Statement of Basis

Permit to Construct No. P-2010.0183
Project ID 61652

GEM State Processing, LLC
Heyburn, Idaho

Facility ID 067-00038

Final

August 21, 2017
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
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EPA	U.S. Environmental Protection Agency
gr	grains (1 lb = 7,000 grains)
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
m	meters
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
NAAQS	National Ambient Air Quality Standard
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
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
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
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
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

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).

March 5, 2015	P-2010.0183 PROJ 61406, modified permit to allow the addition of two new dehydrators, Permit status (A) but will be (S) after this permit issuance.
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, Permit status (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 modification at an existing minor facility.

The applicant has proposed to:

- Increase production of the existing Wolverine Dehydrators from 21.7 tons per day to 62 tons per day.
- Increase PM_{10} and $PM_{2.5}$ pounds per hour emissions rates for the existing Wolverine Dehydrators from 0.85 pounds per hour to 0.99 pounds per hour.

This permit is effective immediately and replaces PTC No. P-2010.0183, issued on March 5, 2015.

Application Chronology

January 14, 2016	DEQ received an application fee.
January 21, 2016	DEQ received an application.
February 1- 16, 2016	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
February 19, 2016	DEQ determined that the application was incomplete.
June 2, 2016	DEQ received supplemental information from the applicant.
September 22, 2016	DEQ determined that the application was complete.

April 11, 2017	DEQ made available the draft permit and statement of basis for peer and regional office review.
May 4, 2017	DEQ made available the draft permit and statement of basis for applicant review.
May 9, 2017	DEQ received the permit processing fee.
July 17- August 16, 2017	DEQ provided a public comment period on the proposed action.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source Description	Control Equipment Description
Emissions Unit Name: Boiler #1 Manufacturer: Johnston Boiler Company Model: PFTA 1200-4 Manufacture Date: 2/1/11 Heat input rating: 49.37MMBtu/hr Fuel: Natural Gas Fuel consumption: 48,398 scf/hr	Control Device Name: Low NOx Burner with FGR Manufacturer: Johnston Boiler Company Model: A-FGR Burner
Emissions Unit Name: Boiler #2 Manufacturer: Johnston Boiler Company Model: PFTA 1200-4 Manufacture Date: 2/1/11 Heat input rating: 49.37MMBtu/hr Fuel: Natural Gas Fuel consumption: 48,398 scf/hr	Control Device Name: Low NOx Burner with FGR Manufacturer: Johnston Boiler Company Model: A-FGR Burner
Emissions Unit Name: Boiler #3 Manufacturer: Johnston Boiler Company Model: PFTA 1600-4 Manufacture Date:2/1/11 Heat input rating: 64.53MMBtu/hr Fuel: Natural Gas Fuel consumption: 64,530 scf/hr	Control Device Name: Low NOx Burner with FGR Manufacturer: Johnston Boiler Company Model: A-FGR Burner
Emissions Unit Name: Bubble Sheet Dryer #1 (Fluidized Bed Dryer) Manufacturer: Idaho Steel Products Model: none Manufacture Date:2/1/11 Heat input rating: 7.0MMBtu/hr Fuel: Natural Gas Fuel consumption: 5,882 scf/hr	Control Device Name: N/A
Emissions Unit Name: Bubble Sheet Dryer #2 (Fluidized Bed Dryer) Manufacturer: Idaho Steel Products Model: none Manufacture Date:2/1/11 Heat input rating: 7.0MMBtu/hr Fuel: Natural Gas Fuel consumption: 5,882 scf/hr Allowable throughput 0.0 T/day This equipment is not on site at the time of issuing this PTC.	Control Device Name: N/A
Emissions Unit Name: AMU#1 Manufacturer: Reyco Model: GasPac 850 Burner Model: AirHeat Manufacture Date: 2/1/11 Heat input rating: 9.0 MMBtu/hr Fuel: Natural Gas Fuel consumption: 8,824 scf/hr	Control Device Name: Manufacturer: Eclipse Model: V2 AirHeat Type: Low NOx, CO
Emissions Unit Name: AMU#2 Manufacturer: Reyco Model: GasPac 1000 Burner Model: AirHeat Manufacture Date: 2/1/11 Heat input rating: 9.0 MMBtu/hr Fuel: Natural Gas Fuel consumption: 8,824 scf/hr	Control Device Name: Manufacturer: Eclipse Model: V2 AirHeat Type: Low NOx, CO

Emissions Unit Name: AMU#3 Manufacturer: Reyco Model: GasPac 1000 Burner Model: AirHeat Manufacture Date: 2/1/11 Heat input rating: 9.0 MMBtu/hr Fuel: Natural Gas Fuel consumption: 8,824 scf/hr	Control Device Name: Manufacturer: Eclipse Model: V2 AirHeat Type: Low NOx, CO
Emissions Unit Name: AMU#4 Manufacturer: Reyco Model: GasPac 1250 Burner Model: AirHeat Manufacture Date: 2/1/11 Heat input rating: 10.0 MMBtu/hr Fuel: Natural Gas Fuel consumption: 9804 scf/hr	Control Device Name: Manufacturer: Eclipse Model: V2 AirHeat Type: Low NOx, CO
Emissions Unit Name: Silo Bin Vent #1 Manufacturer: North Monsen Model: BV8-25-50 Manufacture Date: 2/1/11	Control Device Name: Silo Bin Vent Baghouse #1 Manufacturer: North Monsen Model: BV8-25-50 Number of bags: 25 Air to Cloth ratio: 5.7 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Silo Bin Vent #2 Manufacturer: North Monsen Model: BV8-25-50 Manufacture Date: 2/1/11	Control Device Name: Silo Bin Vent Baghouse #2 Manufacturer: North Monsen Model: BV8-25-50 Number of bags: 25 Air to Cloth ratio: 5.7 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Silo Bin Vent #3 Manufacturer: North Monsen Model: BV8-25-50 Manufacture Date: 2/1/11	Control Device Name: Silo Bin Vent Baghouse #3 Manufacturer: North Monsen Model: BV8-25-50 Number of bags: 25 Air to Cloth ratio: 5.7 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Silo Bin Vent #4 Manufacturer: North Monsen Model: BV8-25-50 Manufacture Date: 2/1/11	Control Device Name: Silo Bin Vent Baghouse #4 Manufacturer: North Monsen Model: BV8-25-50 Number of bags: 25 Air to Cloth ratio: 5.7 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Multipurpose Filter Receiver Manufacturer: North Monsen Model: FRC 24-58 Manufacture Date: 2/1/11	Control Device Name:Plant Receiver Baghouse #1 Manufacturer: North Monsen Model: FRC 24-58 Number of bags: 24 Air to Cloth ratio: 6.8 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: OffSpec Receiver Manufacturer: North Monsen Model: FRC 24-58 Manufacture Date: 2/1/11	Control Device Name: Plant Receiver Baghouse #2 Manufacturer: North Monsen Model: FRC 24-58 Number of bags: 24 Air to Cloth ratio: 6.8 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Super Sack/Tote Pacing Receiver Manufacturer: North Monsen Model: FRC 45-36 Manufacture Date: 2/1/11	Control Device Name: Plant Receiver Baghouse #3 Manufacturer: North Monsen Model: FRC 45-36 Number of bags: 45 Air to Cloth ratio: 5.4 to 1 PM_{10} control efficiency: 0.007 gr/dscf

Emissions Unit Name: Bag Packing Receiver Manufacturer: North Monsen Model: FRC 45-36 Manufacture Date: 2/1/11	Control Device Name: Plant Receiver Baghouse #4 Manufacturer: North Monsen Model: FRC 45-36 Number of bags: 45 Air to Cloth ratio: 5.4 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Truck Loadout Vent Manufacturer: North Monsen Model: FRC 24-58 Manufacture Date: 2/1/11	Control Device Name: Truck Loadout Baghouse Manufacturer: North Monsen Model: FRC 24-58 Number of bags: 24 Air to Cloth ratio: 5.7 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Rail Loadout Vent Manufacturer: North Monsen Model: FRC 24-58 Manufacture Date: 2/1/11	Control Device Name: Rail Loadout Baghouse Manufacturer: North Monsen Model: FRC 24-58 Number of bags: 24 Air to Cloth ratio: 5.7 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Pneumatic Conveying Line Manufacturer: Idaho Steel Products Model: 72-IFAR-14 Manufacture Date: 2/1/11	Control Device Name: Pneumatic Conveying Line Baghouse Manufacturer: Idaho Steel Products Model: 72-IFAR-14 Number of bags: 14 Air to Cloth ratio: 6.0 to 1 PM_{10} control efficiency: 0.007 gr/dscf
Emissions Unit Name: Nuisance Dust Collector Manufacturer: North Monsen Model: 100S-10-20 Mikro Pulsaire Manufacture Date: 2/1/11	Control Device Name: Nuisance Dust Collector Baghouse Manufacturer: North Monsen Model: 100S-10-20 Mikro Pulsaire Number of bags: 100 Air to Cloth ratio: 5.0 to 1 PM_{10} control efficiency: 99.9%
Emissions Unit Name:Drum Dryer #1 Manufacturer: Idaho Steel Products Model: 10-10080-001B Manufacture Date: 2/1/11 Max. production: 1.125 T/hr Allowable/permitted throughput: 24 T/day Fuel: Steam	Control Device Name: Cyclone on snifter side of drum
Emissions Unit Name:Drum Dryer #2 Manufacturer: Idaho Steel Products Model: 10-10080-001B Manufacture Date: 2/1/11 Max. production: 1.125 T/hr Allowable/permitted throughput: 24 T/day Fuel: Steam	Control Device Name: Cyclone on snifter side of drum
Emissions Unit Name:Drum Dryer #3 Manufacturer: Idaho Steel Products Model: 10-10080-001B Manufacture Date: 2/1/11 Max. production: 1.125 T/hr Allowable/permitted throughput: 24 T/day Fuel: Steam	Control Device Name: Cyclone on snifter side of drum

Emissions Unit Name:Drum Dryer #4 Manufacturer: Idaho Steel Products Model: 11-10116-001B Manufacture Date: 2/1/11 Max. production: 1.125 T/hr Allowable/permitted throughput: 24 T/day Fuel: Steam	Control Device Name: Cyclone on snifter side of drum
Emissions Unit Name:Drum Dryer #5 Manufacturer: Idaho Steel Products Model: 11-10116-001B Manufacture Date: 2/1/11 Max. production: 1.125 T/hr Allowable/permitted throughput: 24 T/day Fuel: Steam	Control Device Name: Cyclone on snifter side of drum
Emissions Unit Name:Drum Dryer #6 Manufacturer: Idaho Steel Products Model: 11-10116-001B Manufacture Date: 2/1/11 Max. production: 1.125 T/hr Allowable/permitted throughput: 24 T/day Fuel: Steam	Control Device Name: Cyclone on snifter side of drum
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

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.

Pre-Project Potential to Emit

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

The following table presents the pre-project potential to emit for criteria air pollutants from all emissions units at the facility as determined in the previous permit action. See the Statement of Basis which supports the March 5, 2015 Permit to Construct No. P-2010.0183, Project 61406.

Table 2 PRE-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
Pre- 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.

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 and GHG pollutants from all emissions units at the facility as determined by the applicant and reviewed by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 3 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	3.24	0.0041	0.018	0.69	2.92	0.576	2.456	0.038	0.16
Bubble Sheet Dryer #2	0	0	0	0	0	0	0	0	0	0
Dehydrator #1 & #2	1.84[c]	7.77	0.019	0.082	1.15	4.9	2.364	10.071	0.176	0.748
Post Project Totals	**8.36**	**34.91**	**0.14**	**0.56**	**10.34**	**39.67**	**13.92**	**51.95**	**1.16**	**4.44**

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.
c) Modeled emission rate.

Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 4 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	8.22	35.18	0.14	0.56	10.35	39.67	13.92	52	1.16	4.4
Post Project Potential to Emit	8.36	34.91	0.14	0.56	10.34	39.67	13.92	52	1.16	4.4
Change	**0.14**	**-0.22**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility.

Table 5 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

HAP Pollutants	PTE (T/yr)
Benzene	1.32E-04
Formaldehyde	4.72E-03
Hexane*	1.13E-01
Naphthalene	3.84E-05
Toluene	2.14E-04
Arsenic Compounds	1.26E-05
Beryllium Compounds	7.56E-07
Cadmium Compounds	6.93E-05
Chromium Compounds	8.81E-05
Cobalt Compounds	5.29E-06
Manganese Compounds	2.39E-05
Mercury Compounds	1.64E-05
Nickel Compounds	1.32E-04
Selenium Compounds	1.51E-06
Total	1.19E-01

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard.

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

The AIRS/AFS facility classification codes are as follows:

For THAPs (Total Hazardous Air Pollutants) Only:

A = Use when any one HAP has actual or potential emissions ≥ 10 T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions ≥ 25 T/yr.

SM80 = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the permit sets limits ≥ 8 T/yr of a single HAP or ≥ 20 T/yr of THAP.

SM = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the potential HAP emissions are limited to < 8 T/yr of a single HAP and/or < 20 T/yr of THAP.

B = Use when the potential to emit without permit restrictions is below the 10 and 25 T/yr major source threshold

UNK = Class is unknown

For All Other Pollutants:

A = Actual or potential emissions of a pollutant are ≥ 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are < 80 T/yr.

B = Actual and potential emissions are < 100 T/yr without permit restrictions.

UNK = Class is unknown.

Table 6 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	<100	34.9	100	B
PM_{10}	<100	34.9	100	B
$PM_{2.5}$	<100	34.9	100	B
SO_2	<100	0.56	100	B
NO_X	<100	39.7	100	B
CO	<100	52	100	B
VOC	<100	4.4	100	B
HAP (single)	<10	0.13	10	B
HAP (total)	<25	0.12	25	B
Pb	<100	<0.001	100	B

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 ..... Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the proposed increase of production at the Wolverine Dehydrators and for the corresponding particulate matter emissions increase. 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.

Other Rules

The proposed production increases at the Wolverine Dehydrators, and corresponding particulate emission increases, do not trigger applicability of any other State rules or Federal regulations.

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, NO_X, 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 at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is 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.

Permit Conditions Review

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

Permit Condition 3.5

This permit condition was divided into two sections (3.5.1 & 3.5.2). Permit Condition 3.5.1 includes the original permit condition and remains unchanged except is has been renumbered.

Permit Condition 3.5.2 was added to the permit to limit the production of the No. 1 Bubble Sheet Dryer to 14,058 tons per year to match the emissions estimates that were used to demonstrate PM_{10} and $PM_{2.5}$ ambient standards are protected. Annual production is based on 8,520 hours per year of operation.

Permit Condition 3.6

This permit condition had specified that the Bubble Sheet Dryer No. 1 stack shall be raised to at least 100 feet above ground elevation by May 22, 2015.

This permit condition now allows 180 days from permit issuance to raise the stack to at least 100 feet above ground elevation. However, the source may not increase the production of the dehydrators from 21.7 tons per day to 62 tons per day, as they have requested in the application for this permit, until the stack heights have been raised (see Section 5 of the permit).

Gem State has been working closely with DEQs compliance and permitting staff regarding timing of raising the stack. Equipment availability and Federal Aviation Administration approval, both beyond the permittee's control, have delayed the ability for Gem State to raise the stack.

Permit Condition 3.7

This permit condition was divided into two sections (3.7.1 & 3.7.2). Permit Condition 3.7.1 matches the original permit condition and requires monitoring of production of the dryer.

Permit Condition 3.7.2 was added to the permit and requires monthly monitoring of the production of the dryer during the previous consecutive 12 month period to assure compliance with the corresponding production limit.

Permit Condition 3.8

The original permit condition required an initial source test to be conducted by September 21, 2016 and then every five years after that. The source was tested on December 9, 2016. On June 5, 2017 DEQ approved this test and it showed compliance with the emission limit. Therefore, the next test is required by December 9, 2021.

Permit Condition 4.5

This permit condition was divided into two sections (4.5.1 & 4.5.2). Permit Condition 4.5.1 includes the original permit condition and remains unchanged except is has been renumbered.

Permit Condition 4.5.2 was added to the permit to limit the combined production of the Drum Dryers to 57,510 tons per year to match the emissions estimates that were used to demonstrate PM_{10} and $PM_{2.5}$ ambient standards are protected. Annual production is based on 8,520 hours per year of operation.

Permit Condition 4.6

This permit condition had specified that the Drum Dryer stacks shall be raised to 100 feet elevation by May 22, 2015.

This permit condition now allows 180 days from permit issuance to raise the stack to at least 100 feet above ground elevation. However, the source may not increase the production of the dehydrators from 21.7 tons per day to 62 tons per day, as they have requested in the application for this permit, until the stack heights have been raised (see Section 5 of the permit).

Permit Condition 4.7

This permit condition was divided into two sections (4.7.1 & 4.7.2). Permit Condition 4.7.1 matches the original permit condition and requires daily monitoring of production of the dryers.

Permit Condition 4.7.2 was added to the permit requires monthly monitoring of the production of the dryers during the previous consecutive 12 month period to assure compliance with the corresponding production limit.

Permit Condition 4.8

The original permit condition required an initial performance test on a dryer stack no later than no later than 365 after the stacks are combined into one stack. The stacks have not been combined and this initial test has not been conducted. The modified permit condition requires the initial source test to be conducted within 60 days of permit issuance, if a performance test was conducted on combined stacks within 180 days prior to permit issuance, and approved by DEQ, that test may be accepted as the initial source test. Otherwise the permit testing requirement is the same. Testing is continued to be required every 5 years.

Permit Condition 5.4

This permit condition was divided into three sections (5.4.1, 5.4.2 & 5.4.3). Permit Condition 5.4.1 includes the original permit condition and caps the dehydrators production to 21.7 tons per day.

Permit Condition 5.4.2 was added to the permit to allow production to increase to 62 tons per calendar day once the Drum No. 1 Stack and the Bubble Sheet Dryer stacks have been raised to 100 as required in their respective permit sections.

Permit Condition 5.4.3 was added to the permit to limit the production of the Wolverines Dehydrators combined production to 22,010 tons per year to match the emissions estimates that were used to demonstrate PM_{10} and $PM_{2.5}$ ambient standards are protected. Annual production is based on 8,520 hours per year of operation.

Permit Condition 5.6

The previous permit required the stacks to be 42 feet above ground elevation. The modified permit condition requires the stack to be 60 feet above ground elevation consistent with the ambient impact demonstration.

Permit Condition 5.7

This permit condition was divided into two sections (5.7.1 & 5.7.2). Permit Condition 5.7.1 matches the original permit condition and requires monitoring daily of production of the dehydrators.

Permit Condition 5.7.2 was added to the permit requires monthly monitoring of the production of the dehydrators during the previous consecutive 12 month period to assure compliance with the corresponding production limit.

Permit Condition 5.9

The existing permit condition required source testing within 60 days of permit issuance. That initial test has not been conducted. The modified permit condition continues to require an initial source test to be conducted within 60 days of permit issuance. GEM State has been working with DEQ prior to this permit issuance to conduct this initial test[1] and it is uncertain if an approved test will have been conducted at the time of permit issuance. Therefore the permit has been written so that if a performance test was conducted within 365 days prior to permit issuance, and approved by DEQ, that test may be accepted as the initial source test. Otherwise the permit testing requirement is the same.

Table 7.1 of the permit includes the emission rate limits. This table has been updated consistent with the emissions rates included in the application.

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. During this time, there were no comments on the application and there was a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

Public Comment Period

A public comment period was made available to the public in accordance with IDAPA 58.01.01.209.01.c. During this time, comments were not submitted in response to DEQ's proposed action. Refer to the chronology for public comment period dates.

1 Source testing of the dehydrator stacks occurred during the week of April 10, 2017.

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	0.074	lb/MMBtu	Manufacturer specific emission factor for burners
CO	0.04	lb/MMBtu	Manufacturer specific emission factor for boilers
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
Dehydrator #1[b]	26.2	15,973	0.5750	1.1820	0.1214	0.0096	0.0879	0.0000080
Dehydrator #2[b]	26.2	15,973	0.5750	1.1820	0.1214	0.0096	0.0879	0.0000080
TOTAL	**286.0**	**260,918.3**	**24.05**	**14.63**	**0.92**	**0.15**	**1.21**	**1.30E-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

[b]Eclipse manufactuer assumes 1000 Btu/scf

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	0.074	lb/MMBtu	Manufacturer specific emission factor for burners
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
Dehydrator #1	26.2	15,973	0.5750	1.1820	0.1214	0.0096	0.0879	0.0000080
Dehydrator #2	26.2	15,973	0.5750	1.1820	0.1214	0.0096	0.0879	0.0000080
TOTAL	**282.73**	**260,919.06**	**11.03**	**14.50**	**0.92**	**0.15**	**1.19**	**1.30E-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	0.074 lb/MMBtu	Manufacturer specific emission factor for burners
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
Dehydrator #1	26.2	15,973	2.45	5.04	0.52	0.04	0.37	3.40E-05
Dehydrator #2	26.2	15,973	2.45	5.04	0.52	0.04	0.37	3.40E-05
TOTAL	**282.73**	**260,919.06**	**93.68**	**54.96**	**3.26**	**0.59**	**4.66**	**5.12E-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
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	0.074	lb/MMBtu	Manufacturer specific emission factor for burners
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
Dehydrator #1	26.2	15,973	2.45	5.04	0.52	0.04	0.37	3.40E-05
Dehydrator #2	26.2	15,973	2.45	5.04	0.52	0.04	0.37	3.40E-05
TOTAL	**282.7**	**260,919.1**	**42.6**	**54.4**	**3.2**	**0.6**	**4.6**	**5.1E-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[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[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

7/27 8/11 11/9

[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[e]	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

	Fuel Combustion of Natural Gas											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
Description	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
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
Dehydration Units	1.150	4.899	2.364	10.071	0.243	1.034	0.019	0.082	0.176	0.748	0.000	0.000

	Particulate Equipment											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
Description	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
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						
Dehydration Units					1.58	6.74						
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	24.05	93.68	14.63	54.96	8.55	35.74	0.15	0.59	1.21	4.66	0.0001	0.0001

Gem State Processing, LLC
Heyburn Facility

CONTROLLED CRITERIA POLLUTANTS POTENTIAL TO EMIT

	Fuel Combustion of Natural Gas											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
Description	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
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	2.364	10.071	0.243	1.034	0.019	0.082	0.176	0.748	0.000	0.000

	Particulate Equipment											
	NOx Emissions		CO Emissions		PM-2.5/10 Emissions		SOx Emissions		VOC Emissions		Lead Emissions	
Description	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
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					1.58	6.74						
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	14.50	54.41	8.40	35.11	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

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)	CO (lb/hr)
Zone #1	AMU-1	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	7.41E-01
	AMU-2	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	7.41E-01
	AMU-3	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	7.41E-01
	Total	***2.01E-01***	***5.30E-01***	***1.32E+00***	***3.49E+00***	***1.59E-02***	***2.22E+00***
Zone #2	AMU-4	7.45E-02	1.96E-01	4.90E-01	1.29E+00	5.88E-03	8.24E-01
	Total	***7.45E-02***	***1.96E-01***	***4.90E-01***	***1.29E+00***	***5.88E-03***	***8.24E-01***
Zone #3	AMU-5	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	7.41E-01
	AMU-6	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	7.41E-01
	Total	***1.34E-01***	***3.53E-01***	***8.82E-01***	***2.33E+00***	***1.06E-02***	***1.48E+00***

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)	CO (lb/hr)
Zone #1	EX-1	24225	0.217889908	4.38E-02	1.16E-01	2.88E-01	7.60E-01	3.46E-03					4.84E-01
	EX-2	24225	0.217889908	4.38E-02	1.16E-01	2.88E-01	7.60E-01	3.46E-03					4.84E-01
	EX-3	24225	0.217889908	4.38E-02	1.16E-01	2.88E-01	7.60E-01	3.46E-03					4.84E-01
	EX-4	7140	0.064220183	1.29E-02	3.40E-02	8.50E-02	2.24E-01	1.02E-03					1.43E-01
	EX-5	7140	0.064220183	1.29E-02	3.40E-02	8.50E-02	2.24E-01	1.02E-03					1.43E-01
	EX-6	24225	0.217889908	4.38E-02	1.16E-01	2.88E-01	7.60E-01	3.46E-03					4.84E-01
	Total	*111180*	*1*	*2.01E-01*	*5.30E-01*	*1.32E+00*	*3.49E+00*	1.59E-02					2.22E+00
Zone #2	EX-7	4000	0.037394011	2.79E-03	7.34E-03	1.83E-02	4.83E-02	2.20E-04					3.08E-02
	EX-8	7000	0.06543952	4.88E-03	1.28E-02	3.21E-02	8.45E-02	3.85E-04					5.39E-02
	EX-9	7000	0.06543952	4.88E-03	1.28E-02	3.21E-02	8.45E-02	3.85E-04					5.39E-02
	EX-10	17281	0.161551478	1.20E-02	3.17E-02	7.92E-02	2.09E-01	9.50E-04					1.33E-01
	EX-11	17281	0.161551478	1.20E-02	3.17E-02	7.92E-02	2.09E-01	9.50E-04					1.33E-01
	EX-12	17281	0.161551478	1.20E-02	3.17E-02	7.92E-02	2.09E-01	9.50E-04					1.33E-01
	EX-13	18563	0.173536258	1.29E-02	3.41E-02	8.51E-02	2.24E-01	1.02E-03					1.43E-01
	EX-14	18563	0.173536258	1.29E-02	3.41E-02	8.51E-02	2.24E-01	1.02E-03					1.43E-01
	Total	*106969*	*1*	*7.45E-02*	*1.96E-01*	*4.90E-01*	*1.29E+00*	5.88E-03					8.24E-01
Zone #3	EX-15	18000	0.5	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	1.06E-06	5.84E-06	3.98E-04	1.11E-05	7.41E-01
	EX-16	18000	0.5	6.71E-02	1.77E-01	4.41E-01	1.16E+00	5.29E-03	1.06E-06	5.84E-06	3.98E-04	1.11E-05	7.41E-01
	Total	*36000*	*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*	1.48E+00

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	246,019.57
Boiler #2[a] (1200 hp)	48,398.00 scf/hr	13,725.49
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	94.72%
Reyco AMU #3 1000	8,823.53 scf/hr	5.28%
Reyco AMU #4 1250	9,803.92 scf/hr	
Reyco AMU #5 1250	8,823.53 scf/hr	
Reyco AMU #6 1250	8,823.53 scf/hr	
Bubble Sheet Dryer #1	6,862.75 scf/hr	
Bubble Sheet Dryer #2	6,862.75 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.

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 T/yr[b]	PM-10 T/yr[b]	PM2.5 T/yr[b]	CO T/yr[b]	Pb T/yr[b]	NOx T/yr[b]	VOC T/yr[b]	SO2 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	1.51	1.51	1.51	2.238	1.512E-05	1.09	0.17	1.81E-02
Wolverine Stage A Stack #2 Dryer1	EU-13	0.84	0.84	0.84	1.246	8.418E-06	0.61	0.09	1.01E-02
Wolverine Stage B Dryer1	EU-14	1.04	1.04	1.04	1.181	7.981E-06	0.57	0.09	9.58E-03
Wolverine Stage C Dryer1	EU-15	0.49	0.49	0.49	0.370	2.501E-06	0.18	0.03	3.00E-03
Wolverine Stage A Stack #1 Dryer2	EU-16	1.51	1.51	1.51	2.238	1.512E-05	1.09	0.17	1.81E-02
Wolverine Stage A Stack #2 Dryer2	EU-17	0.84	0.84	0.84	1.246	8.418E-06	0.61	0.09	1.01E-02
Wolverine Stage B Dryer2	EU-18	1.04	1.04	1.04	1.181	7.981E-06	0.57	0.09	9.58E-03
Wolverine Stage C Dryer2	EU-19	0.49	0.49	0.49	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 Snifter 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 Snifter 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 Snifter 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 Snifter 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 Snifter 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 Snifter Fan Drum #6	EU-45	0.0852	0.0852	0.0852	n/a	n/a	n/a	n/a	n/a
Totals*		**35.11**	**35.11**	**35.11**	**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

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.

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	**4.72E-03**
Hexane*	**1.13E-01**
Naphthalene	**3.84E-05**
Toluene	**2.14E-04**
Arsenic Compounds	**1.26E-05**
Beryllium Compounds	**7.56E-07**
Cadmium Compounds	**6.93E-05**
Chromium Compounds	**8.81E-05**
Cobalt Compounds	**5.29E-06**
Manganese Compounds	**2.39E-05**
Mercury Compounds	**1.64E-05**
Nickel Compounds	**1.32E-04**
Selenium Compounds	**1.51E-06**
Total	1.19E-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**	**15,973.0**	**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

			Pounds per Hour					
Description[a]	Capacity (MMBtu/hr)	Throughput (scf/hr)	NOx Emissions (lb/hr)[b]	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	18.0	11,052	0.3979	0.8178	0.0840	0.0066	0.0608	0.0000055
Dryer #1 Stage B Stack 3	6.0	3,747	0.1349	0.2773	0.0285	0.0022	0.0206	0.0000019
Dryer #1 Stage C Stack 4	2.2	1,174	0.0423	0.0869	0.0089	0.0007	0.0065	0.0000006
Dryer #2 Stage A Stack 1 & 2	18.0	11,052	0.3979	0.8178	0.0840	0.0066	0.0608	0.0000055
Dryer #2 Stage B Stack 3	6.0	3,747	0.1349	0.2773	0.0285	0.0022	0.0206	0.0000019
Dryer #2 Stage C Stack 4	2.2	1,174	0.0423	0.0869	0.0089	0.0007	0.0065	0.0000006
TOTAL	52.4	31,946.0	1.15	2.36	2.43E-01	1.92E-02	1.76E-01	1.60E-05

CO lb/hr Stack 2	CO lb/hr Stack 1	NOx lb/hr Stack 2	NOx lb/hr Stack 1	NOx tpy Stack 2	NOx tpy Stack 1	SO2 lb/hr Stack 2	SO2 lb/hr Stack 1
0.525	0.292	0.256	0.142	1.09	0.61	0.0043	0.002371

[a]Utilize Low NOx Burners
[b]Eclipse manufactuer assumes 1000 Btu/scf

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

			Ton per Year					
Description	Capacity (MMBtu/hr)	Throughput (scf/yr)	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	94,163,040	1.69	3.48	0.36	0.03	0.26	0.00
Dryer #1 Stage B Stack 3	51120	31,924,440	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	94,163,040	1.69	3.48	0.36	0.03	0.26	0.00
Dryer #2 Stage B Stack 3	51120	31,924,440	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	446,448.0	272,179,920.0	4.9	10.1	1.0E+00	8.2E-02	7.5E-01	6.8E-05

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)[a]	PM-10 Emissions (lb/hr)	PM-10 Emissions (T/yr)[a]	PM-2.5 Emissions (lb/hr)	PM-2.5 Emissions (T/yr)[a]
Dryer #1 Stage A Stack 1 & 2	2583.3	1.34E-04	Source Test conducted on 4/12/17	0.47	1.99	0.47	1.99	0.47	1.99
Dryer #1 Stage B Stack 3	2583.3	6.28E-05	Source Test conducted on 4/12/17	0.22	0.92	0.22	0.92	0.22	0.92
Dryer #1 Stage C Stack 4	2583.3	2.44E-05	Source Test conducted on 4/12/17	0.11	0.46	0.11	0.46	0.11	0.46
Dryer #2 Stage A Stack 1 & 2	2583.3	1.34E-04	Source Test conducted on 4/12/17	0.47	1.99	0.47	1.99	0.47	1.99
Dryer #2 Stage B Stack 3	2583.3	6.28E-05	Source Test conducted on 4/12/17	0.22	0.92	0.22	0.92	0.22	0.92
Dryer #2 Stage C Stack 4	2583.3	2.44E-05	Source Test conducted on 4/12/17	0.11	0.46	0.11	0.46	0.11	0.46
TOTAL*						1.58	6.74	1.58	6.74

[a] Ton per year emissions based on 8,520 hours of operation/yr
A safety factor of 32% or greater has been added to the lb/hr emissions to account for it not be being an approved source test as of yet.

COMBINED COMBUSTION AND PROCESS PARTICULATE EMISSIONS - DRYERS

Description	PM Emissions (lb/hr)	PM Emissions (T/yr)[a]	PM-10 Emissions (lb/hr)	PM-10 Emissions (T/yr)[a]	PM-2.5 Emissions (lb/hr)	PM-2.5 Emissions (T/yr)[a]
Dryer #1 Stage A Stack 1 & 2	0.55	2.35	0.55	2.35	0.55	2.35
Dryer #1 Stage B Stack 3	0.25	1.04	0.25	1.04	0.25	1.04
Dryer #1 Stage C Stack 4	0.12	0.49	0.12	0.49	0.12	0.49
Dryer #2 Stage A Stack 1 & 2	0.55	2.35	0.55	2.35	0.55	2.35
Dryer #2 Stage B Stack 3	0.25	1.04	0.25	1.04	0.25	1.04
Dryer #2 Stage C Stack 4	0.12	0.49	0.12	0.49	0.12	0.49
TOTAL*	1.8	7.8	1.8	7.8	1.8	7.8

PM 2.5 lb/hr Stack 2	PM2.5 lb/hr Stack 1	PM 2.5 tpy Stack 2	PM2.5 tpy Stack 1
0.35	0.20	1.51	0.84

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

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: August 17, 2017

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

FROM: Darrin Mehr, Analyst, Air Program

PROJECT: P-2010.0183 PROJ 61652 – Permit to Construct (PTC) Modification Application for Gem State Processing's PTC

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

Contents

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a Non-Carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
ACFM	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
ARM	Ambient Ratio Method
ASOS	Automated Surface Observing System
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
Btu/hr	British Thermal Units per hour
CAPCOA	California Air Pollution Control Officers Association
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
°F	Degrees Fahrenheit
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
ft	Feet
fps	Feet per second
Gem State	Gem State Processing, LLC
GEP	Good Engineering Practice
hr	Hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
m	Meters
m/s	Meters per second
MMBtu	Million British Thermal Units
MMBtu/hr	Million British Thermal Units per hour
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
OLM	Ozone Limiting Method
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers

$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	Parts Per Billion
PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit
PVMRM	Plume Volume Molar Ratio Method
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
Stantec	Stantec (Gem State's Permitting and Modeling Consultant)
TAP	Toxic Air Pollutant
tons/year	Ton(s) per year
T/yr	Tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VCU	Vapor Control Unit
VOCs	Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter

1.0 Summary

1.1 General Project Summary

DEQ received a Permit to Construct (PTC) application on January 21, 2016, to modify Gem State Processing's (Gem State's) PTC P-2010.0183, Project 61406, issued May 5, 2015. The project scope is to modify the existing PTC to allow a throughput increase for the two existing Wolverine dehydration lines. Also, the design of the ventilation system that houses these dehydration lines was altered following issuance of the current PTC. The facility constructed two rooftop exhaust fans instead of six rooftop exhaust fans that vent natural gas combustion byproducts from two air makeup units.

Air impact analyses for the proposed permit modification project also changed the stack systems serving identical and independently operating drum dryer dehydration process emissions units. Each separate drum dryer emissions unit currently exhausts through a separate drum dryer stack and a sniffer stack. Each of the six drum dryer flaker process units will be equipped with a single stack combining drum dryer fan hoods and sniffer fan exhaust streams into a single emission point with an increased release height of 100 feet above ground level.

This project also addresses changes to the two existing, independently-operated Wolverine dehydration lines. Each line has four 42-foot high stacks per the existing PTC. This project increases the allowable throughput rate for both lines combined from 21.7 finished tons product per day to 62.0 finished tons per day, and increases the required termination height to 60 feet above grade for each of these eight stacks.

Project-specific air quality impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility 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, Gem State's permitting and modeling consultant, submitted analyses and applicable information and data to enable DEQ to evaluate potential impacts to ambient air.

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 estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the facility as modeled were

below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) 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 ambient air impacts exceeding allowable TAPs 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
Drum Dryer and Bubble Sheet Dryer#1/Agglomerator and Wolverine Dehydration Lines Stacks Each drum dryer processing line consists of a drum fan hood exhaust stream and a sniffer exhaust stream. Each line's two existing point source stacks (drum fan hood and snifter) were combined into a single stack (current model ID DFH#1-DFH#6). Each of these six separate stacks was modeled 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 Agglomerator/Bubble Sheet Dryer #1 (PRE1) was modeled with a vertical and uninterrupted release at a height of 100 feet and an exit diameter of 2.67 feet. Current existing physical release parameters for each stack are: • Drum Fan Hood Stacks (DFH#1-DFH#6) 60 feet above grade and 3.17 feet in diameter; • Snifter Vent Stacks (SFD#1-SFD#6) 55 feet above grade and 1.5 feet in diameter; • Bubble Sheet Dryer #1/Agglomerator (PRE1) 65 feet above grade and 2.67 feet in diameter	The future stack configuration used physical dimensions that greatly enhance plume dispersion, reducing predicted ambient impacts. 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 to offset the increased pollutant emissions rates for certain emissions units. Exit diameters should not be larger than the listed values, without additional approved analyses. Stack exhaust exit velocity is reduced as exit diameter is increased, potentially increasing ambient impacts if a larger diameter stack were installed. • Drum Fan Hood/Snifter Stacks (DFH#1-DFH#6). Increase height to 100 feet above grade 42 inches in diameter. • Bubble Sheet Dryer #1/Agglomerator (PRE1). Increase height to 100 feet above grade and 32 inches diameter. • All eight stacks for Wolverine Dehydration Lines 1 and 2. Increase height to 60 feet above grade and stack diameters at the point of release to atmosphere are not to exceed the following values: WDRY1A1 and WDRY2A1: 2.67 feet each WDRY1A2 and WDRY2A2: 3.0 feet each WDRY1B and WDRY2B: 2.67 feet each WDRY1C and WDRY2C: 1.83 feet each
Product Throughput Increases for Two Existing Wolverine Dehydration Lines This project modeled increased PM_{10} and $PM_{2.5}$ emissions from the Wolverine Dehydration Lines 1 and 2 corresponding to increased requested throughput of potato product for both dehydration lines. Process throughput will be increased from 10.8 tons/day finished product to 31 tons/day finished product for each of the two lines.	The previous project accounted for natural gas combustion products, including PM_{10} and $PM_{2.5}$, at the equipment's rated combustion capacity. Potato product throughput was increased to approximately 3 times the level modeled in the initial PTC issued on March 5, 2015, under Project 61406. Emissions from these sources are the main drivers of the PM_{10} and $PM_{2.5}$ impact analyses, with 24-hour $PM_{2.5}$ impacts at nearly 90% of the NAAQS (including ambient background levels). Compliance with applicable air quality standards has not been demonstrated for emissions rates from release points that are greater than those used in these air impact analyses.
Exhaust Fans – Changes Between Project 61406 and 61652 Project 61406 for the initial PTC on the two Wolverine Dehydration Lines authorized Exhaust Fans EX15-EX20.	Equipment/emissions points have been altered from those listed in the analyses supporting P-2010.0083 PROJECT 61406, issued March 5, 2015.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES	
The as-built arrangement represented in this project reflects only EX15 and EX16.	Exhaust fans EX17, EX18, EX19, and EX20 were not installed for the initial Wolverine Dehydration Lines expansion project and will not be constructed for this project. All natural gas combustion emissions generated by air makeup units AMU-5 and AMU-6 are exhausted through EX15 and EX16 only. AMU-5 and AMU-6 are each rated at 9.0 mmBtu/hr heat input capacity.
Air Make-Units #1 through #6 Natural gas-fired air makeup units (AMUs) provide direct heating to the facility building interior. Emissions are vented through exhaust vents EX1-EX16. Process space heating is not needed year-round so modeled annual average emission rates were based on approximately 5,270 hour/year at the maximum hourly average emission rates.	An operational limitation was applied to the annual average emissions rates reflecting emissions that are roughly 40% below unlimited operations.
Silo Bin Vents #1, #2, #3, and #4 Only one of four silo bins is operational at any time. The air impact analyses reflected this limitation by modeling only a single vent (Bin Vent 1), representing 0.06 pound/hour of PM_{10} and $PM_{2.5}$ for the 24-hour average NAAQS, and 0.26 ton/year for all four vents in aggregate.	A constraint allowing operation of only one silo bin at any time limits $PM_{2.5}$ and PM_{10} emissions below the 0.24 pound/hour and 1.0 ton/year of emissions listed in the project's emissions inventory. Impacts from multiple silo bin vents emitting concurrently have not been analyzed, and compliance has not been demonstrated for such an operational scenario.
Release Orientation for Stacks All exhaust stacks except the four silo bin vents and the rail loadout baghouse vent were modeled as vertical uninterrupted releases.	Compliance with applicable air quality standards has not been demonstrated for the use of capped or horizontal releases of emissions, except for silo bin and rail loadout baghouse vents.
Emission Rates The emission rates listed in Tables 6 and 7 of this memo represent the maximum modeled emissions for each stack. Where several separate stacks exhaust emissions from the same process unit or drying line, no alternative scenarios were presented by the applicant to support compliance with the NAAQS.	Ambient impacts are dependent upon the modeled emission rates and the release parameters for each stack. Stack location and a given stack's release parameters are important considerations due to the effects of building-induced downwash, plume rise, and the distance of the stack to discrete receptors. NAAQS compliance has not been adequately demonstrated for NO_x and $PM_{2.5}$ emissions rates greater than the rates presented in the permittee's ambient air impact analyses for each individual emissions source.
Agglomerator/Bubble Sheet Dryer #1 Stack The Agglomerator/Bubble Sheet Dryer #1 stack was modeled with a volumetric flow rate of 25,000 ACFM. The April 2017 performance test report listed a 13,075 ACFM flow rate, based on an average of 3 runs at a production rate equal to approximately half of the average hourly production rate of 1.67 tons per hour (T/hr), which is based on the requested enforceable throughput of 40 tons per day averaged over 24 hours per day.	DEQ's performance test review and approval letter indicated that the emissions unit had been tested at 91% of the maximum normal operation level. The exit velocity is dependent upon the fan system providing 25,000 ACFM to achieve the momentum buoyancy to achieve enhanced dispersion of the exhaust plume. DEQ verified that 24-hour and annual $PM_{2.5}$ and 1-hour NO_2 NAAQS compliance was still predicted to occur at the lower volumetric flow rate.

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.

1.2 Summary of Submittals and Actions

March 5, 2015:	DEQ issued a final PTC to Gem State for a modification under P-2010.0083, PROJECT 61406.
April 28, 2015:	DEQ received a modeling protocol for the project from Stantec, on behalf of Gem State, via email.
June 5, 2015:	DEQ issued a modeling protocol approval letter to Stantec via email.
December 4, 2015:	DEQ requested an updated modeling protocol via email because more than 6 months would pass between protocol approval and submittal of the permit modification application.
December 11, 2015:	DEQ received an updated modeling protocol from Stantec via email.
January 21, 2016	DEQ received a modification PTC application from Stantec on behalf of Gem State to increase the permitted production throughput for two existing potato dehydration lines.
February 19, 2016	DEQ declared the permit application incomplete.
February 25, 2016	DEQ received a response to the incompleteness determination.
March 7, 2016	DEQ declared the application for the permit modification incomplete.
June 1, 2016	DEQ received a response from Stantec regarding the incompleteness determination.
September 22, 2016	DEQ declared the permit modification application complete.
December 9, 2016	Gem State requested a 60 day extension to the technical review and issuance of a facility draft permit package.
February 3, 2017	DEQ received an updated permit application from Stantec and Gem State Processing. Stack heights of 100 feet above grade were approved by the Federal Aviation Administration for multiple stacks at the Gem State facility.
March 6, 2017	Stantec and Gem State Processing submitted revised electronic modeling files to correct a stack base elevation and submitted justification documentation for release parameters for existing stacks.

May 4, 2017	DEQ issued the facility draft permit modification package to Gem State.
May 19, 2017	DEQ received facility draft comments from Gem State and Stantec. The comments included revised modeling files and a revised modeling report. Natural gas-fired dryer heat input rates were switched between Wolverine Dehydration Line stacks Stage A stacks 1 and 2 for each line, which affects all criteria air pollutant and TAPs emission rates modeled. $PM_{2.5}$ and PM_{10} emissions for Wolverine dehydration lines were altered to reflect April 2017 performance test emission rates and release parameters. These revisions required the dispersion modeling for all pollutants and averaging periods be rerun.
August 16, 2017:	The public comment closed. DEQ received no public comments.

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 applicable emissions from the new source or modification not cause or significantly contribute to a violation of an air quality standard, and Idaho Air Rules Section 203.03 requires that emissions from a new source or modification comply with applicable toxic air pollutant (TAP) increments of Idaho Air Rules Sections 585 and 586.

2.2 Project Location and Area Classification

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

2.3 Modeling Applicability for Criteria Pollutants

This section describes the applicability requirements for providing a demonstration of compliance with air quality standards.

2.3.1 Below Regulatory Concern and DEQ Modeling Guideline Level I and II Thresholds

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 project-wide potential to emit (PTE) values for criteria pollutants would qualify for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more criteria pollutants exceeding the BRC threshold of 10% of emissions defined by Idaho Air Rules as significant, then an air impact analysis may not be required

for those pollutants. DEQ's regulatory interpretation policy[1] of exemption provisions of Idaho Air Rules Section 221 is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant." The interpretation policy also states that the exemption criteria of uncontrolled PTE not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. This permitting project cannot qualify for a BRC exemption from Idaho Air Rules Section 203.02 because there are existing permit conditions that require changes; therefore, the project could not qualify for a BRC exemption regardless of the emissions quantities.

Site-specific air impact analyses may not be required for a project, even when the project cannot use the BRC exemption from the NAAQS demonstration requirements. 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[2]," 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 were 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 DEQ approval for use; 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.

Modeling applicability is established on a project-specific basis. This project addresses a request for a product throughput increase to two independently operated dehydration lines, which were issued a PTC on March 5, 2015. Changes to the stack release parameters were also part of this project's proposed scope.

This project required modeling for emissions increases in PM_{10} and $PM_{2.5}$ resulting from increased throughput to the Wolverine dehydration lines. The Wolverine Dehydration Lines emit particulate matter and all natural gas products of combustion, including TAPs. Gem State modeled facility-wide emissions of PM_{10}, $PM_{2.5}$, NOx, and SO_2 because of proposed changes to physical release parameters for some sources at the facility. The six combined drum dryer and sniffer vent stacks and the existing Bubble Sheet Dryer #1/Agglomerator release parameters will not be altered in this project.

Permit- allowable CO emissions of 14.5 pound/hour were below the *Idaho Air Modeling Guideline* Level I modeling threshold of 15 pound/hour and were not modeled. The application requested allowable SO_2 emissions at 0.15 pound/hour and 0.58 ton/year, which are below the modeling thresholds of 0.21 pound/hour and 1.2 ton/year. Although facility-wide allowable emissions for SO_2 are below the Level I thresholds and there is no requirement to model SO_2 for this project, the applicant chose to model SO_2 emissions to demonstrate NAAQS compliance.

2.3.2 Ozone Modeling Applicability

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the

atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NO_x, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.3.3) cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Addressing secondary formation of O_3 has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

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

Allowable facility-wide emissions estimates of VOCs of 4.6 ton/year and 42.6 ton/year of NOx are well below the 100 ton/year threshold, and DEQ determined it was not appropriate or necessary to require a quantitative source specific O_3 impact analysis.

2.3.3 Secondary Particulate Formation Modeling Applicability

The impact from secondary particulate formation resulting from emissions of NOx, SO_2, and/or VOCs was assumed by DEQ to be negligible based on the magnitude of emissions and the short distance from emissions sources to modeled receptors where maximum PM_{10} and $PM_{2.5}$ impacts would be anticipated.

2.4 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 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]	70 ppb[w]	Not typically modeled

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

If the cumulative NAAQS impact analysis 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) specific applicable criteria pollutant emissions increases are at a level defined as Below Regulatory Concern (BRC), using the criteria established by DEQ regulatory interpretation[1]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling 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 d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 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. The DEQ permit writer evaluates the applicability of specific TAPs to the

Section 210.20 exclusion.

Carcinogenic TAPs modeling was triggered for this project. Changes to the point source stack release parameters for the eight stacks dedicated to the two Wolverine dehydration lines were the basis for requiring the requested allowable TAPs emissions to be modeled using the release parameters established in this project. The key change in parameters is an increase in stack release height from 42 feet above grade to 60 feet above grade.

3.0 Analytical Methods and Data

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, in combination with DEQ's 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 3 provides a brief description of parameters used in the modeling analyses.

Table 3. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Burley, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 16216r.
Meteorological Data	Burley	2008-2012—See Section 3.3 of this memorandum. Surface and ASOS data from the Burley airport and upper air data from Boise, Idaho.
Terrain	Considered	Receptor elevations were determined using USGS 1/3 arc second National Elevation Dataset (NED) files based on the NAD83 datum. The facility is located within Zone 12.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility and appropriate nearby structures.
Receptor Grid	**Criteria Air Pollutants and Toxic Air Pollutants**	
	Grid 1	10-meter spacing exterior along the ambient air boundary.
	Grid 2	10-meter spacing in a grid measuring 550 meters (x) by 530 meters (y) centered on the facility.
	Grid 3	25-meter spacing in a 575-meter (x) by 550-meter (y) grid centered on Grid 2. This provided a single row of receptors on the western, eastern, and southern boundaries of the facility.
	Grid 4	50-meter spacing in an 800-meter (x) by 750-meter (y) grid centered on Grid 3.
	Grid 5	100-meter spacing in a 1,200-meter (x) by 1,200-meter (y) grid centered on Grid 4.
	Grid 6	250-meter spacing in a 2,750-meter (x) by 2,500-meter (y) grid centered on Grid 5.
	Grid 7	500-meter spacing in a 6,000-meter (x) by 5,750-meter (y) grid centered on Grid 6.

3.1.2 *Modeling Protocol*

Stantec, on behalf of Gem State, submitted a modeling protocol to DEQ on April 28, 2015. DEQ issued a modeling protocol approval letter via email on June 5, 2015. DEQ later requested an updated modeling protocol because over six months had passed between submittal of the first protocol and receipt of the permit application. Stantec submitted a second modeling protocol with revisions to the project on December 11, 2015. The project's permit application was submitted on January 21, 2016, prior to issuance of a DEQ protocol approval letter (obtaining DEQ approval for a protocol is not required by Idaho Air Rules). Project-specific modeling was conducted using data and methods described in the modeling protocol and the *Idaho Air Modeling Guideline*[2].

3.1.3 *Model Selection*

Idaho Air Rules Section 202.02 requires that estimates of air pollutant concentrations in ambient air 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.

Stantec used AERMOD version 16216r to evaluate pollutant impacts to ambient air from the facility. Version 16216r is the current version of the AERMOD.

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 Ambient Ratio Method (ARM) assumes a 0.80 default ambient ratio of NO_2/NOx. Tier 2 ARM2[3] was recently developed for demonstrating compliance with the 1-hour NO_2 standard. Per the most recent EPA guidance[4] on compliance methods for the 1-hour NO_2 NAAQS:

> "This method is based on an evaluation of the ratios of NO_2/NO_x from the EPA's Air Quality System (AQS) record of ambient air quality data. The ARM2 development report (API, 2013) specifies that ARM2 was developed by binning all the AQS data into bins of 10 ppb increments for NO_x values less than 200 ppb and into bins of 20 ppb for NO_x in the range of 200-600 ppb. From each bin, the 98th percentile NO_2/NO_x ratio was determined and finally, a sixth-order polynomial regression was generated based on the 98th percentile ratios from each bin to obtain the ARM2 equation, which is used to compute a NO_2/NO_x ratio based on the total NO_x levels."

Tier 3 methods account for more refined assessment of the NO to NO_2 conversion, using a supplemental modeling program 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 for the Tier 3 approach. 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 2 ARM2 and Tier 3 PVMRM and OLM methods are now regulatory options following the publication of final changes to EPA's Guideline on Air Quality Models on January 17, 2017.

The applications 1-hour NO_2 NAAQS compliance demonstration was based on the Tier 3 PVMRM approach. Stantec justified the use of PVMRM in the modeling report, and DEQ determined PVMRM is the more appropriate method for the facility, which will have a combination of NOx-emitting stacks near rooftop level for the exhaust vents and tall stacks for the three boilers and the Agglomerator/Bubble Sheet Dryer #1 stack.

Based on EPA's changes to the regulatory status of PVMRM, specific approval of PVMRM as a non-guideline method is no longer needed; however, DEQ will have review and approval responsibility of any non-default NO_2 to NO_x in-stack ratios (ISRs) used for the analyses.

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

Stantec used Tier 3 PVMRM for the 1-hour NO_2 NAAQS analyses. As listed in Table 4, Stantec applied NO_2/NO_x in-stack ratios (ISRs) of 0.10 for each of the three natural gas-fired boilers and 0.20 for all other natural gas combustion sources. DEQ determined these ratios are appropriate for the modeled sources.

NO_2/NO_x ISRs used by Stantec were obtained from the *Modeling Compliance of the Federal 1-Hour NO_2 NAAQS, CAPCOA Guidance Document*, Appendix C-In-Stack NO_2/NOx Ratios, California Air Pollution Control Officers Association, October 27, 2011. The default value for natural gas-fired boilers is 0.10, and the default value for natural gas-fired dryers and air makeup units is 0.20.

Table 4. PARAMETERS AND DATA FOR PVMRM

Parameter	Value	Sources	Comments
NO_2/NOx ratio for In-Stack Emissions	0.10	Boilers 1, 2, and 3	0.5 is an EPA-suggested default value when source-specific data are not available.
	0.20	All other sources--including: • Air Makeup Units 1 through 5 venting though Exhaust Fans EX1 through EX16 • Wolverine Dehydration Lines 1 and 2, and • Agglomerator/Bubble Sheet Dryer 1	
Ambient Equilibrium Ratio for NO_2/NOx	0.90	All	Default value.
O_3 Concentrations	54 ppb	All	Annualized value obtained from NW AIRQUEST ambient background lookup tool.

3.2 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. The background concentration is added to the design value for each pollutant and averaging period.

Stantec proposed ambient background values in the April 28, 2015, modeling protocol for this project based on the NW AIRQUEST data. DEQ approved the values proposed by Stantec in the June 5, 2015, conditional modeling protocol approval letter. The background values are listed in Table 5.

Table 5. DEQ-RECOMMENDED AMBIENT BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
$PM_{2.5}$[b]	24-hour	13
	Annual	4.3
PM_{10}[c]	24-hour	73[g]
SO_2[d]	1-hour	3.9 (1.5 ppb[h])
NO_2[e]	1-hour	32 (17 ppb)
	Annual	5.8 (3.1 ppb)
Ozone (for Tier 3 PVMRM[f])	Annual	54 ppb

a. Micrograms per cubic meter, except where noted otherwise.
b. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
c. Particulate matter with a mean aerodynamic diameter of 10 microns or less.
d. Sulfur dioxide.
e. Nitrogen dioxide.
f. Plume Volume Molar Ratio Method.
g. Extreme values removed.
h. Parts per billion.

3.3 Meteorological Data

DEQ provided Stantec with a model-ready meteorological dataset processed from Burley surface data and ASOS station data from the Burley airport that is used for data fill. The data record spanned 2008 through 2012. Contemporaneous data from the National Weather Service (NWS) site near the Boise airport was used for the upper air data. Burley surface data and Boise upper air data were processed using AERMET version 11059. DEQ determined these data were reasonably representative for the Gem State site and approved use of this dataset for this project. Future projects must use more recent Burley surface data and Boise upper air data with those data processed by a current version of AERMET. Surface characteristics including albedo, surface roughness length, and Bowen ratio for use in running AERMET were calculated for the dataset using AERSURFACE Version 13016. AERMINUTE was used to process the one-minute ASOS data used for filling missing NWS data. A minimum threshold wind velocity of 0.5 meters per second was specified for processing.

A wind rose of the meteorological dataset is shown in Figure 1. A histogram of various wind speed groups showing the frequency of certain wind speeds is shown in Figure 2.

Figure 1. 2008-2012 Burley Airport Surface and ASOS Fill Wind Rose

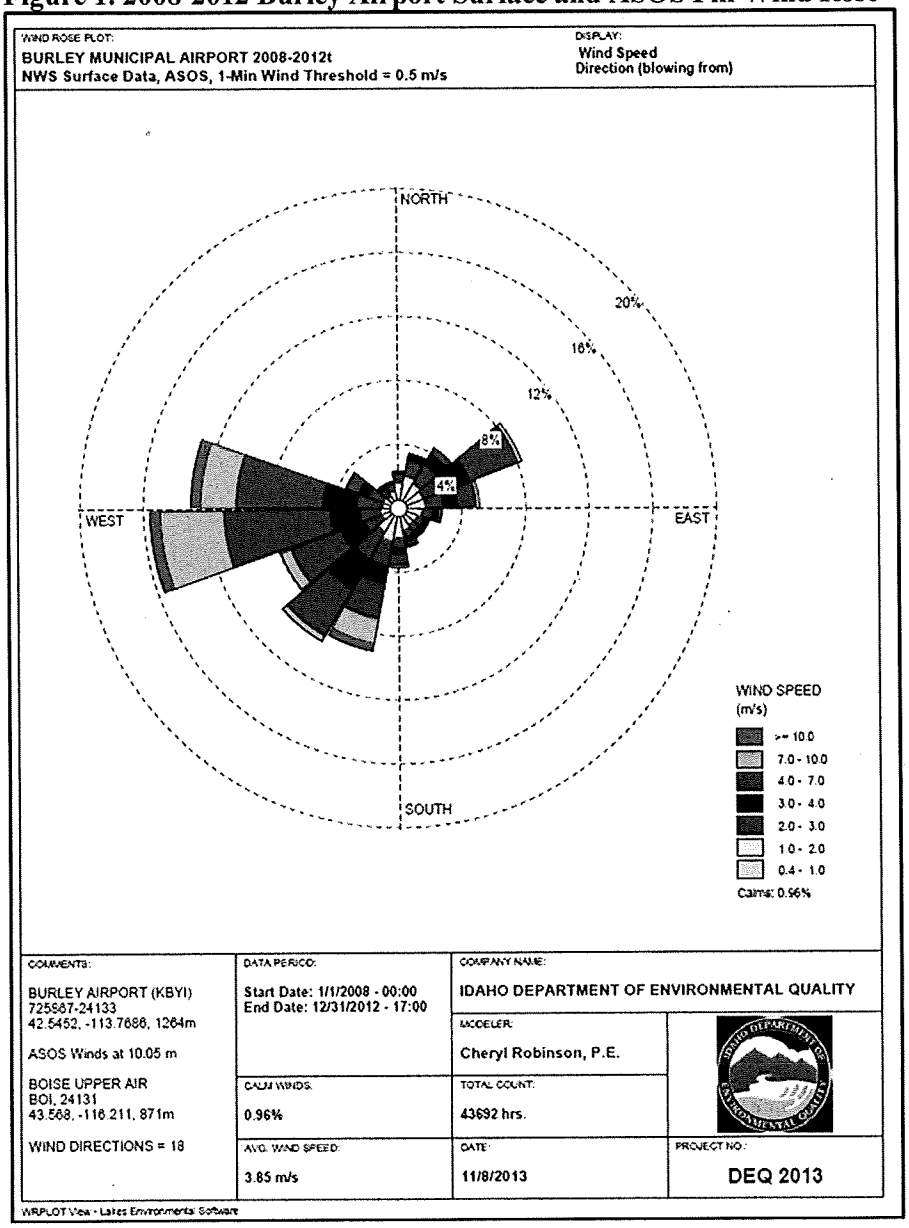
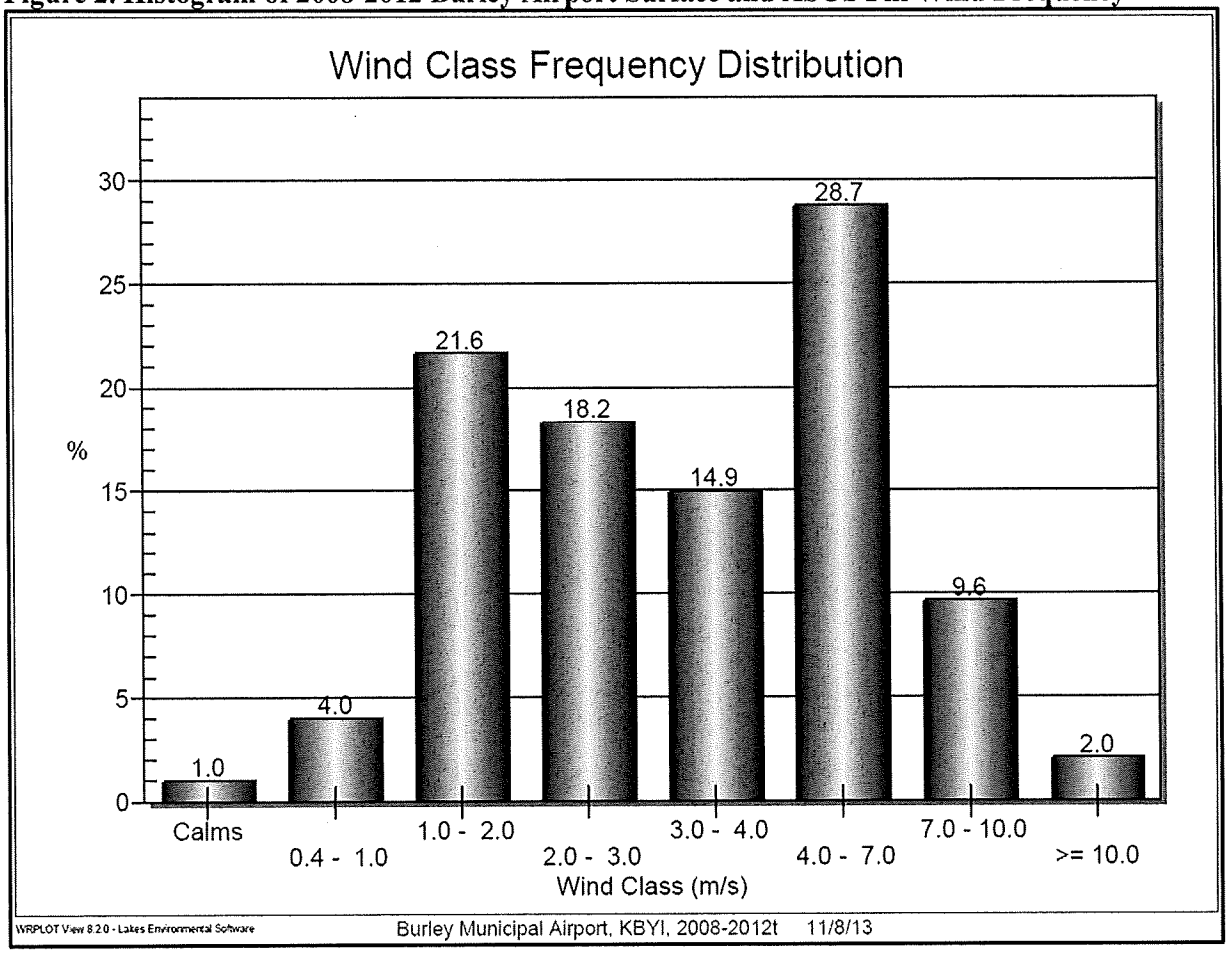


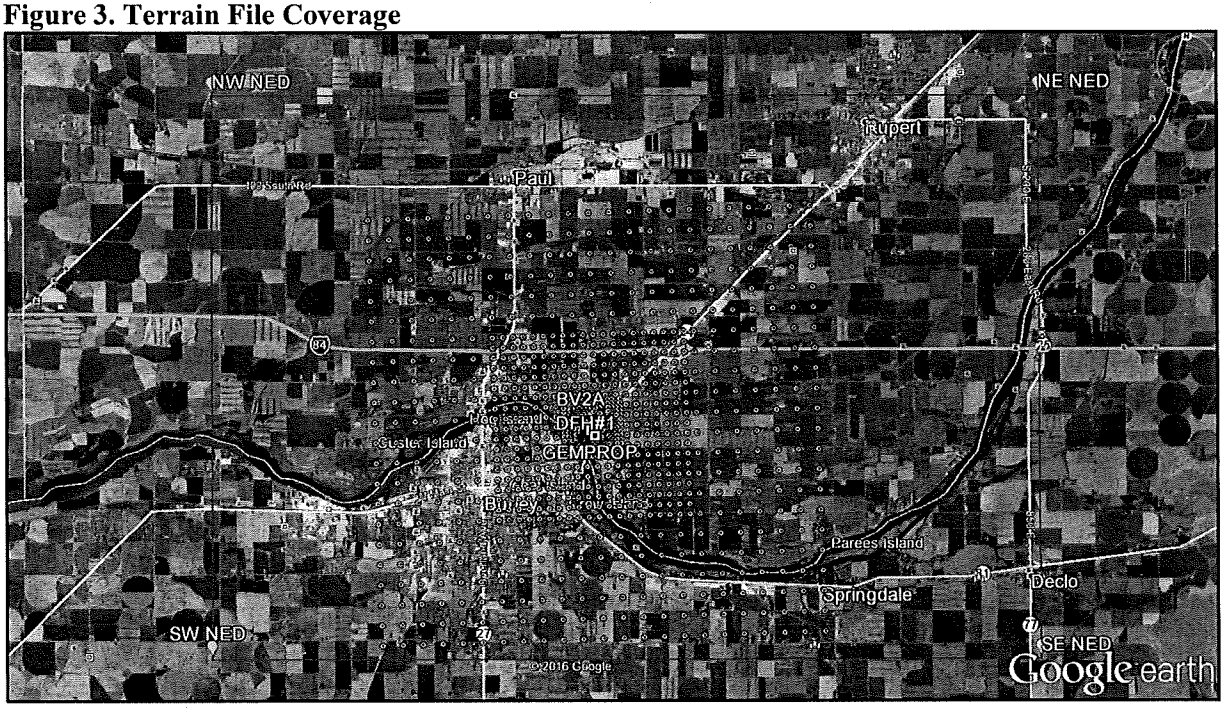
Figure 2. Histogram of 2008-2012 Burley Airport Surface and ASOS Fill Wind Frequency



3.4 Terrain Effects

Stantec used a National Elevation Dataset (NED) file, in "tif" format and in the NAD83 datum, to calculate elevations of receptors. The 1/3rd arc second file provided 10-meter horizontal resolution of elevation data. The terrain preprocessor AERMAP version 11103 was used to extract the elevations from the NED file for 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. The extents of the terrain coverage are shown in Figure 3.

Figure 3. Terrain File Coverage



3.5 *Building Downwash Effects on Modeled Impacts*

Potential downwash effects on emissions plumes were accounted for in the model by using building dimensions 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 for input to AERMOD. DEQ review concluded that the building downwash was appropriately evaluated.

3.6 *Facility Layout*

Figures 4 and 5 below show the facility's emission sources and all structures in the air impact modeling analyses. Stack locations appeared to be appropriately located when compared to the July 2013 Google Earth® imagery. DEQ compared source, building, and ambient air boundary locations to an updated June 2016 image. The modeled facility layout appeared to match well with Google Earth® images.

Figure 4. Gem State Processing Facility Layout

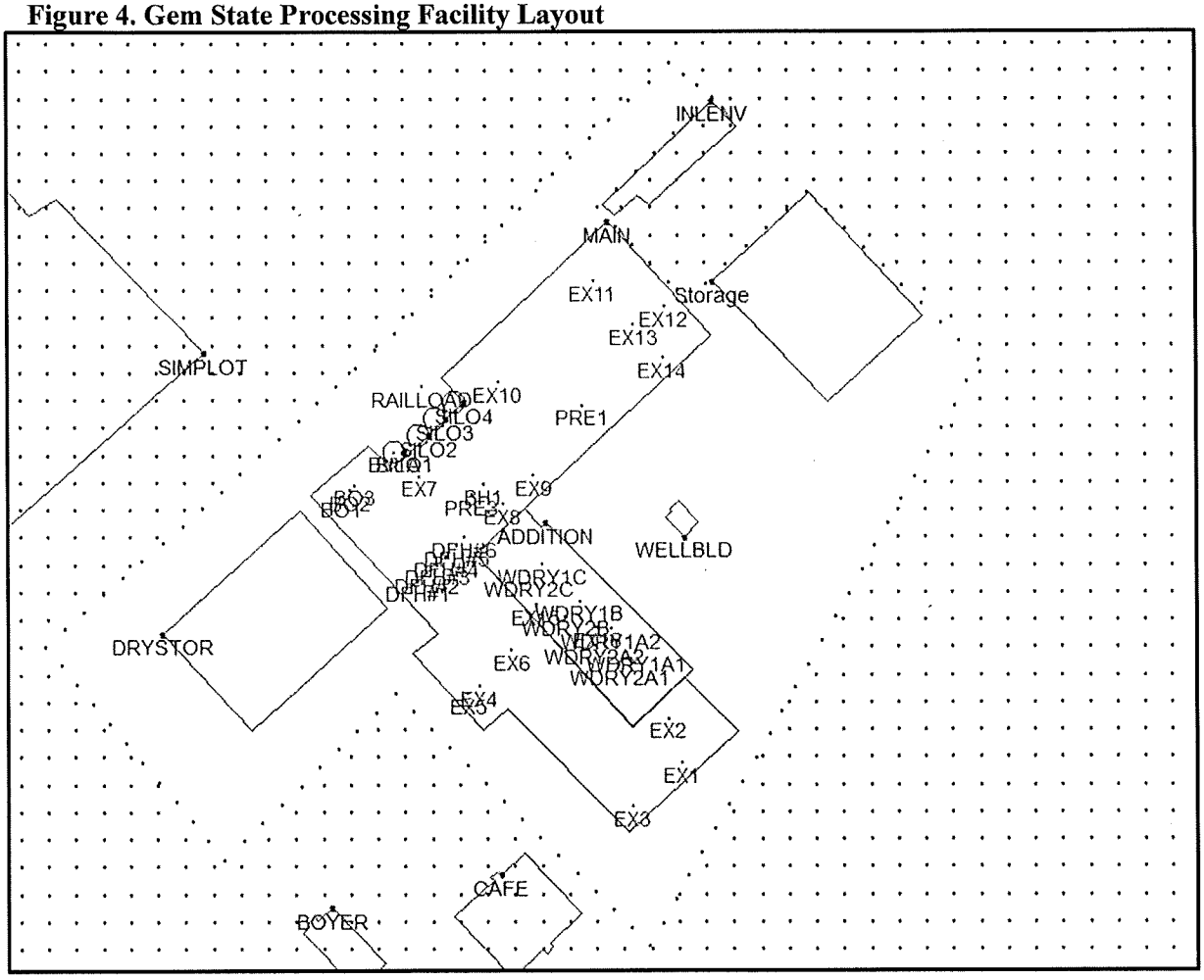
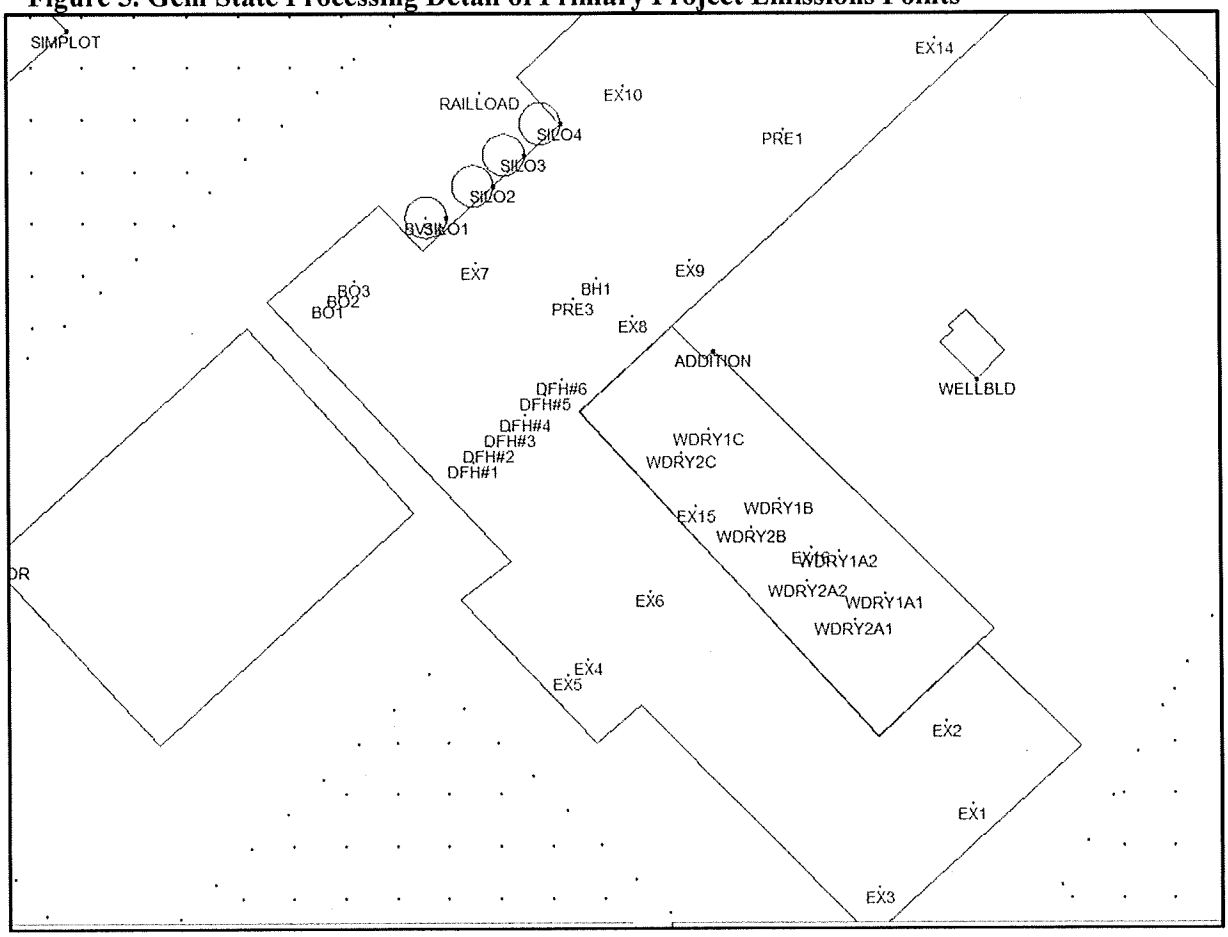


Figure 5. Gem State Processing Detail of Primary Project Emissions Points



3.7 *Ambient Air Boundary*

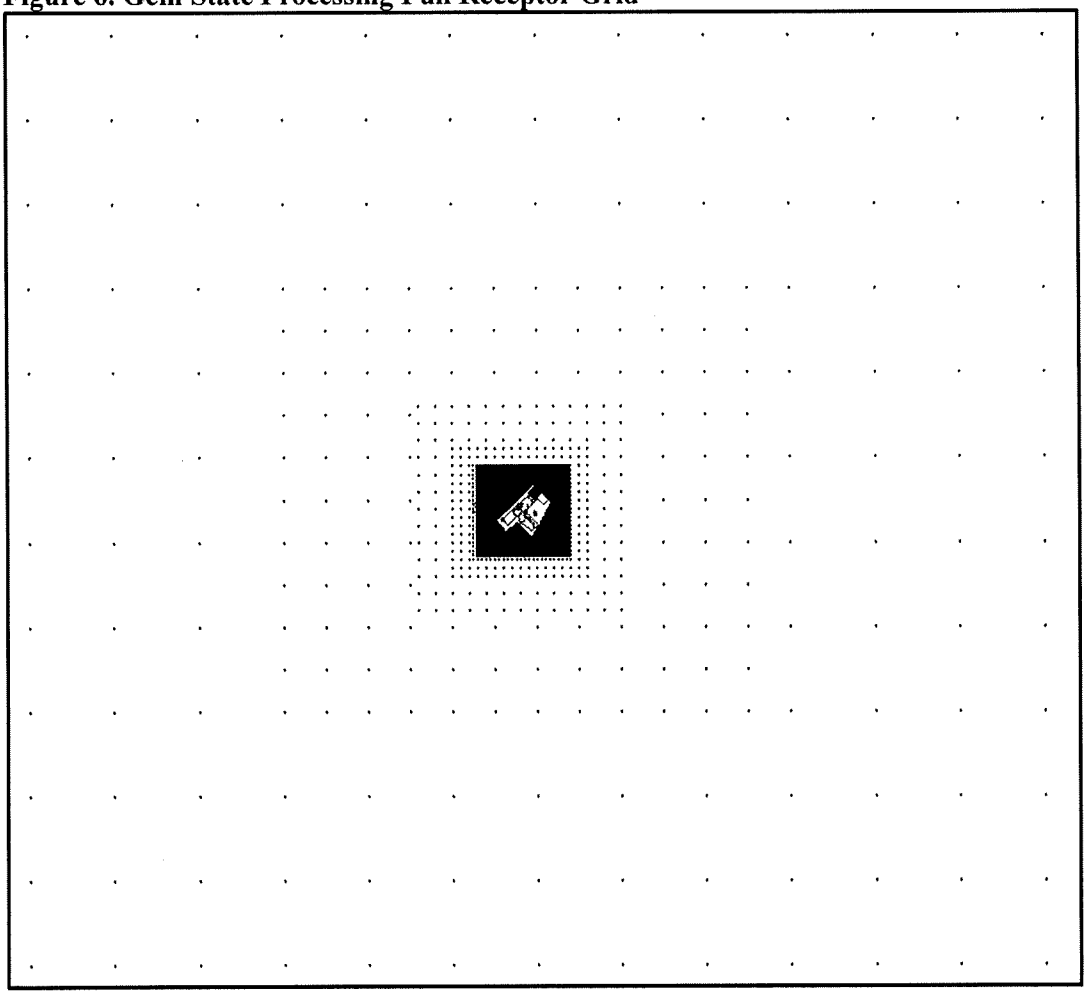
The ambient air boundary for this project was supported by documentation in Stantec's February 17, 2015 submittal. An August 2, 2013, memorandum originally submitted by JBR Environmental (now Stantec) for a previous Gem State permitting project's ambient air boundary expansion, provides the basis for the current project's ambient air boundary. The ambient air boundary was not changed for this project.

Gem State stated they lease property from the Boyer Company and Eastern Idaho Railroad, LLC, to expand their ambient air boundary. Access to leased property must be controlled exclusively by the lessee (Gem State), and access control measures must effectively preclude public access to the leased property excluded from ambient air. Air quality permitting regulations consider the "public" as anyone not under direct control of the facility. Gem State has asserted that the lease agreements will provide them with 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 determined the ambient air boundary described uses appropriate methods to control access as described in DEQ's *Modeling Guideline*[2].

3.8 Receptor Network

Table 3 describes the receptor network used in the submitted modeling analyses. The receptor grids used in the model provided sufficient resolution of the maximum design concentrations for the project. DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations. The complete extent of the receptor grid is depicted below in Figure 6.

Figure 6. Gem State Processing Full Receptor Grid



3.9 Emission Rates

Review and approval of estimated emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emissions estimates is not addressed in this modeling review memorandum.

Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, should be

reviewed by the DEQ permit writer and compared with those in the final emissions inventory. All modeled criteria air pollutant and TAP emissions rates must be equal to or greater than the facility's potential emissions calculated in the PTC emissions inventory or proposed permit allowable emissions rates.

3.9.1 Criteria Pollutant Emissions Rates for Significant Impact Level and Cumulative Analyses

Cumulative NAAQS analyses were conducted to demonstrate compliance with the applicable NAAQS. Significant impact level (SIL) analyses were not used as preliminary screening analyses.

Table 6 lists criteria pollutant continuous (24 hour/day) emissions rates used to evaluate NAAQS compliance for standards with averaging periods of 24 hours or less. Table 7 lists criteria pollutant continuous (8,760 hour/year) emissions rates used to evaluate NAAQS compliance for standards with an annual averaging period. These modeled rates must be equal or greater than permit allowable facility-wide emissions for the listed averaging period.

Table 6. 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)	SO_2[e] (lb/hr)
DFH#1	Drum fan hood & snifter fan #1	0.73	0.73	0.0	0.0
DFH#2	Drum fan hood & snifter fan #2	0.73	0.73	0.0	0.0
DFH#3	Drum fan hood & snifter fan #3	0.73	0.73	0.0	0.0
DFH#4	Drum fan hood & snifter fan #4	0.73	0.73	0.0	0.0
DFH#5	Drum fan hood & snifter fan #5	0.73	0.73	0.0	0.0
DFH#6	Drum fan hood & snifter fan #6	0.73	0.73	0.0	0.0
WDRY1A1	Wolverine Dehydrator #1 Stage A Stack 1	0.20	0.20	0.14	0.0024
WDRY2A1	Wolverine Dehydrator #2 Stage A Stack 1	0.20	0.20	0.14	0.0024
WDRY1A2	Wolverine Dehydrator #1 Stage A Stack 2	0.35	0.35	0.26	0.0043
WDRY2A2	Wolverine Dehydrator #2 Stage A Stack 2	0.35	0.35	0.26	0.0043
WDRY1B	Wolverine Dehydrator #1 Stage B	0.25	0.25	0.14	0.0022
WDRY2B	Wolverine Dehydrator #2 Stage B	0.25	0.25	0.14	0.0022
WDRY1C	Wolverine Dehydrator #1 Stage C	0.12	0.12	0.042	7.0E-04
WDRY2C	Wolverine Dehydrator #2 Stage C	0.12	0.12	0.042	7.0E-04
EX1	Exhaust vent #1	0.044	0.044	0.29	0.0035
EX2	Exhaust vent #2	0.044	0.044	0.29	0.0035
EX3	Exhaust vent #3	0.044	0.044	0.29	0.0035
EX4	Exhaust vent #4	0.013	0.013	0.085	0.0010
EX5	Exhaust vent #5	0.013	0.013	0.085	0.0010
EX6	Exhaust vent #6	0.044	0.044	0.29	0.0035
EX7	Exhaust vent #7	0.0028	0.0028	0.018	2.20E-04
EX8	Exhaust vent #8	0.0049	0.0049	0.032	3.85E-04
EX9	Exhaust vent #9	0.0049	0.0049	0.032	3.85E-04
EX10	Exhaust vent #10	0.012	0.012	0.079	9.50E-04
EX11	Exhaust vent #11	0.012	0.012	0.079	9.50E-04
EX12	Exhaust vent #12	0.012	0.012	0.079	9.50E-04
EX13	Exhaust vent #13	0.013	0.013	0.085	0.00102
EX14	Exhaust vent #14	0.013	0.013	0.085	0.00102
EX15	Exhaust vent #15	0.067	0.067	0.44	0.0053
EX16	Exhaust vent #16	0.067	0.067	0.44	0.0053
PRE1	Bubble sheet dryer #1	0.76	0.76	0.69	0.0040
PRE3	Pneumatic conveying	0.060	0.060	0.0	0.0

Table 6. 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)**	**SO_2[e] (lb/hr)**
BH1	Nuisance dust collector	0.00030	0.00030	0.0	0.0
BO1	Boiler #1	0.048	0.048	1.74	0.027
BO2	Boiler #2	0.048	0.048	1.74	0.027
BO3	Boiler #3	0.065	0.065	2.32	0.0043
BV1A	Silo bin vent baghouse #1	0.060	0.060	0.0	0.0
RAILLOAD	Rail line load out baghouse vent	0.060	0.060	0.0	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.
e. Sulfur dioxide.

Table 7. 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 Dehydrator #1 Stage A Stack 1	0.19	0.14
WDRY2A1	Wolverine Dehydrator #2 Stage A Stack 1	0.19	0.14
WDRY1A2	Wolverine Dehydrator #1 Stage A Stack 2	0.34	0.25
WDRY2A2	Wolverine Dehydrator #2 Stage A Stack 2	0.34	0.25
WDRY1B	Wolverine Dehydrator #1 Stage B	0.24	0.13
WDRY2B	Wolverine Dehydrator #2 Stage B	0.24	0.13
WDRY1C	Wolverine Dehydrator #1 Stage C	0.11	0.041
WDRY2C	Wolverine Dehydrator #2 Stage C	0.11	0.041
EX1	Exhaust vent #1	0.026	0.17
EX2	Exhaust vent #2	0.026	0.17
EX3	Exhaust vent #3	0.026	0.17
EX4	Exhaust vent #4	0.0078	0.051
EX5	Exhaust vent #5	0.0078	0.051
EX6	Exhaust vent #6	0.026	0.17
EX7	Exhaust vent #7	0.0017	0.011
EX8	Exhaust vent #8	0.0029	0.019
EX9	Exhaust vent #9	0.0029	0.019
EX10	Exhaust vent #10	0.0072	0.048
EX11	Exhaust vent #11	0.0072	0.048
EX12	Exhaust vent #12	0.0072	0.048
EX13	Exhaust vent #13	0.0078	0.051
EX14	Exhaust vent #14	0.0078	0.051
EX15	Exhaust vent #15	0.040	0.27
EX16	Exhaust vent #16	0.040	0.27
PRE1	Bubble sheet dryer #1	0.74	0.67
PRE3	Pneumatic conveying	0.058	0.0

Table 7. LONG-TERM EMISSIONS RATES USED IN MODELING ANALYSES			
Modeled Emissions Point	**Description**	**$PM_{2.5}$[a] (lb/hr)[b]**	**NO_x[c] (lb/hr)**
BH1	Nuisance dust collector	0.00029	0.0
BO1	Boiler #1	0.048	1.70
BO2	Boiler #2	0.048	1.70
BO3	Boiler #3	0.062	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.

3.9.2 Toxic Air Pollutant Emissions

The increase in emissions from the proposed project must demonstrate compliance with toxic air pollutant (TAP) increments (AACs or AACCs). TAPs emissions occur from natural gas combustion in the two Wolverine dehydration lines (56.8 MMBtu/hour) and natural gas combustion in Air Makeup Units 5 and 6 (18 MMBtu/hour) vented through rooftop exhaust vents #15 and #16.

Four TAPs with emission rates exceeding the carcinogenic TAP ELs were modeled for the proposed project. Hourly TAPs emission rates listed in Table 8 were modeled for 8,760 hours per year. The hourly emission rates reflect total annual emissions averaged uniformly over 8,760 hours per year.

Table 8. EMISSIONS RATES USED IN TAPs MODELING ANALYSES					
Emissions Point	**Description**	**Arsenic (lb/hr)[a]**	**Cadmium (lb/hr)**	**Formaldehyde (lb/hr)**	**Nickel (lb/hr)**
WDRY1A1	Wolverine Dehydrator #1 Stage A Stack 1	7.69E-07	4.23E-06	2.88E-04	8.07E-06
WDRY2A1	Wolverine Dehydrator #2 Stage A Stack 1	7.69E-07	4.23E-06	2.88E-04	8.07E-06
WDRY1A2	Wolverine Dehydrator #1 Stage A Stack 2	1.38E-06	7.60E-06	5.18E-04	1.45E-05
WDRY2A2	Wolverine Dehydrator #2 Stage A Stack 2	1.38E-06	7.60E-06	5.18E-04	1.45E-05
WDRY1B	Wolverine Dehydrator #1 Stage B	7.29E-07	4.01E-06	2.73E-04	7.65E-06
WDRY2B	Wolverine Dehydrator #2 Stage B	7.29E-07	4.01E-06	2.73E-04	7.65E-06
WDRY1C	Wolverine Dehydrator #1 Stage C	2.28E-07	1.26E-06	8.56E-05	2.40E-06
WDRY2C	Wolverine Dehydrator #2 Stage C	2.28E-07	1.26E-06	8.56E-05	2.40E-06
EX15	Exhaust vent #15	1.06E-06	5.84E-06	3.98E-04	1.11E-05
EX16	Exhaust vent #16	1.06E-06	5.84E-06	3.98E-04	1.11E-05

a. Pounds per hour.

3.10 Emission Release Parameters

Tables 9 and 10 list emissions release parameters for modeled sources for the Gem State facility.

Table 9. POINT SOURCE EMISSIONS RELEASE PARAMETERS							
Release Point	Description	Universal Transverse Mercator Coordinates[a]		Stack Height (m)	Modeled Diameter (m)	Stack Gas Temp[b] (K)[d]	Stack Flow Velocity (m/s)[e]
		Easting (x) (m)[c]	Northing (y) (m)				
DFH#1	Drum fan hood & snifter fan #1	273,385.0	4,714,654.0	30.48	1.07	321.5	18.48
DFH#2	Drum fan hood & snifter fan #2	273,388.0	4,714,657.0	30.48	1.07	321.5	18.48
DFH#3	Drum fan hood & snifter fan #3	273,392.0	4,714,660.0	30.48	1.07	321.5	18.48
DFH#4	Drum fan hood & snifter fan #4	273,395.0	4,714,663.0	30.48	1.07	321.5	17.16
DFH#5	Drum fan hood & snifter fan #5	273,399.0	4,714,667.0	30.48	1.07	321.5	18.48
DFH#6	Drum fan hood & snifter fan #6	273,402.0	4,714,670.0	30.48	1.07	321.5	18.48
WDRY1A1	Wolverine Dehydrator #1 Stage A Stack 1	273,464.3	4,714,628.57	12.80	0.89	338.15	8.77 (7.56)[f]
WDRY2A1	Wolverine Dehydrator #2 Stage A Stack 1	273,458.3	4,714,623.54	12.80	0.89	338.15	8.77 (7.56)[f]
WDRY1A2	Wolverine Dehydrator #1 Stage A Stack 2	273,455.4	4,714,636.64	12.80	0.79	364.82	7.55 (6.93)[f]
WDRY2A2	Wolverine Dehydrator #2 Stage A Stack 2	273,449.3	4,714,631.02	12.80	0.79	364.82	7.55 (6.93)[f]
WDRY1B	Wolverine Dehydrator #1 Stage B	273,443.9	4,714,646.86	12.80	0.79	352.59	14.77 (13.56)[f]
WDRY2B	Wolverine Dehydrator #2 Stage B	273,438.5	4,714,641.39	12.80	0.79	352.59	14.77 (13.56)[f]
WDRY1C	Wolverine Dehydrator #1 Stage C	273,430.5	4,714,660.26	12.80	0.53	342.04	12.59 (13.81)[f]
WDRY2C	Wolverine Dehydrator #2 Stage C	273,425.1	4,714,655.79	12.80	0.53	342.04	12.59 (13.81)[f]
EX1	Exhaust vent #1	273,481.0	4,714,588.0	11.83	1.12	299.82	11.63
EX2	Exhaust vent #2	273,476.0	4,714,604.0	11.83	1.12	299.82	11.63
EX3	Exhaust vent #3	273,463.0	4,714,572.0	11.83	1.12	299.82	11.63
EX4	Exhaust vent #4	273,403.0	4,714,613.0	11.58	0.76	299.82	7.39
EX5	Exhaust vent #5	273,407.0	4,714,616.0	11.83	0.76	299.82	7.39
EX6	Exhaust vent #6	273,419.0	4,714,629.0	11.58	1.12	299.82	11.63
EX7	Exhaust vent #7	273,385.6	4,714,692.25	11.49	0.61	299.82	6.47
EX8	Exhaust vent #8	273,415.9	4,714,682.06	11.55	0.76	299.82	7.24
EX9	Exhaust vent #9	273,427.1	4,714,692.76	11.55	0.76	299.82	7.24
EX10	Exhaust vent #10	273,414.3	4,714,726.45	10.94	1.22	299.82	6.99
EX11	Exhaust vent #11	273,449.2	4,714,763.23	10.91	1.22	299.82	6.99
EX12	Exhaust vent #12	273,475.0	4,714,754.0	10.88	1.22	299.82	6.99
EX13	Exhaust vent #13	273,463.8	4,714,747.27	11.00	1.22	299.82	7.50
EX14	Exhaust vent #14	273,474.5	4,714,735.48	11.00	1.22	299.82	7.50
EX15	Exhaust vent #15	273,428.0	4,714,645.42	10.97	0.69	305.37	15.40
EX16	Exhaust vent #16	273,450.1	4,714,637.36	10.97	0.69	305.37	15.40
PRE1	Bubble sheet dryer 1	273,445.0	4,714,718.0	30.48	0.81	328.15	22.68
PRE3	Pneumatic conveying	273,404.4	4,714,685.38	18.29	0.51	310.93	13.98
BH1	Nuisance dust collector	273,409.0	4,714,689.25	12.22	0.41	310.93	3.17
BO1	Boiler #1	273,357.0	4,714,685.0	18.53	0.91	430.37	10.72
BO2	Boiler #2	273,360.0	4,714,687.0	18.53	0.91	430.37	10.72

BO3	Boiler #3	273,362.0	4,714,689.0	18.53	0.91	430.37	10.72

a. NAD83 datum, Zone 12.
b. Temperature.
c. Meters.
d. Kelvin.
e. Meters per second.
f. April 2017 performance test flow rate at 1.39 ton/hr finished product.

Table 10. VOLUME SOURCE EMISSIONS RELEASE PARAMETERS

Release Point	Description	Universal Transverse Mercator Coordinates[a]		Release Height (m)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (m)
		Easting (x) (m)[b]	Northing (y) (m)			
BV1A	Silo bin vent baghouse #1	273,384.9	4,714,718.1	23.0	0.26	11.2
RAILLOAD	Rail line load out baghouse vent	273,386.5	4,714,725	12.7	0.26	6.2

a. NAD83 datum, Zone 12.
b. Meters.

DEQ's permitting policies and guidance require that each permit application have stand-alone documentation to support the appropriateness of release parameters used in the air impact analyses. Gem State's modeling report and additional email submittals provided justification and documentation of assumptions and data supporting key release parameters used to model point sources and elevated volume sources. Many of the release parameters were supported with an updated facility emission point and process equipment layout schematic and a table of three zones (or process and air handling areas) within the facility. This document is titled "GEM STATE PROCESSING-VENTILATION PLAN" (Ventilation Plan) and was received on March 6, 2017. The tabular data lists stack release parameters with values listed under the "PROCESS" header represented volumetric flow rate in units of actual cubic feet per minute (ACFM). Point source release parameter data for Wolverine Dehydration Lines 1 and 2 were not listed in the Ventilation Plan.

Wolverine Dehydration Lines 1 and 2

Each Wolverine Dehydration Line has three drying stages, referred to as Stages A, B, and C in series, each stage with a dedicated natural gas-fired dryer unit. Stage A has two stacks, and Stages B and C each have one exhaust stack. Dehydrator Lines 1 and 2 have identical stack parameters. All eight Wolverine dehydration line stack release heights will be increased from the current permitted heights of 42 feet above grade to heights of 60 feet above grade with this project.

The final May 19, 2017, ambient impact analyses used release parameters based on the most recent performance testing conducted on one of the dehydration lines on April 11-13, 2017. The test report[5] was included in Gem State's final PTC modification application as supporting documentation. Modeled release parameters matched the performance test values for most emissions points. There were some sources where the submitted impact analyses used exhaust flow rates that were slightly different than those listed in the performance test documentation. DEQ then performed a sensitivity analysis to verify 24-hour $PM_{2.5}$ and 1-hour NO_2 NAAQS compliance at the flow rates listed in the permit application's final modeling report. The exit diameters for all eight Wolverine stacks were modeled using the diameter of the stacks at the test port locations, so the ambient impact analyses do not reflect any reduced diameter, or accelerator sections at the stack top to increase exit velocity; nor were any cap treatments of stacks, which would slow the vertical velocity, reflected in the model

setup.
The sensitivity analyses are discussed in section 4.4 of this memorandum.

Exhaust Vents (model IDs EX15 and EX16)
The air impact analyses for this project corrects the point source exhaust fan arrangement based on the units installed instead of the emissions units and site layout used in analyses supporting the May 5, 2015, PTC, Project 61406. The number of fans and design flow rates were altered. Six exhaust fans were used in initial analyses supporting the initial PTC, with a design flow rate of 12,050 ACFM each and a total of 72,300 ACFM for Zone #3 (Zone #3 refers to the Wolverine Dehydration Lines building addition). The Ventilation Plan indicates only two fans are present, and lists the following for fans EX15 and EX16: release heights of 36 feet above grade (building tier height is 32 feet above grade); flow rate of 18,000 ACFM for each fan vent; exit diameter of 3.0 feet; and, an exit temperature of 90°F.

Exhaust Vents (model IDs EX1 through EX14)
Emissions release parameter values provided in the Ventilation Plan table are identical to those used in the modeling analyses. Additional documentation that was submitted for a previous PTC modification project was resubmitted to support the current modeling demonstration. This document was titled "STACK PARAMETER VERIFICATION/DOCUMENTATION FORM" and listed the results of on an on-site measurement and recordkeeping evaluation to confirm as-built stack parameters matched the modeled parameters. Modeled stack diameters and release heights matched this documentation.

Natural Gas Fired-Boilers (model IDs B1, B2, and B3)
Emissions release parameter values provided in the Ventilation Plan are identical to the modeling analyses inputs. DEQ also compared the modeled exhaust flow rates to those based on the EPA F-Factor method, per 40 CFR 60, Appendix A, Table 19-2, which is based on the combustion byproduct exhaust flow rate of specific fuel types. The modeled stack gas exit temperature of 315°F for each boiler stack and the Heyburn site elevation were used to convert the standard flow rate to actual flow rate values. The F-Factor-derived exhaust flow rate values presented in Figure 7 confirm that Gem State used accurate or conservative values based upon the emission units' rated heat input capacities and the listed 315°F exit temperature.

Figure 7. EPA F-Factor Volumetric Flow Rates

Project 61652 - Gem State Processing 2017 Wolverine Dehydration Throughput Increase Permit Modeling Review
Boiler flow rates

EPA F-Factor flow rate comparison

variable Stack temp = deg F +460
528 Standard temp = 460 + 68 = 528 degrees Rankine
25.77 Site pressure = 29.92 in Hg - (4,150 ft * 0.10 in Hg/100 ft) = 25.77 in Hg
29.92 Standard pressure = 29.92 in Hg
10610 Fw = 10610 standard cubic feet per million Btu EPA natural gas F-Factor for ideal combustion exhaust flow rate.

Unit	Rated Heat Input mmBtu/hr	Flow scf per min	exit temp deg F	deg Rankine	F-Factor-derived flow rate actual CFM	Electronic modeling file input (acfm)	notes	
Boiler 1	49.13	8687.82	315	775	14,806	14,912.0	100.72 modeled flow % vs F-Factor calculation	OK
Boiler 2	49.13	8687.82	315	775	14,806	14,912.0	100.72 modeled flow % vs F-Factor calculation	OK
Boiler 3	65.43	11570.21	315	775	19,718	14,912.0	75.63 modeled flow % vs F-Factor calculation	conservative

Drum Dryer Fan Hood/Snifter Stacks – Six in Total (model IDs DFH#1 through DFH#6)

Support documentation for emissions release parameter values was obtained from a document titled "Proposed $PM_{2.5}$ Stack System," generated by equipment designer and manufacturer, Idaho Steel. The combined flow rates from the drum dryer fan hoods and sniffer fans (listed as "snifter" in past documentation) were listed for each of the six stacks. Release parameters used in the modeling analyses were identical to those specified in the Idaho Steel report and also in the "Ventilation Plan" documentation.

Agglomerator/Bubble Sheet Dryer #1 (PRE1)

Release parameter justification for this stack was based on Idaho Steel's listings in the "Ventilation Plan" and the "Proposed $PM_{2.5}$ Stack System" design values. Stack height will be increased to 100 feet above grade. The volumetric flow rate at the rated capacity was listed as 25,000 ACFM, matching the modeled flow rate.

A performance test report[6] was submitted to DEQ for $PM_{2.5}$ and PM_{10} emissions testing conducted on December 9, 2016. This test report was not submitted with the permit application as supporting documentation and a DEQ performance test approval had not been issued until June 5, 2017. The following parameters, based on the average of the three runs for this emissions unit, were specified in the report:

- a stack height of 60 feet above grade;
- a stack temperature was 128°F;
- the equivalent stack diameter at the test port locations was 38 inches (3.16 feet), or 0.5 feet larger than the stack's exit diameter modeled for the future 100 feet tall stack;
- an exhaust volumetric flow rate of 13,075 ACFM, or 52% of the modeled flow rate of 25,000 ACFM;
- an average production throughput of 0.85 tons per hour, compared to the permit allowable 40 tons per day (average of 1.67 tons per hour based on 24 hours per day).

The modeled flow rate for this source is questionable, based on the performance test report and considering that process equipment and fan specification for ventilation are not changing for this emissions unit. DEQ issued a source test approval letter on June 5, 2017, and the test was accepted as representative of 91% of the normal maximum production rate. The test report and the permit application do not identify partial load operations that are tied to partial volumetric flow rate through the agglomerator/bubble sheet dryer exhaust and stack system, so it is unclear whether the exhaust flow rate would reach the nearly double 25,000 ACFM at a 100% process throughput rate of 1.67 tons per hour. The discrepancy in the flow rate suggests that additional confirmation is necessary to assure this difference would not change the conclusions of the air impact analyses. DEQ performed a model sensitivity analysis to evaluate whether NAAQS compliance is still demonstrated with the lower exhaust flow rate noted in the Agglomerator/Bubble Sheet Dryer No. 1 performance test at the requested allowable emission rate of 0.76 lb/hr $PM_{2.5}$. The 24-hour and annual $PM_{2.5}$ and 1-hour NO_2 NAAQS demonstrations were selected for the sensitivity analyses, as discussed in Section 4.4 of this memorandum.

Rail Loadout Baghouse (model ID RAILROAD) and Silo Bin Vents (model ID BV1A)

Stantec provided adequate documentation of the assumptions and calculations used to generate the volume source release parameters in the modeling report. Each source is a 3.6-foot by 3.6-foot baghouse vent located on the side of a wall at specific heights. Section 4.3, page 14 – Emissions Release Parameters—of the March 6, 2017, modeling report provides justification of the release

parameters.

Overall Summary of Emissions Release Parameters
DEQ determined the release parameters used in the air impact modeling analyses were acceptable.

4.0 Results for Air Impact Analyses

This section provides discussion of results obtained from the air impact analyses submitted in support of the proposed project.

4.1 Results for Significant Impact Analyses

Stantec did not use significant impact level (SIL) analyses to demonstrate compliance with NAAQS; alternatively, NAAQS compliance was demonstrated using cumulative impact analyses.

4.2 Results for Cumulative NAAQS Impact Analyses

Table 11 provides results for the NAAQS analyses. Modeled impacts to ambient air were below applicable NAAQS.

Table 11. 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	17.7[g]	13	30.7	35	88%
	Annual	5.6[h]	4.3	9.9	12	83%
PM_{10}[d]	24-hour	24.0[i]	73	97	150	65%
NO_2[e]	1-hour	172.8[j]	Included in model[k]	172.8[k]	188	92%
	Annual	13.2[l]	5.8	19	100	19%
SO_2[f]	1-hour	3.2[m]	3.9	7.1	196	4%

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. Gem State's analyses used the maximum annual impact averaged over 5 year of meteorological data. DEQ determined that compliance with the NAAQS is adequately demonstrated.
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.

4.3 Results for Toxic Air Pollutant Impact Analyses

Table 12 presents results for TAPs air impact modeling. The impacts listed below were attributed to the full capacity of natural gas combustion emissions of Air Makeup Units 5 and 6 and Wolverine Dehydration Lines 1 and 2. Annual average carcinogenic TAP impacts are the maximum impact averaged over five years of meteorological data. All TAP impacts were below the applicable AACC increments.

Table 12. RESULTS FOR TOXIC AIR POLLUTANT ANALYSES

Pollutant	CAS[a] Number	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[b]	AACC[c] ($\mu g/m^3$)	Percent of Increment
Arsenic	7440-38-2	Annual	2E-05	2.3E-04	9%
Cadmium	7440-43-9	Annual	1.3E-04	5.6E-04	23%
Formaldehyde	50-00-0	Annual	8.7E-03	7.7E-02	11%
Nickel	7440-02-0	Annual	2.4E-04	4.2E-03	6%

a. Chemical Abstract Service
b. Micrograms per cubic meter.
c. Ambient Concentration for Carcinogens (Toxic Air Pollutant allowable increments listed in Idaho Air Rules Section 586).

4.4 Results for DEQ Sensitivity Analyses

DEQ performed sensitivity analyses to evaluate the effect on NAAQS compliance for different stack volumetric flow rates, and correspondingly, stack exit velocities for the two Wolverine dehydration lines and the Bubble Sheet Dryer/Agglomerator #1. The 24-hour and annual $PM_{2.5}$ and 1-hour NO_2 standards were selected for the sensitivity analyses because modeled ambient impacts were closest to the allowable NAAQS.

DEQ increased the modeled flow rates for the Stage C stacks and decreased the flow rate for Stage A and B Stacks on both dehydration lines, based on the performance test exhaust flow rates (Table 6 of the final modeling report submitted), to verify that NAAQS compliance would be met based. Also, the Agglomerator/Bubble Sheet Dryer #1 stack could have a flow rate under actual operating conditions that is lower than modeled by Gem State, unless the pneumatic system is operated at the listed design flow rate of 25,000 ACFM. Therefore, DEQ verified NAAQS compliance at the lower exhaust flow rate noted in the latest DEQ-approved Agglomerator/Bubble Sheet Dryer No. 1 performance test. As discussed in Section 3.10 of this memorandum, the flow rate presented in Gem State's test report was 52% of the flow rate used in the ambient impact analyses submitted for this project, and the Agglomerator was operating at worst-case normal conditions during the test. Thus, the model setup for this set of sensitivity analyses reflected the properly justified April 2017 source test-derived exhaust flow rates for the Wolverine Dehydration Lines 1 and 2 and the Agglomerator. A comparison of the flow rates is listed in Table 13.

Table 13. COMPARISON OF 2017 DEHYDRATION LINE AND 2016 AGGLOMERATOR PERFORMANCE TEST AND PERMIT APPLICATION MODELED FLOW RATES	
Stack Identification	**Volumetric Flow Rate (ACFM)[a]**
Source Test Stage A Stack 1	9,945
Permit Application Model Input WDRY1A1 and WDRY2A1	11,537
Source Test Stage A Stack 2	7,155
Permit Application Model Input – WDRY1A2 and WDRY2A2	7,794
Source Test Stage B	13,992
Permit Application Model Input – WDRY1B and WDRY2B	15,242
Source Test Stage C	6,541
Permit Application Model Input - WDRY1C and WDRY2C[b]	5,960
Bubble Sheet Dryer/Agglomerator Source Test	13,075
Permit Application Model Input – PRE1	25,000

a. Actual cubic feet per minute.

Table 14 provides results for the DEQ sensitivity analysis. The sensitivity analysis confirmed 24-hour $PM_{2.5}$, annual $PM_{2.5}$, and 1-hour NO_2 NAAQS compliance is reasonably assured to DEQ's satisfaction at the altered exhaust flow rates and exit velocities.

Table 14. RESULT OF DEQ FLOW RATE SENSITIVITY 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	20.9[e]	13	33.9	35	97%
	Annual	6.1[f]	4.3	10.4	12	87%
NO_2[d]	1-hour	174.8[g]	Included in model[h]	174.8[h]	188	93%

a. Micrograms per cubic meter.
b. National Ambient Air Quality Standards.
c. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less.
d. Nitrogen dioxide.
e. Modeled design value is the maximum 5-year mean of 8th highest 24-hour values from each year of a 5-year meteorological dataset.
f. Modeled design value is the maximum 5-year mean of annual average values from each year of a 5-year meteorological dataset.
g. 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.
h. 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.

5.0 Conclusions

The ambient air impact 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 and will not exceed allowable TAP increments.

References

1. *Policy on NAAQS Compliance Demonstration Requirements of IDAPA 58.01.01.203.02 and 01.403.02.* Idaho Department of Environmental Quality Policy Memorandum. Tiffany Floyd, Administrator, Air Quality Division, June 10, 2014.

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

3. *Ambient Ratio Method Version 2(ARM2) for use with AERMOD for1-hr NO_2 Modeling Development and Evaluation Report,* Prepared for American Petroleum Institute, 1220 L Street NW, Washington, DC 20005, by M. Podrez, RTP Environmental Associates, Inc., 2031 Broadway, Suite 2, Boulder, Colorado 80302, September 20, 2013.

4. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard,* R. Chris Owen and Roger Brode, Environmental Protection Agency, Office of Air Quality Planning and Standards, September 30, 2014.

5. *Gem State Processing, LLC, Source Test Report, Dehydrator Oven, Heyburn, Idaho, Test Dates: April 11-13, 2017*, Stantec Consulting Services, Inc., dated June 8, 2017.

6. *Gem State Processing, LLC, Source Test Report, Bubble Sheet Dryer No. 1, Heyburn, Idaho, Test Date: December 9, 2016, Project Number:* 203705238, Stantec Consulting Services, Inc., January, 6, 2017.

APPENDIX C – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

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

Company: Gem State Processing
Address: 951 Highway 30
City: Heyburn
State: Idaho
Zip Code: 83336
Facility Contact: Bill Schow
Title: Responsible Official
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	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM10	0.0	0.22	-0.2
VOC	0.0	0	0.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0.22	**-0.2**
Fee Due	**$ 1,000.00**		

Comments: