

# **Statement of Basis**

**Permit to Construct No. P-2009.0011  
Project ID 61533**

**Penford Products Company  
Idaho Falls, Idaho**

**Facility ID 019-00026**

**Final**

**October 1, 2015  
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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.

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## ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BMP	best management practices
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CBP	concrete batch plant
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	CO <sub>2</sub> equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
GHG	greenhouse gases
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
HHV	higher heating value
HMA	hot mix asphalt
hp	horsepower
hr/yr	hours per consecutive 12 calendar month period
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
iwg	inches of water gauge
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NSPS	New Source Performance Standards

O&M	operation and maintenance
O <sub>2</sub>	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PCB	polychlorinated biphenyl
PERF	Portable Equipment Relocation Form
PM	particulate matter
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
PW	process weight rate
RAP	recycled asphalt pavement
RFO	reprocessed fuel oil
RICE	reciprocating internal combustion engines
<i>Rules</i>	<i>Rules for the Control of Air Pollution in Idaho</i>
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TEQ	toxicity equivalent
T-RACT	Toxic Air Pollutant Reasonably Available Control Technology
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
yd <sup>3</sup>	cubic yards
µg/m <sup>3</sup>	micrograms per cubic meter

## **FACILITY INFORMATION**

### ***Description***

Raw starch material is delivered to the Penford Products Company (Penford), Idaho Falls facility in the form of slurry, wet cake, and dried starch. All raw materials are then converted to slurry. The slurry is pumped across screening equipment to remove associated pulp and peel. The slurry is then pumped to holding tanks.

The refined starch is then pumped from the holding tanks to one of the reaction vessels (reactors). Each reactor is equipped with an agitator, as well as top and side mounted inlets for the addition of chemicals. The chemical react with the starch in the reactors to form modified starch products.

After the starch has been modified and neutralized in the reactors it is pumped into a state of the art filtering and dewatering system to remove as much moisture as possible.

The starch is then dried in a flash dryer. The dry starch is then transferred to a storage bin and/or then to separate packaging areas.

The final dry starch product is then shipped in 50-pound paper bags, 25-kg paper bags, 1,000-2,400-pound supersacks, or 180,000-pound bulk railcar shipments.

### ***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).

May 7, 2009	P-2009.0011, Modification to PTC P-2007.0093 to allow for the processing of corn and other fine-grained starches in addition to potato starch at this facility, permit status (A, but will become S upon issuance of this permit).
July 19, 2007	P-2007.0093, Modification to PTC P-030511 for changes to the moisture reduction system (from decant vats where starch was dewatered and re-suspended several times followed by refined screening via a rotary drum vacuum filter to a state of the art filtering and dewatering system) and adding a new air compressor, an air dryer, and a surge tank, permit status (S).
August 18, 2003	P-030511, Modification to PTC P-020510 for upgrades to the dryer bulk transport system and the valve bag packer dust collection system at the potato starch processing facility, permit status (S).
May 2, 2003	P-020510, Modification to PTC 019-00026 to remove the use of ethylene oxide (ETO) for potato starch processing at the facility, permit status (S).
October 30, 1998	019-00026, Modified PTC was issued for the potato starch processing facility to have the PTC correspond with a recently issued consent order, permit status (S).
August 7, 1998	019-00026, Modified PTC was issued for the potato starch processing facility to modify the ethylene oxide scrubber, permit status (S).
April 30, 1996	019-00026, Modified PTC was issued for the potato starch processing facility to install a new ethylene oxide scrubber and a baghouse, permit status (S).
December 9, 1991	0260-0026, Modified PTC was issued for the potato starch processing facility, permit status (S).
October 25, 1989	0260-0026, Initial PTC was issued for the potato starch processing facility, permit status (S).

## Application Scope

The Applicant has proposed to increase the de-watering capacity of the press allowing an increase in process throughput. This increase in process throughput will affect one emissions unit, the starch flash dryer. The Applicant proposes to increase process throughput to 12,000 lb/hr for potato starch (currently permitted at 8,000 lb/hr) and 8,000 lb/hr for corn starch and other fine-grained starches (currently permitted at 6,000 lb/hr).

## Application Chronology

June 9, 2015	DEQ received an application and an application fee.
July 8, 2015	DEQ determined that the application was complete.
July 9 – July 24, 2015	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
August 3, 2015	DEQ made available the draft permit and statement of basis for peer and regional office review.
August 5, 2015	DEQ made available the draft permit and statement of basis for applicant review.
August 19, 2015	DEQ received the permit processing fee.
August 26 – Sept. 25, 2015	DEQ provided a public comment period on the proposed action.
October 1, 2015	DEQ issued the final permit and statement of basis.

## TECHNICAL ANALYSIS

### Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
SFDRY	<u>Starch Flash Dryer</u> Manufacturer: Barr Rosin Model: Flash Dryer Model Yr. 1989 Manufacture date: 1989 Max. Production Rate: 12,000 lbs/hr Fuel: Natural gas only	<u>Twin Cyclones</u> <sup>1</sup> Manufacturer: Barr Rosin Model: Twin Cyclone Yr. 1989 Blower Rating: 200 hp	<u>Stack 100</u> Exit height: 50 ft (15.24 m) Exit diameter: 2.73 ft (0.83 m) Exit flow rate: 25,000 acfm Exit temperature: 140 °F (60 °C)
SUSA	<u>Supersack Packaging Hopper</u>	<u>Bin Vent Filter</u>	<u>Stack 104</u> Exit height: 26 ft (7.92 m) Exit diameter: 0.50 ft (0.15 m) Exit flow rate: 649 acfm Exit temperature: 74.9 °F (23.4 °C)
PACKR	<u>Valve Sack Packaging Hopper</u>	<u>Bin Vent Filter</u>	<u>Stack 105</u> Exit height: 26 ft (7.92 m) Exit diameter: 0.50 ft (0.15 m) Exit flow rate: 670 acfm Exit temperature: 74.9 °F (23.4X °C)
EBBIN	<u>East Bulk Storage</u>	<u>Bin Vent Filter</u>	<u>Stack 106</u> Exit height: 38 ft (11.58 m) Exit diameter: 0.50 ft (0.15 m) Exit flow rate: 670 acfm Exit temperature: 74.9 °F (23.4 °C)
WBBIN	<u>West Bulk Storage</u>	<u>Bin Vent Filter</u>	<u>Stack 107</u> Exit height: 38 ft (11.58 m) Exit diameter: 0.50 ft (0.15 m) Exit flow rate: 670 acfm Exit temperature: 74.9 °F (23.4 °C)
	Bulk Railcar Loadout	N/A	

<sup>1</sup> The twin cyclones are considered process equipment, not an air pollution control device.

