0.18	0.18	0.18	1.953	1.16E-05	1.16	0.13	0.01
Wolverine Stage A Stack #1 Dryer1	EU-12	1.61	1.61	1.61	2.238	1.512E-05	1.09	0.17	1.81E-02
Wolverine Stage A Stack #2 Dryer1	EU-13	0.90	0.90	0.90	1.246	8.418E-06	0.61	0.09	1.01E-02
Wolverine Stage B Dryer1	EU-14	0.59	0.59	0.59	1.181	7.981E-06	0.57	0.09	9.58E-03
Wolverine Stage C Dryer1	EU-15	0.51	0.51	0.51	0.370	2.501E-06	0.18	0.03	3.00E-03
Wolverine Stage A Stack #1 Dryer2	EU-16	1.61	1.61	1.61	2.238	1.512E-05	1.09	0.17	1.81E-02
Wolverine Stage A Stack #2 Dryer2	EU-17	0.90	0.90	0.90	1.246	8.418E-06	0.61	0.09	1.01E-02
Wolverine Stage B Dryer2	EU-18	0.59	0.59	0.59	1.181	7.981E-06	0.57	0.09	9.58E-03
Wolverine Stage C Dryer2	EU-19	0.51	0.51	0.51	0.370	2.501E-06	0.18	0.03	3.00E-03
Silo Bin Vent Baghouse #1	EU-20	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Silo Bin Vent Baghouse #2	EU-21	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Silo Bin Vent Baghouse #3	EU-22	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Silo Bin Vent Baghouse #4	EU-23	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Plant Reciever Baghouse #1	EU-24	0.31	0.31	0.31	n/a	n/a	n/a	n/a	n/a
Plant Reciever Baghouse #2	EU-25	0.31	0.31	0.31	n/a	n/a	n/a	n/a	n/a
Plant Reciever Baghouse #3	EU-26	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Plant Reciever Baghouse #4	EU-27	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Plant Reciever Baghouse #5	EU-28	0.31	0.31	0.31	n/a	n/a	n/a	n/a	n/a
Plant Reciever Baghouse #6	EU-29	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Truck Loadout Baghouse	EU-30	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Rail Load Baghouse	EU-31	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Pneumatic Conveying Line	EU-32	0.26	0.26	0.26	n/a	n/a	n/a	n/a	n/a
Nuisance Dust Collector	EU-33	0.001	0.001	0.001	n/a	n/a	n/a	n/a	n/a
Drum Dryer Drum Fan Hood #1	EU-34	3.02	3.02	3.02	n/a	n/a	n/a	n/a	n/a
Drum Dryer Sulfter Fan Drum #1	EU-35	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Drum Dryer Drum Fan Hood #2	EU-36	3.02	3.02	3.02	n/a	n/a	n/a	n/a	n/a
Drum Dryer Sulfter Fan Drum #2	EU-37	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Drum Dryer Drum Fan Hood #3	EU-38	3.02	3.02	3.02	n/a	n/a	n/a	n/a	n/a
Drum Dryer Sulfter Fan Drum #3	EU-39	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Drum Dryer Drum Fan Hood #4	EU-40	3.02	3.02	3.02	n/a	n/a	n/a	n/a	n/a
Drum Dryer Sulfter Fan Drum #4	EU-41	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Drum Dryer Drum Fan Hood #5	EU-42	3.02	3.02	3.02	n/a	n/a	n/a	n/a	n/a
Drum Dryer Sulfter Fan Drum #5	EU-43	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Drum Dryer Drum Fan Hood #6	EU-44	3.02	3.02	3.02	n/a	n/a	n/a	n/a	n/a
Drum Dryer Sulfter Fan Drum #6	EU-45	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Totals*		34.55	34.55	34.55	54.41	0.00	42.59	4.60	0.58

a) NSR Regulated air Pollutants are defined[11] as: Particulate Matter (PM, 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

b)Ton per year emissions based on 5270.4 hours of operation/yr for the AMUs and 8520 hrs/year for all other listed equipment.

* The total shown in the table includes emissions from all four silo bin vents as if each bin vent were operating 8520 hrs/year, when in actuality, only one bin vent will operate at a time.

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

IDEQ PTC Forms
Toxic Air Pollutant Emissions Inventory

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

Non-Carcinogenic Toxic Air Pollutants (sum of all emissions)	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Antimony	0.00E+00	0.00E+00	0.00E+00	3.30E-02	N
Barium	0.00E+00	2.18E-04	2.18E-04	3.30E-02	N
Chromium	0.00E+00	6.94E-05	6.94E-05	3.30E-02	N
Cobalt	0.00E+00	4.17E-06	4.17E-06	3.30E-03	N
Copper	0.00E+00	4.22E-05	4.22E-05	6.70E-02	N
Ethylbenzene	0.00E+00	0.00E+00	0.00E+00	2.90E+01	N
Fluoride (as F)	0.00E+00	0.00E+00	0.00E+00	1.67E-01	N
Hexane	0.00E+00	8.93E-02	8.93E-02	1.20E+01	N
Manganese	0.00E+00	1.88E-05	1.88E-05	3.33E-01	N
Mercury	0.00E+00	1.29E-05	1.29E-05	3.00E-03	N
Molybdenum	0.00E+00	5.46E-05	5.46E-05	3.33E-01	N
Naphthalene	0.00E+00	3.03E-05	3.03E-05	3.33E+00	N
Pentane	0.00E+00	1.29E-01	1.29E-01	1.18E+02	N
Phosphorous	0.00E+00	0.00E+00	0.00E+00	7.00E-03	N
Selenium	0.00E+00	1.19E-06	1.19E-06	1.30E-02	N
1,1,1-Trichloroethane	0.00E+00	0.00E+00	0.00E+00	1.27E+02	N
Toluene	0.00E+00	1.69E-04	1.69E-04	2.50E+01	N
o-Xylene	0.00E+00	0.00E+00	0.00E+00	2.90E+01	N
Zinc	0.00E+00	1.44E-03	1.44E-03	6.67E-01	N

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

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

Carcinogenic Toxic Air Pollutants (sum of all emissions)	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Arsenic	0.00E+00	8.34E-06	8.34E-06	1.50E-06	Y
Benzene	0.00E+00	8.75E-05	8.75E-05	8.00E-04	N
Beryllium	0.00E+00	5.00E-07	5.00E-07	2.80E-05	N
Cadmium	0.00E+00	4.59E-05	4.59E-05	3.70E-06	Y
Chromium VI	0.00E+00	0.00E+00	0.00E+00	5.60E-07	N
Formaldehyde	0.00E+00	3.13E-03	3.13E-03	5.10E-04	Y
Nickel	0.00E+00	8.75E-05	8.75E-05	2.70E-05	Y
Benzo(a)pyrene	0.00E+00	5.00E-08	5.00E-08	2.00E-06	N
Benz(a)anthracene	0.00E+00	7.50E-08	7.50E-08	NA	N
Benzo(b)fluoranthene	0.00E+00	7.50E-08	7.50E-08	NA	N
Benzo(k)fluoranthene	0.00E+00	7.50E-08	7.50E-08	NA	N
Chrysene	0.00E+00	7.50E-08	7.50E-08	NA	N
Dibenzo(a,h)anthracene	0.00E+00	5.00E-08	5.00E-08	NA	N
Indeno(1,2,3-cd)pyrene	0.00E+00	7.50E-08	7.50E-08	NA	N
Total PAHs	0.00E+00	4.75E-07	4.75E-07	2.00E-06	N

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

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

Gem State Processing, LLC
Heyburn Facility

IDEQ PTC Forms
Facility Wide Hazardous Air Pollutant Potential to Emit

Table 1 HAP POTENTIAL TO EMIT EMISSIONS SUMMARY

HAP Pollutants	PTE (T/yr)
Benzene	**1.32E-04**
Formaldehyde	**4.70E-03**
Hexane*	**1.13E-01**
Naphthalene	**3.82E-05**
Toluene	**2.13E-04**
Arsenic Compounds	**1.25E-05**
Beryllium Compounds	**7.52E-07**
Cadmium Compounds	**6.89E-05**
Chromium Compounds	**8.77E-05**
Cobalt Compounds	**5.26E-06**
Manganese Compounds	**2.38E-05**
Mercury Compounds	**1.63E-05**
Nickel Compounds	**1.32E-04**
Selenium Compounds	**1.50E-06**
Total	1.18E-01

* Maximum Individual HAP

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

CRITERIA EMISSIONS - NATURAL GAS COMBUSTION

Emission Factors

NOx	0.036	lb/MMBtu	Manufacturer specific emission factor for Winnox low NOx burners (WX0300,WX0200, WX0100, WX0050)
CO	0.074	lb/MMBtu	Manufacturer specific emission factor for burners
PM-10	7.6	lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6	lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5	lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005	lb/10^6 scf	AP-42, Table 1.4-2, 1998

			Pounds per Hour					
Description[a]	Capacity (MMBtu/hr)	Throughput (scf/hr)	NOx Emissions (lb/hr)	CO Emissions (lb/hr)	PM-2.5/10 Emissions (lb/hr)	SOx Emissions (lb/hr)	VOC Emissions (lb/hr)	Lead Emissions (lb/hr)
Stage A - Zone 1 Burner #1	3.0	2,137	0.1080	0.2220	0.0162	0.0013	0.0118	0.0000011
Stage A - Zone 1 Burner #2	3.0	2,137	0.1080	0.2220	0.0162	0.0013	0.0118	0.0000011
Stage A - Zone 2 Burner #1	2.0	1,413	0.0720	0.1480	0.0107	0.0008	0.0078	0.0000007
Stage A - Zone 2 Burner #2	2.0	1,413	0.0720	0.1480	0.0107	0.0008	0.0078	0.0000007
Stage A - Zone 3 Burner #1	2.0	926	0.0720	0.1480	0.0070	0.0006	0.0051	0.0000005
Stage A - Zone 3 Burner #2	2.0	926	0.0720	0.1480	0.0070	0.0006	0.0051	0.0000005
Stage A - Zone 4 Burner #1	2.0	1,050	0.0720	0.1480	0.0080	0.0006	0.0058	0.0000005
Stage A - Zone 4 Burner #2	2.0	1,050	0.0720	0.1480	0.0080	0.0006	0.0058	0.0000005
Stage B - Zone 1 Burner #1	1.0	817	0.0360	0.0740	0.0062	0.0005	0.0045	0.0000004
Stage B - Zone 1 Burner #2	1.0	817	0.0360	0.0740	0.0062	0.0005	0.0045	0.0000004
Stage B - Zone 1 Burner #3	1.0	817	0.0360	0.0740	0.0062	0.0005	0.0045	0.0000004
Stage B - Zone 2 Burner #1	1.0	432	0.0360	0.0740	0.0033	0.0003	0.0024	0.0000002
Stage B - Zone 2 Burner #2	1.0	432	0.0360	0.0740	0.0033	0.0003	0.0024	0.0000002
Stage B - Zone 2 Burner #3	1.0	432	0.0360	0.0740	0.0033	0.0003	0.0024	0.0000002
Stage C - Zone 1 Burner #1	0.55	380	0.0198	0.0407	0.0029	0.0002	0.0021	0.0000002
Stage C - Zone 1 Burner #2	0.55	380	0.0198	0.0407	0.0029	0.0002	0.0021	0.0000002
Stage C - Zone 2 Burner #1	0.55	207	0.0198	0.0407	0.0016	0.0001	0.0011	0.0000001
Stage C - Zone 2 Burner #2	0.55	207	0.0198	0.0407	0.0016	0.0001	0.0011	0.0000001
TOTAL	**26.2**	**16,973.0**	**9.43E-01**	**1.94E+00**	**1.21E-01**	**9.58E-03**	**8.79E-02**	**7.99E-06**

[a]Utilize Low NOx Burners

CRITERIA EMISSIONS - NATURAL GAS COMBUSTION - NONPAREIL

Emission Factors

NOx	0.036	lb/MMBtu	Manufacturer specific emission factor for Winnox low NOx burners (WX0300,WX0200, WX0100, WX0050)
CO	0.074	lb/MMBtu	Manufacturer specific emission factor for burners
PM-10	7.6	lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6	lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5	lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005	lb/10^6 scf	AP-42, Table 1.4-2, 1998

			Ton per Year					
Description	Capacity (MMBtu/hr)	Throughput (scf/yr)	NOx Emissions (T/yr)	CO Emissions (T/yr)	PM-2.5/10 Emissions (lb/hr)	SOx Emissions (T/yr)	VOC Emissions (T/yr)	Lead Emissions (T/yr)
Stage A - Zone 1 Burner #1	25560	18,207,240	0.46	0.95	0.07	0.01	0.05	0.00
Stage A - Zone 1 Burner #2	25560	18,207,240	0.46	0.95	0.07	0.01	0.05	0.00
Stage A - Zone 2 Burner #1	17040	12,038,760	0.31	0.63	0.05	0.00	0.03	0.00
Stage A - Zone 2 Burner #2	17040	12,038,760	0.31	0.63	0.05	0.00	0.03	0.00
Stage A - Zone 3 Burner #1	17040	7,889,520	0.31	0.63	0.03	0.00	0.02	0.00
Stage A - Zone 3 Burner #2	17040	7,889,520	0.31	0.63	0.03	0.00	0.02	0.00
Stage A - Zone 4 Burner #1	17040	8,946,000	0.31	0.63	0.03	0.00	0.02	0.00
Stage A - Zone 4 Burner #2	17040	8,946,000	0.31	0.63	0.03	0.00	0.02	0.00
Stage B - Zone 1 Burner #1	8520	6,960,840	0.15	0.32	0.03	0.00	0.02	0.00
Stage B - Zone 1 Burner #2	8520	6,960,840	0.15	0.32	0.03	0.00	0.02	0.00
Stage B - Zone 1 Burner #3	8520	6,960,840	0.15	0.32	0.03	0.00	0.02	0.00
Stage B - Zone 2 Burner #1	8520	3,680,640	0.15	0.32	0.01	0.00	0.01	0.00
Stage B - Zone 2 Burner #2	8520	3,680,640	0.15	0.32	0.01	0.00	0.01	0.00
Stage B - Zone 2 Burner #3	8520	3,680,640	0.15	0.32	0.01	0.00	0.01	0.00
Stage C - Zone 1 Burner #1	4686	3,237,600	0.08	0.17	0.01	0.00	0.01	0.00
Stage C - Zone 1 Burner #2	4686	3,237,600	0.08	0.17	0.01	0.00	0.01	0.00
Stage C - Zone 2 Burner #1	4686	1,763,640	0.08	0.17	0.01	0.00	0.00	0.00
Stage C - Zone 2 Burner #2	4686	1,763,640	0.08	0.17	0.01	0.00	0.00	0.00
TOTAL	**223,224.0**	**136,089,960.0**	**4.0**	**8.3**	**5.2E-01**	**4.1E-02**	**3.8E-01**	**3.4E-05**

Ton per year emissions based on 8,520 hours of operation/yr

CRITERIA EMISSIONS - NATURAL GAS COMBUSTION

Emission Factors

NOx	0.036 lb/MMBtu	Manufacturer specific emission factor for Winnox low NOx burners (WX0300,WX0200, WX0100, WX0050)
CO	0.074 lb/MMBtu	Manufacturer specific emission factor for burners
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description*	Capacity (MMBtu/hr)	Throughput (scf/hr)	Pounds per Hour					
			NOx Emissions (lb/hr)*	CO Emissions (lb/hr)	PM-2.5/10 Emissions (lb/hr)	SOx Emissions (lb/hr)	VOC Emissions (lb/hr)	Lead Emissions (lb/hr)
Dryer #1 Stage A Stack 1 & 2	10.0	11,052	0.3979	0.8178	0.0840	0.0066	0.0608	0.0000055
Dryer #1 Stage B Stack 3	5.0	3,747	0.1349	0.2773	0.0285	0.0022	0.0206	0.0000019
Dryer #1 Stage C Stack 4	1.2	1,174	0.0423	0.0869	0.0089	0.0007	0.0065	0.0000006
Dryer #2 Stage A Stack 1 & 2	10.0	11,052	0.3979	0.8178	0.0840	0.0066	0.0608	0.0000055
Dryer #2 Stage B Stack 3	5.0	3,747	0.1349	0.2773	0.0285	0.0022	0.0206	0.0000019
Dryer #2 Stage C Stack 4	1.2	1,174	0.0423	0.0869	0.0089	0.0007	0.0065	0.0000006
TOTAL	62.4	31,948.0	1.15	2.36	2.43E-01	1.92E-02	1.76E-01	1.60E-06

*Utilize Low NOx Burners

†Eclipse manufacturer assumes 1000 Btu/scf

NOx lb/hr Stack 1	NOx lb/hr Stack 2	NOx tpy Stack 1	NOx tpy Stack 2	SO2 lb/hr Stack 1	SO2 lb/hr Stack 2
0.256	0.142	1.09	0.61	0.0043	0.002371

CRITERIA EMISSIONS - NATURAL GAS COMBUSTION - TON/YR

Emission Factors

NOx	0.036 lb/MMBtu	Manufacturer specific emission factor for Winnox low NOx burners (WX0300,WX0200,
CO	0.074 lb/MMBtu	Manufacturer specific emission factor for burners
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description	Capacity (MMBtu/hr)	Throughput (scf/Dry)	Ton per Year					
			NOx Emissions (T/yr)	CO Emissions (T/yr)	PM-2.5/10 Emissions (T/yr)	SOx Emissions (T/yr)	VOC Emissions (T/yr)	Lead Emissions (T/yr)
Dryer #1 Stage A Stack 1 & 2	153360	84,153,040	1.69	3.48	0.36	0.03	0.26	0.00
Dryer #1 Stage B Stack 3	61120	31,824,440	0.57	1.18	0.12	0.01	0.09	0.00
Dryer #1 Stage C Stack 4	18744	10,002,480	0.18	0.37	0.04	0.00	0.03	0.00
Dryer #2 Stage A Stack 1 & 2	153360	84,153,040	1.69	3.48	0.36	0.03	0.26	0.00
Dryer #2 Stage B Stack 3	61120	31,824,440	0.57	1.18	0.12	0.01	0.09	0.00
Dryer #2 Stage C Stack 4	18744	10,002,480	0.18	0.37	0.04	0.00	0.03	0.00
TOTAL	448,424.0	273,179,920.0	4.9	10.1	1.06E+00	8.25E-02	7.6E-01	6.8E-06

Ton per year emissions based on 8,520 hours of operation/yr

UNCONTROLLED PROCESS PARTICULATE EMISSIONS - DRYERS

Description	Throughput (lb/hr dry)	Emission Factor (lb PM/lb dry throughput)	EF Reference	PM Emissions (lb/hr)	PM Emissions (T/yr)*	PM-10 Emissions (lb/hr)	PM-10 Emissions (T/yr)*	PM-2.5 Emissions (lb/hr)	PM-2.5 Emissions (T/yr)*
Dryer #1 Stage A Stack 1 & 2	902.8	4.85E-04	Similar equipment source test	0.50	2.15	0.50	2.15	0.50	2.15
Dryer #1 Stage B Stack 3	902.8	1.02E-04	Similar equipment source test	0.111	0.47211	0.11083	0.47211	0.11083	0.47211
Dryer #1 Stage C Stack 4	902.8	1.02E-04	Similar equipment source test	0.111	0.47	0.11	0.47	0.11	0.47
Dryer #2 Stage A Stack 1 & 2	902.8	4.85E-04	Similar equipment source test	0.504	2.14568	0.50375	2.14568	0.50375	2.14568
Dryer #2 Stage B Stack 3	902.8	1.02E-04	Similar equipment source test	0.111	0.47	0.11	0.47	0.11	0.47
Dryer #2 Stage C Stack 4	902.8	1.02E-04	Similar equipment source test	0.111	0.47211	0.11083	0.47211	0.11083	0.47211
TOTAL*						1.45	6.18	1.45	6.18

* Ton per year emissions based on 8,520 hours of operation/yr

A safety factor of 20% has been added to the lb/hr emissions to account for differences in the Wolverine dryer and the source tested dryers.

COMBINED COMBUSTION AND PROCESS PARTICULATE EMISSIONS - DRYERS

Description	PM Emissions (lb/hr)	PM Emissions (T/yr)*	PM-10 Emissions (lb/hr)	PM-10 Emissions (T/yr)*	PM-2.5 Emissions (lb/hr)	PM-2.5 Emissions (T/yr)*
Dryer #1 Stage A Stack 1 & 2	0.59	2.50	0.59	2.50	0.59	2.50
Dryer #1 Stage B Stack 3	0.14	0.59	0.14	0.59	0.14	0.59
Dryer #1 Stage C Stack 4	0.12	0.51	0.12	0.51	0.12	0.51
Dryer #2 Stage A Stack 1 & 2	0.59	2.50	0.59	2.50	0.59	2.50
Dryer #2 Stage B Stack 3	0.14	0.59	0.14	0.59	0.14	0.59
Dryer #2 Stage C Stack 4	0.12	0.51	0.12	0.51	0.12	0.51
TOTAL*	1.7	7.2	1.7	7.2	1.7	7.2

PM 2.5 lb/hr Stack 1	PM 2.5 lb/hr Stack 2	PM 2.5 tpy Stack 1	PM2.5 tpy Stack 2
0.35	0.21	1.01	0.90

CRITERIA EMISSIONS - NATURAL GAS COMBUSTION

Emission Factors

NOx	0.035 lb/MMBtu	Manufacturer specific emission factor for burners
CO	0.082 lb/MMBtu	AP-42, Table 1.4-2, 1998, conversion using 1,020 btu/scf
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description*	Capacity (MMBtu/hr)	Throughput (scf/hr)	Pounds per Hour					
			NOx Emissions (lb/hr)	CO Emissions (lb/hr)	PM-2.5/10 Emissions (lb/hr)	SOx Emissions (lb/hr)	VOC Emissions (lb/hr)	Lead Emissions (lb/hr)
Dryer #1 Stage A Stack 1	10.2	9,951	0.3654	0.8323	0.0756	0.0060	0.0547	0.0000050
Dryer #1 Stage B Stack 2	3.2	3,098	0.1134	0.2583	0.0235	0.0019	0.0170	0.0000016
Dryer #1 Stage C Stack 3	1.3	1,276	0.0468	0.1066	0.0097	0.0008	0.0070	0.0000006
Dryer #1 Stage D Stack 3	0.3	284	0.0104	0.0238	0.0022	0.0002	0.0016	0.0000001
Dryer #2 Stage A Stack 1	10.2	9,951	0.3654	0.8323	0.0756	0.0060	0.0547	0.0000050
Dryer #2 Stage B Stack 2	3.2	3,098	0.1134	0.2583	0.0235	0.0019	0.0170	0.0000016
Dryer #2 Stage C Stack 3	1.3	1,275	0.0468	0.1066	0.0097	0.0008	0.0070	0.0000006
Dryer #2 Stage D Stack 3	0.3	284	0.0104	0.0238	0.0022	0.0002	0.0016	0.0000001
TOTAL	29.8	29,196.1	1.07	2.44	2.22E-01	1.75E-02	1.61E-01	1.46E-05

*Utilize Low NOx Burners

CRITERIA EMISSIONS - NATURAL GAS COMBUSTION - TON/YR

Emission Factors

NOx	0.030 lb/MMBtu	Manufacturer specific emission factor for Winnox low NOx burners (WX0300,WX0200,
CO	0.074 lb/MMBtu	Manufacturer specific emission factor for burners
PM-10	7.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
SOx	0.6 lb/10^6 scf	AP-42, Table 1.4-2, 1998
VOC	5.5 lb/10^6 scf	AP-42, Table 1.4-2, 1998
Lead	0.0005 lb/10^6 scf	AP-42, Table 1.4-2, 1998

Description	Capacity (MMBtu/hr)	Throughput (scf/yr)	Ton per Year					
			NOx Emissions (T/yr)	CO Emissions (T/yr)	PM-2.5/10 Emissions (T/yr)	SOx Emissions (T/yr)	VOC Emissions (T/yr)	Lead Emissions (T/yr)
Dryer #1 Stage A Stack 1	89478	84,782,353	1.58	3.56	0.32	0.03	0.23	0.00
Dryer #1 Stage B Stack 2	28838	28,311,765	0.48	1.10	0.10	0.01	0.07	0.00
Dryer #1 Stage C Stack 3	11078	10,658,824	0.20	0.45	0.04	0.00	0.03	0.00
Dryer #1 Stage D Stack 3	2470.6	2,422,353	0.04	0.10	0.01	0.00	0.01	0.00
Dryer #2 Stage A Stack 1	89478	84,782,353	1.58	3.56	0.32	0.03	0.23	0.00
Dryer #2 Stage B Stack 2	28838	28,311,765	0.48	1.10	0.10	0.01	0.07	0.00
Dryer #2 Stage C Stack 3	11078	10,658,824	0.20	0.45	0.04	0.00	0.03	0.00
Dryer #2 Stage D Stack 3	2470.6	2,422,353	0.04	0.10	0.01	0.00	0.01	0.00
TOTAL	263,725.6	249,750,588.2	4.67E+00	1.04E+01	9.45E-01	7.46E-02	6.84E-01	6.22E-05

Ton per year emissions based on 8,520 hours of operation/yr

SO2 lb/hr Stack 3	NOx lb/hr Stack 3	NOx tpy Stack 3
0.0009	0.057	0.244

UNCONTROLLED PROCESS PARTICULATE EMISSIONS - DRYERS

Description	Throughput (lb/hr dry)	Emission Factor (lb PM/lb dry throughput)	EF Reference	PM Emissions (lb/hr)	PM Emissions (T/yr) *	PM-10 Emissions (lb/hr)	PM-10 Emissions (T/yr) *	PM-2.5 Emissions (lb/hr)	PM-2.5 Emissions (T/yr) *
Dryer #1 Stage A Stack 1	677.1	4.85E-04	Similar equipment source test	0.38	1.61	0.38	1.61	0.38	1.61
Dryer #1 Stage B Stack 2	677.1	1.02E-04	Similar equipment source test	0.083	0.35408	0.08312	0.35408	0.08312	0.35408
Dryer #1 Stage C Stack 3	677.1	1.02E-04	Similar equipment source test	0.083	0.35	0.08	0.35	0.08	0.35
Dryer #1 Stage D Stack 3	677.1	1.02E-04	Similar equipment source test	0.083	0.35	0.08	0.35	0.08	0.35
Dryer #2 Stage A Stack 1	677.1	4.85E-04	Similar equipment source test	0.378	1.61	0.38	1.61	0.38	1.61
Dryer #2 Stage B Stack 2	677.1	1.02E-04	Similar equipment source test	0.083	0.35	0.08	0.35	0.08	0.35
Dryer #2 Stage C Stack 3	677.1	1.02E-04	Similar equipment source test	0.083	0.35	0.08	0.35	0.08	0.35
Dryer #2 Stage D Stack 3	677.1	1.02E-04	Similar equipment source test	0.083	0.35	0.08	0.35	0.08	0.35
TOTAL*				1.25	5.34	1.25	5.31	1.25	6.34

* Ton per year emissions based on 8,520 hours of operation/yr
A safety factor of 20% has been added to the lb/hr emissions to account for differences in the Wolverine dryer and the source tested dryers.

COMBINED COMBUSTION AND PROCESS PARTICULATE EMISSIONS - DRYERS

Description	PM Emissions (lb/hr)	PM Emissions (T/yr) *	PM-10 Emissions (lb/hr)	PM-10 Emissions (T/yr) *	PM-2.5 Emissions (lb/hr)	PM-2.5 Emissions (T/yr) *
Dryer #1 Stage A Stack 1	0.45	1.93	0.45	1.93	0.45	1.93
Dryer #1 Stage B Stack 2	0.11	0.45	0.11	0.45	0.11	0.45
Dryer #1 Stage C Stack 3	0.09	0.40	0.09	0.40	0.09	0.40
Dryer #1 Stage D Stack 3	0.09	0.38	0.09	0.38	0.09	0.38
Dryer #2 Stage A Stack 1	0.45	1.93	0.45	1.93	0.45	1.93
Dryer #2 Stage B Stack 2	0.11	0.45	0.11	0.45	0.11	0.45
Dryer #2 Stage C Stack 3	0.09	0.40	0.09	0.40	0.09	0.40
Dryer #2 Stage D Stack 3	0.09	0.38	0.09	0.38	0.09	0.38
TOTAL*	1.48	6.29	1.48	6.29	1.48	6.29

PM 2.5 lb/hr Stack 3	PM 2.5 tpy Stack 3
0.18	0.78

TOXIC AIR POLLUTANTS (TAPs) COMBUSTION CALCULATIONS
GEM STATE

Emission Unit	Fuel Usage
Dryer #1 Stage A Stack 1 & 2	11,052.00 scf/hr
Dryer #1 Stage B Stack 3	3,747.00 scf/hr
Dryer #1 Stage C Stack 4	1,174.00 scf/hr
Dryer #2 Stage A Stack 1 & 2	11,052.00 scf/hr
Dryer #2 Stage B Stack 3	3,747.00 scf/hr
Dryer #2 Stage C Stack 4	1,174.00 scf/hr

NON-CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for NG Combustion (lb/10^6 scf)[a]	TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)
Antimony	7440-36-0	0.0E+00	0.00E+00	3.3E-02	No
Barium	7440-39-3	4.4E-03	1.41E-04	3.3E-02	No
Chromium	7440-47-3	1.4E-03	4.47E-05	3.3E-02	No
Cobalt	7440-48-4	8.4E-05	2.68E-06	3.3E-03	No
Copper	7440-50-8	8.5E-04	2.72E-05	6.7E-02	No
Ethylbenzene	100-41-4	0.0E+00	0.00E+00	2.9E+01	No
Fluoride (as F)	16984-48-8	0.0E+00	0.00E+00	1.67E-01	No
Hexane	110-54-3	1.8E+00	5.75E-02	1.2E+01	No
Manganese	7439-96-5	3.8E-04	1.21E-05	3.33E-01	No
Mercury	7439-97-6	2.6E-04	8.31E-06	3.E-03	No
Molybdenum	7439-98-7	1.1E-03	3.51E-05	3.33E-01	No
Naphthalene	91-20-3	6.1E-04	1.95E-05	3.33E+00	No
Pentane	109-66-0	2.6E+00	8.31E-02	1.18E+02	No
Phosphorous	7723-14-0	0.0E+00	0.00E+00	7.E-03	No
Selenium	7782-49-2	2.4E-05	7.67E-07	1.3E-02	No
1,1,1-Trichloroethane	71-55-6	0.0E+00	0.00E+00	1.27E+02	No
Toluene	108-88-3	3.4E-03	1.09E-04	2.5E+01	No
o-Xylene	1330-20-7	0.0E+00	0.00E+00	2.9E+01	No
Zinc	7440-66-6	2.9E-02	9.26E-04	6.67E-01	No

CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for Natural Gas Combustion (lb/10^6 scf)[a]	Max TAP Emissions (lb/hr)	Annual Avg TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)
Arsenic	7440-38-2	2.0E-04	6.39E-06	6.21E-06	1.5E-06	Yes
Benzene	71-43-2	2.1E-03	6.71E-05	6.52E-05	8.0E-04	No
Beryllium	7440-41-7	1.2E-05	3.83E-07	3.73E-07	2.8E-05	No
Cadmium	7440-43-9	1.1E-03	3.51E-05	3.42E-05	3.7E-06	Yes
Chromium VI	7440-47-3	0.0E+00	0.00E+00	0.00E+00	5.6E-07	No
Formaldehyde	50-00-0	7.5E-02	2.40E-03	2.33E-03	5.1E-04	Yes
Nickel	7440-02-0	2.1E-03	6.71E-05	6.52E-05	2.7E-05	Yes
Benzo(a)pyrene	50-32-8	1.2E-06	3.83E-08	3.73E-08	2.0E-06	No
Benz(a)anthracene	56-55-3	1.8E-06	5.75E-08	5.59E-08	NA	No
Benzo(b)fluoranthene	205-82-3	1.8E-06	5.75E-08	5.59E-08	NA	No
Benzo(k)fluoranthene	205-99-2	1.8E-06	5.75E-08	5.59E-08	NA	No
Chrysene	218-01-9	1.8E-06	5.75E-08	5.59E-08	NA	No
Dibenzo(a,h)anthracene	53-70-3	1.2E-06	3.83E-08	3.73E-08	NA	No
Indeno(1,2,3-cd)pyrene	193-39-5	1.8E-06	5.75E-08	5.59E-08	NA	No
Total PAHs		1.1E-05	3.64E-07	3.54E-07	2.00E-06	No

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

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

Dryer #1 Stage A Stack 1 & 2	Dryer #1 Stage B Stack 3	Dryer #1 Stage C Stack 4	Dryer #2 Stage A Stack 1 & 2	Dryer #2 Stage B Stack 3	Dryer #2 Stage C Stack 4
2.15E-06	7.29E-07	2.28E-07	2.15E-06	7.29E-07	2.28E-07
1.18E-05	4.01E-06	1.26E-06	1.18E-05	4.01E-06	1.26E-06
8.06E-04	2.73E-04	8.56E-05	8.06E-04	2.73E-04	8.56E-05
2.26E-05	7.65E-06	2.40E-06	2.26E-05	7.65E-06	2.40E-06

Stack 1	Stack 2
1.38E-06	7.69E-07
7.60E-06	4.23E-06
5.18E-04	2.88E-04
1.45E-05	8.07E-06

TOXIC AIR POLLUTANTS (TAPs) COMBUSTION CALCULATIONS
GEM STATE

Emission Unit	Fuel Usage
Dryer #1 Stage A Stack 1	9,950.98 scf/hr
Dryer #1 Stage B Stack 2	3,088.24 scf/hr
Dryer #1 Stage C Stack 3	1,274.51 scf/hr
Dryer #1 Stage D Stack 3	284.31 scf/hr
Dryer #2 Stage A Stack 1	9,950.98 scf/hr
Dryer #2 Stage B Stack 2	3,088.24 scf/hr
Dryer #2 Stage C Stack 3	1,274.51 scf/hr
Dryer #2 Stage D Stack 3	284.31 scf/hr

NON-CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for NG Combustion (lb/10^6 scf)[a]	TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)
Antimony	7440-36-0	0.0E+00	0.00E+00	3.3E-02	No
Barium	7440-39-3	4.4E-03	1.28E-04	3.3E-02	No
Chromium	7440-47-3	1.4E-03	4.09E-05	3.3E-02	No
Cobalt	7440-48-4	8.4E-05	2.45E-06	3.3E-03	No
Copper	7440-50-8	8.5E-04	2.48E-05	6.7E-02	No
Ethylbenzene	100-41-4	0.0E+00	0.00E+00	2.9E+01	No
Fluoride (as F)	16984-48-8	0.0E+00	0.00E+00	1.67E-01	No
Hexane	110-54-3	1.8E+00	5.26E-02	1.2E+01	No
Manganese	7439-96-5	3.8E-04	1.11E-05	3.33E-01	No
Mercury	7439-97-6	2.6E-04	7.59E-06	3.E-03	No
Molybdenum	7439-98-7	1.1E-03	3.21E-05	3.33E-01	No
Naphthalene	91-20-3	6.1E-04	1.78E-05	3.33E+00	No
Pentane	109-66-0	2.6E+00	7.59E-02	1.18E+02	No
Phosphorous	7723-14-0	0.0E+00	0.00E+00	7.E-03	No
Selenium	7782-49-2	2.4E-05	7.01E-07	1.3E-02	No
1,1,1-Trichloroethane	71-55-6	0.0E+00	0.00E+00	1.27E+02	No
Toluene	108-88-3	3.4E-03	9.93E-05	2.5E+01	No
o-Xylene	1330-20-7	0.0E+00	0.00E+00	2.9E+01	No
Zinc	7440-66-6	2.9E-02	8.47E-04	6.67E-01	No

CARCINOGENS (POUNDS PER HOUR)

Pollutant	CAS #	EF for Natural Gas Combustion (lb/10^6 scf)[a]	Max TAP Emissions (lb/hr)	Annual Avg TAP Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)
Arsenic	7440-38-2	2.0E-04	5.84E-06	5.68E-06	1.5E-06	Yes
Benzene	71-43-2	2.1E-03	6.13E-05	5.96E-05	8.0E-04	No
Beryllium	7440-41-7	1.2E-05	3.50E-07	3.41E-07	2.8E-05	No
Cadmium	7440-43-9	1.1E-03	3.21E-05	3.12E-05	3.7E-06	Yes
Chromium VI	7440-47-3	0.0E+00	0.00E+00	0.00E+00	5.6E-07	No
Formaldehyde	50-00-0	7.5E-02	2.19E-03	2.13E-03	5.1E-04	Yes
Nickel	7440-02-0	2.1E-03	6.13E-05	5.96E-05	2.7E-05	Yes
Benzo(a)pyrene	50-32-8	1.2E-06	3.50E-08	3.41E-08	2.0E-06	No
Benz(a)anthracene	56-55-3	1.8E-06	5.26E-08	5.11E-08	NA	No
Benzo(b)fluoranthene	205-82-3	1.8E-06	5.26E-08	5.11E-08	NA	No
Benzo(k)fluoranthene	205-99-2	1.8E-06	5.26E-08	5.11E-08	NA	No
Chrysene	218-01-9	1.8E-06	5.26E-08	5.11E-08	NA	No
Dibenzo(a,h)anthracene	53-70-3	1.2E-06	3.50E-08	3.41E-08	NA	No
Indeno(1,2,3-cd)pyrene	193-39-5	1.8E-06	5.26E-08	5.11E-08	NA	No
Total PAHs		1.1E-05	3.33E-07	3.24E-07	2.00E-06	No

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

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

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: February 27, 2015

TO: Dan Pitman, P.E., Permit Writer, Air Program

FROM: Darrin Mehr, Analyst, Air Program

PROJECT: P-2010.0183 PROJ 61406 - PTC Modification Application for the Gem State Processing, LLC Permit to Construct – Installation of Two Dehydration Lines and Stack Configuration Alterations to their Potato Processing Facility in Heyburn, Idaho

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

1.0 Summary

On August 4, 2014, Gem State Processing, LLC (Gem State) submitted a Permit to Construct (PTC) application to revise their current Permit to Construct (PTC), P-2010.0183, for their potato processing facility, located in Heyburn, Idaho, in Minidoka County. There are two primary purposes of this application: 1) to add two new potato dehydration lines, air makeup units, and the structure to house them; and, 2) to modify the physical characteristics of certain exhaust stacks that are addressed in enforceable permit conditions developed for the $PM_{2.5}$ NAAQS compliance demonstration PTC, issued per the requirements of Consent Order E-2010.0040. PTC P-2008.0183, Project 61247 was issued February 21, 2014. $PM_{2.5}$ NAAQS compliance will be established using alternative methods, namely installing seven individual stacks with a 100 feet release height. Six individual stacks will handle the exhaust streams from the drum fan hoods and snifter vents, such that each drum dryer and snifter vent will have its own common exhaust stack. In addition, the Bubble Sheet Dryer #1 / Agglomerator stack height will be increased to 100 feet above grade with an equivalent exit diameter of no greater than 2.67 feet. Provided NAAQS compliance is demonstrated, the Department approves the use of the alternative compliance method.

On October 22, 2014 Gem State Processing provided formal notice that the Buhler design dehydration units were dropped from this project. The permit application will address the installation of two Wolverine brand dehydration lines.

Project-specific air quality impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the identified project were submitted to DEQ to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and 203.03 [Idaho Air Rules Section 203.02 and 203.03]). Stantec Consulting Services, Inc. (Stantec), Gem State's permitting consultant, submitted the analyses and applicable information and data enabling DEQ to evaluate potential impacts to ambient air.

Stantec performed project-specific air quality impact analyses to demonstrate compliance of the facility with air quality standards. The DEQ review summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the pollutant dispersion modeling analyses used to demonstrate that the estimated emissions associated with operation of the facility as modified will not cause or significantly contribute to a violation of the applicable air quality standards. This review did not evaluate

compliance with other rules or analyses that do not pertain to the air impact analyses. This modeling review also did not evaluate the accuracy of emissions estimates. Evaluation of emissions estimates was the responsibility of the permit writer and is addressed in the main body of the DEQ Statement of Basis. The submitted air quality impact analyses: 1) utilized appropriate methods and models according to established DEQ/EPA rules, policies, guidance, and procedures; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emissions estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the facility as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from applicable emissions associated with the project as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable National Ambient Air Quality Standards (NAAQS) at ambient air locations where and when the project has a significant impact; 5) showed that Toxic Air Pollutant (TAP) emissions increases associated with the project do not result in increased ambient air impacts exceeding allowable TAP increments. Table 1 presents key assumptions and results to be considered in the development of the permit.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Each drum dryer processing line consists of a drum fan hood (DFH#1 – DFH#6) and snifter (SFD#1 – SFD#6). Each line's two existing point source stacks were combined into a single stack (current model ID DFH#1-DF#6). Each of these six separate stacks was represented with a stack height of 100.0 feet above grade and an exit diameter of 3.5 feet with a release point that is vertical and uninterrupted. The emission unit identified as bubble sheet dryer #1 (PRE1) was represented with a vertical and uninterrupted release at a height of 100 feet and an exit diameter of 2.67 feet.	These changes were necessary to enable $PM_{2.5}$ NAAQS compliance. It is critical to compliance that such changes are made as described in the application. Exit diameters should not be larger than the listed values, without additional analyses being approved, because exit velocity is reduced as exit diameter is increased.
New emissions units for this project: Two Air Makeup Units (Model IDs AMU #5 and AMU #6) and will vent through 6 new exhaust stacks. Each of these exhaust vent stacks were assumed to terminate vertically and uninterrupted at a height of 4 feet above roofline of the new structure addition.	Six Point Sources: Exhaust #15-Exhaust #20 Stack release height above grade and above roofline are important parameters in evaluating exhaust plume dispersion and in determining ambient impacts.
New emissions units for this project: Two Wolverine Dehydration Lines 8,520 hours per year were accounted for annual average ambient standards compliance demonstrations. All Wolverine Dehydration Line stacks were assumed to terminate vertically and uninterrupted at a height of 10 feet above roofline of the new structure addition.	There are 4 point sources that exhaust emissions for each dehydration line for a total of 8 new point sources. Stack release height above grade and above roofline are important parameters in evaluating exhaust plume dispersion and in determining ambient impacts.
No PM_{10} or $PM_{2.5}$ emissions were modeled from Bubble Sheet Dryer #2 (model ID PRE2).	This source's emissions were not included in the impact analyses.
Emissions rates used in the modeling analyses, as listed in this memorandum, represent maximum potential emissions as given by design capacity or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emissions rates or changes in emissions rates greater than those used in the modeling analyses.
Natural gas-fired air makeup units (AMUs) provide direct heating to the process space. Emission are vented though 20 exhaust vents (existing: EX1-EX14, and new: EX15-EX20) Process space heating is not needed year-round so modeled annual average emission rates were based on approximately 5,270 hours per year at the maximum hourly average emission rates.	An operational limitation on was applied to the annual average emissions rates reflecting emissions that are roughly 40% below unlimited operations.

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

2.0 Background Information

2.1 Permit Requirements for Permits to Construct

PTCs are issued to authorize the construction of a new source or modification of an existing source or permit. Idaho Air Rules Section 203.02 requires that emissions from the new source or modification not cause or significantly contribute to a violation of an air quality standard. In this instance, the PTC will provide enforceability to facility alterations that enable Gem State to demonstrate that emissions from the requested physical changes to the stack parameter compliance options based on underlying requirements established by PTC 2010.0183 Project 61247, issued February 21, 2014 and Consent Order E-2010.0040. These changes primarily affect $PM_{2.5}$ and PM_{10} NAAQS analyses. The project also includes emissions from two new dehydration lines and two makeup air units at the facility. Compliance with the 1-hour SO_2, 1-hour and annual NO_2, and 24-hour PM_{10} NAAQS were based on facility-wide potential to emit.

The proposed installation of natural gas-fired dehydration lines and natural gas-fired air makeup units were required to demonstrate compliance with the increments for four carcinogenic TAPs.

2.2 Applicable Air Quality Impact Limits and Modeling Requirements

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

2.2.1 Area Classification

The facility is located in Heyburn, Idaho, in Minidoka County. The area is designated as attainment or unclassifiable for all pollutants.

2.2.2 Modeling Applicability for Criteria Pollutants

Idaho Air Rules Section 203.02 state that a PTC cannot be issued unless the application demonstrates to the satisfaction of DEQ that the new source or modification will not cause or significantly contribute to a NAAQS violation. Atmospheric dispersion modeling is used to evaluate the potential impact of a proposed project to ambient air and demonstrate NAAQS compliance. However, if the emissions associated with a project are very small, project-specific modeling analyses may not be necessary. If the emissions increases associated with a project are below modeling applicability thresholds established in the *Idaho Air Modeling Guideline* ("State of Idaho Guideline for Performing Air Quality Impact Analyses," available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf, then a project-specific analysis is not required. Modeling applicability emissions thresholds were developed by DEQ based on modeling of a hypothetical source and are designed to reasonably ensure that impacts are below the applicable SIL. DEQ has established two threshold levels: Level 1 thresholds are unconditional thresholds, requiring no approval for use by DEQ; Level 2 thresholds are conditional upon DEQ approval, which depends on evaluation of the project and the site, including emissions quantities, stack parameters, number of sources emissions are distributed amongst, distance between the sources and the ambient air boundary, and the presence of sensitive receptors near the ambient air boundary.

This project was submitted without a modeling protocol. Modeling was assumed to apply for each criteria air pollutant by the applicant except for CO and lead, and the modeling demonstration presented ambient impacts based on facility-wide potential emissions for the existing facility with Bubble Sheet Dryer #1

and six Drum Dryer Lines stacks at the new release height and diameter and the two proposed Wolverine dehydration lines and 2 two air makeup units.

2.2.3 Significant and Cumulative NAAQS Impact Analyses

If maximum modeled pollutant impacts to ambient air from emissions sources associated with a new facility or the emissions increase associated with a modification exceed the SILs of Idaho Air Rules Section 006 (referred to as a significant contribution in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02. A cumulative NAAQS impact analysis may also be required for permit revisions driven by compliance/enforcement actions, any correction of emissions limits or other operational parameters that may affect pollutant impacts to ambient air, or other cases where DEQ believes NAAQS may be threatened by the emissions associated with the facility or proposed project.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts, according to established DEQ/EPA guidance, policies, and procedures, from applicable facility-wide emissions and emissions from any nearby co-contributing sources. A DEQ-approved background concentration value is then added to the modeled result that is appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis.

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Significant Impact Levels[a] ($\mu g/m^3$)[b]**	**Regulatory Limit[c] ($\mu g/m^3$)**	**Modeled Design Value Used[d]**
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.3	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	75 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration. The NAAQS was revised from 15 $\mu g/m^3$ to12 $\mu g/m^3$ on December 14, 2012. l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If the cumulative NAAQS impact analysis shows a violation of the standard, the permit cannot be issued if the proposed project or facility has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. The facility or project does not have a significant contribution to a violation if impacts are below the SIL at all specific receptors showing violations during the time periods when modeled violations occurred.

Compliance with Idaho Air Rules Section 203.02 is demonstrated if: a) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or b) modeled design values of the cumulative NAAQS impact analysis (modeling applicable emissions from the facility and co-contributing sources, and adding a background

concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or c) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.2.4 Toxic Air Pollutant Analyses

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

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

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

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

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

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP.

2.3 Background Concentrations

A background concentration tool was used to establish ambient background concentrations for this project. A beta version of the background concentration tool was developed by the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) and provided through Washington State University (located at http://lar.wsu.edu/nw-airquest/lookup.html). The tool uses regional scale modeling of pollutants in Washington, Oregon, and Idaho, with modeling results adjusted according to available monitoring data. All backgrounds are single "annual" values. The background is added to the design value for each pollutant and averaging period.

The ambient backgrounds were presented by Stantec in the permit application. A modeling protocol was not submitted prior to submittal of the application. Stantec used the background concentration tool to

obtain ambient backgrounds of for 24-hour PM_{10}, 24-hour and annual $PM_{2.5}$, 1-hour and annual NO_2, and 1-hour SO_2.

Modeling was not required for 1-hour and 8-hour CO, because the modification project's emissions of 1.9 lb/hr were below the Level I modeling threshold. Modeling was not required for lead emissions. Based on the facility-wide emissions inventory summary, facility-wide potential emissions are less than 1 pound per year, which is less than the modeling applicability threshold of 14 lbs/month.

The 24-hour and annual backgrounds for the Gem State site were approved for use in the February 21, 2014 $PM_{2.5}$ Compliance Plan PTC's modeling demonstration. The NW Airquest design values had not changed, based on an August 9, 2014 verification. DEQ determined that the ambient backgrounds used in the modeling analyses are appropriate for this project.

Table 3. BACKGROUND CONCENTRATIONS

Pollutant and Averaging Period	Background Concentration ($\mu g/m^3$)[a]
NO_2 1-hour	32 (17 ppb_v)
NO_2, annual	5.8 (3.1 ppb_v)
O_3 1-hour (for PVMRM Tier III 1-hr NO_2 analyses)	106 (54 ppb_v)
PM_{10} 24-hour	73[b] (43 with extreme values removed)
$PM_{2.5}$ 24-hour	13
$PM_{2.5}$ annual	4.3

a. Micrograms per cubic meter, unless noted in units of parts per billion by volume (ppb_v)
b. The background value used by Stantec and Gem State is a conservative value provided by the NW Airquest background tool.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

This section describes the modeling methods used by the applicant's consultant, Stantec, to demonstrate compliance with applicable air quality standards.

3.1.1 Overview of Analyses

Stantec performed project-specific air impact analyses that were determined by DEQ to be reasonably representative of the facility, using established DEQ policies, guidance, and procedures. Results of the submitted analyses demonstrated compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

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

Table 4. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description**
General Facility Location	Heyburn, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 14134.
Meteorological Data	Burley	2006-2010 - See Section 3.1.5 of this memorandum. Surface data from Burley and upper air data from Boise.
Terrain	Considered	Receptor, building, and emissions source elevations were determined using USGS 1/3 arc second NAD83 National Elevation Dataset (NED) files.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility.
Receptor Grid	Grid 1	9-meter spacing along the ambient air boundary.
	Grid 2	1.4-meter minimum to 2.5-meter maximum spacing in a 35-meter (x) by 36-meter (y) grid placed along the northeastern ambient air boundary as a high impact resolution grid.
	Grid 3	10-meter spacing in a 460-meter (x) by 410-meter (y) rectangular grid centered on the facility. Minimum coverage from the facility ambient air boundary is 50 meters. Maximum coverage is 240 meters from the ambient air boundary.
	Grid 4	25-meter spacing in a 575-meter (x) by 550-meter (y) rectangular grid centered on Grid 3.
	Grid 5	50-meter spacing in a 900-meter (x) by 850-meter (y) rectangular grid centered on Grid 4.
	Grid 6	100-meter spacing in a 1,400-meter (x) by 1,400-meter (y) rectangular grid centered on Grid 5.
	Grid 7	250-meter spacing in a 4,750 (x) by 4,500 (y) rectangular grid centered on Grid 6.
	Grid 8	500-meter spacing in an 11,000-meter (x) by 10,500-meter (y) rectangular grid centered on Grid 7.

3.1.2 Modeling protocol and Methodology

A modeling protocol was not submitted to DEQ prior to the application. PTC modification project was conducted by JBR (now Stantec) for Gem State in early 2013, and a protocol was submitted for that project. Project-specific modeling was generally conducted using data and methods described in the *Idaho Air Modeling Guideline*.

3.1.3 Model Selection

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

AERMOD version14134 was used by Stantec for the modeling analyses to evaluate impacts of the facility. This is the current version of this regulatory guideline model. DEQ also used AERMOD version 14134 for sensitivity analyses.

NO_2 1-hour impacts can be assessed using a tiered approach to account for $NO/NO_2/O_3$ chemistry. Tier 1 assumes full conversion of NO to NO_2. Tier 2 assumes a 0.80 default ambient ratio of NO_2/NOx. Tier 3

accounts for more refined assessment of the NO to NO_2 conversion, and a supplemental modeling program can be used with AERMOD to better account for $NO/NO_2/O_3$ atmospheric chemistry. Either the Plume Volume Molar Ratio Method (PVMRM) or the Ozone Limiting Method (OLM) can be specified within the AERMOD input file. EPA guidance (Memorandum: from Tyler Fox, Leader, Air Quality Modeling Group, C439-01, Office of Air Quality Planning and Standards, USEPA; to Regional Air Division Directors. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.* March 01, 2011) has not indicated a preference for one option over the other (PVMRM vs OLM) for particular applications. The Tier 3 methods are considered to be non-regulatory guideline methods and should be approved for the applicant's use on a case-by-case basis. Stantec elected to use PVMRM for the Gem State analyses. Section 3.1.4 provides a description of parameters and data used for PVMRM

3.1.4 Data and Parameters Used for Modeling 1-Hour NO_2 with PVMRM

PVMRM was chosen over OLM by Stantec to be used with AERMOD to provide a more refined estimate of 1-hour NO_2 concentrations at specific receptors. The Gem State facility has a mix of NOx-emitting stacks that are relatively tall (3 natural gas-fired boilers) and relatively short (air makeup units venting through exhaust vent stacks and the stacks for the 2 proposed Wolverine natural gas-fired dehydration lines. Per Stantec's submittal, it was noted that PVMRM was considered to be the better option to use for tall stacks emitting NOx. A single hourly O_3 ambient background value was used in PVMRM to estimate the conversion of NO to NO_2.

Stantec used an in-stack NO_2/NOx ratio of 0.20 for all natural gas-fired emissions units. DEQ accepted the use of 0.20 as the appropriate or conservative in-stack NO_2/NO_x ratio for the dehydration lines, boilers, and air makeup heaters, based on in-stack ratio database documentation.

3.1.5 Meteorological Data

DEQ provided Stantec with a model-ready meteorological dataset processed from Burley surface data and Boise upper air meteorological data that was used for the previous permitting action with modeling memorandum dated January 15, 2014. The dataset used by Stantec for this project was a 2006-2010 dataset based on Burley surface data and Boise upper air data processed using AERMET version 11059. DEQ determined these data were reasonably representative for the Gem State site and approves use of this dataset for this project. Future projects will be required to use Idaho DEQ's 2008-2012 met dataset based on more recent Burley surface data and Boise upper air data with Automated Surface Observing System (ASOS) data for missing surface data. AERMET version 12345 was used to process the 2008-2012 dataset.

3.1.6 Terrain Effects

Stantec used 1/3 arc second National Elevation Dataset (NED) files, in the North American Datum 1983 (NAD83), to calculate elevations of receptors. The terrain preprocessor AERMAP was used to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain.

3.1.7 Building Downwash

Potential downwash effects on the emissions plume were accounted for in the model by using building parameters as described by Stantec. The Building Profile Input Program for the PRIME downwash algorithm (BPIP-PRIME) was used to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and release parameters for input to AERMOD.

Appendix A-Building Layout of Gem State's August 8, 2014 PTC modification application's modeling report contains a Google earth image with the building structure outlines.

A December 2, 2014 submittal presented an outline of the Gem State ambient air boundary and the proposed structure that will house the new Wolverine dehydration lines. This structure was represented in the BPIP file as a separate building with the same base elevation as Gem State's MAIN processing building at 4,153.9 feet above sea level, and with a roofline of 32 feet above grade.

Gem State revised the model setup to include a recently-constructed storage structure on the Gem State property, with BPIP-PRIME ID of "Storage", a roofline height of 32 feet and a base elevation of 4,152.5 feet above grade.

Other off-site nearby buildings were also included in the BPIP-PRIME setup to evaluate any building-induced downwash effects.

3.1.8 Facility Layout

Gem State's modeled emission point sources, volume sources, structures, and ambient air boundary in the model setup are shown in Figure 1. A closer view of the facility's release points is provided in Figure 2. Figure 3 shows the modeled sources exported from the Graphical User Interface to Google earth.

DEQ requested that Gem State verify that the modeled stack locations based on apparent discrepancies in several stack locations compared to photographic Google earth representation. Stantec and Gem State responded in the December 2, 2014 email describing that multiple source stack locations were verified using handheld Global Positioning System (GPS) unit and cell phone with GPS function.

> "...While there are several source locations do not match imagery, it was determined that the modeled locations are correct."

DEQ accepts the modeled facility layout for this project based on the following logic:

- The margin of compliance with any applicable NAAQS or TAPs increment is closest for 24-hour and annual $PM_{2.5}$ NAAQS at 94% and 86% of the NAAQS, respectively. Consideration of the physical locations and other exhaust parameters for stacks emitting $PM_{2.5}$ is most important for supporting the most critical NAAQS demonstration.

  The six existing drum dryer lines and snifters and bubble sheet dryer / agglomerator line venting to stack PRE1 account for nearly 70% of the facility-wide potential emissions of $PM_{2.5}$, including the new Wolverine dehydration modification project. The drum dryer / snifter combination stacks and stack PRE1 will be increased to 100 feet above grade, terminating nearly 68 feet above

modeled roofline height for the new addition to the MAIN Gem State building and 55 feet above the neighboring SIMPLOT building. Small differences in location of these stacks are not expected to cause significant differences in ambient impact concentrations and locations that one may expect for stacks that terminate near roofline height and are subject to more significant building downwash effects than these stacks with increased release heights.

DEQ accepts the submitted coordinates for the proposed Wolverine dehydration lines, exhaust vents, and ADDITION structure. As this project is for a permit to construct, these sources are assumed to have not been constructed at this time, so as-built coordinates are unavailable. The modeled UTM coordinates and Stantec's (on behalf of Gem State) December 2, 2014 submittal contained a plot plan depicting only the facility's ambient air boundary, the outline of the ADDITION structure, and the proposed dehydration unit stacks and exhaust stacks venting AMU emissions. These sources will be permitted to emit approximately 25% of the facility-wide $PM_{2.5}$ emissions at this project's level of potential emissions. The modeled locations and stack parameters are assumed to be appropriately represented in the model.

- Stack PRE1 has been moved to this facility's initial PTC modeled location for stack PRE2 because Bubble Sheet Dryer Line 1 was constructed in Bubble Sheet Dryer Line 2's location. Little or no difference in ambient impacts from this change was expected due to the stack height being increased from the existing 43 feet to the new height of 100 feet above grade.

DEQ has accepted the arguments presented by Stantec and Gem State, and in consideration of the facility's compliance margin with the $PM_{2.5}$ NAAQS, it is pertinent to note that for future modeling demonstrations with $PM_{2.5}$ emission increases, the accuracy of model setup may be an important issue. A DEQ suggestion would be that on-site physical measurement or use of relatively accurate photographs should provide a reasonably accurate approximation of coordinates. Note that if the overall building dimensions are known from building plans or measurements, and those building dimensions match length of the building represented in Google earth, then it would seem distances of stacks on those buildings are reasonably well represented by the graphical depiction as well. The anchor coordinate can be used to establish the location of the structure. So if the Gem State model setup export to Google earth or another photograph that provides a clear image directly overhead the facility, and the building location and dimensions match the photographic depiction, stack locations should match the locations reasonably well in this method as well, considering the building outline is established with individual UTM coordinates for each corner of the building.

Figure 1. Gem State Processing Overhead View of Modeling Setup

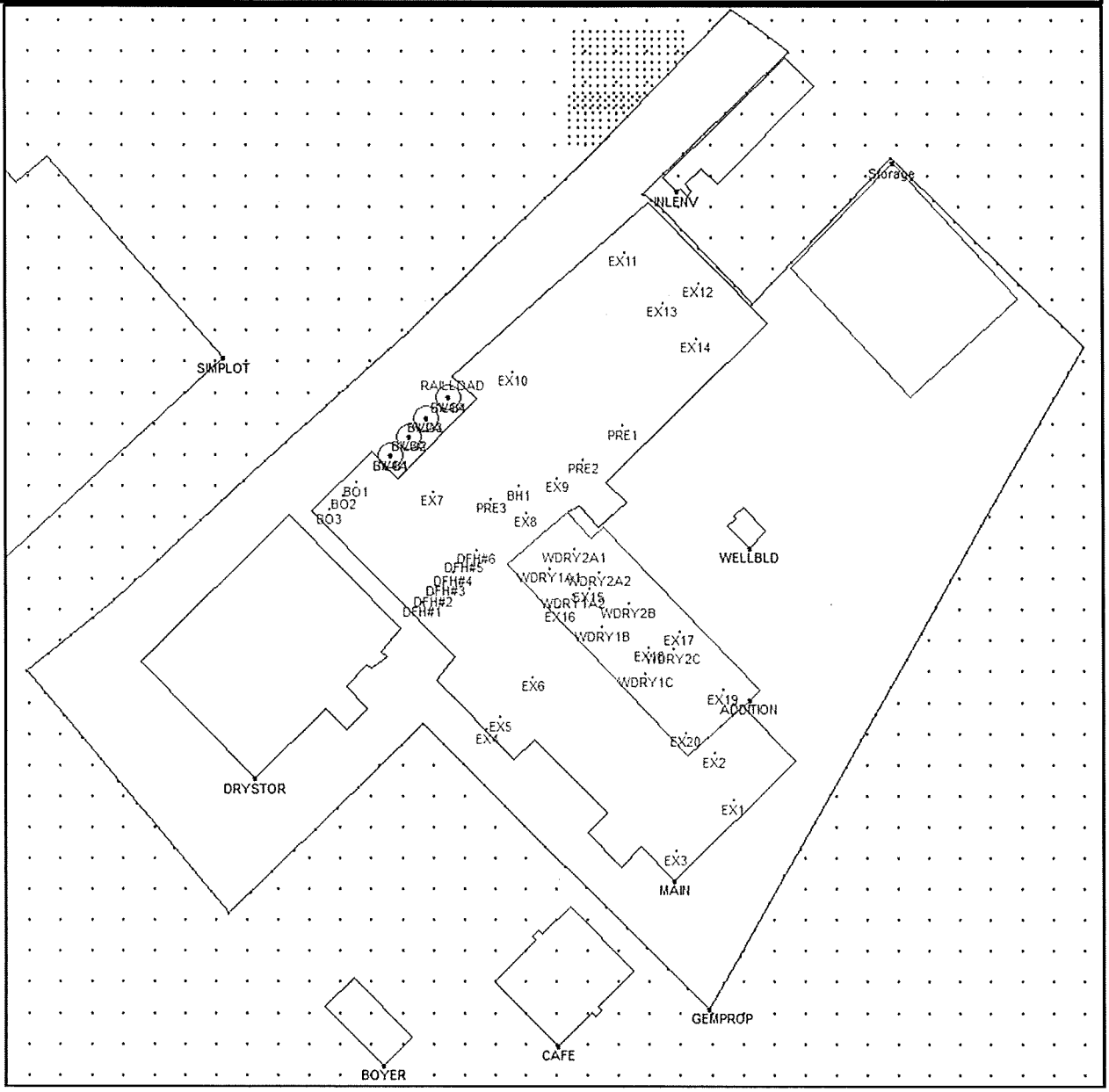


Figure 2. CLOSEUP OF MODELED POINT AND VOLUME SOURCES

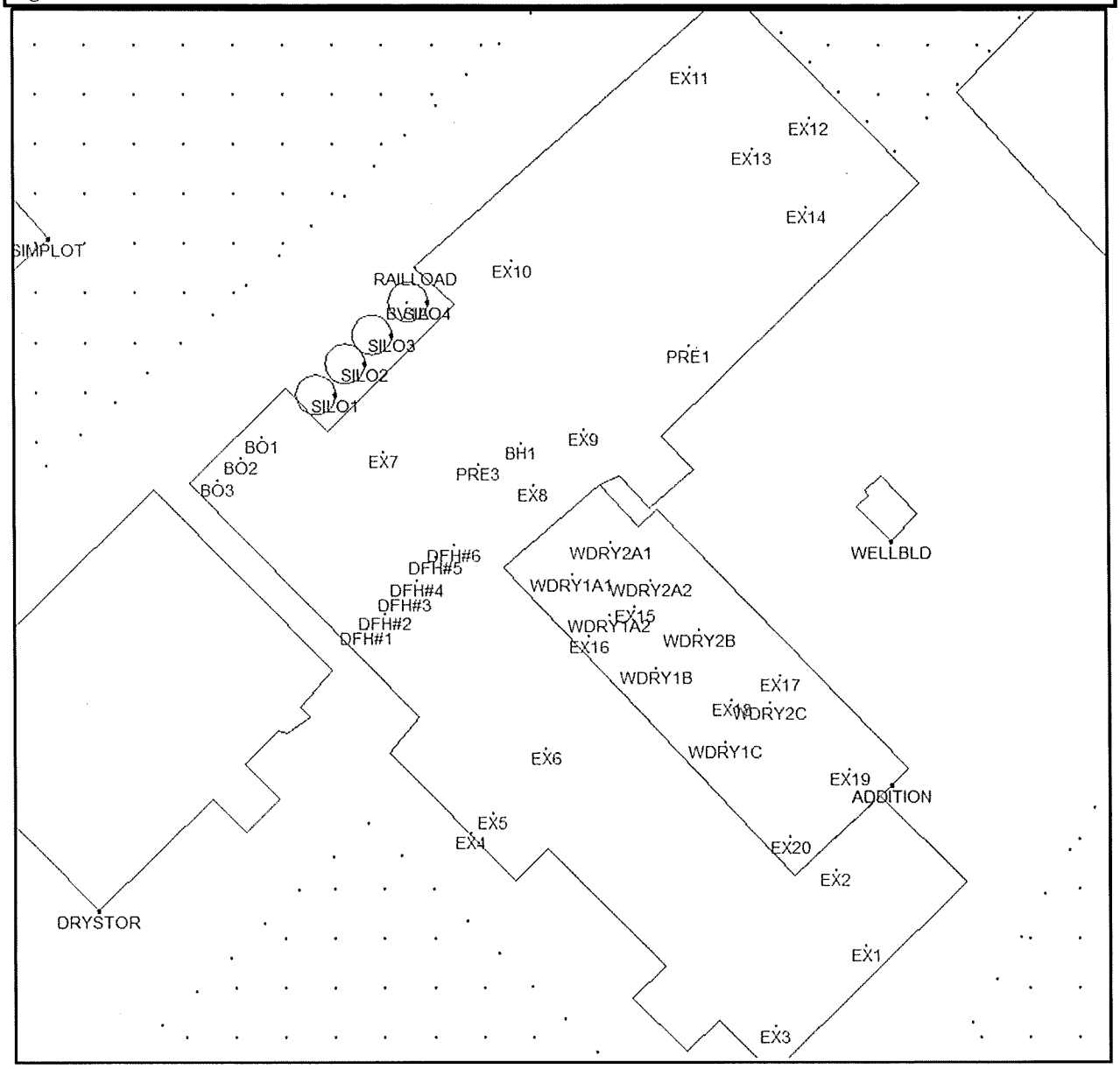
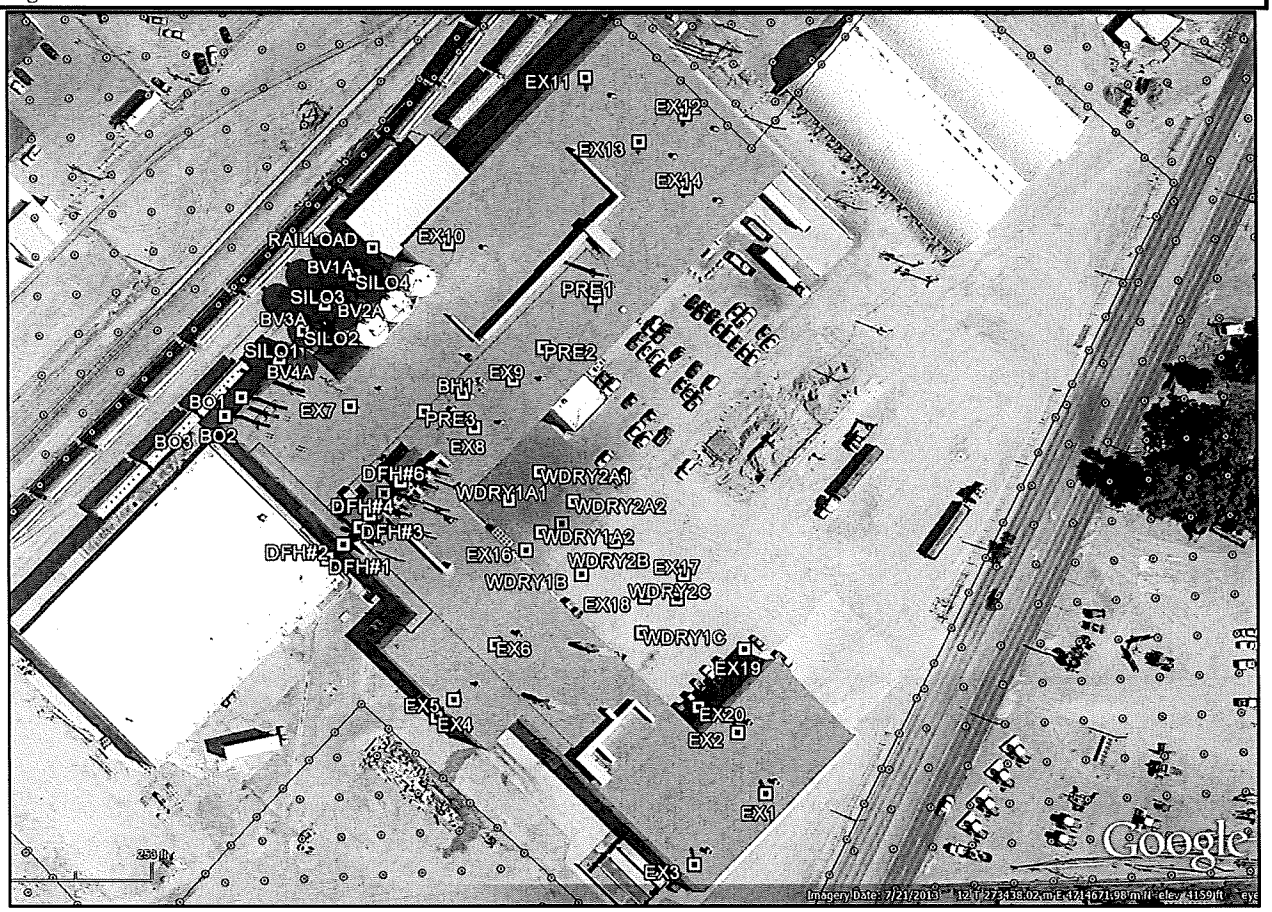


Figure 3. FACILITY STACK LOCATIONS ON EXISTING BUILDING AND FUTURE ADDITION



3.1.8 Ambient Air Boundary

The ambient air boundary for this project was supported with documentation in Stantec's February 17, 2015 submittal. A memorandum dated August 2, 2013, originally submitted by JBR Environmental (now Stantec) for the previous $PM_{2.5}$ compliance plan permitting project's ambient air boundary expansion provides the basis for the current project.

Gem State stated they have leased property from the Boyer Company and Eastern Idaho Railroad, LLC, for the purpose of expanding their ambient air boundary. Access to leased property must be controlled exclusively by the lessee (Gem State), and measures must be taken to effectively preclude public access, including unrestricted access by the landowner, for the leased property to be excluded from ambient air. Gem State has asserted that the lease agreements will provide them with such control over the areas excluded. A combination of physical obstructions and notifications including fencing, gates, and no trespassing signs will be used by Gem State to preclude public access. DEQ agrees the ambient air boundary described uses appropriate methods to control access as described in DEQ's *Modeling Guideline*.

3.1.9 Receptor Network

Table 4 describes the receptor network used in the submitted modeling analyses. DEQ determined that the receptor network was adequate to reasonably assure compliance with applicable air quality standards at all ambient air locations

3.2 Emission Rates

Emissions rates of criteria air pollutants and toxic air pollutants were provided by the applicant. DEQ modeling review, described in this memorandum, did not include review of emissions rates for accuracy. Review and approval of estimated emissions was the responsibility of the DEQ permit writer. DEQ modeling staff provided the model inputs for the permit writer to review and determine whether facility-wide potential emissions had been modeled.

3.2.1 Criteria Pollutant Emissions Rate

Table 5 lists criteria pollutant emissions rates used to evaluate NAAQS compliance for standards with averaging periods of 24 hours or less. Table 6 lists criteria pollutant emissions with an annual averaging period. These rates represent allowable facility-wide emissions and were modeled at the emission rates listed in Table 5 for 24 hours per day, and for the emission rates listed in Table 6 for 8,760 hours per year.

Emissions of NOx, PM_{10}, and $PM_{2.5}$ exceeded the Level I modeling thresholds for the project. Emissions of CO did not exceed the Level I modeling thresholds for the proposed modification project. Stantec elected to submit a facility-wide 1-hour SO_2 NAAQS demonstration. Facility-wide $PM_{2.5}$ emissions exceed DEQ Level I modeling threshold values of 0.054 pound/hour and 0.35 ton/year. Therefore, project-specific modeling analyses are required for both 24-hour and annual $PM_{2.5}$ NAAQS.

This project addresses changes in exhaust parameters for the stacks exhausting the emissions from the facility's six drum dryer lines. These changes trigger the requirement to model the emissions from the facility in a cumulative impact analysis to verify that compliance with NAAQS for the criteria pollutants emitted by the drum dryer lines (also referred to as Flakers) is still demonstrated. Due to the exhaust parameter changes to these stacks and the permitting history, a facility-wide NAAQS demonstration was necessary for 24-hour PM_{10}, 24-hour and annual $PM_{2.5}$ standards.

Table 5. SHORT-TERM EMISSIONS RATES USED IN MODELING ANALYSES				
Modeled Emissions Point	**Description**	**PM_{10}[a] (lb/hr)[b]**	**$PM_{2.5}$[c] (lb/hr)**	**NO_x[d] (lb/hr)**
DFH#1	Drum fan hood & snifter fan #1	0.73	0.73	0.0
DFH#2	Drum fan hood & snifter fan #2	0.73	0.73	0.0
DFH#3	Drum fan hood & snifter fan #3	0.73	0.73	0.0
DFH#4	Drum fan hood & snifter fan #4	0.73	0.73	0.0
DFH#5	Drum fan hood & snifter fan #5	0.73	0.73	0.0
DFH#6	Drum fan hood & snifter fan #6	0.73	0.73	0.0
WDRY1A1	Wolverine Dryer #1 Stage A Stack 1	0.38	0.38	0.26
WDRY2A1	Wolverine Dryer #2 Stage A Stack 1	0.38	0.38	0.26
WDRY1A2	Wolverine Dryer #1 Stage A Stack 2	0.21	0.21	0.14
WDRY2A2	Wolverine Dryer #2 Stage A Stack 2	0.21	0.21	0.14
WDRY1B	Wolverine Dryer #1 Stage B	0.14	0.14	0.14
WDRY2B	Wolverine Dryer #2 Stage B	0.14	0.14	0.14
WDRY1C	Wolverine Dryer #1 Stage C	0.12	0.12	0.042
WDRY2C	Wolverine Dryer #2 Stage C	0.12	0.12	0.042
EX1	Exhaust #1	0.044	0.044	0.29
EX2	Exhaust #2	0.044	0.044	0.29
EX3	Exhaust #3	0.044	0.044	0.29
EX4	Exhaust #4	0.013	0.013	0.085
EX5	Exhaust #5	0.013	0.013	0.085
EX6	Exhaust #6	0.044	0.044	0.29
EX7	Exhaust #7	0.0028	0.0028	0.018
EX8	Exhaust #8	0.0049	0.0049	0.032
EX9	Exhaust #9	0.0049	0.0049	0.032
EX10	Exhaust #10	0.012	0.012	0.079
EX11	Exhaust #11	0.012	0.012	0.079
EX12	Exhaust #12	0.012	0.012	0.079
EX13	Exhaust #13	0.013	0.013	0.085
EX14	Exhaust #14	0.013	0.013	0.085
EX15	Exhaust #15 – new	0.022	0.022	0.15
EX16	Exhaust #16 – new	0.022	0.022	0.15
EX17	Exhaust #17 – new	0.022	0.022	0.15
EX18	Exhaust #18 – new	0.022	0.022	0.15
EX19	Exhaust #19 – new	0.022	0.022	0.15
EX20	Exhaust #20 – new	0.022	0.022	0.15
PRE1	bubble sheet dryer 1	0.76	0.76	0.69
PRE3	pneumatic conveying	0.060	0.0600	0.0
BH1	nuisance dust collector	0.00030	0.00030	0.0
BO1	Boiler #1	0.048	0.048	1.74
BO2	Boiler #2	0.048	0.048	1.74
BO3	Boiler #3	0.065	0.065	2.32
BV1A	Silo bin vent baghouse #1	0.060	0.060	0.0
RAILLOAD	Rail line load out baghouse vent	0.060	0.060	0.0

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
b. Pounds per hour.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Nitrogen oxides.

Table 6. LONG-TERM EMISSIONS RATES USED IN MODELING ANALYSES			
Modeled Emissions Point	**Description**	**$PM_{2.5}$[a] (lb/hr)[b]**	**NO_x[c] (lb/hr)**
DFH#1	Drum fan hood & snifter fan #1	0.71	0.0
DFH#2	Drum fan hood & snifter fan #2	0.71	0.0
DFH#3	Drum fan hood & snifter fan #3	0.71	0.0
DFH#4	Drum fan hood & snifter fan #4	0.71	0.0
DFH#5	Drum fan hood & snifter fan #5	0.71	0.0
DFH#6	Drum fan hood & snifter fan #6	0.71	0.0
WDRY1A1	Wolverine Dryer #1 Stage A Stack 1	0.37	0.25
WDRY2A1	Wolverine Dryer #2 Stage A Stack 1	0.37	0.25
WDRY1A2	Wolverine Dryer #1 Stage A Stack 2	0.21	0.14
WDRY2A2	Wolverine Dryer #2 Stage A Stack 2	0.21	0.14
WDRY1B	Wolverine Dryer #1 Stage B	0.13	0.13
WDRY2B	Wolverine Dryer #2 Stage B	0.13	0.13
WDRY1C	Wolverine Dryer #1 Stage C	0.12	0.041
WDRY2C	Wolverine Dryer #2 Stage C	0.12	0.041
EX1	Exhaust #1	0.026	0.17
EX2	Exhaust #2	0.026	0.17
EX3	Exhaust #3	0.026	0.17
EX4	Exhaust #4	0.0078	0.051
EX5	Exhaust #5	0.0078	0.051
EX6	Exhaust #6	0.026	0.17
EX7	Exhaust #7	0.0017	0.011
EX8	Exhaust #8	0.0029	0.019
EX9	Exhaust #9	0.0029	0.019
EX10	Exhaust #10	0.0072	0.048
EX11	Exhaust #11	0.0072	0.048
EX12	Exhaust #12	0.0072	0.048
EX13	Exhaust #13	0.0078	0.051
EX14	Exhaust #14	0.0078	0.051
EX15	Exhaust #15 – new	0.013	0.089
EX16	Exhaust #16 – new	0.013	0.089
EX17	Exhaust #17 – new	0.013	0.089
EX18	Exhaust #18 – new	0.013	0.089
EX19	Exhaust #19 – new	0.013	0.089
EX20	Exhaust #20 – new	0.013	0.089
PRE1	Bubble sheet dryer 1	0.74	0.67
PRE3	Pneumatic conveying	0.058	0.0
BH1	Nuisance dust collector	0.00030	0.0
BO1	Boiler #1	0.047	1.69
BO2	Boiler #2	0.047	1.69
BO3	Boiler #3	0.063	2.26
BV1A	Silo bin vent baghouse #1	0.060	0.0
RAILLOAD	Rail line load out baghouse vent	0.060	0.0

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
b. Pounds per hour.
c. Nitrogen oxides.

3.2.2 TAP Emissions Rates

The increase in emissions from the proposed project are required to demonstrate compliance with the toxic air pollutant (TAP) increments, with an ambient impact dispersion analysis required for any TAP having a requested potential emission rate that exceeds the screening emission rate limit (EL) specified by Idaho Air Rules Section 585 or 586.

This project's proposed air makeup units and dehydration lines were examined for increases in TAPs emissions. Stantec and Gem State Processing identified four carcinogenic TAPs emissions rates that exceeded the screening emissions rates (ELs) specified by Section 586 of the Idaho Air Rules. Arsenic, cadmium, formaldehyde, and nickel were required to be modeled for this project's requested allowable emission increases. The hourly emission rates listed in Table 7 were modeled for 8,760 hours per year.

Table 7. EMISSIONS RATES USED IN TAPs MODELING ANALYSES

Emissions Point in Model	Description	Arsenic (lb/hr)[a]	Cadmium (lb/hr)	Formaldehyde (lb/hr)	Nickel (lb/hr)
WDRY1A1	Wolverine Dryer #1 Stage A Stack 1	1.38E-06	7.60E-06	5.18E-04	1.45E-05
WDRY2A1	Wolverine Dryer #2 Stage A Stack 1	1.38E-06	7.60E-06	5.18E-04	1.45E-05
WDRY1A2	Wolverine Dryer #1 Stage A Stack 2	7.69E-07	4.23E-06	2.88E-04	8.07E-06
WDRY2A2	Wolverine Dryer #2 Stage A Stack 2	7.69E-07	4.23E-06	2.88E-04	8.07E-06
WDRY1B	Wolverine Dryer #1 Stage B	7.29E-07	4.01E-06	2.73E-04	7.65E-06
WDRY2B	Wolverine Dryer #2 Stage B	7.29E-07	4.01E-06	2.73E-04	7.65E-06
WDRY1C	Wolverine Dryer #1 Stage C	2.28E-07	1.26E-06	8.56E-05	2.40E-06
WDRY2C	Wolverine Dryer #2 Stage C	2.28E-07	1.26E-06	8.56E-05	2.40E-06
EX15	Exhaust #15 – new	3.54E-07	1.95E-06	1.33E-04	3.72E-06
EX16	Exhaust #16 – new	3.54E-07	1.95E-06	1.33E-04	3.72E-06
EX17	Exhaust #17 – new	3.54E-07	1.95E-06	1.33E-04	3.72E-06
EX18	Exhaust #18 – new	3.54E-07	1.95E-06	1.33E-04	3.72E-06
EX19	Exhaust #19 – new	3.54E-07	1.95E-06	1.33E-04	3.72E-06
EX20	Exhaust #20 – new	3.54E-07	1.95E-06	1.33E-04	3.72E-06

[a] Pounds per hour.

3.3 Emission Release Parameters and Plant Criteria

Table 8 lists emissions release parameters for sources modeled. Parameters for point sources appeared to be within normally expected ranges for the source types modeled. DEQ requested additional support documentation for the modeled sources. On-site verification forms, certified by William Schow, Gem State's General Manager, on June 4, 2012, were submitted by JBR (now Stantec) and Gem State as support documentation. Exit flow rates and exit temperatures were described on the forms as "Not verified, used originally submitted data". Therefore, the support documentation for these parameters reverts to the initial facility-wide PTC for Gem State's Heyburn plant for certain emission unit stacks.

Silo Bin Baghouse Vents

Stantec modeled the loadout baghouse vent and the silo bin vent baghouse as volume sources rather than point sources, and justification/documentation for this method and a description of how volume source release parameters were calculated was not provided in the August 4, 2014, application. A January 3, 2014, email from Eric Clark, Stantec, to Kevin Schilling, DEQ, stated the sources in question were modeled as volume sources because "those sources are flat square vent releases on the side of the building." Since the sources are horizontally released point sources, DEQ determined it would be more appropriate to model these sources as point sources, using the AERMOD beta option for horizontal

releases. DEQ did not require Gem State to remodel. Instead DEQ performed verification analyses that modeled these sources as horizontal point sources. The release parameters used in the DEQ verification analyses were obtained from the February 21, 2014 PTC's modeling demonstration sensitivity analyses.

The facility permitted three additional silo bin vents with model IDs BV2A, BV3A, and BV4A. Release parameters are identical to BV1A except for UTM coordinates. These sources were not modeled with any emission rates based on the assumption that only one silo bin will operate at any time. Silo bin vent BV1A was assumed to be representative of the four silo bin vents and was modeled at the location closest to the design impact receptor so this single vent approach is appropriate for the current facility configuration and emission profile.

Natural Gas-fired Boilers
Boiler 3 was modeled with release parameters identical to Boilers 1 and 2. Boilers 1 and 2 are natural gas-fired boilers rated at 1,200 boiler horsepower (bhp). Boiler 3 is rated at 1,600 bhp. Boiler 1 and Boiler 2 exit velocities were identical to the Johnston Boiler Company webpage data that DEQ accessed for Model PFTA 1200-4 – a 4 pass steam packaged firetube boiler. Exit temperature and volumetric flow rate were requested to be reflective of the 60.8 feet above grade release height. Based on the on the schematic diagram of Boiler 3 the flange at the top of the boiler where the exhaust stack would be attached is approximately 13.1 feet above floor level, so the exhaust travels an additional 47 feet though the stack prior to release to the atmosphere. Modeled flow rate is identical to the manufacturer's specification sheet based on the specification sheet exit velocity. DEQ's check on the Johnston Boiler Company webpage showed that exit temperature from the boiler to the stack is dependent upon boiler steam operating pressure. A 315 degree Fahrenheit temperature matched a roughly 45 pound per square inch gauge boiler steam production pressure.

Wolverine Dehydration Lines
Gem State included a letter from the equipment supplier for the new dehydration lines. The modeled exhaust parameters match the values listed in the document.

Exhaust Fans #1-#14 Venting Emissions from Air Makeup Units #1-#4
Exhaust parameters were supported by the on-site verification forms described above that were certified by the facility in June 2012. Exit temperatures and exit velocities were not verified in 2012. The initial PTC submittal is the basis for these parameters per the addendum.

Exhaust Fans #15-#20 Venting Emissions from Air Makeup Units #5 and #6
Release parameter values matched the values presented on a plot plan emission point summary table in the "Ventilation Model (1).pdf". Idaho Steel Products Company created this document.

Drum Fan Hood and Snifter Combined Stacks and Bubble Sheet Dryer #1/Agglomerator
Appendix D of the PTC application contains a sheet from Idaho Steel listing the volumetric flow rates and stack diameters. Stantec submitted an email on February 24, 2015, confirming exit flow rates and temperatures reflect conditions at the increased stack release height of 100 feet above grade.

DEQ staff checked historical source test documentation on these emissions units to verify flow rates and temperatures. A July 19, 2011 test report on Drum Dryer Fan Hood #1 and Snifter #1 and a corrected November 4, 2011 report were used for DEQ's validation. These stacks were modeled at 60 feet above grade for the initial PTC. The test's sampling ports were located 90 inches below the stack termination and 88 inches above the fan unit for the drum fan hood. The snifter stack test ports were located 157

inches above the snifter cyclone and 10 feet below the stack termination. These locations should be fairly representative of the exhaust stream's conditions at the point of release based on a relatively small difference between the exhaust temperature and the ambient air temperature and the distance between the sampling ports and the stack termination. Temperature drop caused by cooling is less dramatic for smaller temperature differences than for large differences for extremely hot exhaust streams.

The test's #1 drum dryer fan hood average flow rate during the test was 37,037 actual cubic feet per minute (ACFM) and 119 degrees Fahrenheit (°F). The #1 snifter stack test average flow rate was 5,624 ACFM at 110°F. The combined drum dryer and snifter stacks for this project were modeled at 35,000 ACFM and 119 degrees Fahrenheit. This is adequate justification for the modeled exhaust parameters applied to DFH#1-DFH#6 stacks in this modeling demonstration, even considering the increase from 60 feet above grade to 100 feet above grade for the stacks servicing these emissions units. The drum fan hood stack temperature is identical to the current modeled temperature. Idaho Steel's documentation submitted in the historical August 12, 2013 PTC project indicated that the 25,000 ACFM is the agglomerator fan design specification.

The Agglomerator / Bubble Sheet Dryer # 1/Scratch Mash Dryer source test report (corrected) dated November 4, 2011 provided actual monitored values to compare the modeled values. Test ports were located 9.5 feet below stack termination. The test's average volumetric flow rate was 20,023 ACFM from 3 runs and the average temperature was 131°F. This is the same temperature that Stantec used in the current modeling demonstration. The tested flow rate is 80% of the 25,000 ACFM modeled flow rate. The 2011 agglomerator performance test appears to have been conducted at a production rate of 1,400 pounds per hour. The current project permits a production rate of 3,300 pounds per hour of dry finished product. The fan system flow rate cannot be tied to the production in a direct linear fashion. It is Gem State's responsibility to operate the fan and stack system to achieve the exhaust flow rates represented in the modeling. A future performance test on the agglomerator stack (PRE1) would validate whether accurate flow rates and temperatures were used in this modeling demonstration. Presumably the facility has had sufficient opportunity to examine the design and performance characteristics of this source.

Table 8. EMISSIONS RELEASE PARAMETERS

Point Sources

Release Point	New or Existing Stack	Universal Transverse Mercator Coordinates		Stack Height (meters)	Modeled Diameter (meters)	Stack Gas Temp. (Kelvin)	Stack Flow Velocity (meters per second)
		Easting (x) (meters)	Northing (y) (meters)				
DFH#1	New	273,376.4	4,714,652.4	30.48	1.07	321.5	18.48
DFH#2	New	273,380.2	4,714,655.4	30.48	1.07	321.5	18.48
DFH#3	New	273,384.2	4,714,659.2	30.48	1.07	321.5	18.48
DFH#4	New	273,386.6	4,714,662.1	30.48	1.07	321.5	17.16
DFH#5	New	273,390.2	4,714,666.7	30.48	1.07	321.5	18.48
DFH#6	New	273,394.2	4,714,669.3	30.48	1.07	321.5	18.48
WDRY1A1	New	273,418	4,714,663.2	12.80	0.81	380.4	13.34
WDRY2A1	New	273,425.8	4,714,669.8	12.80	0.81	380.4	13.34
WDRY1A2	New	273,425.4	4,714,655.1	12.80	0.91	384.3	13.74
WDRY2A2	New	273,433.8	4,714,662.1	12.80	0.91	384.3	13.74
WDRY1B	New	273,434.8	4,714,644.4	12.80	0.81	358.7	13.47
WDRY2B	New	273,443.5	4,714,652.0	12.80	0.81	358.7	13.47
WDRY1C	New	273,448.7	4,714,629.4	12.80	0.56	353.2	12.05
WDRY2C	New	273,457.7	4,714,637.3	12.80	0.56	353.2	12.05
EX1	Existing	273,476.9	4,714,588.6	11.83	1.12	299.82	11.63
EX2	Existing	273,470.8	4,714,603.8	11.83	1.12	299.82	11.63
EX3	Existing	273,458.5	4,714,572.3	11.83	1.12	299.82	11.63
EX4	Existing	273,401.7	4,714,615.3	11.58	0.76	299.82	7.39
EX5	Existing	273,397.3	4,714,611.3	11.83	0.76	299.82	7.39
EX6	Existing	273,412.6	4,714,628.2	11.58	1.12	299.82	11.63
EX7	Existing	273,380.0	4,714,688.0	11.49	0.61	299.82	6.47
EX8	Existing	273,410.3	4,714,681.3	11.55	0.76	299.82	7.24
EX9	Existing	273,420.5	4,714,692.5	11.55	0.76	299.82	7.24
EX10	Existing	273,406.1	4,714,726.6	10.94	1.22	299.82	6.99
EX11	Existing	273,442.2	4,714,765.4	10.91	1.22	299.82	6.99
EX12	Existing	273,466.1	4,714,755.3	10.88	1.22	299.82	6.99
EX13	Existing	273,454.5	4,714,749.1	11.00	1.22	299.82	7.50
EX14	Existing	273,465.4	4,714,737.3	11.00	1.22	299.82	7.50
EX15	New	273,430.6	4,714,656.8	10.97	0.69	305.37	15.40
EX16	New	273,421.3	4,714,650.8	10.97	0.69	305.37	15.40
EX17	New	273,459.7	4,714,642.9	10.97	0.69	305.37	15.40
EX18	New	273,450	4,714,637.9	10.97	0.69	305.37	15.40
EX19	New	273,473.7	4,714,624.0	10.97	0.69	305.37	15.40
EX20	New	273,461.7	4,714,610.3	10.97	0.69	305.37	15.40
PRE1	New	273,441.6	4,714,709.3	30.48	0.81	328.15	22.68
PRE3	Existing	273,399.1	4,714,685.5	18.29	0.51	310.93	13.98
BH1	Existing	273,407.9	4,714,689.8	12.22	0.41	310.93	3.17
BO1	Existing	273,355.4	4,714,691.0	18.53	0.91	430.37	10.72
BO2	Existing	273,351.1	4,714,686.7	18.53	0.91	430.37	10.72
BO3	Existing	273,346.6	4,714,682.3	18.53	0.91	430.37	10.72

Elevated Volume Sources

Release Point	New or Existing Stack	Location UTM[a] Coordinates		Release Height (meters)	Initial Horizontal Dimension (meters)	Initial Vertical Dimension (meters)
		Easting (x) (meters)	Northing (y) (meters)			
BV1A[f]	Existing	273,384.9	4,714,718.1	23.0	0.26	11.2
RAILLOAD	Existing	273,386.5	4,714,725	12.7	0.26	6.2

3.4 Results for Cumulative NAAQS Analyses

Table 9 provides results for the 24-hour and annual $PM_{2.5}$ NAAQS analyses. Emissions increases of other criteria pollutants resulting from the proposed project were below applicable DEQ modeling thresholds that trigger site-specific analyses. A SIL analysis was not submitted by the applicant for this project.

Table 9. RESULTS FOR CUMULATIVE IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design Value Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
$PM_{2.5}$[c]	24-hour	19.8[g]	13	32.8	35	94%
	Annual	6.0[h]	4.3	10.3	12	86%
PM_{10}[d]	24-hour	25.8[i]	73	98.8	150	66%
NO_2[e]	1-hour	132.8[j]	Included in model[k]	132.8	188	71%
	Annual	12.2[l]	5.8	18.0	100	18%
SO_2[f]	1-hour	66.3[m]	3.6	69.9	196	36%

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
e. Nitrogen dioxide.
f. Sulfur dioxide.
g. Modeled design value is the maximum 5-year mean of 8th highest 24-hour values from each year of a 5-year meteorological dataset.
h. Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.
i. Modeled design value is the maximum of 6th highest 24-hour values from a 5-year meteorological dataset.
j. Modeled design value is the maximum 5-year mean of 8th highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset.
k. Background NO_2 concentrations are included with the modeled output value. The individual hour background NO_2 value of 17 parts per billion by volume (32 micrograms per cubic meter) was used for the 1-hr NO_2 NAAQS analysis.
l. Modeled design value is the maximum annual average value of 5 individual years of meteorological data.
m. Modeled design value is the maximum 5-year mean of 4th highest daily 1-hour maximum for each year of a 5-year meteorological dataset.

3.5 Results for Toxic Air Pollutant Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 586 for those TAPs with facility-wide emissions exceeding emissions screening levels (ELs). The results of the TAPs analyses are listed in Table 10. The predicted ambient TAPs impacts were below any TAPs increments.

Table 10. RESULTS OF TAPs ANALYSES

Toxic Air Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	AACC[b] ($\mu g/m^3$)	Percent of AACC
Arsenic	Annual	2E-05	2.3E-04	9%
Cadmium	Annual	1.2E-04	5.6E-04	21%
Formaldehyde	Annual	8.1E-03	0.077	11%
Nickel	Annual	2.3E-04	4.2E-03	5%

a. Micrograms per cubic meter
b Acceptable ambient concentration for carcinogens

3.6 Results for DEQ Sensitivity Analyses

DEQ modeled the two elevated volume sources—the rail loadout baghouse and silo bin vent baghouse—as point sources to verify that the new arrangement of drum dryer lines and Bubble sheet dryer stacks increased to 100 feet above grade in addition to the two proposed dehydration lines and two air makeup units did not increase $PM_{2.5}$ impacts above the applicable NAAQS. DEQ conducted sensitivity model runs on these sources in past permitting projects for the facility. These vents exhaust horizontally with an equivalent diameter of 4.14 feet. DEQ used the February 14, 2014 PTC's sensitivity run exhaust parameters and applied the non-regulatory Beta algorithms in AERMOD for capped and horizontal release points. DEQ's assumptions use a 1,005 actual cubic feet per minute (ACFM) flow rate for each vent. The February17, 2015, addendum from Stantec & Gem State contained a plot plan and design specifications by Idaho Steel with a flow rate for each of these vents of 450 ACFM. DEQ did not revise the sensitivity runs to update these values because Stantec indicated that only Zone 3 data was accurate.

The sensitivity analyses confirmed that the ambient impacts at this project's NAAQS design receptors were not significantly affected if these vents were modeled as horizontal point sources instead of elevated volume sources. The 24-hour $PM_{2.5}$ design impact was reduced by a minor amount (0.04 $\mu g/m^3$), and the annual $PM_{2.5}$ design impact increased slightly (0.2 $\mu g/m^3$). Release parameters replacing the volume sources in the model setup are listed in Table 11. Results of the sensitivity run using the revised exhaust parameters and AERMOD with Beta option are listed in Table 12.

Table 11. EMISSIONS RELEASE PARAMETERS

Release Point	Release Orientation	Universal Transverse Mercator Coordinates		Stack Height (meters)	Modeled Diameter (meters)	Stack Gas Temp. (Kelvin)	Stack Flow Velocity (meters per second)
		Easting (meters)	Northing (meters)				
RAILLOAD_PT	Horizontal	273,386.5	4,714,725	12.74	1.26	294	0.38
SILOBV1A_PT	Horizontal	273,384.9	4,714,718.1	23.01	1.26	294	0.38

Table 12. RESULTS FOR SENSITIVITY IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design Value Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
$PM_{2.5}$[c]	24-hour	19.8[d]	13	32.8	35	94%
	Annual	6.2[e]	4.3	10.5	12	88%

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Modeled design value is the maximum 5-year mean of 8th highest 24-hour values from each year of a 5-year meteorological dataset.
e. Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.

4.0 Conclusions

The ambient air impact analyses and DEQ sensitivity analyses demonstrated to DEQ's satisfaction that emissions from the Gem State Processing facility will not cause or significantly contribute to a violation of any NAAQS or TAPs increments.

APPENDIX C – PROCESSING FEE

PTC Fee Calculation

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company: Gem State Processing, LLC
Address: 951 Highway 30
City: Heyburn
State: Idaho
Zip Code: 83336
Facility Contact: Bill Schow
Title: General Manager
AIRS No.: 067-00038

N Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N

Y Did this permit require engineering analysis? Y/N

N Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	7.2	0	7.2
SO_2	0.1	0	0.1
CO	14.3	0	14.3
PM10	7.6	0	7.6
VOC	1.0	0	1.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	**30.2**
Fee Due	**$ 5,000.00**		

Comments: TAP/HAP emission increase not specifically quantified. But will not affect fee.TAP/HAP emissions would have to be at least 69.8 tons per year to affect the fee.