## 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.

Using this definition of Potential to Emit an emission inventory was developed for the increase in emissions from the Starch Flash Dryer operation at the facility (see Appendix A) associated with this proposed project. Emissions estimates of PM<sub>10</sub>/PM<sub>2.5</sub> were based on source test results from 1998 and 2008 and process information specific to the facility for this proposed project.

### Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined 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 **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

The following table presents the uncontrolled Potential to Emit for regulated air pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this starch processing operation uncontrolled Potential to Emit is the same as the controlled Potential to Emit because there are no controls or limits on operation placed on the equipment used at the facility.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM <sub>10</sub> /PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	CO <sub>2</sub> e
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources						
Starch Flash Dryer	17.94	0.02	3.54	2.98	0.19	4,231
Supersack Packaging Hopper Bin Vent	0.03	0.00	0.00	0.00	0.00	0.00
Valve Sack Packaging Hopper Bin Vent	0.22	0.00	0.00	0.00	0.00	0.00
East Bulk Storage Bin Vent	0.03	0.00	0.00	0.00	0.00	0.00
West Bulk Storage Bin Vent	0.03	0.00	0.00	0.00	0.00	0.00
<b>Total, Point Sources</b>	<b>18.25</b>	<b>0.02</b>	<b>3.54</b>	<b>2.98</b>	<b>0.19</b>	<b>4,231</b>

The following table presents the uncontrolled Potential to Emit for HAP pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit.

**Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS**

<b>Hazardous Air Pollutants</b>	<b>PTE (T/yr)</b>
Hexane	6.38E-02
Formaldehyde	2.66E-03
Toluene	1.20E-04
Benzene	7.44E-05
Nickel	7.44E-05
Chromium	4.96E-05
Dichlorobenzene	4.25E-05
Cadmium	3.90E-05
Naphthalene	2.16E-05
Manganese	1.35E-05
Mercury	9.21E-06
Arsenic	7.09E-06
Cobalt	2.98E-06
2-Methylnaphthalene	8.50E-07
Selenium	8.50E-07
Phenanthrene	6.02E-07
7,12-Dimethylbenz(a)anthracene	5.67E-07
Beryllium	4.25E-07
Pyrene	1.77E-07
Fluoranthene	1.06E-07
Anthracene	8.50E-08
3-Methylchloranthene	6.38E-08
Benza(a)anthracene	6.38E-08
Benzo(b)fluoranthene	6.38E-08
Benzo(k)fluoranthene	6.38E-08
Chrysene	6.38E-08
Indeno(1,2,3-cd)Pyrene	6.38E-08
Acenaphthene	6.38E-08
Acenaphthylene	6.38E-08
Dibenzo(a,h)anthracene	4.25E-08
Benzo(a)Pyrene	4.25E-08
Benzo(g,h,i)perylene	4.25E-08
<b>Total</b>	<b>0.067</b>



### Pre-Project Potential to Emit

The following table presents the pre-project potential to emit for all criteria and GHG pollutants from all emissions units at the facility/for the one unit being modified as submitted by the Applicant and verified by DEQ staff. Since this is a previously permitted facility pre-project emissions were taken from the post project emissions established by the previous permitting project at this facility (P-2009.0011, dated May 7, 2009).

**Table 4 PRE-PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS**

Source	PM <sub>10</sub> /PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO		VOC		CO <sub>2</sub> e
	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	T/yr <sup>(b)</sup>
Starch Flash Dryer	2.41	9.93	0.00	0.02	0.78	3.20	0.16	0.64	0.06	0.26	4,231
Supersack Packaging Hopper Bin Vent	0.05	0.03	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Valve Sack Packaging Hopper Bin Vent	0.05	0.22	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
East Bulk Storage Bin Vent	0.05	0.03	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
West Bulk Storage Bin Vent	0.05	0.03	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
<b>Pre-Project Totals</b>	<b>2.61</b>	<b>10.24</b>	<b>0.00</b>	<b>0.02</b>	<b>0.78</b>	<b>3.20</b>	<b>0.16</b>	<b>0.64</b>	<b>0.06</b>	<b>0.26</b>	<b>4,231</b>

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 DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

**Table 5 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS**

Source	PM <sub>10</sub> /PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO		VOC		CO <sub>2</sub> e
	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	lb/hr <sup>(a)</sup>	T/yr <sup>(b)</sup>	T/yr <sup>(b)</sup>
Starch Flash Dryer	4.10	17.94	0.00	0.02	0.81	3.54	0.68	2.98	0.04	0.19	4,231
Supersack Packaging Hopper Bin Vent	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Valve Sack Packaging Hopper Bin Vent	0.05	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Bulk Storage Bin Vent	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Bulk Storage Bin Vent	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Post Project Totals</b>	<b>4.30</b>	<b>18.25</b>	<b>0.00</b>	<b>0.02</b>	<b>0.81</b>	<b>3.54</b>	<b>0.68</b>	<b>2.98</b>	<b>0.04</b>	<b>0.19</b>	<b>4,231</b>

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.

### 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 6 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS**

Source	PM <sub>10</sub> /PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO		VOC		CO <sub>2</sub> e
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	T/yr
Pre-Project Potential to Emit	2.61	10.24	0.00	0.02	0.78	3.20	0.16	0.64	0.06	0.26	4,231
Post Project Potential to Emit	4.30	18.25	0.00	0.02	0.81	3.54	0.68	2.98	0.04	0.19	4,231
Changes in Potential to Emit	1.69	8.01	0.00	0.00	0.03	0.34	0.52	2.34	-0.02	-0.07	0.00

### Non-Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of non-carcinogenic toxic air pollutants (TAP) is provided in the following table. Note: TAPs emissions for the project are the result of natural gas combustion. As there is no change in the amount of natural gas combusted as a result of this project, there is no change in TAPs emissions as a result of this project.

**Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS**

Non-Carcinogenic Toxic Air Pollutants	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)
Dichlorobenzene	9.71E-06	9.71E-06	0.0000	20	No
Hexane	1.46E-02	1.46E-02	0.0000	12	No
Naphthalene	4.93E-06	4.93E-06	0.0000	3.33	No
Pentane	2.10E-02	2.10E-02	0.0000	118	No
Toluene	2.75E-05	2.75E-05	0.0000	25	No
Barium	3.56E-05	3.56E-05	0.0000	0.033	No
Chromium	1.13E-05	1.13E-05	0.0000	0.033	No
Cobalt metal, dust, and fume	6.79E-07	6.79E-07	0.0000	0.0033	No
Copper fume	6.88E-06	6.88E-06	0.0000	0.013	No
Manganese fume	3.07E-06	3.07E-06	0.0000	0.067	No
Molybdenum soluble	8.90E-06	8.90E-06	0.0000	0.333	No
Selenium	1.94E-07	1.94E-07	0.0000	0.013	No
Vanadium	1.86E-05	1.86E-05	0.0000	0.003	No
Zinc oxide dust	2.35E-04	2.35E-04	0.0000	0.667	No

None of the PTEs for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

## **Carcinogenic TAP Emissions**

A summary of the estimated PTE for emissions increase of carcinogenic toxic air pollutants (TAP) is provided in the following table. Note: As discussed previously, TAPs emissions for the project are the result of natural gas combustion. As there is no change in the amount of natural gas combusted as a result of this project, there is no change in TAPs emissions as a result of this project.

**Table 8 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS**

<b>Carcinogenic Toxic Air Pollutants</b>	<b>Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)</b>	<b>Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)</b>	<b>Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)</b>	<b>Carcinogenic Screening Emission Level (lb/hr)</b>	<b>Exceeds Screening Level? (Y/N)</b>
3-Methylchloranthene	1.46E-08	1.46E-08	0.0000	2.5E-06	No
PAH,except 7-PAH group	9.22E-08	9.22E-08	0.0000	2.0E-06	No
POM, 7-PAH Group	2.83E-07	2.83E-07	0.0000	9.1E-05	No
Benzene	1.70E-05	1.70E-05	0.0000	8.0E-04	No
Formaldehyde	6.07E-04	6.07E-04	0.0000	5.1E-04	No
Arsenic	1.62E-06	1.62E-06	0.0000	1.5E-06	No
Beryllium	9.71E-08	9.71E-08	0.0000	2.8E-05	No
Cadmium	8.90E-06	8.90E-06	0.0000	3.7E-06	No
Nickel	1.70E-05	1.70E-05	0.0000	2.7E-05	No

a) Polycyclic Organic Matter (POM) 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.

None of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any carcinogenic TAP because none of the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

## **Post Project HAP Emissions**

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility/for the one unit being modified as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

**Table 9 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY**

<b>Hazardous Air Pollutants</b>	<b>PTE (T/yr)</b>
Hexane	6.38E-02
Formaldehyde	2.66E-03
Toluene	1.20E-04
Benzene	7.44E-05
Nickel	7.44E-05
Chromium	4.96E-05
Dichlorobenzene	4.25E-05
Cadmium	3.90E-05
Naphthalene	2.16E-05
Manganese	1.35E-05
Mercury	9.21E-06
Arsenic	7.09E-06
Cobalt	2.98E-06
2-Methylnaphthalene	8.50E-07
Selenium	8.50E-07
Phenanthrene	6.02E-07
7,12-Dimethylbenz(a)anthracene	5.67E-07
Beryllium	4.25E-07
Pyrene	1.77E-07
Fluoranthene	1.06E-07
Anthracene	8.50E-08
3-Methylchloranthene	6.38E-08
Benza(a)anthracene	6.38E-08
Benzo(b)fluoranthene	6.38E-08
Benzo(k)fluoranthene	6.38E-08
Chrysene	6.38E-08
Indeno(1,2,3-cd)Pyrene	6.38E-08
Acenaphthene	6.38E-08
Acenaphthylene	6.38E-08
Dibenzo(a,h)anthracene	4.25E-08
Benzo(a)Pyrene	4.25E-08
Benzo(g,h,i)perylene	4.25E-08
<b>Totals</b>	<b>0.067</b>

## ***Ambient Air Quality Impact Analyses***

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM<sub>10</sub> and PM<sub>2.5</sub> from this project exceeded applicable Level I emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline<sup>1</sup>. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

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

<sup>1</sup> Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013.

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

## REGULATORY ANALYSIS

### ***Attainment Designation (40 CFR 81.313)***

The facility is located in Bonneville County, which is designated as attainment or unclassifiable for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, 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  $\geq 10$  T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions  $\geq 25$  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  $\geq 8$  T/yr of a single HAP or  $\geq 20$  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  $\geq 100$  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  $\geq 80$  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 10 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION**

<b>Pollutant</b>	<b>Uncontrolled PTE (T/yr)</b>	<b>Permitted PTE (T/yr)</b>	<b>Major Source Thresholds (T/yr)</b>	<b>AIRS/AFS Classification</b>
PM	18.25	18.25	100	B
PM <sub>10</sub> /PM <sub>2.5</sub>	18.25	18.25	100	B
SO <sub>2</sub>	0.02	0.02	100	B
NO <sub>x</sub>	3.54	3.54	100	B
CO	2.98	2.98	100	B
VOC	0.19	0.19	100	B
HAP (single)	6.38E-02	6.38E-02	10	B
HAP (Total)	0.067	0.067	25	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 modified starch flash dryer. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

**Tier II Operating Permit (IDAPA 58.01.01.401)**

IDAPA 58.01.01.401

Tier II Operating Permit

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

**Visible Emissions (IDAPA 58.01.01.625)**

IDAPA 58.01.01.625

Visible Emissions

The sources of PM<sub>10</sub> emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 2.4 and 3.4.

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

IDAPA 58.01.01.701

Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment's process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 and IDAPA 58.01.01.702 establish PM emission limits for equipment that commenced operation on or after October 1, 1979 and for equipment operating prior to October 1, 1979, respectively.

For equipment that commenced operation on or after October 1, 1979, the PM allowable emission rate (E) is based on one of the following four equations:

IDAPA 58.01.01.701.01.a: If PW is < 9,250 lb/hr;  $E = 0.045 (PW)^{0.60}$

IDAPA 58.01.01.701.01.b: If PW is  $\geq 9,250$  lb/hr;  $E = 1.10 (PW)^{0.25}$

For equipment that commenced prior to October 1, 1979, the PM allowable emission rate is based on one of the following equations:

IDAPA 58.01.01.702.01.a: If PW is < 17,000 lb/hr;  $E = 0.045 (PW)^{0.60}$

IDAPA 58.01.01.702.01.b: If PW is  $\geq 17,000$  lb/hr;  $E = 1.12 (PW)^{0.27}$

For the existing starch flash dryer emissions unit that commenced operation on or after October 1, 1979 to be modified as a result of this project with a proposed throughput of 10.0 T/hr (20,000 lb/hr), E is calculated as follows:

Proposed throughput = 10.0 T/hr x 2,000 lb/1 T = 20,000 lb/hr

Therefore, E is calculated as:

$$E = 1.10 \times PW^{0.25} = 1.10 \times (20,000)^{0.25} = 13.08 \text{ lb-PM/hr}$$

As presented previously in the Emissions Inventories Section of this evaluation the post project PTE for the starch flash dryer emissions unit is 4.10 lb-PM<sub>10</sub>/hr. Assuming PM is 50% PM<sub>10</sub> means that PM emissions will be 8.20 lb-PM/hr (4.10 lb-PM<sub>10</sub>/hr ÷ 0.5 lb-PM<sub>10</sub>/lb-PM). Therefore, compliance with this requirement has been demonstrated.

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

IDAPA 58.01.01.301

Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for (list pollutants, i.e., PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, VOC, and HAP) or 10 tons per year for any one HAP or 25 tons per year for all HAP combined (list HAP or HAP) 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 52.21(b)(1). Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is/is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

### ***NSPS Applicability (40 CFR 60)***

The facility is not subject to any NSPS requirements 40 CFR Part 60.

### ***NESHAP Applicability (40 CFR 61)***

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

### ***MACT Applicability (40 CFR 63)***

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

### ***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 1.1 describes the modifications to the existing processes at the facility process being permitted as a result of this project.

Permit Condition 1.3 explains which previous permit for the facility is being replaced as a result of this project.

Table 1.1 was updated to reflect the change in throughput being proposed as a result of this project.

## ***NATURAL GAS-FIRED STARCH FLASH DRYER***

Table 2.2 was updated to reflect the increase in emissions due to the increase in throughput being proposed as a result of this project.

Permit Condition 2.6 was modified to allow the new potato starch processing limit as proposed by the Applicant.

Permit Condition 2.7 was modified to allow the new corn starch and other fine-grained starches processing limit as proposed by the Applicant.

## **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 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.



## **APPENDIX A – EMISSIONS INVENTORIES**

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

Emissions Unit	PM10	SO2	NOx	CO	VOC	CO2e	Lead
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Starch Flash Dryer	11.96	0.02	3.54	2.98	0.19	4,231	1.77E-05
Supersack Packaging Hopper Bin Vent	0.03	0	0	0	0	0	0
Valve Sack Packaging Hopper Bin Vent	0.22	0	0	0	0	0	0
East Bulk Storage Bin Vent	0.03	0	0	0	0	0	0
West Bulk Storage Bin Vent	0.03	0	0	0	0	0	0
Totals	12.27	0.02	3.54	2.98	0.19	4,231	1.77E-05

Table 2 POST-PROJECT POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

Emissions Unit	PM10	SO2	NOx	CO	VOC	CO2e	Lead
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Starch Flash Dryer	17.94	0.02	3.54	2.98	0.19	4,231	1.77E-05
Supersack Packaging Hopper Bin Vent	0.03	0	0	0	0	0	0
Valve Sack Packaging Hopper Bin Vent	0.22	0	0	0	0	0	0
East Bulk Storage Bin Vent	0.03	0	0	0	0	0	0
West Bulk Storage Bin Vent	0.03	0	0	0	0	0	0
Totals	18.25	0.02	3.54	2.98	0.19	4,231	1.77E-05

Table 3 CHANGES IN POTENTIAL TO EMIT FOR NSR REGULATED POLLUTANTS

Emissions Unit	PM10	SO2	NOx	CO	VOC	CO2e	Lead
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Starch Flash Dryer	5.98	0	0	0	0	0	0
Supersack Packaging Hopper Bin Vent	0.00	0	0	0	0	0	0
Valve Sack Packaging Hopper Bin Vent	0.00	0	0	0	0	0	0
East Bulk Storage Bin Vent	0.00	0	0	0	0	0	0
West Bulk Storage Bin Vent	0.00	0	0	0	0	0	0
Totals	5.98	0	0	0	0	0	0

Table X HAP POTENTIAL TO EMIT EMISSIONS SUMMARY

HAP Pollutants	PTE (T/yr)
Hexane	6.38E-02
Formaldehyde	2.66E-03
Toluene	1.20E-04
Benzene	7.44E-05
Nickel	7.44E-05
Chromium	4.96E-05
Dichlorobenzene	4.25E-05
Cadmium	3.90E-05
Naphthalene	2.16E-05
Manganese	1.35E-05
Mercury	9.21E-06
Arsenic	7.09E-06
Cobalt	2.98E-06
2-Methylnaphthalene	8.50E-07
Selenium	8.50E-07
Phenanthrene	6.02E-07
7,12-Dimethylbenz(a)anthracene	5.67E-07
Beryllium	4.25E-07
Pyrene	1.77E-07
Fluoranthene	1.06E-07
Fluorene	9.92E-08
Anthracene	8.50E-08
3-Methylchloranthene	6.38E-08
Benzo(a)anthracene	6.38E-08
Benzo(b)fluoranthene	6.38E-08
Benzo(k)fluoranthene	6.38E-08
Chrysene	6.38E-08
Indeno(1,2,3-cd)pyrene	6.38E-08
Acenaphthene	6.38E-08
Acenaphthylene	6.38E-08
Dibenzo(a,h)anthracene	4.25E-08
Benzo(a)pyrene	4.25E-08
Benzo(g,h,i)perylene	4.25E-08
Total	6.69E-02

**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)
Dichlorobenzene	9.71E-06	9.71E-06	0	20	N
Hexane	1.46E-02	1.46E-02	0	12	N
Naphthalene	4.93E-06	4.93E-06	0	3.33	N
Pentane	2.10E-02	2.10E-02	0	118	N
Toluene	2.75E-05	2.75E-05	0	25	N
Barium	3.56E-05	3.56E-05	0	0.033	N
Chromium	1.13E-05	1.13E-05	0	0.033	N
Cobalt	6.79E-07	6.79E-07	0	0.0033	N
Copper	6.88E-06	6.88E-06	0	0.013	N
Manganese	3.07E-06	3.07E-06	0	0.067	N
Molybdenum	8.90E-06	8.90E-06	0	0.333	N
Selenium	1.94E-07	1.94E-07	0	0.013	N
Vanadium	1.86E-05	1.86E-05	0	0.003	N
Zinc	2.35E-04	2.35E-04	0	0.667	N

**Table 2. PRE- AND POST PROJECT 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)	Carcinogenic Screening Emission Level  (lb/hr)	Exceeds Screening Level?  (Y/N)
3-Methylchloranthene	1.46E-08	1.46E-08	0	0.0000025	N
7-PAH group	9.22E-08	9.22E-08	0	0.000002	N
Other-PAH (exclude 7-PAH)	2.83E-07	2.83E-07	0	0.000091	N
Benzene	1.70E-05	1.70E-05	0	0.0008	N
Formaldehyde	6.07E-04	6.07E-04	0	0.00051	N
Arsenic	1.62E-06	1.62E-06	0	0.0000015	N
Beryllium	9.71E-08	9.71E-08	0	0.000028	N
Cadmium	8.90E-06	8.90E-06	0	0.0000037	N
Nickel	1.70E-05	1.70E-05	0	0.000027	N

## **APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES**

## MEMORANDUM

**DATE:** August 3, 2015

**TO:** Darrin Pampaian, Permit Writer, Air Program

**FROM:** Thomas Swain, Air Quality Modeler, Analyst 3, Air Program

**PROJECT:** Penford Products Company (PPC), Idaho Falls Facility, Process Throughput Increase, Permit to Construct (PTC), Facility No. 019-00026

**SUBJECT:** Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

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## **1.0 Summary**

Penford Products Company (PPC) submitted an application for a Permit to Construct (PTC) for an existing facility in Idaho Falls, Idaho. The facility has an existing PTC, and is proposing a physical modification to allow an increase in process throughput.

The PPC facility produces modified starch products that are eventually used as food ingredients. The existing permit (P-2009-0011) incorporates a process throughput limit of 8,000 pounds/ hour for potato starch and 6,000 pounds/ hour for corn and other fine-grained starches. The filter press at the facility will be modified because of inherent flaws in its original design. As part of the repair process, PPC plans to increase the capacity of the press and the process throughput to 12,000 pounds/hour for potato starch and 8,000 pounds/hour for corn starch. This increase would affect one emission unit, the starch flash dryer. The entire process is discussed in detail in the main body of the DEQ Statement of Basis supporting the issued PTC. This modeling review memorandum provides a summary and approval of the ambient air impact analyses submitted with the permit application. It also describes DEQ's review of those analyses, DEQ's verification analyses, additional clarifications, and conclusions.

Project-specific air quality impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the proposed facility modification were submitted to DEQ to demonstrate that the modification would not cause or significantly contribute to a violation of any ambient air quality standard as required by (IDAPA 58.01.01.203.02 and 203.03 {Idaho Air Rules Section 203.02 and 03}).

CH2MHill, on behalf of PPC, performed the ambient air impact analyses for this project, demonstrating compliance with applicable air quality standards. The DEQ review summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that the estimated emissions increases at the facility associated with the proposed project will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not evaluate compliance with other rules or analyses that do not pertain to the air impact analyses. Evaluation of emissions estimates was the responsibility of the permit writer and is addressed in the main body of the Statement of Basis. Emissions estimates were not reviewed as part of the modeling review described in this modeling review memorandum.

A modeling protocol was submitted to DEQ for this project on March 27, 2015. DEQ approved the protocol shortly after, on March 30, with a few minor comments. CH2MHill submitted a PTC application on June 9, 2015. DEQ responded with comments on the modeling analyses, and CH2MHill responded in kind on various minor issues between June 19 and July 1, 2015. The application was deemed complete on July 1, 2015 by DEQ. Additional requested information was provided by CH2MHill regarding the derivation of source characterizations of the Bin and Hopper sources (see section 3.1.3) on July 7, 2015. The final submitted air quality impact analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emissions estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from 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 will not result in increased ambient air impacts exceeding allowable TAP increments.



Table 1 presents key assumptions and results to be considered in the development of the permit.

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 that operation of the proposed facility 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.

<b>Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES</b>	
<b>Criteria/Assumption/Result</b>	<b>Explanation/Consideration</b>
<b>General Emissions Rates.</b> Emissions rates used in the modeling analyses, as listed in this memorandum, represent maximum potential emissions as given by design capacity or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling analyses.
<b>Level I Modeling Thresholds for Criteria Pollutant Emissions.</b> Maximum short-term and long-term emissions of PM <sub>2.5</sub> and PM <sub>10</sub> associated with the proposed project are above Level I modeling applicability thresholds as found in State of Idaho Modeling Guidelines. Emissions of other criteria pollutants were below Level I Thresholds. Project-specific air impact analyses are not necessary for projects with emissions increases below Level I Thresholds.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutants having an emissions increase that is greater than Level I modeling applicability thresholds. These thresholds are set to assure that impacts are below significant impact levels (SILs). Compliance with NAAQS has not demonstrated for emissions that exceed the emission estimates presented in the application..
<b>Throughput Increases:</b> The modeling analyses demonstrated compliance with all criteria NAAQS when increasing the throughput to 12,000 pounds/hour for potato starch, and 8,000 pounds/hour for corn starch. These values are changed from the existing permit restrictions of 8,000 pounds/hour and 6,000 pounds/hour, respectively.	Compliance has not been demonstrated for product throughput amounts greater than those used in the modeling analyses..

## **2.0 Background Information**

This section provides background information applicable to the project and the site where the facility is located. It also provides a brief description of the applicable air impact analyses requirements for the project.

### ***2.1 Project Description***

The PPC is a facility which produces modified starch products to be used as food ingredients. Starch is washed and mixed with water and salt in reaction vessels where the starch is chemically modified. The starch is then de-watered on a filter press, and fed into a direct-fired flash dryer for drying before processing. The current filter press is in need of repairs due to flaws in the original design. This repair process will allow the capacity of the press to increase throughput from 8,000 pounds/hour for potato starch and 6,000 pounds/hour for corn starch to 12,000 pounds/hour and 8,000 pounds/hour for potato and corn starch, respectively.

### ***2.2 Proposed Location and Area Classification***

The PPC facility is located in Idaho Falls, Idaho. This area is designated as an attainment or unclassifiable area for sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), lead (Pb), ozone (O<sub>3</sub>),

particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>), and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers (PM<sub>2.5</sub>). The area is not classified as non-attainment for any criteria pollutants.

### **2.3 Air Impact Analyses Required for All Permits to Construct**

Criteria Pollutant and TAP Impact Analyses for a PTC are addressed in Idaho Air Rules Sections 203.02 and 203.03:

*No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*

*02. NAAQS. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*

*03. Toxic Air Pollutants. 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.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

*Estimates of Ambient Concentrations. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

### **2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses**

The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. 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.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in 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. Table 2 lists the applicable SILs.

If modeled maximum pollutant impacts to ambient air from the emissions sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

DEQ has developed modeling applicability thresholds that effectively assure that project-related emissions increases below stated values will result in ambient air impacts below the applicable SILs. The threshold levels and dispersion modeling analyses supporting those levels are presented in the *State of Idaho Guideline for Performing Air Quality Impact Analyses*<sup>1</sup> (*Idaho Air Modeling Guideline*). Use of a modeling threshold represents the use of conservative modeling, performed in support of the threshold, as a project SIL analysis. Project-specific modeling applicability for this project is addressed in Section 3.1.1 of this memorandum.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from facility-wide emissions, and emissions from any nearby co-contributing sources, and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period 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 for the modeling domain.

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. If the SIL analysis indicates the facility/modification has an impact exceeding the SIL, the facility might not have a significant contribution to a violation if impacts are below the SIL at the specific receptor showing the violation during the time periods when a modeled violation occurred.

<b>Table 2. APPLICABLE REGULATORY LIMITS</b>				
<b>Pollutant</b>	<b>Averaging Period</b>	<b>Significant Impact Levels<sup>a</sup> (µg/m<sup>3</sup>)<sup>b</sup></b>	<b>Regulatory Limit<sup>c</sup> (µg/m<sup>3</sup>)</b>	<b>Modeled Design Value Used<sup>d</sup></b>
PM <sub>10</sub> <sup>e</sup>	24-hour	5.0	150 <sup>f</sup>	Maximum 6 <sup>th</sup> highest <sup>g</sup>
PM <sub>2.5</sub> <sup>h</sup>	24-hour	1.2	35 <sup>i</sup>	Mean of maximum 8 <sup>th</sup> highest <sup>j</sup>
	Annual	0.3	12 <sup>k</sup>	Mean of maximum 1 <sup>st</sup> highest <sup>l</sup>
Carbon monoxide (CO)	1-hour	2,000	40,000 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
	8-hour	500	10,000 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
Sulfur Dioxide (SO <sub>2</sub> )	1-hour	3 ppb <sup>o</sup> (7.8 µg/m <sup>3</sup> )	75 ppb <sup>p</sup> (196 µg/m <sup>3</sup> )	Mean of maximum 4 <sup>th</sup> highest <sup>q</sup>
	3-hour	25	1,300 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
	24-hour	5	365 <sup>m</sup>	Maximum 2 <sup>nd</sup> highest <sup>n</sup>
	Annual	1.0	80 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	4 ppb (7.5 µg/m <sup>3</sup> )	100 ppb <sup>s</sup> (188 µg/m <sup>3</sup> )	Mean of maximum 8 <sup>th</sup> highest <sup>t</sup>
	Annual	1.0	100 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
Lead (Pb)	3-month <sup>u</sup>	NA	0.15 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
	Quarterly	NA	1.5 <sup>r</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
Ozone (O <sub>3</sub> )	8-hour	40 TPY VOC <sup>v</sup>	75 ppb <sup>w</sup>	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 1<sup>st</sup> 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 98<sup>th</sup> percentile of the annual distribution of 24-hour concentrations.
  - j. 5-year mean of the 8<sup>th</sup> 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 1<sup>st</sup> 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 99<sup>th</sup> percentile of the annual distribution of maximum daily 1-hour concentrations.
  - q. 5-year mean of the 4<sup>th</sup> highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1<sup>st</sup> 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 98<sup>th</sup> percentile of the annual distribution of maximum daily 1-hour concentrations.
  - t. 5-year mean of the 8<sup>th</sup> 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<sub>3</sub>.
  - w. Annual 4<sup>th</sup> highest daily maximum 8-hour concentration averaged over three years.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or b) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or c) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

## **2.5 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 Idaho Air Rules 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.

### **3.0 Analytical Methods and Data**

This section describes the methods and data used in analyses to demonstrate compliance with applicable air quality impact requirements.

#### ***3.1 Emission Source Data***

Emissions rates of criteria pollutants for the proposed project at the PPC facility were provided by CH2MHill for various applicable averaging periods. Review and approval of estimated emissions was the responsibility of the DEQ permit writer, and is not addressed in this modeling memorandum. DEQ modeling review included verification that the application's potential emissions rates were properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emissions rates used in the dispersion modeling analyses submitted by PPC should be reviewed by the DEQ permit writer against those in the emissions inventory of the permit application. All modeled criteria air pollutant and TAP emissions rates should be equal to or greater than the facility's emissions calculated in other sections of the PTC application or requested permit allowable emission rates.

##### ***3.1.1 Criteria Pollutant Emissions Rates and Modeling Applicability***

If project-related potential to emit (PTE) values would qualify for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221 if it were not for some pollutants exceeding BRC thresholds, then an air impact analysis may not be required for those criteria pollutants with project emissions below BRC. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules (Policy on NAAQS Compliance Demonstration Requirements, DEQ policy memorandum, July 11, 2014) 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.

Excluding pollutants from air impact analyses on the basis of the BRC interpretation is not applicable for the PPC project. Since the existing permit regulates emissions of criteria pollutants by a throughput limit, and that throughput limit must be changed by this permitting action, project-related emissions increases could not qualify for a BRC exemption.

An impact analysis must be performed for pollutant increases that would not qualify for an exclusion as BRC. Modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline*. Modeling applicability emissions thresholds published in the *Idaho Air Modeling Guideline* were based on assuring an ambient impact of less than established SIL for that specific pollutant and averaging period. PPC is assessing project emissions with Level I modeling thresholds, and electing to show compliance with air quality modeling for those pollutants that have emissions exceeding the Level I modeling thresholds.

If project-specific total emissions rates are below Level I thresholds, project-specific air impact analyses are not necessary for permitting. Use of Level II Modeling Thresholds are conditional, requiring DEQ approval. Table 3 provides the emissions-based modeling applicability summary. PPC selected to do air quality modeling analyses for all pollutants having emissions greater than the Level I Modeling Threshold. These pollutants, as shown in Table 3, are PM<sub>10</sub> and PM<sub>2.5</sub>. (The project had no effect on the emissions for any other criteria pollutants.) Table 4 lists the source specific criteria pollutant emission rates as used in the modeling analyses. All short term periods were modeled with the maximum short term emission rates as listed in Table 4.

Table 3. Modeling Applicability Analysis Results						
Pollutant	Averaging Period	Emissions	BRC Threshold TPY	Level I Modeling Thresholds	Level II Modeling Thresholds	Modeling Required
PM <sub>2.5</sub>	24-hour	1.4 lb/hr		0.054	0.63	Yes
	Annual	5.98 ton/yr	1	0.35	4.1	Yes
PM <sub>10</sub>	24-hour	1.4 lb/hr		0.22	2.6	Yes

<b>Table 4. Emissions by Source</b>			
<b>Emissions Point</b>	<b>PM<sub>10</sub> (lb/hr)</b>	<b>PM<sub>2.5</sub> (lb/hr)</b>	<b>PM<sub>2.5</sub> (ton/yr)</b>
Starch Flash Dryer	4.09	4.09	17.9
East Bulk Storage Bin	0.05	0.05	0.22
West Bulk Storage Bin	0.05	0.05	0.22
Valve Sack Packaging Hopper	0.05	0.05	0.22
Supersack Packaging Hopper	0.05	0.05	0.22

Ozone (O<sub>3</sub>) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O<sub>3</sub> is formed in the atmosphere through reactions of VOCs, NO<sub>x</sub>, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.3.3) cannot be used to estimate O<sub>3</sub> impacts resulting from VOC and NO<sub>x</sub> emissions from an industrial facility. O<sub>3</sub> 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<sub>3</sub> 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 emissions estimates of VOCs and NO<sub>x</sub> are below the 100 tons/year threshold, and DEQ determined it was not appropriate or necessary to require a quantitative source specific O<sub>3</sub> impact analysis.

### **Secondary Particulate Formation**

The impact from secondary particulate formation resulting from emissions of NO<sub>x</sub>, SO<sub>2</sub>, and/or VOCs was assumed by DEQ to be negligible on the basis of the magnitude of emissions and the short distance from emissions sources to modeled receptors where maximum PM<sub>10</sub> and PM<sub>2.5</sub> impacts would be anticipated.

#### **3.1.2 Toxic Air Pollutant Emissions Rates**

TAP emissions regulations under Idaho Air Rules Section 220 are only applicable for new or modified sources constructed after July 1, 1995. The submitted emissions inventory in the June 2015 application did

not address any modeling with TAP emissions because PPC did not identify any TAPs with any potential increases.

### 3.1.3 Emissions Release Parameters

Table 5 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources as used in the final modeling assessment.

Stack parameters used in the modeling analyses were not documented/justified in the originally submitted application, as the parameters of the existing sources were taken from a non-specified previous permit. CH2MHill subsequently (on July 7, 2015) provided adequate information on the derivation of stack parameters of these minor sources, supplying copies of data sheets from a previous permit.

Table 5. Stack Parameters used in Modeling							
Source ID	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
	(m)	(m)	(m)	(ft)	(°F)	(fps)	(ft)
SFDRY <sup>a</sup>	414680	4813430	1429.1	50	140	71.2	2.73
EBBIN <sup>b</sup>	414701	4813451	1429.1	38	75	56.9	0.5
WBBIN <sup>c</sup>	414696	4813453	1429.1	38	75	56.9	0.5
PACKR <sup>d</sup>	414676	4813451	1429.1	26	75	56.9	0.5
SUSA <sup>e</sup>	414673	4813451	1429.1	26	75	56.9	0.5

<sup>a</sup> – Starch Flash Dryer

<sup>b</sup> – East Bulk Storage Bin

<sup>c</sup> – West Bulk Storage Bin

<sup>d</sup> – Valve Sack Packaging Hopper

<sup>e</sup> – Supersack Packaging Hopper

## 3.2 Background Concentrations

Background concentrations were provided by DEQ and obtained from NW AIRQUEST. DEQ has determined that the NW AIRQUEST background values are representative of the Idaho Falls area. Because the modeling analyses showed maximum impacts for all criteria pollutants to be greater than the Significant Impact Level (SIL) for each modeled pollutant and averaging period, background concentrations were needed for final NAAQS compliance demonstration, and are listed in Table 8.

## 3.3 Impact Modeling Methodology

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

### 3.3.1 General Overview of Analyses

PPC performed project-specific air impact analyses that were determined by DEQ to be reasonably representative of the proposed facility and proposed modification as described in the application. Results of the submitted analyses demonstrate 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 6 provides a brief description of parameters used in the modeling analyses.



### 3.3.2 Modeling protocol and Methodology

PPC submitted a modeling to DEQ on March 27, 2015. DEQ approved the protocol on March 30 with a few minor comments. Project-specific modeling and other required impact analyses were generally conducted using data and methods discussed in post-application correspondence and in the *Idaho Air Quality Modeling Guideline*<sup>1</sup>.

<b>Table 6. MODELING PARAMETERS</b>		
<b>Parameter</b>	<b>Description/Values</b>	<b>Documentation/Addition Description</b>
General Facility Location	Idaho Falls, ID	The facility is located in an area that is attainment or unclassified for all criteria air pollutants
Model	AERMOD	AERMOD with the PRIME downwash algorithm,.
Meteorological Data	Idaho Falls surface data and Boise upper air data	The meteorological model input files for this project were provided by and recommended as most representative for this project by IDEQ, as described in the IDEQ modeling protocol and verified by IDEQ's approval of that protocol.
Terrain	Considered	See section 3.3.5 below
Building Downwash	Considered	BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD.
Receptor Grid	<b>Significant Impact Analyses</b>	
	Grid 1	25-meter spacing along the ambient air boundary
	Grid 2	50-meter spacing for at least 500 meters from the grid centered on the facility
	Grid 3	100-meter spacing for at least 1000 meters from the grid centered on the facility
	Grid 4	1,000-meter spacing for 10,000 meters from the grid centered on the facility
	Grid 5	1,500-meter spacing for 15,000 meters from the grid centered on the facility

### 3.3.3 Model Selection

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

AERMOD version 14134 was used by PPC for the modeling analyses to evaluate impacts of the facility. This version is the current version at the time the application was received by DEQ.

### 3.3.4 Meteorological Data

DEQ provided five years of data from the Idaho Falls, Idaho airport for the years 2008-2012. This data included both surface and upper air data, and DEQ determined that these data are adequately representative of the meteorology in the Idaho Falls area for minor source permitting.

### 3.3.5 Effects of Terrain on Modeled Impacts

Terrain data were extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) files in the WGS84 datum (approximately equal to the NAD83 datum). CH2MHill used 1 second data files (about 30-meter resolution), which is sufficient to adequately resolve terrain in the area for evaluating air pollution impacts resulting from emissions.

The terrain preprocessor AERMAP Version 11103 was used to extract the elevations from the NED files and

assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain.

DEQ reviewed the area surrounding the facility by using the web-based mapping program Google Earth, which uses the WGS84 datum. DEQ also overlaid modeling files with a digital photograph background images acquired from the 2013 ARCGIS NAIP (National Agriculture Imagery Program) data base. The immediate area is effectively flat with regard to dispersion modeling affects. Elevations in the modeling domain matched those indicated by the background images

### ***3.3.6 Facility Layout***

DEQ verified proper identification of buildings on the site by comparing a graphical representation of the modeling input file to aerial photographs on Google Earth. The modeled layout matched well with aerial photographs in Google Earth as well as from those in the ARCGIS 2013 NAIP database.

### ***3.3.7 Effects of Building Downwash on Modeled Impacts***

Potential downwash effects on emissions plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

### ***3.3.8 Ambient Air Boundary***

Ambient air is defined in Section 006 of the Idaho Air Rules as “that portion of the atmosphere, external to buildings, to which the general public has access.” PPC has a fenceline which clearly precludes public access to the facility and defines the ambient boundary for the facility.

### ***3.3.9 Receptor Network***

Table 8 describes the receptor grid used in the submitted analyses. The receptor grid met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*<sup>1</sup>. DEQ determined this grid assured maximum impacts were reasonably resolved by the model considering: 1) types of sources modeled; 2) modeled impacts, and the modeled concentration gradient; 3) conservatism of the methods and data used as inputs to the analyses; 4) potential for continual exposures or exposure to sensitive receptors.

### ***3.3.10 Good Engineering Practice Stack Height***

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

$H = S + 1.5L$ , where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

All point sources were below GEP stack height. Therefore, consideration of downwash caused by nearby buildings was required.

## 4.0 Impact Modeling Results

### 4.1 Results for NAAQS Significant Impact Level Analyses

All criteria pollutant emission increases associated with the proposed project above the Level I Modeling Applicability Thresholds were modeled to show compliance with the NAAQS. This included net project emissions of both PM<sub>2.5</sub> and PM<sub>10</sub>. These modeling applicability thresholds, based on modeling of a single emissions stack with specified release parameters, were established to assure that impacts of projects when emissions equal to or less than these levels will not cause impacts exceeding the SILs. Since the emission increases associated with the proposed project are above these threshold values, a project-specific air impact analysis is required to demonstrate NAAQS compliance for issuance of the PTC. All modeled impacts were above the SIL for each pollutant, as listed in Table 7. Results of the NAAQS modeling analyses are listed in Table 8, and show that compliance has been demonstrated with the NAAQS for all modeled pollutants.

Table 7. RESULTS FOR SIGNIFICANT IMPACT ANALYSES					
Pollutant	Averaging Period	Modeled Design Concentration (µg/m <sup>3</sup> ) <sup>a</sup>	Significant Impact Level (µg/m <sup>3</sup> )	% of SIL	NAAQS (µg/m <sup>3</sup> )
PM <sub>2.5</sub> <sup>b</sup>	24-hour	7.75	1.2	646	35
	Annual	0.93	0.3	309	12
PM <sub>10</sub> <sup>c</sup>	24-hour	9.42	5	188	150
<sup>a</sup> Highest max any year <sup>b</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. <sup>c</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.					

Table 8. RESULTS FOR NAAQS ANALYSES					
Pollutant	Averaging Period	Modeled Design Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Concentration (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
PM <sub>2.5</sub>	24-hour	14.88 <sup>a</sup>	9.80	24.68	35
	Annual	3.77 <sup>b</sup>	3.8	7.6	12
PM <sub>10</sub> <sup>c</sup>	24-hour	19.10	97.0	116.10	150
<sup>a</sup> Mean of the Maximum eighth-highest value over a five year period. <sup>b</sup> Maximum annual average over a five year period. <sup>c</sup> Maximum 6 <sup>th</sup> highest over a five year period					

#### **4.2     *Results for TAPs Impact Analyses***

Dispersion modeling is required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with project-specific emission increases exceeding emissions screening levels (ELs). The June 2015 application did not identify any TAPs that required air impact modeling analysis because there are no increases in any TAPS emissions. Therefore, no modeling assessment was done to demonstrate compliance with any TAPS AAC or AACC.

#### **5.0     Conclusions**

The ambient air impact analyses and other air quality analyses submitted with the PTC application demonstrated to DEQ's satisfaction that emissions from the proposed PPC project will not cause or significantly contribute to a violation of any ambient air quality standard.

**References:**

1. *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>.

## **APPENDIX C – FACILITY DRAFT COMMENTS**

## **The following comments were received from the facility on August 13, 2015:**

**Facility Comment:** Statement of Basis, Emissions Inventories, Potential to Emit – There is a discrepancy between the emissions shown in Tables 4 and 6 of the Statement of Basis for pre-project and change in emissions of the Starch Flash Dryer and the emissions shown in Tables 1 and 3 of the Statement of Basis. The emissions in Table 4 are from the previous permit. The emissions in Appendix A are emissions that we recalculated for the permit application from the source test conducted in 1998 and with the use of AP-42 emission factors. The use of either previously permitted or recalculated emissions makes no difference in modelling requirements or results; however, using the previous permit emissions may lead one to believe that emissions from natural gas combustion will increase. Since there is no increase in natural gas usage or emissions, this is a false conclusion. Indeed, the tables for the toxic air pollutants arising from the natural gas combustion show no change in emissions and thus contradict the conclusion of Table 6. Therefore, Penford requests that the emissions recalculated for the permit application as presented in Appendix A be used in the Statement of Basis with an explanation for the change.

In addition to the discrepancy above, Table 5 of the Statement of Basis does not total the hourly emissions for NO<sub>x</sub>, CO, and VOC. Penford requests that these totals be added to the table.

As discussed, please make clear in the permit the reason for the apparent change in TAP emissions (i.e., the difference between previously permitted emissions and the calculated emissions for the permit application) is not due to any production or fuel combustion increase; instead, it is likely due to the change in calculation methodology.

**DEQ Response:** Pre-project emissions were taken from the Statement of Basis from the previous permitting project which established Post Project emissions at that time. The Post Project emissions were the basis for the issuance of the previous permit in May 2009. Therefore, Pre-Project emissions for this project will not be changed to accommodate a change in the emissions calculation methodology. A note will be placed in the TAPs emissions calculation section explaining that there is no change in the natural gas combustion rate as a result of this project.

**Facility Comment:** Statement of Basis, Technical Analysis, Table 1 and Permit, Regulated Sources, Table 1.1 - The facility would like to upgrade the blower for the twin cyclones installed on its Starch Flash Dryer. As stated in Table 1.1 of the draft permit, the current motor has a 150 horsepower (hp) rating. This rating is inadequate for the design conditions and a larger rated motor would correct an operational deficiency. There would be no change in emissions with this upgrade as both the current and proposed motors are electric. In addition, the size of the motor does not change the stack flow characteristics. Therefore, Penford requests that Table 1.1 be updated to show a blower rating of 200 hp. This upgrade should occur by the time the permit is issued.

**DEQ Response:** The requested change will be made to the Statement of Basis and the permit.

## **APPENDIX D – PROCESSING FEE**



## PTC Fee Calculation

### Instructions:

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

Company: Penford Products Company  
Address: 1088 W. Sunnyside Rd.  
City: Idaho Falls  
State: Idaho Falls  
Zip Code: 83402  
Facility Contact: Chuck Duthler  
Title: VP, EH & S  
AIRS No.: 019-00026

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

☐ Y ☐ N Did this permit require engineering analysis? Y/N

☐ N ☐ Y 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 <sub>x</sub>	0.3	0	0.3
SO <sub>2</sub>	0.0	0	0.0
CO	2.3	0	2.3
PM10	8.0	0	8.0
VOC	0.0	0.07	-0.1
TAPS/HAPS	0.0	0	0.0
Total:	10.7	0.07	10.6
Fee Due	\$ 5,000.00		

Comments: