Statement of Basis

Permit to Construct No. P-2008.0024
Project ID 0024

Idaho Supreme Potatoes, Inc.
Firth, Idaho

Facility ID 011-00013

Final

October 5, 2012
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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.

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_2	carbon dioxide
CO_{2e}	CO_2 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
FBD	fluidized bed dryer
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
ISP	Idaho Supreme Potatoes, Inc.
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_2	nitrogen dioxide

NOx	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PCB	polychlorinated biphenyl
PERF	Portable Equipment Relocation Form
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
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
Rules	Rules for the Control of Air Pollution in Idaho
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_2	sulfur dioxide
SOx	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
Tier II	Tier II operating permit
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^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Idaho Supreme Potatoes, Inc. (ISP) is a potato processing company. The facility primarily involves potato dehydration to make potato flakes. ISP also makes small quantity of dehydrated potato pieces, such as slices, strips, or hash browns. A brief description of ISP's processes is presented below.

Flake Lines: A, B, and C Lines

The flake process consists of three lines: A, B, and C lines to make flakes. A and B lines share the same peeler and peel scrubbers with separate but identical blanchers, coolers, cookers, and flakers. C line has a separate peeler and peel scrubber along with the other equipment. Each line contains four steam heated drum dryers, also called flakers, for a total of twelve at the facility. There are ten storage silos.

The processes are described as follows:

- The potatoes arrive at the plant on trucks, then are unloaded across pilers, deposited in temporary storage bins, transported from the bins, washed with cold water, and conveyed to a tare removal table where rot, sticks, and other debris are removed.
- The potatoes are transferred to a steam peeler and exposed to steam. Steam is exhausted and quenched in a water bath.
- The peel is fully removed by dry and wet scrubbing using revolving brushes and/or water sprays. Waste products from this portion of the process are used for cattle feed.
- Peeled potatoes are transferred to a trim table where defective parts and the remaining peel are removed.
- The potatoes are held in a surge bin and released at a metered rate for proper slicing. Sliced potatoes are pumped to pre-cookers or blanchers.
- The potatoes are then cooled to retrograde the starch gelatinization, water transported into cookers, and exposed to atmospheric steam until fully cooked.
- The potatoes are then forced through slots, broken into smaller pieces, and added to dehydration rolls.
- The mashed/dehydrated potatoes are spread across the face of drum dryers (also called flakers) with five applicator rolls. The steam heater drum dryer rotates and drives moisture from the potato cells. Excess moisture is removed by a steam snifter fan.
- The dried potato sheet is cut off the drum and broken into smaller pieces. Good flake is transferred to mills, cut into desired particle size and density, and transported to product separation baghouses.
- The flake is then bagged and placed into large totes for storage and transport, reblended for texture and quality, or sent to silos for storage.

Flake With Additives

Potato flakes are layered into the single unit fluidized bed dryer (FBD). Potato flakes, with a moisture content of approximately 7%, are metered from the onsite process and storage units into a mixing unit. In the same mixer, liquid additives are applied using pressure sprays at room temperature ahead of the dryer body. The treated moist flakes, with a moisture content of approximately 30%, are then metered into the FBD, where it passes through three compartments. The first two compartments are heating stages and the third compartment is a cooling stage. The resulting product is collected and repacked according to customer specifications. Two natural gas-fired burners, which each have a maximum capacity of 3.5 MMBtu/hr, provide the required heat for final dehydration. The actual heat input of the burners depends on the desired product drying rate.

Slice Line

The slice line makes dehydrated potato slices.

- The potatoes arrive at the plant on trucks, then are unloaded across pilers; deposited in temporary storage bins; transported from the bins; washed with cold water; and conveyed to a tare removal table where rot,

sticks, and other debris are removed.

- The potatoes are transferred to a steam peeler and exposed to steam. Steam is exhausted and quenched in a water bath.
- The peel is fully removed by dry and wet scrubbing using revolving brushes and/or water sprays. Waste products from this portion of the process are used for cattle feed.
- Peeled potatoes are transferred to a trim table where defective parts and the remaining peel are removed.
- The potatoes are held in a surge bin and released at a metered rate for proper slicing. Sliced potatoes are pumped to pre-cookers or blanchers.
- After precooking/blanching, the slices are blown down or up to dehydrate the slices to a shelf stable product.
- The slices are piled in various thicknesses in Multistage Dryer Stages A, B, and C. The slices are then sorted and shipped in bags or totes.
- The slices may be finished or dried in the secondary dryer or used as byproduct for dog food.

The multistage dryer (National Dryer) has three separate drying stages A, B, and C. Each stage contains separate air intakes, gas burners, fans and exhaust outlets. The A stage exhaust has no external stack. The exhaust is vented through a heat exchanger to preheat the air flowing into the A stage and B stage air intakes. The A stage exhaust is then routed back into the building and into the C stage air intake. Both B stage and C stage exhaust through stacks on the roof. There are only two external emissions points (B & C) for this dryer.

The secondary dryer has no set production rate and is only used when absolutely necessary. Occasionally finished product (slice, dice, etc.) that has been dried in the National Dryer will have small pockets that contain a higher than spec moisture content. The secondary dryer is used to dry out this over moist product to meet whatever specifications that have been set by the customer. These variations in moisture are usually a fraction of a percent and the amount of product needing the secondary drying varies from a few hundred pounds to several thousand pounds. Typically the secondary dryer is not needed, but when it is deemed necessary the moist product is placed in large stainless steel totes with a duct attachment vented into the bottom. The totes are then attached to the secondary dryer exhaust manifold. Heated air is then blown through the bottom of the tote and up through the product. The amount of time varies due to the moisture content of the product. The secondary dryer is capable of drying one to four totes at a time with each tote capable of holding a maximum of 500 pounds of product. There is no external exhaust stack; the heated air containing the gas combustion emissions is vented through the totes and into the room.

Boiler

Process steam and heat is provided by the Bigelow Boiler (Boiler No. 4), which has a maximum capacity of 140 MMBtu/hr. The Bigelow Boiler has a low-NOx burner which is permitted to burn natural gas, or propane.

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).

January 19, 1983	DEQ issued initial PTC for construction of a coal-fired boiler. The boiler was permitted to burn liquid fuel or coal. (S)
March 13, 1995	EPA determined that NSPS Subpart Db does not apply to the Bigelow Boiler, based on the assumption that coal would no longer be burned in this boiler. EPA determined that the change in the configuration of the boiler (to increase the steam rate) did not result in an increase in the emission rate and, thus, did not constitute a modification.
May 4, 1995	DEQ issued PTC No. 011-00013 to reconfigure the Bigelow Boiler to run on natural gas or No. 2 fuel oil instead of coal and No. 2 fuel oil. (S)

September 22, 1995	DEQ issued PTC No. 011-00013 to increase the Bigelow Boiler emissions by using more accurate emission factors and to replace the natural gas throughput monitoring with a requirement to monitor steam production. (S)
January 16, 1996	DEQ issued initial T2 No. 011-00013 to limit NOx emissions below major source threshold so that ISP would not be subject to Title V program or Tier I operating permit. (S)
December 23, 1998	DEQ issued revised T2 No. 011-00013 to change certain requirements within the existing Tier II. (S)
December 11, 2000	DEQ issued permit exemption for temporary boiler operations to burn a maximum of 331,200 gallons of No. 6 residual fuel oil with a max. sulfur content of 1.5%. (S) (expired on February 21, 2001)
March 8, 2001	DEQ issued permit exemption for temporary boiler operations to burn a maximum of 338,800 gallons of No. 6 fuel oil with a maximum sulfur content of 0.4%. (S)
April 19, 2001	Fluidized bed dryer was exempt from PTC permitting.
April 22, 2002	DEQ renewal the Tier II in accordance with IDAPA 58.01.01.400 and permitted the facility modification (i.e. allow burning fuel oil in the boilers) in accordance with IDAPA 58.01.01.200. The facility became major source for Title V program because of this modification. (S)
June 7, 2002	DEQ revised existing Tier II to correct the number of storage tanks from four to five. (A, will be S after the issuance of this PTC)
November 26, 2004	EPA determined that NSPS Subparts Db and Dc do not apply to the Bigelow Boiler and the Cleaver Brooks Boiler. This determination was based on the fact that the planned 2001 nozzle replacement did not occur and on the assumption that coal would not be burned in the Bigelow Boiler. Burning coal in the Bigelow Boiler would invalidate this decision and would trigger NSPS and PSD review.
December 1, 2004	DEQ received updated application materials for the request to obtain a Consent Order that will allow ISP to combust fuel oil with sulfur content greater than 0.5%.
December 20, 2004	DEQ issued Consent Order, which requires the Cleaver Brooks Boiler to be operated only on natural gas, limits combustion of residual fuel oil with a maximum sulfur content of 1.75% in the Bigelow Boiler, prohibits burning of coal in the Bigelow Boiler without first conducting a DEQ-approved PSD analysis and an EPA-approved NSPS Subpart Db applicability analysis, and requires submittal of a T2 permit application by February 25, 2005. (Will be terminated after the issuance of this PTC)
February 4, 2008	DEQ issued initial Tier I OP T1-030513 (A, will be terminated after the issuance of this PTC).

Application Scope

This permitting action is to renew what are currently allowed in the Tier II operating permit, issued on June 7, 2002 based on 2002 modeling analysis and to convert the Tier II into a PTC.

More discussions can be found under Regulatory Analysis section of this SOB regarding Permit to Construct.

On February 26, 2008, ISP submitted a PTC/T2 application to revise and renew the Tier II operating permit issued on June 7, 2002. ISP proposed to burn coal in Bigelow Boiler (Boiler No. 4). Because the proposed

modification could not demonstrate compliance with the ambient air quality standards, DEQ was not able to permit the proposed modifications. However, DEQ could renew what are currently allowed in the 2002 Tier II operating permit based on 2002 permit and not permit the proposed modification (i.e., use coal in Boiler No. 4). Any modification as defined in the Rules requires ISP to submit a separate application and to demonstrate compliance with the new NAAQS. A draft permit was issued for facility review on May 29, 2012 based on the above approach.

On June 20, 2012, ISP submitted the comments on the draft permit. In the comments, ISP requested the following changes to the permit:

- Remove all references pertaining to fuel oil because ISP has proposed not to burn any diesel or residual oil.
- Remove Boiler No. 3 because ISP would no longer use Boiler No. 3.
- Limit Boiler No. 4 annual operating hour to 7,757 hr/yr to keep NOx emissions below 100 T/yr to avoid being major source for Title V program.

The changes already made in the first draft permit are as follows:

- Requirements of 40 CFR 60 Subpart Db and Dc are removed from this permit because they are not applicable when Boiler No. 4 is only permitted to burn natural gas or propane.
- Some permit conditions are revised based on newly available testing data and according to the current Department guidance.

DEQ reviewed ISP's PTE calculations for NOx and greenhouse gases (GHG) submitted on June 20, 2012 and discovered that to keep NOx emissions below 100 T/yr, the permit needs to add the following limit:

- The annual operating hour of the multistage dryer (National Dryer) shall not exceed 6,000 hours per year.

Second facility draft is provided to ISP for review as requested by ISP.

After issuance of this permit, DEQ will terminate the 12/20/2004 consent order because the consent order is temporary and does not intend to be used as a permit. Because the facility becomes an SM source after this permit is issued, DEQ will terminate facility's Tier I operating permit. For any modifications as defined in IDAPA 58.01.01.006.68, ISP will need to submit a separate PTC application.

Application Chronology

February 25, 2005	DEQ received T2/PTC application for modification of T2 No. 011-00013. The project, in part, included permitting the use of high-sulfur content residual fuel oil in the Bigelow Boiler and the removal of NSPS requirements for the Cleaver Brooks Boiler and the Bigelow Boiler. Application determined incomplete on March 25, 2005 and complete on July 1, 2005.
May 24, 2006	DEQ received a PSD analysis for the Bigelow Boiler. The analysis covers potential coal combustion and was submitted in accordance with the December 20, 2004 consent order.
September 14, 2006	DEQ issued letter clarifying that ISP is not allowed to burn coal in the Bigelow Boiler until the 2002 T2 permit is modified.
December 19, 2006	EPA determined that NSPS Subpart Db will not apply to the Bigelow Boiler when burning coal, based on ISP's assertions that no physical changes to the boiler were required to burn coal (i.e. the only changes needed were to the fuel delivery system and to reinstall the induction fan and baghouse).
February 9, 2007	DEQ terminated T2/PTC application as requested by ISP on January 30, 2007.

April 3, 2007	DEQ received PTC application to modify 2002 T2, Project No. P-2007.0049 assigned. Application determined incomplete on May 3, 2007.
October 25, 2007	DEQ received required supplemental information from ISP.
November 23, 2007	DEQ determined application complete.
December 13, 2007	DEQ requested documentation and justification of the stack parameters by December 28, 2007.
January 15, 2008	DEQ received information on stack parameters from JBR Environmental, showing considerable differences between modeled stack parameters and actual stack parameters.
January 17, 2008	DEQ received request from Wade Chapman to withdraw the application. DEQ issued acknowledgement letter and terminated project No. P-2007.0049.
February 26, 2008	DEQ received PTC application to modify T2 No. T2-011-00013 (issued June 7, 2002 and expired June 7, 2007). The $1,000 PTC application fee from terminated project P-2007.0049 was applied to this project, P 2008.0024.
March 7, 2008	DEQ reminded ISP by email that their T2 expired in 2007. ISP requested through email that this project be processed as a combination T2 renewal and PTC action. Project number was changed to T2 2008.0024.
March 27, 2008	DEQ determined application complete.
May 19, 2008	A teleconference was conducted to clarify ISP's proposed boiler operations when burning coal, prompted by questions raised during an April 16, 2008 inspection.
May 22, 2008	DEQ received a request from JBR Environmental regarding options for using a temporary natural gas-fired boiler to provide steam while the Bigelow boiler is being repaired. DEQ determined that the proposed temporary boiler, with ~118 MMBtu/hr capacity (~75,000 lb steam/hr), would not be exempt from PTC requirements. Other options were evaluated, but it was determined that a PTC would be required.
June 16, 2008	DEQ determined that the application omitted fugitive emissions from coal handling and information regarding the pulverizer. The application also does not demonstrate compliance for nickel.
June 2008 – March 2012	ISP worked with the consultant to try to demonstrate compliance with the ambient standards, but was not able to when coal is to be used for Boiler No. 4.
March 13, 2012	DEQ had a conference call with ISP and JBR environmental. It was decided that DEQ would renew the existing Tier II operating permit issued on June 7, 2002 based on 2002 modeling analysis and not allow for any modification as defined in Rules, and ISP would submit a separate PTC application for proposed modifications.
May 23, 2012	DEQ made available the draft permit and statement of basis for peer and regional office review.
May 29, 2012	DEQ made available the draft permit and statement of basis for applicant review.
June 4 – June 19, 2012	DEQ provided a public comment period on the proposed action.

July 3, 2012 DEQ received the permit processing fee.

June 20, June 29, and September 25, 2012 DEQ received supplemental information during facility review on the first and second draft permits.

September 6, 2012 DEQ made available the second draft permit and statement of basis for applicant review.

October 5, 2012 DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Emission Unit / ID No.	Emissions Unit Description	Control Device Description	Emissions Discharge Point ID No. and/or Description
Bigelow Boiler (Boiler No. 4)	Boiler No. 4 Manufacturer: Bigelow Manufacture date: 1983 Model: Coen 200 Series CSI NOx Mixer Size 34 burner Rated Heat Input Capacity: 140 MMBtu/hr Burner type: Low NOx burner Fuels: Natural gas or Propane	None	Boiler #4 Stack B4: Stack height: 12.29 m (50 ft) Exit diameter: 0.91 m (3 ft) Exit flow rate: 32,000 acfm Exit temperature: 463.60 K (375°F)
Fluidized Bed Dryer	Fluidized Bed Dryer Manufacturer: Maxon Manufacturer date: July 1977 Model: BD21X3 Burner Type: two 435 Oven Pak II burners Maximum throughput: 1 T/yr Rated Heat Input Capacity: two burners, each rated at 3.5 MMBtu/hr Fuels: Natural gas (primary) Propane (backup)	None	Stack FBD: Stack height: 8.60 m (40 ft) Exit diameter: 1.04 m (22 in. x 40 in.) Exhaust flow rate: 26,000 acfm Exit gas temp: 321.00 K (120°F)
Multistage Dryer (National Dryer)	Multistage Dryer Manufacturer: National Model: Maxon NP-1 with three stages Rated Heat Input Capacity: Stage A (8 MMBtu/hr) Stage B (3.2 MMBtu/hr) Stage C (3.2 MMBtu/hr) Production Rate: 1,000 lb/hr output Fuels: Natural gas Propane (backup fuel)	None	Stacks DS-B & DS-C: For each stack: Stack height: 8 m (26.25 ft) Stack exit diameter.: 0.70 m (2.3 ft) Stack orientation: Vertical Exhaust flow rate: 12,977 acfm Exit gas temperature: 380 K(224.3°F)

Emission Unit / ID No.	Emissions Unit Description	Control Device Description	Emissions Discharge Point ID No. and/or Description
Secondary Dryer	Secondary Dryer Manufacturer: Maxon Model: 405 Ovenpak Rated Heat Input Capacity: 0.55 MMBtu/hr Production rate: capable of drying 1 to 4 totes, each tote holding a maximum of 500 lb of product Fuels: Natural Gas Propane (backup fuel)	None	Vent to the room
Industrial Space Heaters (South, North, and East)	Industrial Space Heaters (South, North, and East) Manufacturer/Model: Maxon NP-1 Rated Heat Input Capacity: South (8.25 MMBtu/hr) North (8.25 MMBtu/hr) East (15.4 MMBtu/hr) Fuels: Natural Gas Propane (backup fuel)	None	Volume Sources (SRC1 –SRC4) Release height: 7.62 m (25 ft) Initial vertical dimension: 3.12 m (10.24 ft) Initial horizontal dimension: SRC1: 14.2 m (46.6 ft) SRC2: 28.37 m (93.08 ft) SRC3: 26.69 m (97.41 ft) SRC4: 26.69 m (97.41 ft)
Miscellaneous Industrial Space Heaters	Miscellaneous Industrial Space Heaters Various Manufacturers ~ 2 MMBtu/hr aggregate	None	N/A
Flakers, Process dehydration lines (Nos. 1 to 12 flakers)	Flakers (Nos. 1 to 12) Manufacturer/Model: Blawnox Maximum Production Output: 900 lb/hr/Flaker	None	Stacks FLKR1-FLKR4 For each stack: Stack height: 17.07 m (56.0 ft) Stack exit diameter: 1.14 m (3.74 ft) Exhaust flow rate: 7,503 acfm Exit gas temperature: 293 K (68°F) Stack FLKR5 For each stack: Stack height: 17.07 m (56.0 ft) Stack exit diameter: 0.63 m (2.07 ft) Exhaust flow rate: 7,503 acfm Exit gas temperature: 293 K (68°F) Stacks FLKR6-FLKR8 For each stack: Stack height: 17.07 m (56.0 ft) Stack exit diameter: 0.76 m (2.49 ft) Exhaust flow rate: 16,116 acfm Exit gas temperature: 293 K (68°F) Stacks FLKR9-FLKR12 For each stack: Stack height: 17.07 m (56.0 ft) Stack exit diameter: 0.61 m (2.00 ft) Exhaust flow rate: 7,503 acfm Exit gas temperature: 293 K (68°F)

Emission Unit / ID No.	Emissions Unit Description	Control Device Description	Emissions Discharge Point ID No. and/or Description
Storage silos (A through J, 10 total)	Storage silos (A through J, 10 total)	Baghouse filter on each silo	Baghouse: Manufacturer: Dust Control EQ Model: VS-10-KS1 or equivalent Efficiency: 99.99% Storage Silo Stacks (A-J): Stack height: 22.43 m (73.59 ft) Stack exit diameter: 0.244 m (0.80 ft) Exhaust flow rate: 1,818 acfm Exit gas temperature: 293 K (68°F)

Emissions Inventories

This permitting action does not allow modifications as defined in the Rules. Any modification as defined in the Rules requires to submit a separate application and to demonstrate compliance with the new NAAQS. This permitting action is to renew what are currently allowed in the Tier II operating permit issued on June 7, 2002 based on 2002 modeling analysis and to convert the Tier II into a PTC.

PRE-PROJECT PTE

The PTE for the existing Tier II issued on June 7, 2002 is taken from the technical memo for the 2002 permit and listed in the following table:

Table 2 PRE-PROJECT PTE

Process Description	PM_{10}	SO_2	NO_x	CO	Lead	VOCs
	T/yr					
#4 Boiler	32.8	223.4	135.8	48.2	0.004	3.3
#3 Boiler	3.7	25	17.5	5.6	0.0006	0.41
Fluidized Bed Dryer	3.3	0.02	4.8	2.5	0.00001	0.18
Other Natural Gas Sources	1.2	0.1	15.2	13.6	0.0001	1.3
Dehydration Process	22	0	0	0	0	0
Storage Silos [a]	2.8	0	0	0	0	0
FACILITY TOTALS	**65.8**	**248.5**	**173.3**	**69.9**	**0.005**	**5.1**

[a] it was missed in the 2002 PTE table and is added in this permitting action.

POST-PROJECT PTE

On June 20, 2012, ISP submitted the comments on the draft permit. In the comments, ISP requested the following changes to the permit: 1) remove all references pertaining to fuel oil because ISP has proposed not to burn any diesel or residual oil; 2) remove Boiler No. 3 because ISP would no longer use Boiler No. 3; and 3) limit Boiler No.4 operating hours to keep NOx emissions below 100 T/yr to avoid being major source for Title V program.

Because of the above proposed changes, PTE for Boiler No. 4 and facility-wide NOx PTE are recalculated, and emissions from Boiler No. 3 are removed. GHG PTE is calculated as it is required in the EI. The new calculations can be found in Appendix A of the SOB. Other emissions are kept as they were for the 2002 Tier II permit. EI for 2002 Tier II permit can be found in Appendix E of the SOB.

The PTE for Boiler No. 4 is calculated using ISP's proposed operating hours of 7,757 hr/yr for Boiler No. 4 and EFs in AP-42, Section 1.4, rev. 9/98 for natural gas combustion. Facility-wide NOx PTE is calculated for all combustion sources using 6000 hr/yr for the multistage dryer (National Dryer), 7757 hr/yr for Boiler No. 4, 6048 hr/yr for the space heaters, and EFs in AP-42, Section 1.4, rev. 9/98 for natural gas combustion.

The revised PTE is presented in Table 3. HAP emissions decrease as a result of removing fuel oil as a fuel option for Boiler No. 4. The facility continues being minor for HAPs.

Table 3 POST-PROJECT PTE IN TONS PER YEAR (T/yr)

Process Description	PM_{10}	SO_2	NO_x	CO	Lead	VOCs	COe
#4 Boiler	4.01	0.317	73.95	44.37	0.004	2.9	
Fluidized Bed Dryer	3.3	0.02	24.3	2.5	0.00001	0.18	
Other Natural Gas Sources	1.2	0.1		13.6	0.0001	1.3	
Dehydration Process	22	0	0	0	0	0	
Storage Silos	2.8	0	0	0	0	0	
FACILITY TOTALS	33.31	0.44	98.30	60.47	0.0041	4.39	84,449

Ambient Air Quality Impact Analyses

This permitting action does not allow modifications as defined in the Rules. It is to renew what are currently allowed in the Tier II operating permit issued on June 7, 2002 based on 2002 modeling and to convert the Tier II into a PTC. Ambient air quality impact analysis for this permitting action is not required.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Bingham County which is designated as attainment or unclassifiable for PM_{10}, $PM_{2.5}$, CO, NO_2, SO_X, and Ozone. Reference 40 CFR 81.313.

Facility Classification

This facility was a major facility for Title V program as defined by IDAPA 58.01.01.008 because it emits or has the potential to emit regulated air pollutants in amounts greater than or equal to major facility thresholds listed in IDAPA 58.01.01.008. As a result of ISP's 6/20/2012 proposed changes and limiting National Dryer operating hour to 6,000 hours per year, the facility becomes an SM80 source.

This facility is not a major facility for PSD as defined by IDAPA 58.01.01.205 because it emits or has the potential to emit a regulated criteria air pollutant in amounts less than 250 tons per year. This facility is not a designated facility as defined by IDAPA 58.01.01.006.

Refer to Emissions Inventories Section for calculation details.

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 .....Permit to Construct Required

In mid '90s, ISP applied for a Tier II operating permit to limit the facility's NO_x PTE to be less than 100 T/yr to avoid subjecting to Title V program. ISP also requested a few modifications to the facility in the same application. A Tier II operating permit was issued on January 16, 1996.

In 2001, ISP applied for a PTC for a facility modification. ISP became a major source for Title V program because of the modification. However, instead of issuing a PTC for the modification, a Tier II renewal was issued in 2002 for the modification according to the Department practice at that time. This permitting action converts the

existing Tier II into a PTC. This permitting action is 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

As discussed above, this permitting action converts the existing Tier II into a PTC. Rules for Tier II operating permit do not apply to this permitting action.

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

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

This facility will be an SM80 source because the permit will limit the operating hours of Boiler No. 4, National Dryer, and the space heaters to keep NOx emissions below 100 T/yr. The facility's initial Tier I operating permit was issued on February 4, 2008 and will be terminated after this permit is issued.

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/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.

NESHAP Applicability (40 CFR 61)

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

CAM Applicability (40 CFR 64)

The facility is not a major source for Title V, therefore, is not subject to CAM.

Non Applicability Determination

NSPS Applicability (40 CFR 60)

40 CFR 60.110b Subpart Kb ..... Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced After July 23, 1984

On June 20, 2012, ISP submitted the comments on the draft permit. In the comments, ISP requested to remove all references pertaining to fuel oil because ISP proposed not to burn any diesel or residual oil. Permit Condition 2.13 is revised to read as: The fuel oil storage tanks shall be removed or rendered inoperable. ISP is no longer subject to this regulation.

MACT Applicability (40 CFR 63)

40 CFR 63 Subpart JJJJJJ ..... National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

On June 20, 2012, ISP submitted the comments on the draft permit. In the comments, ISP proposed to burn only gas fuel (i.e., natural gas or propane) in Boiler No. 4. Therefore, ISP is not subject to this regulation.

Conditional Non Applicability Determination

40 CFR 60 Subpart Db.....Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

The non-applicability determination in EPA's 2004 letter was based on the assumption that coal would no longer be burned in Boiler No. 4. The non-applicability determination in EPA's 2006 letter was based on that Boiler No. 4 did not undergo any physical modification since its original installation. The non-applicability determination is only valid for when Boiler No. 4 is permitted to burn fuel oil, natural gas, or propane.

As requested by ISP in its 6/20/2012 comments to the draft permit, Boiler No. 4 is now only permitted to burn natural gas or propane. Therefore, Boiler No. 4 is not subject to the requirements of 40 CFR 60 Subpart Db. The requirements are removed from the permit.

40 CFR 60 Subpart Dc.....Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Based on EPA's November 26, 2004 letter, "*Boiler No. 3 was originally designed to operate on natural gas. It was also tested to operate on fuel oil, but has operated on nature gas since 1978.*" EPA determined that Boiler No. 3 was not subject to 40 CFR 60 Subpart Dc in the November 26, 2004 letter. The non-applicability determination is only valid for when Boiler No. 3 is permitted to burn fuel oil, natural gas, or propane.

The requirements of 40 CFR 60 Subpart Dc are removed from the permit because ISP is not permitted to use Boiler No. 3 as requested by ISP in its 6/20/2012 comments on the draft permit.

Permit Conditions Review

This section describes those permit conditions that have been added, revised, modified or deleted as a result of this permitting action. The new text is in bold. The deleted text is struck out.

New Permit Conditions 1.1 – 1.4

Permit Condition 1.1 states the purpose of this permitting action. PC 1.2 states that those permit conditions that have been modified or revised by this permitting action are identified by the permit issue date citation located directly under the permit condition and on the right hand margin. PC 1.3 states that this PTC replaces Tier II operating permit No. T2-010314 issued on June 7, 2002. PC 1.4 lists the emission sources regulated by this permit.

SECTION 2 FACILITY-WIDE CONDITIONS

The facility-wide conditions in the existing Tier II are kept with some minor changes. The citations for the facility-wide conditions are removed to be consistent with the permit condition format in the current permit template.

Permit Condition 2.7

PC 2.7 duplicates the requirements in General Provision 11 on excess emissions and is replaced with "Reserved".

Permit Condition 2.8

Because ISP is not subject to any federal regulations, PC 2.8 is revised to remove the reporting requirement to EPA Region 10. Revised PC 2.8 reads as follows:

"2.8 Any reporting required by this permit, including but not limited to, records, monitoring data, supporting information, requests for confidential treatment, testing reports, or compliance certifications, shall contain a certification by a responsible official…

~~Any reporting required for New Source Performance Standards shall also be submitted to EPA at the following address:~~

~~EPA Region 10~~
~~Air Operating Permits, OAQ-107~~

~~1200 Sixth Ave.~~
~~Seattle, Washington 98101~~"

Permit Condition 2.9

Corrections are made to PC 2.9 as a result of the *Rules* changes. Revised PC 2.9 reads as follows:

"2.9 The permittee shall comply with the requirements of IDAPA 58.01.01.600-**624** ~~616~~, Rules for Control of Open Burning.

Permit Condition 2.11

Because ISP is not permitted to burn liquid fuel in the boiler at the facility, PC 2.11 is revised to remove grain loading standard for burning liquid fuel. Revised PC 2.11 reads as follows:

"2.11 The permittee shall not discharge to the atmosphere from any fuel-burning equipment PM in excess of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume for gas ~~or 0.050 gr/dscf of effluent gas corrected to 3% oxygen by volume for liquid~~."

Permit Condition 2.12

ISP is not allowed to burn fuel oil, however, any fuel oil at the facility needs to meet the requirements in PC 2.12.

Permit Condition 2.13

In ISP's comments on the draft permit submitted on June 20, 2012, ISP proposed not to burn any fuel oil and to remove references pertaining fuel oil in the permit. PC 2.13 is revised to reflect the requested changes. Revised PC 2.13 reads as follows:

"2.13 The fuel oil storage tanks shall be removed or rendered inoperable. ~~The permittee shall keep readily accessible records showing dimensions and an analysis showing the capacity of the following storage vessels utilized at the facility: one 16,000-gallon AST containing fuel oil; two 30,000-gallon ASTs containing fuel oil; one 10,000-gallon AST containing No. 2 distillate oil; and one 20,000-gallon AST containing No. 2 distillate oil.~~"

Old Permit Condition 2.14

Old PC 2.14 is removed because it is no longer applicable.

~~2.14 The permittee shall submit to the Department a complete application for an original Tier I permit within 12 months of issuance of this Tier II operating permit.~~

SECTION 3 BIGELOW BOILER (BOILER NO. 4)

Permit Condition 3.1

PC 3.1 is revised to add more details about Boiler No. 4. PC 3.1 reads as follows:

"3.1 Boiler No. 4 is used **to provide steam for** the dehydration process and has a maximum rated heat capacity of approximately 140 MMBtu/hr. **Boiler No. 4 utilizes a Coen 200 series low NOx burner. The types of fuel permitted to use in Boiler No. 4 are either natural gas or propane."**

According to the information in EPA's November 26, 2004 letter, ISP installed low NOx burners in December 1994.

Old Permit Conditions 3.2 – 3.11

Old PCs 3.2 through 3.11 were taken from 40 CFR 60 Subpart Db. They are removed from the permit because the subpart does not apply to Boiler No. 4 when it is only permitted to burn natural gas or propane. More discussions can be found in EPA's 2004 and 2006 applicability determination letters that are included in Appendix B of the SOB.

New Permit Condition 3.2

New PC 3.2 describes emissions control of the boiler and reads as follows:

"**3.2 Emission Control Description**

The boiler installed low NOx burners in December 1994. The boiler does not have other emissions control devices.

Table 3.1 BIGELOW BOILER (BOILER NO. 4) DESCRIPTION

Emissions Units / Processes	Control Devices	Emission Points
Boiler No. 4 **Manufacturer: Bigelow** **Manufacture date: 1983** **Model: Coen 200 Series CSI NOx Mixer Size 34 burner** **Rated heat input capacity: 140 MMBtu/hr** **Fuels: Natural gas, or propane**	**Low NOx burner**	**Boiler No. 4 Stack**

New Permit Condition 3.3

New PC 3.3 establishes annual NOx emissions limit for Boiler No. 4. The NOx limits, including the boiler NOx limit, are for keeping the NOx emissions below 100 T/yr to avoid Title V program. The NOx emissions from Boiler No. 4 were estimated using the boiler heat input rate of 140 MMBtu/hr, EF from AP-42, Table 1.4, rev. 9/98, and the boiler's annual operating hour of 7,757 hr/yr.

New PC 3.3 reads as follows:

"**3.3 Emissions Limit**

The NOx emissions from the Boiler No. 4 stack shall not exceed 74.0 T/yr, based on any consecutive 12 calendar month period.

In absence of any other credible evidence, compliance is assured by complying with permit operating, monitoring, and recordkeeping requirements."

New Permit Conditions 3.4 and 3.5

On June 20, 2012, ISP submitted the comments on the draft permit. In the comments, ISP proposed not to burn any diesel or residual oil in Boiler No. 4. ISP also proposed to limit operating hours of Boiler No. 4 to 7,757 hr/yr to keep NOx emissions below 100 T/yr. New PC 3.4 limits the fuel type of Boiler No. 4 to natural gas or propane only. New PC 3.5 limits the annual Boiler No. 4 operating hours to 7,757 hours per year. New PCs 3.4 and 3.5 read as follows:

"**3.4 Fuel Type**

The permittee shall only use natural gas or propane in Boiler No. 4.

3.5 Boiler Operating Hours

The annual operating hours of Boiler No. 4 shall not exceed 7,757 hours per year."

New Permit Condition 3.6

The permittee is required to monitor and record the boiler operating hours to demonstrate compliance with the boiler operating hours limit in PC 3.5. New PC 3.6 reads as follows:

"3.6 **Operating Hours Monitoring**

Every month, the permittee shall monitor and record the monthly boiler operating hours and calculate the annual boiler operating hours by adding the current month boiler operating hours to the previous consecutive 11-month boiler operating hours."

While PM_{10} emissions from burning natural gas in Boiler No. 4 are 1.04 lb/hr and 3.91 T/hr, the PM_{10} emissions were modeled at the rate of 7.48 lb/hr and 32.8 T/yr in 2002 modeling analysis for when Boiler No. 4 is burning fuel oil. As long as Boiler No. 4 is fired by natural gas or propane only, its PM_{10} emissions will not exceed the modeled values. The PM_{10} emissions rates of Boiler No. 4 are not specifically included in the permit.

SECTION 4 CLEAVER BROOKS BOILER (BOILER NO. 3)

On June 20, 2012, ISP submitted the comments on the draft permit. In the comments, ISP requested to remove Boiler No. 3 because ISP would no longer use Boiler No. 3. PTE of Boiler No. 3 was zero in ISP's PTE calculation submitted with the comments. Existing requirements for Boiler No. 3 are removed.

New Permit Condition 4.1 is added and reads as follows:

"4.1 Boiler No. 3 shall be removed or rendered inoperable."

SECTION 5 NATURAL GAS-COMBUSTION AT THE FACILITY

Section 5 in the 2002 Tier II permit only regulates the emissions from natural gas combustion at the facility. The equipment burning natural gas at the facility includes the fluidized bed dryer, multistage dryer (National Dryer), secondary dryer, and space heaters. The emissions permitted in section 5 of the 2002 permit do not include process emissions from the dryers. They are regulated under Section 6 of the permit. For clarification purpose, the title of the section 5 is revised and reads as follows:

"OTHER NATURAL GAS-COMBUSTION EQUIPMENT AT THE FACILITY ~~**DRYERS AND OTHER NATURAL GAS-BURNING EQUIPMENT**~~"

National Dryer, with three stages, at the facility is a multistage dryer. Multistage dryer and Nation Dryer are used interchangeably in the permit and SOB.

Permit Condition 5.1

As discussed above, for clarification purpose, PC 5.1 is revised and reads as follows:

The facility **has** ~~**utilizes**~~ **one fluidized bed dryer,** one **multistage** dryer **(National Dryer)** with three stages (A, B, and C), one secondary dryer, three industrial space heaters, and other miscellaneous space heaters. ~~**in the dehydration process**~~ **They are fired by** ~~**burns**~~ natural gas **and use propane** ~~**with LPG used**~~ as a backup fuel.

This section regulates emissions from natural gas combustion of the above equipment and does not include process particulate emissions from the dryers.

New Permit Condition 5.2

Following the current template, new PC 5.2 describes emissions control of equipment under this permit section.

New PC 5.2 reads as follows:

"5.2 **Emission Control Description**

There are no emissions control devices on any of the equipment listed in this section.

Table 5.1 DRYERS AND OTHER NATURAL-GAS BURNING EQUIPMENT DESCRIPTION

Emissions Unit / Process	Emissions Control Device	Emissions Point
Fluidized Bed Dryer	**None**	**Stack FBD**
Multistage Dryer (National Dryer)	**None**	**Stacks DS-B & DS-C**
Secondary Dryer	**None**	**Vent to the room**
Industrial Space Heaters (South, North, and East)	**None**	**Volume Sources (SRC1 –SRC4)**
Miscellaneous Industrial Space Heaters	**None**	**N/A**

Permit Condition 5.3

Permit Condition 5.3 is old PC 5.2 with changes.

The PM_{10} emissions limits for the space heaters are taken from Table 7.1 of the old Tier II permit issued on June 7, 2002. The emissions limits of the space heaters were developed based on their rated heat input capacities and the operating hour of 6,048 hr/yr for each heater.

The PM_{10} emissions limits for the fluidized bed dryer and multistage dryer (National Dryer) are removed because they are included in Table 6.2 of the permit. The PM_{10} emissions limit for the secondary dryer is removed because the secondary dryer vents to the room rather than to the atmosphere. Footnotes are added according to current DEQ internal guidance.

The total NOx emissions in T/yr from these combustion sources is added as a new emissions limit to ensure that the NOx PTE is below 100 T/yr.

SO_2 emissions in the existing permit issued on June 7, 2002 were for keeping SO_2 emissions below 250 T/yr to avoid being a major source for PSD. With removing fuel oil as a fuel option for Boiler No. 4, SO_2 emissions are way below 250 T/yr; all SO_2 limits are removed.

PC 5.3 reads as follows:

"Emissions of PM_{10} and **NOx~~SO_2~~** from the listed natural gas-burning equipment shall not exceed any applicable emissions limit listed in Table **~~5~~7.2~~1 in the appendix~~**.

Table 5.2 DRYERS AND OTHER NATURAL GAS-BURNING EQUIPMENT EMISSIONS LIMITS [a]

Source Description	PM_{10} [b]		**NOx ~~SO_2~~**	
	lb/hr[c]	T/yr[d]	~~lb/hr~~[c]	T/yr[d]
Fluidized Bed Dryer	~~0.76~~	~~3.3~~	~~4.0E-03~~	~~1.8E-02~~
Secondary Dryer	~~4.1E-03~~	~~0.02~~	~~3.0E-04~~	~~1.3E-03~~
Multistage Dryer	~~5.9E-02~~	~~0.26~~	~~4.7E-03~~	~~2.0E-02~~
~~National Dryer~~–Stage A	~~2.4E-02~~	~~0.10~~	~~1.9E-03~~	~~8.2E-03~~
~~National Dryer~~–Stage B ~~National Dryer~~- Stage C	~~2.4E-02~~	~~0.10~~	~~1.9E-03~~	~~8.2E-03~~
Space Heater- North	6.1E-02	0.18	~~4.8E-03~~	~~1.5E-02~~
Space Heater- South	6.1E-02	0.18	~~4.8E-03~~	~~1.5E-02~~
Space Heater- East	0.11	0.34	~~9.0E-03~~	~~2.7E-02~~
Misc. Space Heaters	1.5E-02	0.045	~~1.2E-03~~	~~3.5E-03~~

Source Description	PM_{10}[b]		NOx ~~SO_2~~	
	lb/hr[c]	T/yr[d]	~~lb/hr~~[c]	T/yr[d]
Total				**24.3**

a) **In absence of any other credible evidence, compliance is assured by complying with permit operating, monitoring, and recordkeeping requirements.**
b) **Particulate matter with an aerodynamic diameter less than or equal to a nominal ten (10) micrometers,** including condensable **particulate as defined in IDAPA 58.01.01.006.**
c) As determined by a pollutant-specific U.S. EPA reference method, **a test method prescribed by IDAPA 58.01.01.157,** a Department-approved alternative, or as determined by the Department's emissions estimation methods used in this permit analysis.
d) **Tons per any consecutive 12 calendar month period.** As determined by multiplying the actual or allowable (if actual is not available) pound per hour emission rate by the allowable hours per year that the process(es) may operate(s), or by actual annual production rates"

New Permit Condition 5.4.1

PC 5.4.1 limits the operating hour of National Dryer to 6,000 hours per year to keep NOx PTE below 100 T/yr to avoid being subject to Title V program. It reads as follows:

"5.4.1 The permittee shall not operate the multistage dryer more than 6,000 hours per any consecutive 12-month period."

Permit Condition 5.4.2

PC 5.4.2 is old PC 5.3 without changes.

Old Permit Conditions 5.4, 5.5 and 5.6

Hourly emissions limits in the 2002 Tier II permit are used to back calculate the heat input rates of the listed dryers and heaters. The calculated results show that the heat input design capacities were used to develop the hourly emissions limits for natural gas combustion. As long as ISP operates the equipment as designed, the hourly and daily fuel limits and monitoring are not necessary. Old PC 5.4, 5.5, and 5.6 are removed.

~~5.4 Fuel Throughput- Fluidized Bed Dryer~~

~~To demonstrate compliance with the PM_{10} and SO_2 emissions limits for the fluidized bed dryer, the amount of natural gas burned in the fluidized bed dryer shall not exceed 6,843 standard cubic feet per hour (scf/hr) on average per day. The maximum amount of LPG burned in the fluidized bed dryer shall not exceed 78 gallons per hour (gal/hr) on average per day.~~

~~5.5 Fuel Throughput- Dryers A, B, C and Secondary Dryer~~

~~To demonstrate compliance with the PM_{10} and SO_2 emissions limits for dryers A, B, and C and the secondary dryer, the combined maximum amount of natural gas burned in dryers A, B, and C and the secondary dryer shall not exceed 53,000 scf/hr, based on a 24-hour average. The combined maximum amount of LPG burned in Dryers A, B, and C and the Secondary Dryer shall not exceed 253 gal/hr, based on a 24-hour average.~~

~~5.6 Fuel Throughput- Industrial Space Heaters~~

~~To demonstrate compliance with the PM_{10} and SO_2 emissions limits for the industrial space heaters, the amount of natural gas burned in the industrial space heaters shall not exceed 41,235 scf/hr combined, based on a 24-hour average. The amount of LPG burned in the industrial space heaters shall not exceed 174 gal/hr combined, based on a 24-hour average.~~

New Permit Condition 5.5.1

New PC 5.5.1 is a monitoring requirement for compliance with the operating hour limit for National Dryer in PC 5.4.1. New PC 5.5.1 reads as follows:

"5.5.1 The permittee shall monitor and record monthly and annual operating hours of the multistage dryer every month. The permittee shall calculate annual operating hours of the multistage dryer by adding the current month operating hours to the previous consecutive 11-month operating hours. Records shall show that operation of the multistage dryer does not exceed its annual operating hour limit."

Permit Condition 5.5.2

PC 5.5.2 is old PC 5.7 with changes.

Quarterly monitoring is not adequate for annual limit according to EPA. Monthly monitoring is required. Natural gas monitoring for daily natural gas usage is removed as a result of removing old PCs 5.4, 5.5, and 5.6. Records keeping requirement is removed because it is included in General Provision 10. Revised PC 5.5 reads as follows:

"5.~~7~~5.2 The permittee shall monitor and record monthly and annual operating hours of each space heater every month. The permittee shall calculate annual operating hours of each space heater by adding the current month operating hours to the previous consecutive 11-month operating hours. Records shall show that operation of each industrial space heater does not exceed its annual operating hour limit.

~~5.7 The permittee shall record the following parameters in a quarterly record to verify compliance with Permit Conditions 5.3 through 5.6. The records shall be kept at the facility for a minimum period of two years and shall be made available to Department representatives upon request.~~

~~5.7.1 Number of hours each industrial space heater is operated per consecutive 12-month period.~~

~~5.7.2 Hourly amount averaged on a daily basis of natural gas and LPG used in each of the following equipment: fluidized bed dryer; Dryers A, B, and C; secondary dryer; and industrial space heaters.~~

SECTION 6 DEHYDRATION PROCESS

For clarification purposes, the title for permit Section 6 is revised and read as: "~~PROCESS~~ DEHYDRATION **PROCESS** ~~LINES (FLAKER LINES AND SLICE LINE)~~"

Permit Condition 6.1

For clarification purposes, PC 6.1 is revised and reads as follows:

"6.1 **Raw potatoes are received at the facility and traverse through several pre-processing steps including washing, peeling, slicing, and blanching. After these initial steps, the potatoes are either sent to flake lines to make flakes or sent to the slice line to make slices, strips, or hash browns.**

The flake process consists of three lines: A, B, and C lines. A and B lines share the same peeler and peel scrubbers with separate but identical blanchers, coolers, cookers, and flakers. C line has a separate peeler and peel scrubber along with the other equipment. Each line contains four steam heated drum dryers, also called flakers, for a total of twelve at the facility.

Potato flakes are layered into the single unit fluidized bed dryer (FBD). Potato flakes, with a moisture content of approximately 7%, are metered from the onsite process and storage units into a mixing unit. In the same mixer, liquid additives are applied using pressure sprays at room temperature ahead of the dryer body. The treated moist flakes, with a moisture content of approximately 30%, are then metered into the FBD, where it passes through three compartments. The first two compartments are heating stages, and the third compartment is a cooling stage. The resulting product is collected and repacked according to customer specifications. Two natural gas-fired burners, which each burner has a maximum capacity of 3.5 MMBtu/hr, provide the required heat for final dehydration. The actual heat input of the burners depends on the desired product drying rate.

The flake process has ten storage silos.

The slice line has one multistage dryer (National Dryer) with stages A, B, and C and one secondary dryer that vents to the room. These are natural gas-fired dryers.

This section regulates particulate emissions from the dehydration process and associated storage silos.

~~Raw potatoes are received at the facility and traverse through several pre-processing steps including peeling and slicing. After these initial steps, the potatoes are dehydrated to produce several final products.~~ This section permits particulate emissions from the dehydration process and associated storage silos."

New Permit Condition 6.2

New PC 6.2 describes emissions control of equipment under this permit section. New PC 6.2 reads as follows:

"6.2 Emission Control Description

Emissions from the flakers (also called drum dryers), fluidized bed dryer, multistage dryer (National Dryer), and secondary dryer are uncontrolled. Baghouse filters are used on each storage silo to control PM emissions."

Permit Condition 6.3 and Table 6.1

PC 6.3 is old PC 6.2 with changes.

According to the information in the 2002 technical memorandum for the 2002 Tier II permit, the emissions were developed based on material balance due to lack of emissions information at that time. The emissions were evenly divided among the 17 stacks of the steam heated drum dryers (also called flakers) (12 stacks), one multistage dryer (National Dryer, three stacks), and one secondary dryer (two stacks). The PM_{10} emissions from each stack were 0.375 lb/hr. This hourly rate was modeled in according to the 2002 modeling analysis. The total emissions from 17 stacks of the dryers was: 0.375 lb/hr x (12+3+2) = 4.51 lb/hr + 1.13 lb/hr + 0.75 lb/hr = 6.4 lb/hr that was in the 2002 permit as a limit. The corresponding annual limit was 22 T/yr in the 2002 permit. These modeled values/limits remain the same in this permit.

The PM_{10} emissions limit of 0.76 lb/hr for the fluidized bed dryer is taken from Table 7.1 of the 2002 Tier II permit. Because the annual emissions are inherently limited by the hourly limit, the annual limit is not included in this permit.

Each silo was modeled at 0.064 lb/hr according to the 2002 modeling memo. The total emissions from ten silos were 0.64 lb/hr. The emissions from the silos were modeled in 2002 but were missed in the 2002 permit. The hourly emissions limit for the silos is added into this permit.

Table 6.1 includes the emissions limits for the dryers and silos. Permit Condition 6.3 is revised and reads as follows:

"6.3 Emission Limits

Emissions of ~~PM and~~ PM_{10} from the ~~process dehydration lines~~ **flakers, fluidized bed dryer, multistage dryer (National Dryer),** and storage silos shall not exceed the pounds per hour or tons per any consecutive 12-month period values in Table ~~67.21 in the appendix~~.

Table 6.2 DEGYDRATION LINES EMISSIONS LIMITS [a]

Sources	PM_{10} [b]	
	lb/hr [c]	T/yr [d]
Drum Dryers (Flakers)	6.4	22
Multistage Dryer		
Fluidized Bed Dryer	**0.76**	**---** ~~3.3~~
Ten storage silos	**0.64**	**---**

a) **In absence of any other credible evidence, compliance is assured by complying with permit operating, monitoring, and recordkeeping requirements.**
b) **Particulate matter with an aerodynamic diameter less than or equal to a nominal ten (10) micrometers,** including condensable **particulate as defined in IDAPA 58.01.01.006.**

c) As determined by a pollutant-specific U.S. EPA reference method, **a test method prescribed by IDAPA 58.01.01.157,** a Department-approved alternative, or as determined by the Department's emissions estimation methods used in this permit analysis.

d) **Tons per any consecutive 12 calendar month period.** As determined by multiplying the actual or allowable (if actual is not available) pound per hour emission rate by the allowable hours per year that the process(es) may operate(s), or by actual annual production rates"

ISP may submit a separate PTC application to revise these emissions limits using more accurate facility operations and emissions information.

Permit Condition 6.4

PC 6.4 is old PC 6.3 with changes. The throughput limit for raw potatoes is removed. The related discussions and explanations can be found under "New Permit Condition 6.5" section. Revised PC 6.4 reads as follows:

6.4 Throughput

~~The total clean raw potatoes processed shall not exceed a rate of 868 tons per day (868 T/day) and 287,000 tons per any consecutive 12-month period (287,000 T/yr).~~

The total aggregate throughput of the ten storage silos shall not exceed 1,152 tons per day.

New Permit Condition 6.5

New Permit Condition 6.5 is for developing source specific EFs for the flakers and multistage dryer.

Over the years, flakers at other similar potato facilities were source tested. Better emissions factors are now available. Using the newly available emissions data and the throughput limit in the 2002 Tier II operation permit, ISP could not demonstrate compliance with the emissions limits in the permit.

Based on available source test data for flakers, the average PM/PM_{10} EF is 2.8 lb/T dried material. This EF is the same as what is used in ISP's 2008 application. Using EF of 2.8 lb PM_{10}/T and the throughput limit of 868 T/day in the existing 2002 Tier II, the emissions from for the dryers can be calculated as: (2.8 lb/T) x (868 T/day) x (1-80%, moisture in feed stream) / (1- 7%, moisture in product stream) / (24 hr/day) = 21.8 lb/hr, 24-hour average. The calculated emission rate of 21.8 lb/hr is much higher than the permit limit of 6.4 lb/hr for the dryers.

The 2008 application only includes PM/PM_{10} emissions from burning natural gas in the multistage dryer (National Dryer). The application does not address the PM/PM_{10} emissions from the drying process in the multistage dryer (National Dryer). Over the years, natural gas-fired multistage dryers (e.g., National or Proctor dryers) at other similar potato facilities were source tested. The tested PM/PM_{10} emissions are much higher than the emissions causing by natural gas combustion in multistage dryers. The emissions from the National Dryer in the 2008 application need to be revised.

With the much higher emissions from the flakers and multistage dryers based on source test data, the existing throughput based on 2002 material balance calculation cannot be granted anymore and is removed.

~~**6.4 Throughput**~~

~~The total clean raw potatoes processed shall not exceed a rate of 868 tons per day (868 T/day) and 287,000 tons per any consecutive 12-month period (287,000 T/yr).~~

The new compliance method is developed in accordance with DEQ's internal guidance for monitoring and recordkeeping. Because the flakers emit more than 10 T/yr and because the 24-hr ambient impact from the facility for PM_{10} was 91% of the 24-hour PM_{10} NAAQS according to 2002 modeling analysis, the flakers are required to be tested every five years to demonstrate compliance.

According to the information provided by ISP during the 5/14/2012 conference call, National Dryer has two stacks. The A stage exhaust has no external stack. The exhaust is vented through a heat exchanger to preheat the air flowing into the A stage and B stage air intakes. Stage B has one stack. Stage C has one stack. According to the phone conversation with ISP on 5/18/2012, the slice line production is about $1/8^{th}$ of the total production. The emissions from National Dryer are likely below 10 T/yr. Therefore, only one time source test of the two stacks is required to find out the emissions rate from and to develop EF for the National Dryer.

According to ISP, the exhaust flue gas from the secondary dryer vents to the room and does not vent to the atmosphere. The secondary dryer is seldom used according to ISP.

ISP is required to perform source test to develop EFs for the flakers and the National Dryer and then to use these EFs or DEQ approved EFs based on source test, may include source test data from other similar dryers, to calculate emissions from the flakers and the National Dryer.

New PC 6.5 is developed and reads as follows:

"6.5 PM_{10} Performance Test

6.5.1 Testing Schedule for Flaker Main Stack and Sniffer Vent

Within 60 days of the permit issuance, the permittee shall conduct performance test to measure PM_{10} emissions from the main stack and the sniffer vent for either Flaker No. 1, 2, 3, or 4.

By December 2017, the permittee shall conduct performance test to measure PM_{10} emissions from the main stack and the sniffer vent from Flaker No. 5. The sniffer vent test may be waived upon DEQ's approval.

By December 2022, the permittee shall conduct performance test to measure PM_{10} emissions from the main stack and the sniffer vent from either Flaker No. 6, 7, or 8. The sniffer vent test may be waived upon DEQ's approval.

By December 2027, the permittee shall conduct performance test to measure PM_{10} emissions from the main stack and the sniffer vent from either Flaker No. 9, 10, 11, or 12. The sniffer vent test may be waived upon DEQ's approval.

Every five years after December 2027 or an alternative testing frequency approved by DEQ based on previous source test results, the permittee shall conduct performance test to measure PM_{10} emissions from the main stack and the sniffer vent from one flaker using above rotation of the flakers. The sniffer vent test may be waived upon DEQ's approval.

6.5.2 Testing Schedule for Multistage Dryer (National Dryer) Stacks

Within 60 days of the permit issuance, the permittee shall conduct a performance test to measure PM_{10} emissions from all the stacks of the multistage dryer.

6.5.3 Production Monitoring during Source Testing

The permittee shall monitor and record the following process data during each performance test run:

Flaker

- **Finished potato production expressed as tons-per-hour for the tested flaker.**

Multistage Dryer (National Dryer)

- **Finished potato production expressed as tons-per-hour for the multistage dryer and each stage of the multistage dryer, respectively.**
- **The natural gas usage for each stage shall be recorded in MMBtu/hr or scf/hr.**

6.5.4 Emissions Factor Calculation as Part of Test Report

The permittee shall calculate the emission factor (EF) in lb PM_{10}/T of finished potato production based on test results.

Flaker

EF lb/T = EF main stack lb/T + EF sniffer stack lb/T

= (tested emissions rate from the main stack in lb/hr) / (the flaker's finished potato production in T/hr) + (tested emissions rate from the sniffer stack in lb/hr) / (the flaker's production in T/hr)

Multistage Dryer (National Dryer)

EF lb/T = (sum of the tested emissions rate from all the stacks in lb/hr) / (the finished potato production of the multistage dryer in T/hr)"

Permit Condition 6.6

PC 6.6 is old PC 6.4 with changes.

As of February 2012, DEQ has the following information on EFs:

Flaker

For main stacks, the average EF, based on source test on five flakers, is 2.8 lb/T dried materials. For sniffer vents, the average EF, based on source test on two sniffer vents, is 0.28 lb/T dried materials.

Multistage Dryer (e.g., National Dryer)

One available EF for National Dryer Stage A is 2.3 lb/T dried materials. No emissions data are available for National Dryer Stage B and Stage C.

Fluidized Bed Dryer

The approved PM_{10} EF for the fluidized bed dryer is 3.5 lb/T of dried materials. It is the same as what used in ISP's 6/20/2012 submittal.

ISP is required to calculate PM_{10} emissions rates to demonstrate compliance with the emissions limits in the permit. DEQ may approve different EFs based on newly available test data.

The revised PC 6.6 reads as follows:

"6.6 Monitoring Requirement

6.6.1 Flakers and Multistage Dryer (National Dryer)

- **The permittee shall record daily aggregated finished potato production of all the flakers and daily finished potato production of the multistage dryer. The permittee shall calculate daily the total emissions from the flakers and the multistage dryer using the following calculation or DEQ approved alternative to demonstrate that total emissions from the flakers and the multistage dryer (National Dryer) do not exceed the hourly PM_{10} emissions limit specified in the permit for the flakers and National Dryer.**

  Total emissions (lb/hr) = [Daily aggregated finished potato production of all flakers (T/day) x EF lb/T for flakers + daily finished potato production of the multistage dryer (T/day) x EF lb/T for the multistage dryer] / (24 hr/day)

  The permittee shall use EFs developed based on DEQ approved source test required in the permit or DEQ approved alternative EFs.

- **The permittee shall sum daily emissions from all flakers and the multistage dryer every month. The permittee shall add the current month emissions from all flakers and the National Dryer to the previous 11-month emissions from all flakers and the National Dryer to demonstrate compliance with the annual emissions limit for the flakers and multistage dryer.**

6.6.2 Fluidized Bed Dryer

The permittee shall record daily finished potato production of the fluidized bed dryer. The permittee shall calculate daily total emissions from the fluidized bed dryer when the fluidized bed dryer is in operation. The permittee shall use the following calculation or DEQ approved alternative to demonstrate that total emissions from the fluidized bed dryer do not exceed the hourly PM10 emissions limit specified in the permit. The permittee shall use DEQ approved EF.

Emissions (lb/hr) = [daily finished potato production of the fluidized bed dryer (T/day) x EF lb/T] / (24 hr/day)

6.6.3 Ten Storage Silos

The permittee shall record the daily aggregate throughput of the storage silos to demonstrate compliance with the daily throughput limit for the storage silos.

~~6.4 The permittee shall record the calendar date and the daily and consecutive 12-month period throughput of each potato process line in operation, and the daily aggregate throughput of the storage silos to verify compliance with the Throughput Permit Condition. The records shall be kept at the facility for a minimum period of five years and shall be made available to DEQ representatives upon request.~~"

OLD APPENDIX

Old section 7 APPENDIX, Emissions Summary, is removed because emissions limits are specified under each specific section.

GENERAL PROVISIONS

General provisions are replaced with the ones in the current permit template.

Because recordkeeping requirements are specified in General Provision 10, they are removed from other sections of the permit to avoid duplications.

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 not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – GHG AND NOx PTE

NOx and GHG PTE

High Heating Value				
	HHV	1.028E+03	MMBtu/MMcf	40 CFR 98 Table C-1
Dryer operating hours		8760 hr/yr		
National Dryer		6000 hr/yr		
Boiler operating hours		7757 hr/yr		
Heaters operating hours		6048 hr/yr		

Calculation Method- Tier 1

$CO_2 = 1x10^{-3} * Fuel * HHV * EF$

This result is very different because of the emission factors from 40 CFR 98
This is how the Nonapreil spreadsheet was done.

Emission Factors

CO_2	53.02	kg/MMBtu	40 CFR 98 Table C-1
CH_4	0.001	kg/MMBtu	40 CFR 98 Table C-2
N_2O	0.0001	kg/MMBtu	40 CFR 98 Table C-2

GHG PTE

Combustion Source	Fuel	Rate (MMBtu/hr)	Calc. fuel usage (MMcf/hr)	CO_2 (tonne/yr)	CH_4 (tonne/yr)	N_2O (tonne/yr)	CO_2e (tonne/yr)
#4 Boiler	Natural Gas	140	0.13618677	5.758E+04	1.086E+00	1.086E-01	5.764E+04
Space Heater South	Natural Gas	8.25	0.00802529	2.645E+03	4.990E-02	4.990E-03	2.648E+03
Space Heater North	Natural Gas	8.25	0.00802529	2.645E+03	4.990E-02	4.990E-03	2.648E+03
Space Heater East	Natural Gas	15.4	0.01498054	4.938E+03	9.314E-02	9.314E-03	4.943E+03
Space Heater Miscellaneous	Natural Gas	2	0.00194553	6.413E+02	1.210E-02	1.210E-03	6.420E+02
Dryer Stage A	Natural Gas	8	0.00778210	2.565E+03	4.800E-02	4.800E-03	2.567E+03
Dryer Stage B	Natural Gas	3.2	0.00311284	1.026E+03	1.920E-02	1.920E-03	1.019E+03
Dryer Stage C	Natural Gas	3.2	0.00311284	1.026E+03	1.920E-02	1.920E-03	1.019E+03
Secondary Dryer	Natural Gas	0.55	0.00053502	2.555E+02	4.818E-03	4.818E-04	2.557E+02
Fluidized Bed	Natural Gas	7	0.00680934	3.251E+03	6.132E-02	6.132E-03	3.254E+03

Total GHG PTE	76,612	Tonne/yr
	84,449	tpy

NOx PTE

PM/PM-10 EF (AP-42, Section 1.4, Rev.7/98)	7.6	lb/MMscf
NOx EF (AP-42, Section 1.4, Rev.7/98)	140	lb/MMscf

Combustion Source	Fuel	Rate (MMBtu/hr)	Calc. fuel usage (MMcf/hr)	NOx (lb/hr)	NOx (T/yr)	PM (lb/hr)
#4 Boiler	Natural Gas	140	1.36E-01	19.066	73.948	1.035E+00
Space Heater South	Natural Gas	8.25	8.03E-03	1.124	3.398	6.099E-02
Space Heater North	Natural Gas	8.25	8.03E-03	1.124	3.398	6.099E-02
Space Heater East	Natural Gas	15.4	1.50E-02	2.097	6.342	1.139E-01
Space Heater Miscellaneous	Natural Gas	2	1.95E-03	0.272	0.824	1.479E-02
Dryer Stage A	Natural Gas	8	7.78E-03	1.089	3.298	5.914E-02
Dryer Stage B	Natural Gas	3.2	3.11E-03	0.436	1.307	2.366E-02
Dryer Stage C	Natural Gas	3.2	3.11E-03	0.436	1.307	2.366E-02
Secondary Dryer	Natural Gas	0.55	5.35E-04	0.075	0.328	4.066E-03
Fluidized Bed	Natural Gas	7	6.81E-03	0.953	4.175	5.175E-02
NOx PTE					98.296	
Total without the Boiler					24.348	

APPENDIX B – EPA APPLICABILITY DETERMINATION LETTERS

Determination Detail

Control Number: 0700019

Category: NSPS
EPA Office: Region 10
Date: 11/26/2004
Title: Idaho Supreme Potato Boilers
Recipient: Chapman, Wade
Author: KenKnight, Jeff
Comments:

Subparts:	Part 60, Db	Indust.-Comm.-Inst. Steam Gen. Units
	Dc	Small Indust.-Comm.-Inst. Steam Gen. Units

References: 60.14
60.14(e)(4)
60.40b
60.40c

Abstract:

Q: Does EPA waive applicability of 40 CFR part 60, subpart Db, and 40 CFR part 60, subpart Dc, for Boilers No. 3 and No. 4 at the Idaho Supreme Potato (ISP) facility in Firth, Idaho, given that an assumed modification of replacing nozzles reported on February 13, 2001, did not actually happen?

A: Yes. EPA has determined that Boilers No. 3 and No. 4 were not modified pursuant to 40 CFR 60.14, and therefore, are currently not subject to NSPS subparts Db or Dc. This determination is based on the assumption that although Boiler No. 4 still has the physical ability to burn coal in Boiler No. 4 it will not do so. In a previous EPA applicability determination on ISP's Boiler No. 4 dated March 13, 1995, EPA assumed that this boiler would not burn coal in the future. Therefore, if coal were to be burned in Boiler No. 4 in the future, the 1995 EPA determination would no longer be valid. In such an event, NSPS and PSD review would be triggered.

Letter:

November 26, 2004
Reply To
Attn Of: AWT - 107

Mr. Wade Chapman
General Manager
Idaho Supreme Potato
P.O. Box 246
Firth, Idaho 83236-0246

Re: AIRS Facility No. 011-00013, Idaho Supreme Potatoes, Inc. NSPS Subpart Db and Dc Applicability Determination Request

Dear Mr. Chapman:

This determination is in response to a request that was originally submitted by the Idaho Department of Environmental Quality (IDEQ) to the Environmental Protection Agency (EPA) dated March 11, 2004, and then followed up with more information in a request from Idaho Supreme Potato (ISP) dated September 16, 2004. In the March 11, 2004, letter IDEQ asked for concurrence on an applicability determination of New Source Performance Standards (NSPS) 40 CFR 60 Subpart Db "Standards of Performance for Industrial Commercial Institutional Steam Generating Units" (Subpart Db) and 40 CFR 60 Subpart Dc "Standards of Performance for

Small Commercial Institutional Steam Generating Units" (Subpart Dc) for two boilers (Boilers No. 3 and No. 4) located at the ISP facility in Firth, Idaho.

IDEQ has requested concurrence from the EPA as part of their review in preparation for a response to a request by ISP submitted to IDEQ dated February 5, 2004, to remove NSPS requirements for Boilers No. 3 and No. 4. EPA has determined that Boilers No. 3 and No. 4 are not subject to Subpart Db or Dc. However, if ISP were to burn coal in Boiler No. 4 that could trigger NSPS Subpart Db and the Prevention of Significant Deterioration (PSD) permit program. Background information justifying this determination is detailed further in this letter.

Subpart Db is applicable to each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a maximum design heat capacity of greater than 100 MMBtu/hr. Subpart Dc is applicable to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989, and that has a maximum design heat capacity of 100 MMBtu/hr or less. The first step is to determine if the boilers are subject to Subpart Dc or Db based on the date of construction. Boiler No. 3, which is rated at 43 MMBtu/hr and therefore is potentially subject to Subpart Dc with an applicability date of June 9, 1989, was installed at the facility in 1978. Boiler No. 4, which is rated at 140 MMBtu/hr and therefore is potentially subject to Subpart Db with an applicability date of June 19, 1984, was installed at the facility in 1983. Therefore, EPA concurs with IDEQ's findings that based on the initial construction or installation dates, Subparts Db and Dc are not applicable.

Therefore NSPS would only be applicable if it is determined that any changes made to the boilers constituted a modification as defined in the general provisions, in 40 CFR 60.14. In 40 CFR 60.14 a modification is defined as

"any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies"

Boiler No. 3 was originally designed to operate on natural gas. It was also tested to operate on fuel oil, but has operated on natural gas since 1978. Boiler No. 4 was originally designed to operate on either coal, fuel oil, or natural gas. In the letter of February 5, 2004, from ISP to IDEQ, ISP describes several changes that have occurred and the planned reintroduction of higher sulfur fuel oil. It has been determined that these changes were to the fuel delivery systems for each of the boilers and not to the boilers themselves. Physical changes to the fuel delivery systems are not physical changes to the existing facilities (each boiler) and the operational changes of using alternate fuels would not be considered modifications according to 40 CFR 60.14(e)(4) which states that "the use of alternative fuel will not be a modification, if prior to applicability the existing facility was designed to use that fuel." Therefore, there have been no modifications to Boiler No. 3 and the changes to the fuel delivery systems and reintroduction of a fuel would not constitute a modification to Boiler No. 4.

In the letter of February 5, 2004, from ISP to IDEQ, changes that occurred in December 1994, in how Boiler No. 4 operated are described. On or about December 24, 1994, ISP installed a low NOx burner on Boiler No. 4 for burning natural gas. Planning to no longer burn coal, they changed the boiler from a negative to a positive air system by removing the induction fan and the corresponding baghouse. ISP has stated coal has not been fired in Boiler No. 4 since these changes occurred.

On March 13, 1995, in a letter from EPA to ISP, this December 1994 change in operations was addressed. It was determined then that NSPS was not triggered because, despite the fact that the boiler itself was physically modified with the installation of low NOx burners and there was an increase in rated capacity, it was assumed that coal would no longer be burned. It was therefore found that the practice of burning gas and oil with the new burners, without using a baghouse, had lower emissions than the practice of burning coal with the older burners, using a baghouse. Therefore, a determination was made that this modification had no resulting increase in emissions and so it would not trigger NSPS.

On February 13, 2001, ISP submitted a notification letter to EPA stating that they installed new nozzles on the burner in Boiler No. 4 in order to burn very low sulfur #6 fuel oil rather than the #2 fuel oil that they had been firing. ISP believed that this change would be a physical modification to the boiler that would trigger NSPS Subpart Db for Boiler No. 4 The purpose of the February 5, 2004, letter from ISP to IDEQ, in which many changes are described in detail, was to ask IDEQ to remove the NSPS applicability. ISP states that upon their further review of the history of the changes that have occurred, they now do not think that NSPS should have been triggered. This is because ISP states that new nozzles were never installed on Boiler No. 4, but that their plant engineer at that time was misinformed and was incorrect in making that statement in the letter dated February 13, 2001.

In further discussions between ISP and EPA and in the letter from ISP to EPA dated September 16, 2004, ISP has attested that they consider themselves to still have the capability to burn coal. ISP believes that this distinction is important because it verifies that Boiler No. 4 itself did not undergo a modification in regards to burning coal or oil but that all changes relating to the burning of coal and oil were to the fuel delivery systems. ISP has described the changes that would have to occur in order for coal to be burned. The induction fan, which is necessary while burning coal, could easily be reinstalled changing the boiler back to negative air pressure. The coal crusher exists onsite and the section of coal supply line needed could be installed. ISP states that all of these changes could happen easily and that they could burn coal within a very short time period.

Although ISP has the physical ability to burn coal, please be aware that if ISP were to start up the operation of burning coal in Boiler No. 4, that could potentially trigger NSPS Subpart Db and PSD. The analysis of the December 1994 changes to Boiler No. 4 that was performed by EPA and summarized in the March 13, 1995, letter from EPA to ISP where it was determined that NSPS Subpart Db and PSD were not triggered, was based on the assumption that coal would no longer be fired in Boiler No. 4. Therefore, if coal were fired in this boiler that analysis would no longer be valid.

In conclusion, EPA determines that Idaho Supreme's boilers No. 3 and No. 4 are not subject to NSPS Subparts Dc or Db. This determination is based on information provided by Idaho Supreme and IDEQ. Any additional information made available to EPA may invalidate this determination. This determination does not impact any other regulations these boilers may be subject to.

If you have any further questions or concerns, please contact Heather Valdez of the Region 10 Office of Air, Waste and Toxics at (206) 553-6220 or valdez.heather@epa.gov

Sincerely,

Jeff KenKnight, Manager
Federal and Delegated Air Programs Unit
Office of Air, Waste and Toxics

cc: Doug Cole, EPA-IOO
Dan Pitman, IDEQ
Mike Simon, IDEQ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

ACS/RR/SF

DEC 19 2006

Reply To
Attn Of: AWT-107

RECEIVED
DEC 26 2006
DEPT. OF ENVIRONMENTAL QUALITY
TECHNICAL SERVICES OFFICE

Mr. Wade Chapman
General Manager
Idaho Supreme Potatoes, Inc.
P.O. Box 246
614 East, 800 North
Firth, Idaho 83236-0246

Re: New Source Performance Standards (NSPS) – Subpart Db Applicability Analysis

Dear Mr. Chapman:

This is in response to your letter on February 28, 2006, and supplemental information via e-mail on September 1, 8, and 18, 2006. You requested the U.S. Environmental Protection Agency (EPA) review and determine whether the No. 4 Bigelow boiler located at Idaho Supreme Potatoes, Inc. (ISP) in Firth, Idaho is subject to NSPS 40 CFR 60 Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units, when ISP starts burning coal in lieu of the current operation of burning fuel oil.

Background

The No. 4 Bigelow boiler located at ISP, constructed in 1983, has a maximum heat input capacity of 140 million Btu/hr (MMBtu/hr) with the capability of burning fuel oil, coal, and natural gas. The boiler has undergone operational changes in the past.

In 1995, ISP changed the configuration of the steam generating unit to allow an increase in steam rate. In the March 13, 1995, letter to Idaho Department of Environmental Quality (IDEQ) with ISP on copy, EPA determined that the change in the steam generating unit did not result in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies. Thus, the changes did not constitute a modification as defined in 40 CFR 60.14.

In 2004, ISP decided to burn low sulfur fuel oil to replace coal as the primary fuel. On February 5, 2004, ISP requested IDEQ's determination on whether changing the boiler from a negative to a positive air system after the removal of the induction fan and the corresponding baghouse would constitute a modification as defined in 40 CFR 60.2 and 60.14. In the letter dated March 11, 2004, IDEQ requested EPA's concurrence on its decision that the changes did not constitute a modification. Based on the discussions and information provided by ISP, EPA agrees with IDEQ's decision in a letter dated November 26, 2004.

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Discussion

In your February 28, 2006, letter, you indicated that ISP is considering resuming the usage of pulverized coal to replace the usage of fuel oil. As communicated in the same letter, ISP will re-install and operate a baghouse when coal is combusted as the primary fuel. Moreover, ISP demonstrated to EPA on September 8, 2006, that the emission rates for burning coal is either lower than or equal to the emission rates for firing fuel oil. Pollutants included in the estimate were SO_2, NO_X, PM, and PM-10. Based on the information provided, EPA determined that ISP will not increase the emission rates while coal is used as the primary fuel. Additionally, ISP attested in the September 1, 2006, e-mail and the December 1, 2006, phone conversation that the No. 4 boiler did not undergo any physical modification since its original installation and it always has the capability to burning coal, fuel oil, and natural gas. Pursuant to 40 CFR 60.14(e)(4), the use of an alternative fuel or raw material shall not be considered a modification if the existing facility was designed to accommodate the alternative fuel usage. Thus, ISP's proposal to use coal as alternative fuel does not cause the No. 4 Bigelow boiler to become subject to 40 CFR 60 Subpart Db.

It was also communicated to EPA, on September 1, 2006, that ISP would be able to burn coal without making any significant modifications to the existing facility other than reinstalling the baghouse for pollution control. IDEQ is reviewing the proposed actions to determine whether the facility will trigger provisions from Prevention of Significant Deterioration (PSD).

Based on the discussions above, EPA believes that the No. 4 Bigelow boiler located at ISP was designed and manufactured with the capacity to burn coal as an alternative fuel, and the change of fuel will not require major modifications to either the unit or the facility. Pursuant to 40 CFR 61.14(e), the change of fuel is not a modification and does not trigger 40 CFR 60,Subpart Db. ISP shall, before the burning of pulverized coal, install and operate a baghouse to control the emission from coal burning.

Please note that EPA only determined the applicability of NSPS Subpart Db to ISP's No. 4 Bigelow boiler. This determination does not undermine in any way the PSD applicability determination that will be performed by IDEQ. ISP may be required to comply with PSD after IDEQ's determination. In addition, this determination is based on information provided by ISP. Any additional information made available to EPA subsequently may invalidate this determination.

If you have any questions, please contact Davis Zhen of my staff at (206) 553-7660 or e-mail at zhen.davis@epa.gov.

Sincerely,

Jeff KenKnight, Manager
Federal and Delegated Air Programs Unit

cc: Mike Stambulis (IDEQ)

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on June 20, June 29, and September 25, 2012:

Facility Comment 1:

Natural Gas Combustion Only – Remove all references to oil. Idaho Supreme will not combust any diesel or residual oil.

- Please remove section 3.6 performance testing.
- Please remove section 3.7 reference to Subpart JJJJJJ.

DEQ Response 1:

DEQ removed the permit conditions related to fuel oil combustion. Detailed discussions can be found under Permit Conditions Review section of the SOB.

Facility Comment 2:

Remove Boiler #3 – Idaho Supreme will not use boiler #3 and requests to have section 4.0 removed from the permit.

DEQ Response 2:

All existing permit conditions related to Boiler No. 3 under section 4 of the permit are removed. A new permit condition is added to ensure that No. 3 is removed, or rendered inoperable.

"4.1 Boiler No. 3 shall be removed or rendered inoperable."

Facility Comment 3:

Not a Title V Source – With the removal of oil Idaho Supreme is no longer a Title V source. The maximum hours of operation for Boiler #4 is 7,757 hr/yr.

DEQ Response 3:

DEQ reviewed ISP's PTE calculation for NOx, submitted on June 20, 2012, and discovered that to keep NOx emissions below 100 T/yr, ISP needed to limit the multistage dryer's (National Dryer) annual operating hour to 6,000 hours per year. This operating hour limit is added to the permit as Permit Condition 5.4.1.

Facility Comment 4:

National Dryer Stack Performance Testing – Please change section 6.5.2 to state that performance testing can be conducted on a representative stack.

DEQ Response 4:

DEQ is not able to make the requested change. The configuration of the National Dryer does not suggest that stack B emissions would be the same as the emissions from stack C. ISP did not provide information to support the requested change.

Facility Comment 5:

A2 (a) – Multistage Dryer – Maximum Production Rate: 1000 lbs/hr

A2 (b) – Secondary Dryer – Maximum Production Rate: The secondary dryer has no set production rate and is only used when absolutely necessary. Occasionally finished product (slice, dice, etc.) that has been dried in the National Dryer will have small pockets that contain a higher than spec moisture content. The secondary dryer is used to dry out this over moist product to meet whatever specifications that have been set by the customer. These variations in moisture are usually a fraction of a percent and the amount of product needing the secondary drying varies from a few hundred pounds to several thousand pounds. Typically the secondary dryer is not needed, but when it is deemed necessary the moist product is placed in large stainless steel totes with a duct attachment vented into the bottom. The totes are then attached to the secondary dryer exhaust manifold. Heated air is then blown through the bottom of the tote and up through the product. The amount of time varies due to the moister content of the product. The secondary dryer is capable of drying 1 to 4 totes at a time with each tote capable of holding a maximum of 500 lbs of product. There is no external exhaust stack; the heated air containing the gas combustion emissions is vented through the totes and into the room.

A2 (c) – Flakers (No. 1 to 12) – Manufacturer: Blawnox Maximum Production Rate: 900 lbs/hr/flaker

A3 – Multistage Dryer (National Dryer) – The Multistage or National Dryer has three separate drying stages A, B and C. Each stage contains separate air intakes, gas burners, fans and exhaust outlets. The A stage exhaust has no external stack. The exhaust is vented through a heat exchanger to preheat the air flowing into the A stage and B stage air intakes. The A stage exhaust is then routed back into the building and into the C stage air intake. Both B stage and C stage exhaust through stacks on the roof. There are only 2 external emissions points (B & C) for this dryer.

DEQ Response 5:

Process information provided in the comments is added to the permit and statement of basis.

Facility Comment 6:

Our flake process consists of three lines A, B and C.

A and B lines share the same peeler and scrubbers with separate but identical blanchers, coolers, cookers and flakers. C line has a separate peeler and scrubber along with the other equipment.

The three flake lines each contain four drum dryers for a total of twelve at the facility.

DEQ Response 6:

Process information provided in the comments is added to the permit and statement of basis.

APPENDIX D – PROCESSING FEE

APPENDIX E – TECHNICAL MEMORANDUM FOR TIER II ISSUED ON JUNE 7, 2002

Air Quality Permitting

Technical Memorandum

Tier II Operating Permit No. 011-00013

IDAHO SUPREME POTATOES, INC.
FIRTH, IDAHO

Project No. T2-010314

Prepared by:

Mike Stambulis
Air Quality Engineer

MAY 29, 2002

Final Permit

TABLE OF CONTENTS

LIST OF ACRONYMS

ACFM	Actual Cubic Feet Per Minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
BACT	Best Available Control Technology
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DEQ	Idaho Department of Environmental Quality
dscf	Dry Standard Cubic Feet
EF	Emission Factor
EPA	United States Environmental Protection Agency
gpm	Gallons Per Minute
gr	Grain (1 lb = 7,000 grains)
HAPs	Hazardous Air Pollutants
IDAPA	Idaho Administrative Procedures Act
km	Kilometer
lb/hr	Pound Per Hour
MACT	Maximum Available Control Technology
MMBtu	Million British thermal units
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
NSPS	New Source Performance Standards
O_3	Ozone
OP	Operating Permit
PM	Particulate Matter
PM_{10}	Particulate Matter with an Aerodynamic Diameter of 10 Micrometers or Less
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
PTC	Permit To Construct
PTE	Potential To Emit
SCC	Source Classification Code
scf	Standard Cubic Feet
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
TSP	Total Suspended Particulates
T/yr	Tons Per Year
µm	Micrometers
VOC	Volatile Organic Compound

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01 Sections 404.04, *Rules for the Control of Air Pollution in Idaho* (*Rules*) for Tier II Operating Permits (OP) and to document the factual basis for issuing this operating permit.

PROJECT DESCRIPTION

This project is for the issuance of a Tier II OP for the Idaho Supreme Potatoes, Inc (Idaho Supreme Potatoes) Firth Facility located on the corner of Highway 91 and 800 Goshen Highway near Firth, Idaho. The Range-Township location is the northeast quarter of Section 25, Township 1 South, Range 36 East.

Idaho Supreme Potatoes is proposing to modify the main plant boiler (Boiler #4 – formerly designated as Boiler #1) and the Clever Brooks boiler (Boiler #3). Due to high natural gas prices, Idaho Supreme Potatoes is proposing to have the capability to burn Nos. 4, 5, and/or 6 residual fuel oil; natural gas; propane; and/or No. 2 distillate fuel oil.

In addition, Idaho Supreme Potatoes wishes to permit a fluidized bed dryer. The fluidized bed dryer was previously exempted from permitting based on an hourly operational limit. Idaho Supreme Potatoes wishes to increase the operational hours of the dryer.

Idaho Supreme Potatoes was previously issued a Tier II OP in December 1998. This OP expired in January 2001. In addition to the boilers, other permitted equipment included a primary dryer consisting of three sections (Dryer Stages A, B, and C), a secondary dryer, three industrial space heaters, other miscellaneous space heaters, storage silos, and flaker lines. This equipment will be included in a revised Tier II OP.

SUMMARY OF EVENTS

On September 17, 2001, the Idaho Department of Environmental Quality (DEQ) received a permit to construct (PTC) application from Idaho Supreme Potatoes for an increase in hours of operation for the fluidized bed dryer and for the ability to burn alternative fuels in boilers at the Idaho Supreme Potatoes Firth facility.

On October 29, 2001, DEQ conveyed to Idaho Supreme Potatoes's consultant, via a phone conversation, that DEQ will issue a renewed and revised Tier II OP. The Tier II OP will serve as the PTC for the facility. On November 14, 2001, DEQ issued a letter indicating the permit application was incomplete. On December 17, 2001, DEQ issued a letter indicating the permit application was complete.

A proposed permit was issued by DEQ for public comment between March 1, 2002 and April 1, 2002. The response to these comments is presented in Appendix A of this memorandum.

DISCUSSION

1. Process Description

Idaho Supreme Potatoes is a potato processing company. The process primarily involves potato dehydration to make potato flakes. A brief description of the process is presented below.

Main Process Line

- The potatoes arrive at the plant on trucks, then are unloaded across pilers; deposited in temporary store bins; transported from the bins; washed with cold water; and conveyed to a tare removal table where sticks, and other debris are removed.

- The potatoes are transferred to a steam peeler and exposed to steam. Steam is exhausted and quenched in a water bath.
- The peel is fully removed by dry and wet scrubbing using revolving brushes and/or water sprays. Waste products from this portion of the process are used for cattle feed.
- Peeled potatoes are transferred to a trim table where defective parts and the remaining peel are removed.
- The potatoes are held in a surge bin and released at a metered rate for proper slicing. Sliced potatoes are pumped to pre-cookers or blanchers.
- The potatoes are then cooled to retrograde the starch gelatinization, water transported into cookers, and exposed to atmospheric steam until fully cooked.
- The potatoes are then forced through slots, broken into smaller pieces, and added to dehydration rolls.
- The mashed/dehydrated potatoes are spread across the face of drum dryers with five applicator rolls. The steam drum dryer rotates and drives moisture from the potato cells. Excess moisture is removed by a steam snifter fan.
- The dried potato sheet is cut off the drum and broken into smaller pieces. Good flake is transferred to mills, cut into desired particle size and density, and transported to product separation baghouses.
- The flake is then bagged and placed into large totes for storage and transport, reblended for texture and quality, or sent to silos for storage.

The "C line" process (an additional process line) flow is identical to the main process.

Slice Line

- The slice line process follows the main line process until the pre-cooker/blancher stage.
- After precooking/blanching, the slices are blown down or up to dehydrate the slices to a shelf stable product.
- The slices are piled in various thicknesses in Dryer Stages A, B, and C. The slices are then sorted and shipped in bags or totes.
- The slices may be finished or dried in the secondary dryer or used as byproduct for dog food.

2. Equipment Listing

The following equipment is being added or modified:

- Boiler #4: Bigelow boiler with Coen 200 Series CSI nitrogen oxide (NO_x) Mixer Size 34 burner.

  Stack Parameters:
  Height: 50 feet — Exit Gas Volume: 32,000 actual cubic feet per minute (acfm)
  Exit Diameter: 3 feet — Exit Gas Temperature: 375 °F

- Boiler #3: Cleaver Brooks Model WT200X-BR3.

  Stack Parameters:
  Height: 36 feet — Exit Gas Volume: 13,000 acfm
  Exit Diameter: 2.89 feet — Exit Gas Temperature: 550 °F

- Fluidized Bed Dryer: A BD21X3 fluidized bed dryer fired by two Maxon 435 Oven Pak II burners. Ancillary equipment includes a mixer vessel, miscellaneous tanks and pumps for liquid ingredients, enclosed conveyors for product transportation, and bulk bagging station for product collection.

  Stack Parameters:
  Height: 40 feet — Exit Gas Volume: 26,000 acfm
  Exit Diameter: 1.41 feet — Exit Gas Temperature: 120 °F

The other equipment at the facility is not being modified, nor are operational hour increases requested for other equipment. A complete equipment listing including stack parameters is presented in Appendix B.

In addition to the equipment listed in Appendix B, the facility utilizes one portable 16,000-gallon aboveground storage tank (AST) containing fuel oil; two 30,000-gallon ASTs containing fuel oil; one 10,000-gallon AST and one 20,000-gallon AST containing diesel fuel; and one 30,000-gallon AST containing propane.

3. Emissions Estimates

Air pollution emission rates from fuel burning equipment were calculated using United States Environmental Protection Agency (EPA) Air Pollution Emission Factors (AP-42 emissions factors). Listed below are hourly and annual emissions of criteria pollutants from all emission sources at the facility operating at full capacity. Criteria pollutants include NO_x, sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), carbon monoxide (CO), and lead. Emissions of toxic air pollutants (TAPs) were also calculated using AP-42 emission factors. Please refer to Appendix C for details regarding the ambient air concentration calculations. Appendix C also includes assumptions regarding hours of operation and equipment operating parameters.

In addition to fuel-burning equipment, particulate matter (PM) and PM_{10} are emitted from material processing and handling operations at the facility. Aggregate dehydration process emissions of PM were based on a mass balance previously completed by Idaho Supreme Potatoes. The results of the mass balance were originally submitted to DEQ in April 1995. The maximum PM emissions identified were approximately 0.00995% of the raw potato throughput. The facility did not request a change to the potato throughput capacity; therefore, the throughput limits were established as 72,338 pounds per hour and 287,000 tons per year as previously established in the Tier II OP issued in December 1998. Based on these throughputs, PM emissions are 7.19 pounds per hour and 28.6 tons per year.

The mass balance discussed above established PM emission rates from potato processing; however, no emissions factors for PM_{10} from potato dehydration processing are reported in AP-42. Therefore, to estimate PM_{10} emissions, it was assumed that the process is most similar to cereal drying. Emission factors for cereal drying in AP-42 indicate PM_{10} emissions are approximately 44% of PM emissions. Based on this assumption, PM_{10} emissions are 3.2 pounds per hour and 12.6 tons per year from all 12 flaker lines.

In addition, PM is also emitted from 10 storage silos at the facility. The PM emissions from each silo are controlled by a baghouse filter. No change to the throughputs was requested; therefore, the emission limits have not changed from the previous Tier II OP. The PM emissions limits for the previous Tier II OP were 0.064 pounds per hour per silo. It was assumed that all PM was emitted as PM_{10}.

The facility requested an emission limit for the aggregate dehydration process (the dehydration line, storage silos, and process emissions from the secondary dryers and Dryers A, B, and C) of 14.5 pounds per hour of PM and 6.4 pounds per hour of PM_{10}. The modeled emission rate for PM_{10} from the aggregate dehydration process was 7.0 pounds per hour.

Table 1. Facility-wide Emission Estimates of Criteria Pollutants

Process Description	PM_{10}[1]		SO_2[2]		NO_x[3]		CO[4]		Lead		VOCs[7]
	lb/hr[5]	T/yr[6]	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	T/yr
#4 Boiler	7.5	32.8	51.0	223.4	31.0	135.8	11.0	48.2	0.001	0.004	3.3
#3 Boiler	2.3	3.7	15.7	25.0	11.0	17.5	3.5	5.6	0.0004	0.0006	0.41
Fluidized Bed Dryer	0.8	3.3	0.004	0.02	1.1	4.8	0.6	2.5	0.000003	0.00001	0.18
Other Natural Gas Sources	0.4	1.2	0.03	0.1	4.5	15.2	4.0	13.6	0.00002	0.0001	1.3
Dehydration Process	6.4	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FACILITY TOTALS	**17.4**	**63.0**	**66.7**	**248.5**	**47.6**	**173.3**	**19.1**	**69.9**	**0.001**	**0.005**	**5.1**

1. PM_{10} = condensable and filterable particulate matter.
2. SO_2 = sulfur dioxide
3. NO_x = nitrogen oxides
4. CO = carbon monoxide
5. lb/hr = pounds per hour; emissions rates represent maximum hourly emissions from simultaneous operation of both generators.
6. T/yr = Tons per year; emissions rates represent maximum annual emissions from both generators.
7. VOCs = volatile organic compounds

Emissions from the #4 Boiler, #3 Boiler, and the fluidized bed dryer were evaluated burning Nos. 4, 5, and 6 residual fuel, No. 2 distillate fuel oil, natural gas, and propane. The emissions reported in Table 1 represent the maximum emissions from the boilers and fluidized bed dryer. A complete summary of emissions is presented in Appendix C.

In addition, emission rates were calculated from the two 12,000-gallon ASTs at the facility using EPA's Tanks 4.0 volatile organic chemical (VOC) emission calculation program. A copy of the program's output is presented in Appendix D. Total annual VOC emissions from both ASTs were calculated to be 9.82 pounds per year. Emissions from the ASTs were negligible; therefore, emissions from the ASTs are not regulated in the OP.

4. Modeling

Idaho Supreme Potatoes used the ISCST3 model, an approved regulatory model, to assess the ambient air quality impacts. The operating scenario modeled was for process equipment at the facility operating at full capacity as worst case. All sulfur oxide (SO_x) and NO_x emissions were modeled assuming that all SO_x was emitted as SO_2 and all NO_x was emitted as nitrogen dioxide (NO_2). These are worst-case assumptions. The ambient impacts from operation of the Firth facility are given in Table 2 below.

Table 2. Criteria Air Pollutant Ambient Impacts

	SO_2[1]			PM_{10}[2]		CO[3]		NO_2[4]	Lead
	3-Hour (µg/m³)[5]	24-Hour (µg/m³)	Annual (µg/m³)	24-Hour (µg/m³)	Annual (µg/m³)	1-Hour (µg/m³)	8-Hour (µg/m³)	Annual (µg/m³)	Quarterly (µg/m³)
A	424.93	121.22	11.95	50.45	9.50	282.3	81.5	11.83	0.0023
B	545	144	23.5	86	32.7	11,450	5,130	40	0.15
C	970	265	35	136	42	11,732	5,212	52	0.15
D	1,300	365	80	150	50	40,000	10,000	100	1.5

A. Modeled Ambient Concentration
B. Background Concentration
C. Modeled Ambient Concentration plus Background Concentration
D. National Ambient Air Quality Standards (NAAQS) for SO_2, PM_{10}, NO_2, and CO
1. SOx = sulfur dioxide
2. PM_{10} = particulate matter with an aerodynamic mean diameter of 10 micrometers or less
3. CO = carbon monoxide
4. NO_2 = nitrogen dioxide
5. µg/m3 = micrograms per cubic meter.

Emissions of TAPs from the generators were evaluated and determined to be below the state standards or within acceptable risk criteria. Emissions of cobalt, fluoride, and phosphorus were greater than the toxic screening levels listed in IDAPA 58.01.01.585, and emissions of arsenic, beryllium, cadmium, chromium (VI) formaldehyde, nickel, and polyaromatic hydrocarbons (PAHs) were greater than the toxic screening levels listed in IDAPA 58.01.01.586. The emission rates for each of the other toxic air pollutants emitted by the generators were below screening thresholds specified by IDAPA 58.01.01.585 and 586. Refined modeling was conducted to determine ambient concentrations of the chemicals for which emissions exceeded corresponding screening thresholds. All impacts were found to be below acceptable ambient concentrations (AACs) and acceptable cumulative risk factors.

A discussion of the modeling results used to establish the ambient impacts of the generators at this site may be seen in Appendix E, and a more detailed discussion is included in Section 6 of this memorandum.

5. Facility Classification

The Idaho Supreme Potatoes Firth facility is a major facility as defined in IDAPA 58.01.01.006.55. It is a not a designated facility as defined in IDAPA 58.01.01.006.27. The Standard Industrial Classification code is 2034–Dried and Dehydrated Fruits, Vegetables, and Soup Mixes; "Establishments engaged in sun drying or artificially dehydrating fruits and vegetables, or in manufacturing packaged soup mixes from dehydrated ingredients."[1]

The Aerometric Information Retrieval System (AIRS) facility classification is "A" because the actual or controlled potential to emit is greater than 100 tons per year. The project is not subject to Potential of Significant Deterioration (PSD) requirements since the potential to emit is less than the PSD major source threshold of 250 tons per year for any one regulated pollutant located in an attainment or unclassifiable area.

[1] Standard Industrial Classification Manual, Executive Office of the President, Office of Management and Budget, 1987.

Area Classification

The facility is located within Bingham County in the northern portion of the Pocatello regional district. Bingham County is designated as an unclassifiable area for all regulated criteria air pollutants. Bingham County is located in Air Quality Control Region 61 and Zone 12.

7. Regulatory Review

This OP is potentially subject to the following permitting requirements:

IDAPA 58.01.01.006.55.a.i Major Facility

A major facility is defined as any facility that emits, or has the potential to emit, 100 tons per year or more of any regulated air pollutant. Idaho Supreme Potatoes has requested a permitted emission limit of 249 tons per year of SO_2 and 178 tons per year of NO_x, both regulated air pollutants, from the Firth facility. Therefore, the Idaho Supreme Potatoes's Firth facility is defined as a major facility.

IDAPA 58.01.01.161 Toxic Substances

Toxic substances 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. Compliance with this standard was demonstrated through facility-wide modeling discussed in Appendix E of this memorandum.

IDAPA 58.01.01.401.03.a Tier II Operating Permits Required by the Department

A Tier II OP was required for the ISUP by DEQ to attain or maintain ambient air quality standards.

IDAPA 58.01.01.402 Application Procedures

A Tier II OP was requested by DEQ for the facility to establish facility-wide requirements to limit the facility's potential to emit below Prevention of Significant Deterioration emission rates and to comply with ambient air quality standards in accordance with *Rules for the Control of Air Pollution in Idaho.*

IDAPA 58.01.01.403 Permit Requirements for Tier II Sources

The Idaho Supreme Potatoes Firth facility demonstrated compliance with local, state, and federal emission standards and NAAQS as required in IDAPA 58.01.01.403. See Tables 1 and 2 above and Appendices B and D of this memorandum.

IDAPA 58.01.01.406 Obligation to Comply

The facility is required to comply with all applicable local, state, and federal rules and regulations.

IDAPA 58.01.01.470 Permit Application Fees for Tier II Permits

The facility is required to submit a permit application fee of $500.

IDAPA 58.01.01.510 – 516 Stack Heights and Dispersion Techniques

The provisions of IDAPA 58.01.01.510 through 516 do not apply to stack heights in existence on or before December 31, 1970. The generators were constructed in 1967; therefore, they are not subject to the provisions in Sections 510 through 516.

IDAPA 58.01.01.577 Ambient Air Quality Standards For Specific Air Pollutants

Emissions of pollutants listed in IDAPA 58.01.01.577 were shown to be in compliance with the Ambient Air Quality Standards. See Table 2 above and Appendix E.

IDAPA 58.01.01.625 Visible Emissions

The facility will not discharge any pollutant into the atmosphere for a period or periods aggregating more than three minutes in any 60-minute period which is greater than 20% opacity as determined by EPA Test Method 9.

IDAPA 58.01.01.650 Rules For Control Of Fugitive Dust

The facility is required to take all reasonable precautions to prevent the generation of fugitive dust.

IDAPA 58.01.01.677 Standards For Minor And Existing Sources

The facility shall not discharge into the atmosphere from any fuel burning equipment in operation prior to October 1, 1979, PM in excess of 0.050 grains per dry standard cubic foot (gr/dscf) corrected to 3% oxygen when burning liquid fuel, and 0.015 gr/dscf when burning gaseous fuel.

Both liquid and gaseous fuels are burned at the facility in a variety of equipment. Appendix F of this memorandum contains a combustion analysis (based on the maximum amount of fuel that can be combusted in the equipment per hour) that demonstrates compliance with this standard with one exception. When burning #5 residual oil in either Boiler #4 or Boiler #3, the PM emissions will slightly exceed the standard of 0.050 gr/dscf. The PM emissions are based on AP-42 emission factors, which are generally conservative. Therefore, a source test is required for both boilers when combusting #5 residual oil to determine actual PM emissions and compliance with the fuel burning standard.

IDAPA 58.01.01.701 Particulate Matter – New Equipment Process Weight Limitations

The facility operates 12 process dehydration lines and 10 storage silos that are individual sources of PM emissions. Based on the mass balance discussed in Section 3 of this memorandum, the emissions to process rate ratio (E/PW) for the dehydration lines is 0.0000995. Two equations for determining PM emissions are given in IDAPA 58.01.01.701:

Equation 1:	$E = 0.045(PW)^{0.60}$	$0<PW<9,250$
Equation 2:	$E = 1.10(PW)^{0.25}$	$9,250<PW$

Where E is the emissions rate and PW is the process throughput, both in pounds per hour. These equations can be rearranged to give the E/PW ratio.

Equation 1a:	$E/PW = 0.045(PW)^{-0.4}$	$0<PW<9,250$
Equation 2a:	$E/PW = 1.10(PW)^{-0.75}$	$9,250<PW$

Substituting the maximum value for PW of 9,250 lb/hr in Equation 1a, and the maximum throughput (72,338 lb/hr) into Equation 2a, the results are:

E/PW = 0.0017	(Equation 1a)
E/PW = 0.000294	(Equation 2a)

By comparison, these values are less than the E/PW values determined by the mass balance performed by Idaho Supreme Potatoes (0.0000995); therefore, the facility is in compliance with the process weight limitations.

The permit application indicated the maximum throughput through each storage silo is 9,600 lbs/hr. Each storage silo has an associated baghouse filter. Equation 2 gives a maximum emission rate of 10.9 lbs/hr based on process weight limitations. Based on the presence of the baghouse filter and the relatively low throughput, it is reasonable to assume the maximum emissions from the storage silos will be less than the emission rate established using Equation 2.

The process weight emission limit is not established as an enforceable permit condition because the permitted emissions limits are less than the limits established by the process weight equations.

IDAPA 58.01.01.727 and .7288 Fuel Oil Sulfur Content

The facility will not use any No. 1 distillate fuel oil with a sulfur content of greater than 0.3% by weight, No. 2 distillate fuel oil with a sulfur content of greater than 0.5% by weight, or residual fuel oil with a sulfur content of greater than 1.75% sulfur by weight.

40 CFR 60.40b Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

Boiler #4 at the ISUP facility is subject to the New Source Performance Standard (NSPS) 40 CFR 60.40b. The emissions requirements of Subpart Db are summarized below. Monitoring, recordkeeping, and reporting requirements are presented in the Tier II OP.

60.40b(a): Subpart Db applies to steam generating units that have a heat input capacity of greater than 100 MMBtu/hr. The maximum steam generating capacity of Boiler #4 is approximately 140 MMBtu/hr; therefore, Subpart Db is applicable.

60.42b(j): By combusting only very low sulfur oil, ISUP will comply with the sulfur dioxide standards of 60.42b. Very low sulfur oil is defined as oil that contains no more than 0.5 weight % sulfur or that, when combusted without controls, has a sulfur dioxide emission rate equal to or less than 0.5 lb/MMBtu heat input.

60.43b(f): Opacity shall not exceed 20% (six-minute average), except for one six-minute period per hour of not more than 27% opacity. This standard applies at all times, except during periods of startup, shutdown, or malfunction as provided in 60.43b(g).

60.44b(a): The NO_x emissions at the facility shall not exceed:
0.40 lb/MMBtu heat input for burning residual fuel at high heat release rate;
0.30 lb/MMBtu heat input for burning residual fuel at low heat release rate;
0.20 lb/MMBtu heat input for burning diesel fuel and natural gas at high heat release rate; and
0.10 lb/MMBtu heat input for burning diesel fuel and natural gas at low heat release rate.
This standard applies at all times, including periods of startup, shutdown, or malfunction, and compliance is determined on a 30-day rolling average as provided in 60.44b(h) and 60.44b(i).

40 CFR 60.40c Subpart Dc Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Boiler #3 at the Idaho Supreme Potatoes facility is subject to the New Source Performance Standard (NSPS) 40 CFR 60.40c. The emissions requirements of Subpart Dc are summarized below. Monitoring, recordkeeping, and reporting requirements are presented in the Tier II operating permit.

60.40c(a): Subpart Dc applies to steam generating units that have a heat input capacity of greater than or equal to 10 MMBtu/hr but less than 100 MMBtu/hr. The maximum steam generating capacity of Boiler #3 is approximately 43 MMBtu/hr; therefore, Subpart Dc is applicable.

60.42c(d): To comply with the SO_2 standard, Idaho Supreme Potatoes will not burn oil with a sulfur content greater than 0.5% by weight. Compliance with the fuel oil sulfur limit is based on a 30-day rolling average as provided in 60.42c(g).

60.43c(c): Opacity shall not exceed 20% (six-minute average), except for one six-minute period per hour of not more than 27% opacity. This standard applies at all times, except during periods of startup, shutdown, or malfunction as provided in 60.43c(d).

40 CFR 60.110b Subpart Kb Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced After July 23, 1984

The facility is equipped with one 10,000-gallon AST, one 16,000-gallon AST, one 20,000-gallon AST, and two 30,000-gallon ATSs. The ASTs contain either distillate or residual fuel oil. The following portions of 60.110b apply to the ASTs at the Idaho Supreme Potatoes facility.

60.110b(b) and (c): Storage vessels with a capacity of less than approximately 19,800 gallons and storage vessels with a capacity of greater than about 19,800 gallons and less than about 40,000 gallons and with a maximum true vapor pressure of less 15 kilopascals (kPa) are exempt from the general provisions of 40 CFR 60 and from most of the portions of Subpart Kb. The three ASTs greater than 19,800 gallons in storage capacity contain liquids with a vapor pressure less than 15 kPa. Therefore, the ASTs at the facility qualify for the exemptions. The remaining applicable sections are discussed below.

60.116b(b): The facility will keep readily accessible records showing the dimensions of the ASTs and an analysis showing the capacity of the ASTs. These records will be kept at the facility for the life of the ASTs as provided in 60.116b(a).

8. Permit Requirements

In addition to the requirements identified in this section, emissions limits, operating requirements, and monitoring and recordkeeping requirements are established for Boiler #3, Boiler #4, and the storage tanks at the facility NSPS. These requirements are discussed in Section 6 of this memorandum, and are not discussed in this section.

8.1 Emission Limits

Emission limits on specific air pollutants emitted from Boiler #3, natural gas burning equipment, and the dehydration processes are required to limit potential SO_2 emissions to below PSD levels and to ensure compliance with the PM_{10} 24-hour and annual NAAQS. Emissions from Boiler #4, and emissions of NO_x and CO from Boiler #3 and natural gas burning equipment, are provided in the permit for the purpose of managing air quality. The emissions rates listed in the Tier II OP appendix are estimated maximum emissions from the facility when operated at there potential to emit including operational limitations.

8.2 Operating Requirements

The permittee shall combust residual oil with a fuel content of 0.5% or less in any fuel burning equipment.

The permittee shall not combust in Boiler #4 residual oil with a nitrogen content greater than 0.3%.

The permittee shall operate Boiler #3 for a period not to exceed 3,185 hours per consecutive 12-month period.

The permittee shall operate the three industrial space heaters and miscellaneous space heaters for a period not to exceed 6,048 hours each per consecutive 12-month period.

The combined maximum amount of natural gas burned in Dryers A, B, C, and the secondary dryer shall not exceed 53,000 standard cubic feet per hour (scf/hr) on average per day. The combined maximum amount of LPG burned shall not exceed 253 gallons per hour on average per day.

The combined maximum amount of natural gas burned in the industrial space heaters shall not exceed 41,235 scf/hr on average per day. The combined maximum amount of LPG burned shall not exceed 174 gallons per hour on average per day.

The total clean raw potatoes processed shall not exceed a rate of 868 tons per day, nor shall it exceed 287,000 tons per year for any consecutive 12-month period.

The total throughput through each storage silo shall not exceed 1,152 tons per day.

8.3 Monitoring, Recordkeeping, and Reporting Requirements

The permittee is required to report the results of all required performance test.

The permittee shall monitor the consecutive 12-month period operational hours of Boiler #3.

The permittee shall record the amount of hours each industrial space heater is operated per consecutive 12-month period, and record the amount of natural gas and LPG used from the fluidized bed dryer, Dryers A, B, C, secondary dryer, and industrial space heater per day.

The permittee shall record the calendar date and the daily and consecutive 12-month period throughput of each potato process line in operation, and the daily throughput of each storage silo.

9. AIRS

AIRS/AFS[1] FACILITY-WIDE CLASSIFICATION[2] DATA ENTRY FORM

AIR PROGRAM POLLUTANT	SIP[3]	PSD[4]	NSPS[6] (Part 60)	NESHAP[5] (Part 61)	MACT[7] (Part 63)	TITLE V	AREA CLASSIFICATION A – Attainment U – Unclassifiable N – Nonattainment
SO_2[8]	A		A			A	A
NO_x[9]	A		A			A	A
CO[10]	B						A
PM_{10}[11]	B						A
PM[12]	B		B				
VOC[13]	B		B				A
Total HAPs[14]	B						
			APPLICABLE SUBPART				
			Db, Dc, Kb				

1. Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)
2. AIRS/AFS CLASSIFICATION CODES:
   - A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only class "A" is applied to each pollutant which is below the 10 ton-per-year (T/yr) threshold, but which contributes a plant total in excess of 25 T/yr of all NESHAP pollutants.
   - SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.
   - B = Actual and potential emissions below all applicable major source thresholds.
   - C = Class is unknown.
   - ND = Major source thresholds are not defined (e.g., radionuclides).
3. State Implementation Plan
4. Prevention of Significant Deterioration
5. National Emission Standards for Hazardous Air Pollutants
6. New Source Performance Standards
7. Maximum Achievable Control Technology
8. Sulfur Dioxide
9. Nitrogen Oxides
10. Carbon Monoxide
11. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
12. Particulate Matter
13. Volatile Organic Compounds
14. Hazardous Air Pollutants

VE/FE/FD (Visible Emissions, Fugitive Emissions, and Fugitive Dust) are entered for compliance purposes only and do not require evaluation by the permit engineer.

The facility has paid the required $500.00 Tier II fee in accordance with IDAPA 58.01.01.470. This Tier II permt changes the facility classification to a major facility, therefore, this facility is required to register and pay fees in accordance with IDAPA 58.01.01.525.

RECOMMENDATIONS

Based on the review of the application materials and all applicable state and federal regulations, staff recommends that DEQ issue a final Tier II OP to the Idaho Supreme Potatoes, Inc. Firth facility. A public comment period was provided on the proposed permit and comments were evaluated.

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cc: Sherry Davis, Technical Services
Tiffany Floyd, Pocatello Regional Office
Joan Lechtenberg, Air Quality Division

APPENDIX A

IDAHO SUPREME POTATOES, INC.

FIRTH FACILITY

RESPONSE TO COMMENTS

April 2, 2002

STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY
RESPONSE TO PUBLIC COMMENTS
ON DRAFT AIR QUALITY TIER II OPERATING PERMIT
FOR IDAHO SUPREME POTATOES, INC., FIRTH, IDAHO

Introduction

As required by IDAPA 58.01.01.404 (*Rules for the Control of Air Pollution in Idaho*), the Idaho Department of Environmental Quality (DEQ) provided for public comment on the Tier II operating permit drafted for Idaho Supreme Potatoes, Inc.'s (ISUP's), Firth, Idaho facility. Public comment packages, which included the application materials, a proposed permit, and technical memorandum, were made available for public review at the Blackfoot Public Library in Blackfoot, Idaho, DEQ's Pocatello Regional Office, DEQ's State Office in Boise, and DEQ's Web site. The public comment period was provided from March 1, 2002 through April 1, 2002. Comments regarding the air quality aspects of the draft permit are provided below with DEQ's response immediately following. No entity requested a public hearing.

Public Comments and DEQ Responses

Comment 1: **Operational Throughputs**

A comment was submitted to adjust the time frames of the operational throughput limits listed in permit condition 6.3 of the Tier II operating permit. The comment suggested changing the hourly throughput limit to a daily throughput limit on a monthly average. The comment also suggested aggregating the throughput of the storage silos and changing the hourly throughput limit to a daily throughput limit on a monthly average.

Response to 1: The operational limits established in permit condition 6.3 of the Tier II operating permit are necessary to limit emissions of particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) to protect the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The primary and secondary NAAQS for PM_{10} are based on a 24-hour period and an annual period. It is appropriate to establish operating limits based on a 24-hour period (i.e. daily). However, it is inappropriate to average the monthly throughputs to determine compliance with the daily standard. There would exist a potential to exceed the 24-hour PM_{10} NAAQS within the month, yet still be in compliance with the operational limit daily operational throughput limit when averaged for the month. Therefore, permit condition 6.3 was changed to state:

"The total clean raw potatoes processed shall not exceed a rate of 868 tons per day, nor shall it exceed 287,000 tons per consecutive 12-month period.

The total aggregate throughput of the ten storage silos shall not exceed 1,152 tons per day."

Although the throughput limit of the silos was aggregated instead of establishing a limit for each silo, the maximum potential emissions from the silo will remain unchanged.

Comment 2: **Monitoring and Recordkeeping**

A comment was submitted to adjust the time frames of the monitoring and recordkeeping required in permit condition 6.4 of the Tier II operating permit.

Response to 2: The suggested time frame for monitoring and recordkeeping requirements established in permit condition 6.4 of the Tier II operating permit would be consistent with the operational throughput limits established in permit condition 6.3. Therefore permit condition 6.4 was

changed to state:

"The permittee shall record the calendar date and the daily and consecutive 12-month period throughput of each potato process line in operation, and the daily aggregate throughput of the storage silos to verify compliance with Permit Condition 6.3. The records shall be kept at the facility for a minimum period of five years and shall be made available to Department representatives upon request."

APPENDIX B

IDAHO SUPREME POTATOES, INC.

FIRTH FACILITY

STACK LISTING

APPENDIX A. EQIUPMENT LISTING

EQUIPMENT	MODEL	STACK HEIGHT (m)	EXIT TEMPERATURE (°K)	EXIT VELOCITY (ACFM)	STACK DIAMETER (m)	CONTROL EQIUPMENT	CAPACITY
Fluidized Bed Dryer	BD21x3 w/ Maxon 435 Oven Pak II	8.6	321.00	26,000	0.43	None	7 MMBTU/hr
#4 Boiler	Bigelow	12.29	463.56	32,000	0.91	Low NOx	140 MMBTU/hr
#3 Boiler	Cleaver Brooks WT200X-BR3	9.68	560.78	13,000	0.88	Low NOx	43 MMBTU/hr
Dryer, Stage A	National Maxon NP-1	7.99	366.33	8,500	0.70	None	8 MMBTU/hr
Dryer, Stage B	National Maxon NP-1	7.99	366.33	7,500	0.70	None	3.2 MMBTU/hr
Dryer, Stage C	National Maxon NP-1	7.99	366.33	8,500	0.70	None	3.2 MMBTU/hr
Secondary Dryer (two identical vents)	Maxon 405 Ovenpak	7.68	293.00	7,000	0.76	None	0.55 MMBTU/hr
Space Heater South	Maxon NP-1	7.62	310.78	70,000	Not Applicable	None	8.25 MMBTU/hr
Space Heater North	Maxon NP-1	7.62	310.78	70,000	Not Applicable	None	8.25 MMBTU/hr
Space Heater East	Maxon NP-1	7.62	310.78	70,000	Not Applicable	None	15.4 MMBTU/hr
Misc. Space Heaters	Various				Not Applicable	None	2 MMBTU/hr
Storage Silo A	Not Applicable	22.43	293.00	750	6"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo B	Not Applicable	22.43	293.00	750	6"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo C	Not Applicable	22.43	293.00	750	6"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo D	Not Applicable	22.43	293.00	750	6"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo E	Not Applicable	22.43	293.00	750	6"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo F	Not Applicable	22.43	293.00	750	24" x 24"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo G	Not Applicable	22.43	293.00	750	30" x 45"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo H	Not Applicable	22.43	293.00	750	30" x 45"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Storage Silo I	Not Applicable	22.43	293.00	750	30" x 45"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour

APPENDIX A. EQUIPMENT LISTING (continued)

EQUIPMENT	MODEL	STACK HEIGHT (m)	EXIT TEMPERATURE (°K)	EXIT VELOCITY (ACFM)	STACK DIAMETER (m)	CONTROL EQUIPMENT	CAPACITY[1]
Storage Silo J	Not Applicable	22.43	293.00	750	30" x 45"	Baghouse; Dust Control EQ Model No. VS-10-KS1	9,600 pounds per hour
Flaker # 1	Not Applicable	7.37	293.00	9,935	1.14	None	Not Provided[2]
Flaker # 2	Not Applicable	7.37	293.00	9,935	1.14	None	Not Provided[2]
Flaker # 3	Not Applicable	7.37	293.00	9,935	1.14	None	Not Provided[2]
Flaker # 4	Not Applicable	7.37	293.00	11,039	1.14	None	Not Provided[2]
Flaker # 5	Not Applicable	7.68	293.00	10,333	0.63	None	Not Provided[2]
Flaker # 6	Not Applicable	8.29	293.00	10,793	0.76	None	Not Provided[2]
Flaker # 7	Not Applicable	8.29	293.00	9,812	0.76	None	Not Provided[2]
Flaker # 8	Not Applicable	8.29	293.00	16,190	0.76	None	Not Provided[2]
Flaker # 9	Not Applicable	9.83	293.00	10,625	0.61	None	Not Provided[2]
Flaker # 10	Not Applicable	8.93	293.00	10,000	0.61	None	Not Provided[2]
Flaker # 11	Not Applicable	9.83	293.00	8,750	0.61	None	Not Provided[2]
Flaker # 12	Not Applicable	9.83	293.00	10,000	0.61	None	Not Provided[2]

Notes: 1. Capacity listed in MMBTU/hr based on natural gas burning.
2. Capacity identified as confidential information.

APPENDIX C

IDAHO SUPREME POTATOES, INC.

FIRTH FACILITY

EMISSIONS CALCULATIONS

CRITERIA POLLUTANTS

TABLE 1. MAXIMUM HOURLY EMISSION RATES
(pounds per hour)

Process	PM-10	SO2	NO2	CO	F	Pb
Fluidized Bed Dryer	7.6E-01	4.E-03	1.1E+00	5.7E-01	0	3.E-06
Boiler #4	7.48E+00	5.1E+01	3.1E+01	1.1E+01	2.42E-02	1.E-03
Boiler #3	2.3E+00	1.57E+01	1.1E+01	3.5E+00	7.46E-03	4.E-04
Secondary Dryers	4.1E-03	3.E-04	5.9E-02	4.5E-02	0	3.E-07
Dryers - Stage A	5.9E-02	5.E-03	6.3E-01	6.5E-01	0	4.E-06
Dryer - Stage B	2.4E-02	2.E-03	2.5E-01	2.6E-01	0	2.E-06
Dryers - Stages C	2.4E-02	2.E-03	2.5E-01	2.6E-01	0	2.E-06
Space Heater - North	6.1E-02	5.E-03	8.03E-01	6.8E-01	0	4.E-06
Space Heater - South	6.1E-02	5.E-03	8.03E-01	6.8E-01	0	4.E-06
Space Heater - East	1.1E-01	9.E-03	1.50E+00	1.3E+00	0	8.E-06
Space Heater - Misc.	1.5E-02	1.E-03	2.09E-01	1.6E-01	0	1.E-06

TABLE 2. MAXIMUM EMISSION RATES
(grams per second)

Process	PM-10	SO2	NO2	CO	F	Pb
Fluidized Bed Dryer	9.6E-02	5.E-04	1.4E-01	7.2E-02	0	4.E-07
Boiler #4	9.42E-01	6.4E+00	3.9E+00	1.4E+00	3.05E-03	1.E-04
Boiler #3	2.9E-01	1.98E+00	1.4E+00	4.4E-01	9.40E-04	5.E-05
Secondary Dryers	5.2E-04	4.E-05	7.4E-03	5.7E-03	0	4.E-08
Dryers - Stage A	7.5E-03	6.E-04	8.0E-02	8.2E-02	0	5.E-07
yer - Stage B	3.0E-03	2.E-04	3.2E-02	3.3E-02	0	2.E-07
ryers - Stages C	3.0E-03	2.E-04	3.2E-02	3.3E-02	0	2.E-07
Space Heater - North	7.7E-03	6.E-04	1.01E-01	8.5E-02	0	5.E-07
Space Heater - South	7.7E-03	6.E-04	1.01E-01	8.5E-02	0	5.E-07
Space Heater - East	1.4E-02	1.E-03	1.89E-01	1.6E-01	0	9.E-07
Space Heater - Misc.	1.9E-03	1.E-04	2.6E-02	2.1E-02	0	1.E-07

TABLE 3. MAXIMUM ANNUAL EMISSION RATES
(tons per year)

Process	PM-10	SO2	NO2	CO	F	Pb
Fluidized Bed Dryer	3.3E+00	2.E-02	4.8E+00	2.5E+00	0	1.E-05
Boiler #4	3.28E+01	2.2E+02	1.4E+02	4.8E+01	1.06E-01	4.E-03
Boiler #3	3.7E+00	2.5E+01	1.8E+01	5.6E+00	1.19E-02	6.E-04
Secondary Dryers	1.8E-02	1.E-03	2.6E-01	2.0E-01	0	1.E-06
Dryers - Stage A	2.6E-01	2.E-02	2.8E+00	2.9E+00	0	2.E-05
Dryer - Stage B	1.0E-01	8.E-03	1.1E+00	1.1E+00	0	7.E-06
Dryers - Stages C	1.0E-01	8.E-03	1.1E+00	1.1E+00	0	7.E-06
Space Heater - North	1.8E-01	1.5E-02	2.4E+00	2.0E+00	0.0E+00	1.2E-05
Space Heater - South	1.8E-01	1.5E-02	2.4E+00	2.0E+00	0.0E+00	1.2E-05
Space Heater - East	3.4E-01	2.7E-02	4.5E+00	3.8E+00	0.0E+00	2.3E-05
Space Heater - Misc.	4.5E-02	3.5E-03	6.3E-01	5.0E-01	0.0E+00	2.9E-06
TOTAL ANNUAL EMISSIONS	**4.10E+01**	**2.48E+02**	**1.73E+02**	**7.0E+01**	**1.18E-01**	**5.E-03**

Notes: Emissions from Boiler #3 based on 3,185 hours of operation per year.
Emissions from all space heaters based on 6,048 hours of operation for each unit per year.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. BOILER #4 - NON-CARCINOGENS
FUEL OIL

Pollutant	Emission Factor (lb/1,000 gal)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	5.25E-03	3.41E-03	1.49E-02	4.30E-04
Barium	2.57E-03	1.67E-03	7.32E-03	2.10E-04
Chromium	8.45E-04	5.49E-04	2.41E-03	6.92E-05
Cobalt	6.02E-03	3.91E-03	1.71E-02	4.93E-04
Copper	1.76E-03	1.14E-03	5.01E-03	1.44E-04
Ethylbenzene	6.36E-05	4.13E-05	1.81E-04	5.21E-06
Fluoride	3.73E-02	2.42E-02	1.06E-01	3.05E-03
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	3.00E-03	1.95E-03	8.54E-03	2.46E-04
Mercury	4*	4.E-04	2.E-03	5.E-05
Moybdenum	7.87E-04	5.12E-04	2.24E-03	6.45E-05
Naphthalene	1.13E-03	7.35E-04	3.22E-03	9.25E-05
Pentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phosphorous	9.46E-03	6.15E-03	2.69E-02	7.75E-04
Selenium	15*	2.1E-03	9.2E-03	2.6E-04
Toluene	6.20E-03	4.03E-03	1.77E-02	5.08E-04
o-Xylene	1.09E-04	7.09E-05	3.10E-04	8.93E-06
Zinc	2.91E-02	1.89E-02	8.28E-02	2.38E-03

TABLE 2. BOILER #4 - CARCINOGENS
FUEL OIL

Pollutant	Emission Factor (lb/1,000 gal)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	1.32E-03	8.58E-04	3.76E-03	1.08E-04
Benzene	2.14E-04	1.39E-04	6.09E-04	1.75E-05
Beryllium	4*	4.E-04	2.E-03	5.E-05
Cadmium	3.98E-04	2.59E-04	1.13E-03	3.26E-05
Chromium VI	2.48E-04	1.61E-04	7.06E-04	2.03E-05
Formaldehyde	3.30E-02	2.15E-02	9.40E-02	2.70E-03
Nickel	8.45E-02	5.49E-02	2.41E-01	6.92E-03
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(a)anthracene	4.01E-06	2.61E-06	1.14E-05	3.28E-07
Benzo(b)fluoranthene	7.40E-07	4.81E-07	2.11E-06	6.06E-08
Benzo(k)fluoranthene	7.40E-07	4.81E-07	2.11E-06	6.06E-08
Chrysene	2.38E-06	1.55E-06	6.78E-06	1.95E-07
Dibenzo(a,h)anthracene	1.67E-06	1.09E-06	4.75E-06	1.37E-07
Indeno(1,2,3-cd)pyrene	2.14E-06	1.39E-06	6.09E-06	1.75E-07
Total PAHs	1.17E-05	7.59E-06	3.33E-05	9.57E-07

Notes: * Emission factor units in pounds per 1,000,000 MMBTU.

Emission estimates represent maximum emissions based on burning #2, #4, #5, or #6 fuel oil, and based on AP-42 Tables 1.3-9, 1.3-10, and 1.3-11.

Emissions based on boiler operating with maximum fuel usage of 650 gal/hour.

Emissions based on 8,760 hours of operation.

TABLE 3. BOILER #4 - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	6.0E-04	2.6E-03	7.6E-05
Chromium	1.4E-03	1.9E-04	8.4E-04	2.4E-05
Cobalt	8.4E-05	1.1E-05	5.0E-05	1.4E-06
Copper	8.5E-04	1.2E-04	5.1E-04	1.5E-05
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	2.5E-01	1.1E+00	3.1E-02
Manganese	3.8E-04	5.2E-05	2.3E-04	6.5E-06
Mercury	2.6E-04	3.5E-05	1.6E-04	4.5E-06
Molybdenum	1.1E-03	1.5E-04	6.6E-04	1.9E-05
Naphthalene	6.1E-04	8.3E-05	3.6E-04	1.0E-05
Pentane	2.6E+00	3.5E-01	1.6E+00	4.5E-02
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	3.3E-06	1.4E-05	4.1E-07
Toluene	3.4E-03	4.6E-04	2.0E-03	5.8E-05
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	4.0E-03	1.7E-02	5.0E-04

TABLE 4. BOILER #4 - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	2.7E-05	1.2E-04	3.4E-06
Benzene	2.1E-03	2.9E-04	1.3E-03	3.6E-05
Beryllium	1.2E-05	1.6E-06	7.2E-06	2.1E-07
Cadmium	1.1E-03	1.5E-04	6.6E-04	1.9E-05
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	1.0E-02	4.5E-02	1.3E-03
Nickel	2.1E-03	2.9E-04	1.3E-03	3.6E-05
Benzo(a)pyrene	1.2E-06	1.6E-07	7.2E-07	2.1E-08
Benz(a)anthracene	1.8E-06	2.5E-07	1.1E-06	3.1E-08
Benzo(b)fluoranthene	1.8E-06	2.5E-07	1.1E-06	3.1E-08
Benzo(k)fluoranthene	1.8E-06	2.5E-07	1.1E-06	3.1E-08
Chrysene	1.8E-06	2.5E-07	1.1E-06	3.1E-08
Dibenzo(a,h)anthracene	1.2E-06	1.6E-07	7.2E-07	2.1E-08
Indeno(1,2,3-cd)pyrene	1.8E-06	2.5E-07	1.1E-06	3.1E-08
Total PAHs	1.1E-05	1.6E-06	6.8E-06	2.0E-07

Notes: Emissions based on boiler operating at maximum rate of 140 MMBTU/hr.
Assumed 1,027 BTU/scf heat content of natural gas.
Emissions based on 8,760 hours of operation.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. BOILER #3 - NON-CARCINOGENS
FUEL OIL

Pollutant	Emission Factor (lb/1,000 gal)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	5.25E-03	1.05E-03	1.67E-03	1.32E-04
Barium	2.57E-03	5.14E-04	8.19E-04	6.48E-05
Chromium	8.45E-04	1.69E-04	2.69E-04	2.13E-05
Cobalt	6.02E-03	1.20E-03	1.92E-03	1.52E-04
Copper	1.76E-03	3.52E-04	5.61E-04	4.44E-05
Ethylbenzene	6.36E-05	1.27E-05	2.03E-05	1.60E-06
Fluoride	3.73E-02	7.46E-03	1.19E-02	9.40E-04
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	3.00E-03	6.00E-04	9.56E-04	7.56E-05
Mercury	4*	2.E-04	3.E-04	2.E-05
Moybdenum	7.87E-04	1.57E-04	2.51E-04	1.98E-05
Naphthalene	1.13E-03	2.26E-04	3.60E-04	2.85E-05
Pentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phosphorous	9.46E-03	1.89E-03	3.01E-03	2.38E-04
Selenium	15*	1.7E-04	2.7E-04	2.2E-05
Toluene	6.20E-03	1.24E-03	1.97E-03	1.56E-04
o-Xylene	1.09E-04	2.18E-05	3.47E-05	2.75E-06
Zinc	2.91E-02	5.82E-03	9.27E-03	7.33E-04

TABLE 2. BOILER #3 - CARCINOGENS
FUEL OIL

Pollutant	Emission Factor (lb/1,000 gal)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	1.32E-03	2.64E-04	4.20E-04	3.33E-05
Benzene	2.14E-04	4.28E-05	6.82E-05	5.39E-06
Beryllium	4*	2.E-04	3.E-04	2.E-05
Cadmium	3.98E-04	7.96E-05	1.27E-04	1.00E-05
Chromium VI	2.48E-04	4.96E-05	7.90E-05	6.25E-06
Formaldehyde	3.30E-02	6.60E-03	1.05E-02	8.32E-04
Nickel	8.45E-02	1.69E-02	2.69E-02	2.13E-03
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(a)anthracene	4.01E-06	8.02E-07	1.28E-06	1.01E-07
Benzo(b)fluoranthene	7.40E-07	1.48E-07	2.36E-07	1.86E-08
Benzo(k)fluoranthene	7.40E-07	1.48E-07	2.36E-07	1.86E-08
Chrysene	2.38E-06	4.76E-07	7.58E-07	6.00E-08
Dibenzo(a,h)anthracene	1.67E-06	3.34E-07	5.32E-07	4.21E-08
Indeno(1,2,3-cd)pyrene	2.14E-06	4.28E-07	6.82E-07	5.39E-08
Total PAHs	1.17E-05	2.34E-06	3.72E-06	2.94E-07

Notes: * Emission factor units in pounds per 1,000,000 MMBTU.

Emission estimates represent maximum emissions based on burning #2, #4, #5, or #6 fuel oil, and based on AP-42 Tables 1.3-9, 1.3-10, and 1.3-11.

Emissions based on boiler operating with maximum fuel usage of 200 gal/hour.

Emissions based on 3,185 hours of operation.

TABLE 3. BOILER #3 - NON-CARCINOGENS NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	1.8E-04	2.9E-04	2.3E-05
Chromium	1.4E-03	5.9E-05	9.3E-05	7.4E-06
Cobalt	8.4E-05	3.5E-06	5.6E-06	4.4E-07
Copper	8.5E-04	3.6E-05	5.7E-05	4.5E-06
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	7.5E-02	1.2E-01	9.5E-03
Manganese	3.8E-04	1.6E-05	2.5E-05	2.0E-06
Mercury	2.6E-04	1.1E-05	1.7E-05	1.4E-06
Molybdenum	1.1E-03	4.6E-05	7.3E-05	5.8E-06
Naphthalene	6.1E-04	2.6E-05	4.1E-05	3.2E-06
Pentane	2.6E+00	1.1E-01	1.7E-01	1.4E-02
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.0E-06	1.6E-06	1.3E-07
Toluene	3.4E-03	1.4E-04	2.3E-04	1.8E-05
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	1.2E-03	1.9E-03	1.5E-04

TABLE 4. BOILER #3 - CARCINOGENS NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	8.4E-06	1.3E-05	1.1E-06
Benzene	2.1E-03	8.8E-05	1.4E-04	1.1E-05
Beryllium	1.2E-05	5.0E-07	8.0E-07	6.3E-08
Cadmium	1.1E-03	4.6E-05	7.3E-05	5.8E-06
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	3.1E-03	5.0E-03	4.0E-04
Nickel	2.1E-03	8.8E-05	1.4E-04	1.1E-05
Benzo(a)pyrene	1.2E-06	5.0E-08	8.0E-08	6.3E-09
Benz(a)anthracene	1.8E-06	7.5E-08	1.2E-07	9.5E-09
Benzo(b)fluoranthene	1.8E-06	7.5E-08	1.2E-07	9.5E-09
Benzo(k)fluoranthene	1.8E-06	7.5E-08	1.2E-07	9.5E-09
Chrysene	1.8E-06	7.5E-08	1.2E-07	9.5E-09
Dibenzo(a,h)anthracene	1.2E-06	5.0E-08	8.0E-08	6.3E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	7.5E-08	1.2E-07	9.5E-09
Total PAHs	1.1E-05	4.8E-07	7.6E-07	6.0E-08

Notes: Emissions based on boiler operating at maximum rate of 43.03 MMBTU/hr.
Assumed 1,027 BTU/scf heat content of natural gas.
Emissions based on 3,185 hours of operation.

TOXIC AIR POLLUTANTS CALCULATIONS

TABLE 1. FLUID BED DRYER - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	3.0E-05	1.3E-04	3.8E-06
Chromium	1.4E-03	9.5E-06	4.2E-05	1.2E-06
Cobalt	8.4E-05	5.7E-07	2.5E-06	7.2E-08
Copper	8.5E-04	5.8E-06	2.5E-05	7.3E-07
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	1.2E-02	5.4E-02	1.5E-03
Manganese	3.8E-04	2.6E-06	1.1E-05	3.3E-07
Mercury	2.6E-04	1.8E-06	7.8E-06	2.2E-07
Molybdenum	1.1E-03	7.5E-06	3.3E-05	9.4E-07
Naphthalene	6.1E-04	4.2E-06	1.8E-05	5.2E-07
Pentane	2.6E+00	1.8E-02	7.8E-02	2.2E-03
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.6E-07	7.2E-07	2.1E-08
Toluene	3.4E-03	2.3E-05	1.0E-04	2.9E-06
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	2.0E-04	8.7E-04	2.5E-05

TABLE 2. FLUID BED DRYER - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.00E-04	1.4E-06	6.0E-06	1.7E-07
Benzene	2.1E-03	1.4E-05	6.3E-05	1.8E-06
Beryllium	1.20E-05	8.2E-08	3.6E-07	1.0E-08
Cadmium	1.10E-03	7.5E-06	3.3E-05	9.4E-07
Chromium VI	0.00E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	5.1E-04	2.2E-03	6.4E-05
Nickel	2.1E-03	1.4E-05	6.3E-05	1.8E-06
Benzo(a)pyrene	1.2E-06	8.2E-09	3.6E-08	1.0E-09
Benz(a)anthracene	1.8E-06	1.2E-08	5.4E-08	1.5E-09
Benzo(b)fluoranthene	1.8E-06	1.2E-08	5.4E-08	1.5E-09
Benzo(k)fluoranthene	1.8E-06	1.2E-08	5.4E-08	1.5E-09
Chrysene	1.8E-06	1.2E-08	5.4E-08	1.5E-09
Dibenzo(a,h)anthracene	1.2E-06	8.2E-09	3.6E-08	1.0E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	1.2E-08	5.4E-08	1.5E-09
Total PAHs	1.1E-05	7.8E-08	3.4E-07	9.8E-09

Notes: Emissions based on two Maxon burners operating at maximum rate of 3.5 MMBTU/hr.
Assumed 1,027 BTU/scf heat content of natural gas.
Emissions based on 8,760 hours of operation.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. DRYERS A, B, & C - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions Dryer A (lb/hr)	Emissions Dryer B (lb/hr)	Emissions Dryer C (lb/hr)	Dryer A Emissions (grams/sec)	Dryer B Emissions (grams/sec)	Dryer C Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	3.4E-05	1.4E-05	1.4E-05	4.3E-06	1.7E-06	1.7E-06
Chromium	1.4E-03	1.1E-05	4.4E-06	4.4E-06	1.4E-06	5.5E-07	5.5E-07
Cobalt	8.4E-05	6.5E-07	2.6E-07	2.6E-07	8.2E-08	3.3E-08	3.3E-08
Copper	8.5E-04	6.6E-06	2.6E-06	2.6E-06	8.3E-07	3.3E-07	3.3E-07
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	1.4E-02	5.6E-03	5.6E-03	1.8E-03	7.1E-04	7.1E-04
Manganese	3.8E-04	3.0E-06	1.2E-06	1.2E-06	3.7E-07	1.5E-07	1.5E-07
Mercury	2.6E-04	2.0E-06	8.1E-07	8.1E-07	2.6E-07	1.0E-07	1.0E-07
Molybdenum	1.1E-03	8.6E-06	3.4E-06	3.4E-06	1.1E-06	4.3E-07	4.3E-07
Naphthalene	6.1E-04	4.8E-06	1.9E-06	1.9E-06	6.0E-07	2.4E-07	2.4E-07
Pentane	2.6E+00	2.0E-02	8.1E-03	8.1E-03	2.6E-03	1.0E-03	1.0E-03
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.9E-07	7.5E-08	7.5E-08	2.4E-08	9.4E-09	9.4E-09
Toluene	3.4E-03	2.6E-05	1.1E-05	1.1E-05	3.3E-06	1.3E-06	1.3E-06
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	2.3E-04	9.0E-05	9.0E-05	2.8E-05	1.1E-05	1.1E-05

TABLE 2. DRYERS A, B, & C - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions Dryer A (lb/hr)	Emissions Dryer B (lb/hr)	Emissions Dryer C (lb/hr)	Dryer A Emissions (grams/sec)	Dryer B Emissions (grams/sec)	Dryer C Emissions (grams/sec)
Arsenic	2.0E-04	1.6E-06	6.2E-07	6.2E-07	2.0E-07	7.9E-08	7.9E-08
Benzene	2.1E-03	1.6E-05	6.5E-06	6.5E-06	2.1E-06	8.2E-07	8.2E-07
Beryllium	1.2E-05	9.3E-08	3.7E-08	3.7E-08	1.2E-08	4.7E-09	4.7E-09
Cadmium	1.1E-03	8.6E-06	3.4E-06	3.4E-06	1.1E-06	4.3E-07	4.3E-07
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	5.8E-04	2.3E-04	2.3E-04	7.4E-05	2.9E-05	2.9E-05
Nickel	2.1E-03	1.6E-05	6.5E-06	6.5E-06	2.1E-06	8.2E-07	8.2E-07
Benzo(a)pyrene	1.2E-06	9.3E-09	3.7E-09	3.7E-09	1.2E-09	4.7E-10	4.7E-10
Benz(a)anthracene	1.8E-06	1.4E-08	5.6E-09	5.6E-09	1.8E-09	7.1E-10	7.1E-10
Benzo(b)fluoranthene	1.8E-06	1.4E-08	5.6E-09	5.6E-09	1.8E-09	7.1E-10	7.1E-10
Benzo(k)fluoranthene	1.8E-06	1.4E-08	5.6E-09	5.6E-09	1.8E-09	7.1E-10	7.1E-10
Chrysene	1.8E-06	1.4E-08	5.6E-09	5.6E-09	1.8E-09	7.1E-10	7.1E-10
Dibenzo(a,h)anthracene	1.2E-06	9.3E-09	3.7E-09	3.7E-09	1.2E-09	4.7E-10	4.7E-10
Indeno(1,2,3-cd)pyrene	1.8E-06	1.4E-08	5.6E-09	5.6E-09	1.8E-09	7.1E-10	7.1E-10
Total PAHs	1.1E-05	8.9E-08	3.6E-08	3.6E-08	1.1E-08	4.5E-09	4.5E-09

Notes: Emissions based on Dryer A operating at 8 MMBTU/hr, Dryer B operating at 3.2 MMBTU/hr, and Dryer C operating at 3.2 MMBTU/hr.

Assumed 1,027 BTU/scf heat content of natural gas.

Emissions based on 8,760 hours of operation for each dryer.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. SECONDARY DRYER - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	2.4E-06	1.0E-05	3.0E-07
Chromium	1.4E-03	7.5E-07	3.3E-06	9.4E-08
Cobalt	8.4E-05	4.5E-08	2.0E-07	5.7E-09
Copper	8.5E-04	4.6E-07	2.0E-06	5.7E-08
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	9.6E-04	4.2E-03	1.2E-04
Manganese	3.8E-04	2.0E-07	8.9E-07	2.6E-08
Mercury	2.6E-04	1.4E-07	6.1E-07	1.8E-08
Molybdenum	1.1E-03	5.9E-07	2.6E-06	7.4E-08
Naphthalene	6.1E-04	3.3E-07	1.4E-06	4.1E-08
Pentane	2.6E+00	1.4E-03	6.1E-03	1.8E-04
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.3E-08	5.6E-08	1.6E-09
Toluene	3.4E-03	1.8E-06	8.0E-06	2.3E-07
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	1.6E-05	6.8E-05	2.0E-06

TABLE 2. SECONDARY DRYER - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	1.1E-07	4.7E-07	1.3E-08
Benzene	2.1E-03	1.1E-06	4.9E-06	1.4E-07
Beryllium	1.2E-05	6.4E-09	2.8E-08	8.1E-10
Cadmium	1.1E-03	5.9E-07	2.6E-06	7.4E-08
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	4.0E-05	1.8E-04	5.1E-06
Nickel	2.1E-03	1.1E-06	4.9E-06	1.4E-07
Benzo(a)pyrene	1.2E-06	6.4E-10	2.8E-09	8.1E-11
Benz(a)anthracene	1.8E-06	9.6E-10	4.2E-09	1.2E-10
Benzo(b)fluoranthene	1.8E-06	9.6E-10	4.2E-09	1.2E-10
Benzo(k)fluoranthene	1.8E-06	9.6E-10	4.2E-09	1.2E-10
Chrysene	1.8E-06	9.6E-10	4.2E-09	1.2E-10
Dibenzo(a,h)anthracene	1.2E-06	6.4E-10	2.8E-09	8.1E-11
Indeno(1,2,3-cd)pyrene	1.8E-06	9.6E-10	4.2E-09	1.2E-10
Total PAHs	1.1E-05	6.1E-09	2.7E-08	7.7E-10

Notes: Emissions based on dryer operating at a maximum rate of 0.55 MMBTU/hr.
Assumed 1,027 BTU/scf heat content of natural gas.
Emissions based on 8,760 hours.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. SPACE HEATERS N, E, & S - NON-CARCINOGENS NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions SH South (lb/hr)	Emissions SH North (lb/hr)	Emissions SH East (lb/hr)	Emissions SH South (grams/sec)	Emissions SH North (grams/sec)	Emissions SH East (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	3.5E-05	3.5E-05	6.6E-05	4.5E-06	4.5E-06	8.3E-06
Chromium	1.4E-03	1.1E-05	1.1E-05	2.1E-05	1.4E-06	1.4E-06	2.6E-06
Cobalt	8.4E-05	6.7E-07	6.7E-07	1.3E-06	8.5E-08	8.5E-08	1.6E-07
Copper	8.5E-04	6.8E-06	6.8E-06	1.3E-05	8.6E-07	8.6E-07	1.6E-06
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	1.4E-02	1.4E-02	2.7E-02	1.8E-03	1.8E-03	3.4E-03
Manganese	3.8E-04	3.1E-06	3.1E-06	5.7E-06	3.8E-07	3.8E-07	7.2E-07
Mercury	2.6E-04	2.1E-06	2.1E-06	3.9E-06	2.6E-07	2.6E-07	4.9E-07
Molybdenum	1.1E-03	8.8E-06	8.8E-06	1.6E-05	1.1E-06	1.1E-06	2.1E-06
Naphthalene	6.1E-04	4.9E-06	4.9E-06	9.1E-06	6.2E-07	6.2E-07	1.2E-06
Pentane	2.6E+00	2.1E-02	2.1E-02	3.9E-02	2.6E-03	2.6E-03	4.9E-03
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.9E-07	1.9E-07	3.6E-07	2.4E-08	2.4E-08	4.5E-08
Toluene	3.4E-03	2.7E-05	2.7E-05	5.1E-05	3.4E-06	3.4E-06	6.4E-06
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	2.3E-04	2.3E-04	4.3E-04	2.9E-05	2.9E-05	5.5E-05

TABLE 2. SPACE HEATERS N, E, & S - CARCINOGENS NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions SH South (lb/hr)	Emissions SH North (lb/hr)	Emissions SH East (lb/hr)	Emissions SH South (grams/sec)	Emissions SH North (grams/sec)	Emissions SH East (grams/sec)
Arsenic	2.0E-04	1.6E-06	1.6E-06	3.0E-06	2.0E-07	2.0E-07	3.8E-07
Benzene	2.1E-03	1.7E-05	1.7E-05	3.1E-05	2.1E-06	2.1E-06	4.0E-06
Beryllium	1.2E-05	9.6E-08	9.6E-08	1.8E-07	1.2E-08	1.2E-08	2.3E-08
Cadmium	1.1E-03	8.8E-06	8.8E-06	1.6E-05	1.1E-06	1.1E-06	2.1E-06
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	6.0E-04	6.0E-04	1.1E-03	7.6E-05	7.6E-05	1.4E-04
Nickel	2.1E-03	1.7E-05	1.7E-05	3.1E-05	2.1E-06	2.1E-06	4.0E-06
Benzo(a)pyrene	1.2E-06	9.6E-09	9.6E-09	1.8E-08	1.2E-09	1.2E-09	2.3E-09
Benz(a)anthracene	1.8E-06	1.4E-08	1.4E-08	2.7E-08	1.8E-09	1.8E-09	3.4E-09
Benzo(b)fluoranthene	1.8E-06	1.4E-08	1.4E-08	2.7E-08	1.8E-09	1.8E-09	3.4E-09
Benzo(k)fluoranthene	1.8E-06	1.4E-08	1.4E-08	2.7E-08	1.8E-09	1.8E-09	3.4E-09
Chrysene	1.8E-06	1.4E-08	1.4E-08	2.7E-08	1.8E-09	1.8E-09	3.4E-09
Dibenzo(a,h)anthracene	1.2E-06	9.6E-09	9.6E-09	1.8E-08	1.2E-09	1.2E-09	2.3E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	1.4E-08	1.4E-08	2.7E-08	1.8E-09	1.8E-09	3.4E-09
Total PAHs	1.1E-05	9.2E-08	9.2E-08	1.7E-07	1.2E-08	1.2E-08	2.2E-08

Notes: Emissions based on north and south space heaters operating at 8.25 MMBTU/hr, and east space heater operating at 15.4 MMBTu/hr.

Assumed 1,027 BTU/scf heat content of natural gas.

Emissions based on 6,048 hours of operation for each space heater.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. MISC. SPACE HEATERS - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	8.6E-06	2.6E-05	1.1E-06
Chromium	1.4E-03	2.7E-06	8.2E-06	3.4E-07
Cobalt	8.4E-05	1.6E-07	4.9E-07	2.1E-08
Copper	8.5E-04	1.7E-06	5.0E-06	2.1E-07
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	3.5E-03	1.1E-02	4.4E-04
Manganese	3.8E-04	7.4E-07	2.2E-06	9.3E-08
Mercury	2.6E-04	5.1E-07	1.5E-06	6.4E-08
Molybdenum	1.1E-03	2.1E-06	6.5E-06	2.7E-07
Naphthalene	6.1E-04	1.2E-06	3.6E-06	1.5E-07
Pentane	2.6E+00	5.1E-03	1.5E-02	6.4E-04
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	4.7E-08	1.4E-07	5.9E-09
Toluene	3.4E-03	6.6E-06	2.0E-05	8.3E-07
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	2.9E-02	5.6E-05	1.7E-04	7.1E-06

TABLE 2. MISC. SPACE HEATERS - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	3.9E-07	1.2E-06	4.9E-08
Benzene	2.1E-03	4.1E-06	1.2E-05	5.2E-07
Beryllium	1.2E-05	2.3E-08	7.1E-08	2.9E-09
Cadmium	1.1E-03	2.1E-06	6.5E-06	2.7E-07
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	1.5E-04	4.4E-04	1.8E-05
Nickel	2.1E-03	4.1E-06	1.2E-05	5.2E-07
Benzo(a)pyrene	1.2E-06	2.3E-09	7.1E-09	2.9E-10
Benz(a)anthracene	1.8E-06	3.5E-09	1.1E-08	4.4E-10
Benzo(b)fluoranthene	1.8E-06	3.5E-09	1.1E-08	4.4E-10
Benzo(k)fluoranthene	1.8E-06	3.5E-09	1.1E-08	4.4E-10
Chrysene	1.8E-06	3.5E-09	1.1E-08	4.4E-10
Dibenzo(a,h)anthracene	1.2E-06	2.3E-09	7.1E-09	2.9E-10
Indeno(1,2,3-cd)pyrene	1.8E-06	3.5E-09	1.1E-08	4.4E-10
Total PAHs	1.1E-05	2.2E-08	6.7E-08	2.8E-09

Notes: Emissions based on heaters operating at an aggregate maximum rate of 2 MMBTU/hr.
Assumed 1,027 BTU/scf heat content of natural gas.
Emissions based on 6,048 hours of operation for each space heater.

SUMMARY OF TOXIC AIR POLLUTANT EMISSIONS

TABLE 1. NON-CARCINOGENS

Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Antimony	4.5E-03	3.3E-02	N	1.3E-02
Barium	2.4E-03	3.3E-02	N	7.3E-03
Chromium	7.9E-04	3.3E-02	N	2.4E-03
Cobalt	5.1E-03	3.3E-03	Y	1.5E-02
Copper	1.5E-03	6.7E-02	N	4.7E-03
Ethylbenzene	5.4E-05	2.9E+01	N	1.6E-04
Fluoride	3.17E-02	1.67E-01	N	9.6E-02
Hexane	9.8E-02	1.2E+01	N	3.0E-01
Manganese	2.57E-03	3.33E-01	N	7.8E-03
Mercury	6.E-04	3.E-03	N	1.8E-03
Molybdenum	7.29E-04	6.67E-01	N	2.2E-03
Naphthalene	9.94E-04	3.33E+00	N	3.0E-03
Pentane	1.41E-01	1.18E+02	N	4.3E-01
Phosphorous	8.E-03	7.E-03	Y	2.4E-02
Selenium	2.3E-03	1.3E-02	N	6.9E-03
Toluene	5.5E-03	2.5E+01	N	1.6E-02
o-Xylene	9.3E-05	2.9E+01	N	2.8E-04
Zinc	2.63E-02	6.67E-01	N	8.0E-02

TABLE 2. CARCINOGENS

Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Arsenic	1.1E-03	1.5E-06	Y	3.4E-03
Benzene	3.0E-04	8.0E-04	N	9.0E-04
Beryllium	5.7E-04	2.8E-05	Y	1.7E-03
Cadmium	4.0E-04	3.7E-06	Y	1.2E-03
Chromium VI	2.1E-04	5.6E-07	Y	6.4E-04
Formaldehyde	3.2E-02	5.1E-04	Y	9.7E-02
Nickel	7.2E-02	2.7E-05	Y	2.2E-01
Benzo(a)pyrene	6.5E-08	2.0E-06	N	2.0E-07
Benz(a)anthracene	3.5E-06	NA	NA	1.1E-05
Benzo(b)fluoranthene	7.3E-07	NA	NA	2.2E-06
Benzo(k)fluoranthene	7.3E-07	NA	NA	2.2E-06
Chrysene	2.1E-06	NA	NA	6.4E-06
Dibenzo(a,h)anthracene	1.5E-06	NA	NA	4.5E-06
Indeno(1,2,3-cd)pyrene	1.9E-06	NA	NA	5.8E-06
Total PAHs	1.1E-05	2.0E-06	Y	3.2E-05

APPENDIX D

IDAHO SUPREME POTATOES, INC.

FIRTH FACILITY

TANKS 4.0 OUTPUT

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Idaho Supreme 10000 gal diesel
City:	Firth
State:	Idaho
Company:	Idaho Supreme
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	27.40
Diameter (ft):	8.00
Volume (gallons):	10,000.00
Turnovers:	0.00
Net Throughput (gal/yr):	10,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Pocatello, Idaho (Avg Atmospheric Pressure = 12.53 psia)

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.13	1.49	1.62

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	48.21	41.93	54.49	46.37	0.0044	0.0035	0.0054	130.0000			188.00	Option 5: A=12.101, B=8907

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Idaho Supreme 20,000 gal Tank
City:	Firth
State:	Idaho
Company:	Idaho Supreme
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	31.20
Diameter (ft):	10.50
Liquid Height (ft):	30.00
Avg. Liquid Height (ft):	20.00
Volume (gallons):	20,000.00
Turnovers:	3.50
Net Throughput (gal/yr):	70,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft):	0.00
Radius (ft) (Dome Roof):	0.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Pocatello, Idaho (Avg Atmospheric Pressure = 12.53 psia)

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.94	1.75	2.69

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	48.21	41.93	54.49	46.37	0.0044	0.0035	0.0054	130.0000			188.00	Option 5: A=12.101, B=8907

APPENDIX E

IDAHO SUPREME POTATOES, INC.

FIRTH FACILITY

MODELING MEMORANDUM

MEMORANDUM

TO: Michael Stambulis, State Office of Technical Services

FROM: Yayi Dong, State Office of Technical Services

SUBJECT: Modeling Review for the Tier II Operating Permit Application, Idaho Supreme Potatoes, Inc., Firth, Idaho

DATE: January 19, 2002

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1. SUMMARY:

JBR Environmental Consultants Inc., on behalf of Idaho Supreme Potatoes, Inc. (ISUP), submitted a Tier II operating permit (Tier II) application for its facility in Firth, Idaho. The Tier II application addresses all pollutants on a facility-wide basis. The criteria pollutants of concern for this facility are particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), oxides of nitrogen (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), and lead (Pb). It is also required to analyze the impact of toxic air pollutants (TAPs). There are no ambient air quality standards for TAPs for use in Tier II permitting actions. Procedures required to demonstrate compliance with IDAPA 58.01.01.161 have not been finalized. However, under IDAPA 58.01.01.161, the Department of Environmental Quality (DEQ) will ensure that any TAP "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." The Tier II permitting process requires those emissions, on a facility-wide basis, that exceed the screening emissions level presented in IDAPA 58.01.01.585 and 586 be modeled. The analysis demonstrated compliance with all regulatory requirements and the quantities of TAPs emissions were determined to not unreasonably affect human or animal life or vegetation.

2. DISCUSSION:

2.1 Process Description

Idaho Supreme Potatoes, Inc. Firth facility is located at the corner of Highway 91 and 800 North, Goshen Highway, less than one mile northeast of Firth. Air Quality Control Region 61 surrounding Firth (Bingham County) is attainment for all criteria pollutants. The Universal Transverse Mercator (UTM) coordinates of this facility are UTM North 4,795,900 meters and UTM East 404,800 meters, in Zone 12.

The main criteria pollutants released from this facility are PM_{10}, NO_x and SO_2. Other criteria pollutants emitted from this facility are CO and volatile organic compounds (VOCs). All pollutants are emitted from either the processing of potatoes or the combustion of fuel from boilers, dryers, or space heaters. Emission factors for PM_{10}, NO_x, SO_2, CO, and Pb are based on EPA's Compilation of Air Pollution Factors, 5th Edition, Version 7, November 1999. Ambient impacts of VOCs were not modeled in this evaluation because there are no ambient air quality standards for VOCs. See Table 1 for pollutant emission rates used in this evaluation.

Table 1. Emissions Rates of Criteria Pollutants

Source	PM_{10} [1] (g/s)[2]	SO_2 [3] (g/s)	CO[4] (g/s)	NO_x [5](g/s)	Lead (g/s)
Fluidized Bed Dryer	0.09	0.001	0.07	0.14	
No. 4 Bigelow Boiler	0.94	6.43	1.43	3.85	1.24E-04
No. 3 Cleaver Brooks	0.29	1.98	0.45	1.4	3.81E-05
Secondary Dryer (1st vent)	0.0003	0.0000	0.0028	0.0037	
Secondary Dryer (2nd vent)	0.0003	0.0000	0.0028	0.0037	
Secondary Dryer (1st vent)	4.71E-02				
Secondary Dryer (2nd vent)	4.71E-02				
Silo Storage A	8.06E-03				
Silo Storage B	8.06E-03				
Silo Storage C	8.06E-03				
Silo Storage D	8.06E-03				
Silo Storage E	8.06E-03				
Silo Storage F	8.06E-03				
Silo Storage G	8.06E-03				
Silo Storage H	8.06E-03				
Silo Storage I	8.06E-03				
Silo Storage J	8.06E-03				
Flaker No. 4	4.71E-02				
Flaker No. 3	4.71E-02				
Flaker No. 2	4.71E-02				
Flaker No. 1	4.71E-02				
Flaker No. 8	4.71E-02				
Flaker No. 7	4.71E-02				
Flaker No. 6	4.71E-02				
Flaker No. 5	4.71E-02				
Flaker No. 10	4.71E-02				
Flaker No. 9	4.71E-02				
Flaker No. 12	4.71E-02				
Flaker No. 11	4.71E-02				
Dryer Stage A	4.71E-02				
Dryer Stage B	4.71E-02				
Dryer Stage C	4.71E-02				
Dryer Stage A	0.007	0.001	0.081	0.097	
Dryer Stage B	0.003	0.000	0.033	0.039	
Dryer Stage C	0.003	0.000	0.033	0.039	
Space Heater South	7.69E-03	6.07E-04	8.50E-02	1.01E-01	
Space Heater North	7.69E-03	6.07E-04	8.50E-02	1.01E-01	
Space Heater East	1.44E-02	1.13E-03	1.59E-01	1.89E-01	

1. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
2. Grams per second
3. Sulfur dioxide
4. Carbon monoxide
5. Nitrogen dioxides

DEQ also requires TAPs to be evaluated. For non-carcinogenic TAPs, compliance under IDAPA 58.01.01.161 is demonstrated by meeting the limits in IDAPA 58.01.01.585, acceptable ambient concentrations (AAC). For carcinogenic TAPs, the cumulative risk calculated using the Unit Risk Factor (URF, IDAPA 58.01.01. 586) and modeled concentrations must be less than 1.0E-05. JBR has identified arsenic, cadmium, hexavalent chromium (Cr+6), formaldehyde (HCOH), nickel, beryllium, and polyaromatic hydrocarbons (PAHs) as the carcinogenic toxics that exceed the screening emissions level (EL). Cobalt, fluoride, and phosphorus are identified as carcinogenic toxics that exceed the EL. The emission rates are listed in Table 2.

Table 2. Emission Rates of TAPs

Source	Arsenic (g/s)[1]	Cadmium (g/s)	HCOH [2] (g/s)	Nickel (g/s)	Chromium +6[3] (g/s)	PAH (g/s)	Beryllium (g/s)	Cobalt (g/s)	Fluoride (g/s)	Phosphorous (g/s)
Fluidized Bed Dryer	1.72E-07	9.45E-07	6.44E-05	1.80E-06	0.00E+00	9.79E-09	1.03E-08	7.21E-08		
No. 4 Bigelow Boiler	9.17E-05	3.30E-08	2.30E-03	5.88E-03	2.03E-05	9.57E-07	3.46E-05	4.93E-04	2.67E-03	7.75E-04
No. 3 Cleaver Brooks	2.82E-05	1.02E-08	7.08E-04	1.81E-03	6.26E-06	2.94E-07	1.07E-05	1.52E-04	8.49E-04	2.38E-04
Secondary Dryer (1st vent)	7.12E-09	3.92E-08	2.67E-06	7.47E-08	0.00E+00	4.06E-10	4.27E-10	2.99E-09		
Secondary Dryer (2nd vent)	7.12E-09	3.92E-08	2.67E-06	7.47E-08	0.00E+00	4.06E-10	4.27E-10	2.99E-09		
Dryer Stage A	2.07E-07	1.14E-06	7.76E-05	2.17E-06	0.00E+00	1.18E-08	1.24E-08	8.70E-08		
Dryer Stage B	8.28E-08	4.55E-07	3.11E-05	8.69E-07	0.00E+00	4.72E-09	4.97E-09	3.48E-08		
Dryer Stage C	8.28E-08	4.55E-07	3.11E-05	8.69E-07	0.00E+00	4.72E-09	4.97E-09	3.48E-08		
Space Heater South	2.14E-07	1.17E-06	8.01E-05	2.24E-06	0.00E+00	1.22E-08	1.28E-08	8.97E-08		
Space Heater North	2.14E-07	1.17E-06	8.01E-05	2.24E-06	0.00E+00	1.22E-08	1.28E-08	8.97E-08		
Space Heater East	3.99E-07	2.19E-06	1.49E-04	4.18E-06	0.00E+00	2.27E-08	2.39E-08	1.68E-07		
Misc. Space Heaters	2.14E-07	1.17E-06	8.01E-05	2.24E-06	0.00E+00	1.22E-08	1.28E-08	8.97E-08		

1. Grams per second
2. Formaldehyde
3. It is conservative to assume that all chromium emissions were of the form chromium (+6), the most toxic form of chromium.

2.2 Applicable Air Quality Impact Limits

The facility is located in Firth, Idaho, which is attainment for all criteria pollutants. If the increment(s) of any criteria pollutant (CO, SO_2, PM_{10}, NO_2, and Pb) is higher than the significant contributions, the appropriate background concentration is added to those ambient concentration increments to determine compliance to the National Ambient Air Quality Standards (NAAQS). The NAAQS are listed in Table 3. The impact of carcinogenic TAPs is evaluated by calculating the cumulative risk of TAPs according to the DEQ modeling guidance (to be published). According to the DEQ's modeling guidance, the cumulative risk cannot exceed 1.0E-05.

Table 3. Applicable regulatory limits[1]

Pollutant	Averaging Period	Regulatory Limit ($\mu g/m^3$)[2]
NO_2[3]	Annual	100
SO_2[4]	3-hour	1,300
	24-hour	375
	Annual	80
CO[5]	1-hour	40,000 (NA)[7]
	8-hour	10,000 (NA)[7]
PM_{10}[6]	24-hour	150
	Annual	50

1. IDAPA 58.01.01.577
2. Micrograms per cubic meter
3. Nitrogen dioxide
4. Sulfur dioxide
5. Carbon monoxide
6. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
7. Since Ada County is a non-attainment area for CO (any time averaging period), the NAAQS are not applicable.

2.3 Background Concentrations

Table 4 is the background for regulated air pollutants. There are no background concentrations available for TAPs.

Table 4. Background concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[1]
NO_2[2]	Annual	40
SO_2[3]	3-hour	18.3
	24-hour	120
	Annual	374
CO[4]	1-hour	11,450
	8-hour	5,130
PM_{10}[5]	24-hour	86
	Annual	32.7

1. Micrograms per cubic meter
2. Nitrogen dioxide
3. Sulfur dioxide
4. Carbon monoxide
5. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

2.4 Modeling Impact Assessment

ISC-3 was used for this analysis. Surface meteorological data of 1987 through 1991 from Pocatello Airport (Station 24156) were used. The upper air data used are from station 24127 (Idaho Falls, Idaho). Environmental Protection Agency (EPA) default parameters for rural area were used. Receptors were set up according to DEQ modeling guidance. All regulated air pollutants and the TAPs that exceeded respective ELs were modeled. The concentrations of NO_2 were obtained by multiplying model results of NO_x by 0.75 as described in Section 16.7.2 of the application. All SO_x is considered as SO_2. The analyses presented in the application demonstrate compliance with the requirements for Tier II sources as required by IDAPA 58.01.01.403. The impact of carcinogenic TAPs was evaluated using cumulative risk.

Cumulative Risk = sum of Risk

where Risk = modeled concentration ($\mu g/m^3$) x Unit Risk Factor (URF risk/($\mu g/m^3$)).

The URF is listed in IDAPA58.01.01.586. The calculated cumulative risk is less than 1.0E-05. Although TAP Tier II permitting requirements for demonstrating compliance with IDAPA 58.01.01.161 have not been finalized, DEQ currently considers a risk increment of one in a hundred thousand to be a protective standard for facility-wide Tier II permitting and IDAPA 58.01.01.161. Since the acceptable ambient concentrations listed in IDAPA 58.01.01.586 are based on an excess risk of one in a million, a cumulative risk for the modeled TAP ambient concentrations was estimated. The cumulative risk estimate for the modeled TAP concentrations is between one in a hundred thousand and one in a million and therefore does not require further analysis at this time. The impact of non-carcinogenic TAPs concentrations were compared to ACC. All modeled maximum concentrations are below ACC. The results are summarized in Table 5 through Table 7.

Table 5. Modeled concentrations of criteria pollutants

Pollutant (MET[9] data Year)	Averaging Period	Result ($\mu g/m^3$)[1]	Location (UTME, UTMN)[7]	Background ($\mu g/m^3$)	Result + Background ($\mu g/m^3$)	NAAQS[2] ($\mu g/m^3$)
NO_2[3] (1989)	Annual	11.83	260,65	40	52	100
PM_{10}[4] (1991)	24-Hour	50.45	15, 225	86	136	150
PM_{10} (1988)	Annual	9.50	45, 270	32.7	42	50
SO_2[5] (1989)	3-Hour	424.93	205,-27.6	545	970	1,300
SO_2 (1989)	24-Hour	121.22	260, 65	144	265	365
SO_2 (1989)	Annual	11.95	260, 50	23.5	35	80
CO[6] (1989)	1-Hour	282.3	190, -75	11,450	11732	40,000
CO (1989)	8-Hour	81.5	240,25	5,130	5212	10,000
Lead[8]	24-Hour	0.0023	260,65	0.15	0.15	1.5(quarterly)[8]

1. Micrograms per cubic meter
2. National Ambient Air Quality Standard
3. Nitrogen dioxide
4. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
5. Sulfur dioxide
6. Carbon monoxide
7. Normalized Universal Transverse Mercator coordinates , East and North
8. 24-hour average is used to compare to the quarterly standard to evaluate the impact.
9. Meteorological

Table 6. Modeled carcinogenic TAPs[1] concentrations

Pollutant (MET[7] data Year)	Averaging Period	Result (µg/m³)[2]	Location (UTME, UTMN)[3]	URF[4]	Risk[5]
Arsenic (1989)	Annual	0.00018	260 50	4.3E-03	7.74E-07
Cadmium (1989)	Annual	0.00013	305 200	1.8E-03	2.34E-07
Chromium +6 (1989)	Annual	0.00003	260 50	1.2E-02	3.60E-07
HCOH (1989)	Annual	0.00855	305 200	1.3E-05	1.11E-07
Nickel (1989)	Annual	0.00649	260 50	2.4E-04	1.56E-06
Beryllium (1989)	Annual	0.00006	260 50	2.4E-04	1.44E-08
PAH (1989)	Annual	0.00144	260 50	3.3E-03	4.75E-06
Cumulative Risk[6]					**7.80E-06**

1. Toxic air pollutants
2. Micrograms per cubic meter
3. Universal Transverse Mercator coordinates, East and North, in meters
4. Unit Risk Factor, from US Environmental Protection Agency, IDAPA 58.01.01.586
5. Risk = concentration x URF
6. Cumulative Risk = sum of Risk, 1.0E-05 not to be exceeded
7. Meteorological

Table 7. Modeled non-carcinogenic TAPs[1] concentrations

Pollutant (MET[5] data Year)	Averaging Period	Result (µg/m³)[2]	Location (UTME, UTMN)[3]	ACC[4] (µg/m³)	Compliance
Cobalt (1989)	24-hour	9.2E-03	260 65	2.50E-00	Y
Fluoride (1989)	24-hour	5.2E-02	260 50	1.25E+02	Y
Phosphorus (1989)	24-hour	1.4E-02	260 65	5.0E-00	Y

1. Toxic air pollutants
2. Micrograms per cubic meter
3. Normalized Universal Transverse Mercator coordinates, East and North, in meters
4. Acceptable ambient concentrations, IDAPA 58.01.01.585
5. Meteorological

APPENDIX F

IDAHO SUPREME POTATOES, INC.

FIRTH FACILITY

COMBUSTION EVALUATION

Equipment	Fuel	dscfm at 3% O2	PM Emissions (lb/1,000 gal)	Fuel Usage (gal/hr)*	PM Emissions (lb/hr)	PM Emissions (gr/dscf)	Standard (gr/dscf)	Compliance (Y/N)
No. 4 Boiler	#2 Diesel	15971.2	3.3	650	2.145	0.016	0.050	Y
No. 4 Boiler	#4 Residual	16805	8.5	650	5.525	0.038	0.050	Y
No. 4 Boiler	#5 Residual	17103.3	11.5	650	7.475	**0.051**	0.050	**N**
No. 4 Boiler	#6 Residual	17282.1	9.32	650	6.058	0.041	0.050	Y
No. 4 Boiler	Natural Gas	24424.9	7.6	0.135	1.026	0.005	0.015	Y
No. 4 Boiler	Propane	3823.9	0.6	1050	0.63	0.019	0.050	Y
No. 3 Boiler	#2 Diesel	4914.2	3.3	200	0.66	0.016	0.050	Y
No. 3 Boiler	#4 Residual	5170.7	8.5	200	1.7	0.038	0.050	Y
No. 3 Boiler	#5 Residual	5262.5	11.5	200	2.3	**0.051**	0.050	**N**
No. 3 Boiler	#6 Residual	5317.6	9.32	200	1.864	0.041	0.050	Y
No. 3 Boiler	Natural Gas	7725.5	7.6	0.0427	0.32452	0.005	0.015	Y
No. 3 Boiler	Propane	1165.4	0.6	320	0.192	0.019	0.050	Y
Space Heater East	Natural Gas	2713.9	7.6	0.015	0.114	0.005	0.015	Y
Space Heater East	Propane	287.7	0.6	79	0.0474	0.019	0.050	Y
Space Heater North	Natural Gas	1452.7	7.6	0.00803	0.061028	0.005	0.015	Y
Space Heater North	Propane	153	0.6	42	0.0252	0.019	0.050	Y
Space Heater South	Natural Gas	1452.7	7.6	0.00803	0.061028	0.005	0.015	Y
Space Heater South	Propane	153	0.6	42	0.0252	0.019	0.050	Y
Misc Space Heaters	Natural Gas	363.7	7.6	0.00201	0.015276	0.005	0.015	Y
Misc Space Heaters	Propane	40.1	0.6	11	0.0066	0.019	0.050	Y
Fluidized Bed Dryer	Natural Gas	1233.1	7.6	0.00682	0.051832	0.005	0.015	Y
Fluidized Bed Dryer	Propane	284.1	0.6	78	0.0468	0.019	0.050	Y
Dryer Stage A	Natural Gas	1486.5	7.6	0.00822	0.062472	0.005	0.015	Y
Dryer Stage A	Propane	164.6	0.6	45.2	0.02712	0.019	0.050	Y
Dryer Stage B	Natural Gas	594.4	7.6	0.00329	0.025004	0.005	0.015	Y
Dryer Stage B	Propane	65.6	0.6	18	0.0108	0.019	0.050	Y
Dryer Stage C	Natural Gas	594.4	7.6	0.00329	0.025004	0.005	0.015	Y
Dryer Stage C	Propane	65.6	0.6	18	0.0108	0.019	0.050	Y
Secondary Dryer	Natural Gas	102.4	7.6	0.000565	0.004294	0.005	0.015	Y
Secondary Dryer	Propane	11.3	0.6	3.1	0.00186	0.019	0.050	Y

Combustion Evaluation - #4 Boiler, #2 Distillate

ISP

Fuel Data (% by weight)

S	0.5
N2	0.2
C	86.4
H2	12.7
H20	0.5
O2	0.2

Fuel burned (lb/hr)	4683.9
Excess air (%)	2
Stk temp (F)	463.56
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.73	2.75
N2	0.00	0
C	336.93	1267.51
H2	147.61	555.28
O2	-0.29	
	484.98	1825.54

stioc. comb air = 2462.2609 lb.mole/hr

stoic. dry comb air = 2163.1976 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.73	46.75
N2	1862.38	52146.65
CO2	336.93	14825.01
H2O(comb)	297.43	5353.70
O2	9.70	310.38
H2O(fuel)	1.30	23.42
dry	2209.74	
wet	2508.47	

Volume of flue gas (acfm)	28194.5
Volume of flue gas (sdcfm)	13984.1
Volume of flue gas (dscfm@7%O2)	20534.4
Volume of flue gas (dscfm@15%O2)	47913.5
Volume of flue gas (dscfm@8%O2)	22113.9
Volume of flue gas (dscfm@3%O2)	15971.2
Volume of flue gas (dscfm@10%O2)	26134.7

Combustion Evaluation - #4 Boiler, #4 Residual

ISP

Fuel Data (% by weight)

S	0.5
N2	0.489
C	86.1
H2	11.9
H20	0.5
O2	0.489

Fuel burned (lb/hr)	5022.6
Excess air (%)	2
Stk temp (F)	463.56
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.78	2.95
N2	0.00	0
C	360.04	1354.44
H2	148.31	557.93
O2	-0.77	
	508.37	1915.32

stioc. comb air = 2577.2572 lb.mole/hr

stoic. dry comb air = 2276.1401 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.78	50.13
N2	1954.50	54725.97
CO2	360.04	15841.83
H2O(comb)	298.84	5379.20
O2	10.17	325.36
H2O(fuel)	1.40	25.11
dry	2325.49	
wet	2625.73	

Volume of flue gas (acfm)	29512.5
Volume of flue gas (sdcfm)	14716.6
Volume of flue gas (dscfm@7%O2)	21606.5
Volume of flue gas (dscfm@15%O2)	50415.1
Volume of flue gas (dscfm@8%02)	23268.5
Volume of flue gas (dscfm@3%02)	16805.0
Volume of flue gas (dscfm@10%02)	27499.2

Combustion Evaluation - #4 Boiler, #5 Residual

ISP

Fuel Data (% by weight)

S	0.5
N2	0.7
C	85.55
H2	11.7
H20	0.5
O2	0.7

Fuel burned (lb/hr)	5157.8
Excess air (%)	2
Stk temp (F)	463.56
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.80	3.02
N2	0.00	0
C	367.37	1382.02
H2	149.74	563.32
O2	-1.13	
	516.79	1948.36

stioc. comb air = 2620.9874 lb.mole/hr

stoic. dry comb air = 2316.5339 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.80	51.48
N2	1988.61	55681.21
CO2	367.37	16164.34
H2O(comb)	301.73	5431.16
O2	10.34	330.75
H2O(fuel)	1.43	25.79
dry	2367.13	
wet	2670.29	

Volume of flue gas (acfm)	30013.3
Volume of flue gas (sdcfm)	14980.1
Volume of flue gas (dscfm@7%O2)	21989.9
Volume of flue gas (dscfm@15%O2)	51309.8
Volume of flue gas (dscfm@8%O2)	23681.5
Volume of flue gas (dscfm@3%O2)	17103.3
Volume of flue gas (dscfm@10%O2)	27987.2

Combustion Evaluation - #4 Boiler, #6 Residual

ISP

Fuel Data (% by weight)

S	0.5
N2	0.92
C	85.7
H2	10.5
H20	0.5
O2	0.92

Fuel burned (lb/hr)	5337.8
Excess air (%)	2
Stk temp (F)	463.56
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.83	3.13
N2	0.00	0
C	380.86	1432.75
H2	139.07	523.18
O2	-1.53	
	519.23	1959.07

stioc. comb air = 2624.2307 lb.mole/hr

stoic. dry comb air = 2340.7596 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.83	53.28
N2	2000.00	56000.10
CO2	380.86	16757.79
H2O(comb)	280.23	5044.22
O2	10.38	332.31
H2O(fuel)	1.48	26.69
dry	2392.08	
wet	2673.80	

Volume of flue gas (acfm)	30052.7
Volume of flue gas (sdcfm)	15138.0
Volume of flue gas (dscfm@7%O2)	22219.9
Volume of flue gas (dscfm@15%O2)	51846.4
Volume of flue gas (dscfm@8%O2)	23929.1
Volume of flue gas (dscfm@3%O2)	17282.1
Volume of flue gas (dscfm@10%O2)	28279.9

Combustion Evaluation - #4 Boiler, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	6439.5
Excess air (%)	2
Stk temp (F)	463.56
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	400.60	1507.02
H2	372.31	1400.59
O2	-2.46	
	770.45	2907.60

stioc. comb air = 4060.1532 lb.mole/hr

stoic. dry comb air = 3308.2036 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	2967.50	83090.13
CO2	400.60	17626.36
H2O(comb)	750.20	13503.63
O2	15.41	493.09
H2O(fuel)	0.00	0.00
dry	3383.51	
wet	4133.71	

Volume of flue gas (acfm)	46461.8
Volume of flue gas (sdcfm)	21412.2
Volume of flue gas (dscfm@7%O2)	31403.5
Volume of flue gas (dscfm@15%O2)	73274.7
Volume of flue gas (dscfm@8%02)	33819.1
Volume of flue gas (dscfm@3%02)	24424.9
Volume of flue gas (dscfm@10%02)	39968.0

Combustion Evaluation - #4 Boiler, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	1050
Excess air (%)	2
Stk temp (F)	463.56
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	71.51	269.01
H2	47.16	177.41
O2	0.00	
	118.67	446.42

stioc. comb air = 612.95314 lb.mole/hr

stoic. dry comb air = 517.92814 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	455.35	12749.72
CO2	71.51	3146.42
H2O(comb)	95.03	1710.45
O2	2.37	75.95
H2O(fuel)	0.00	0.00
dry	529.23	
wet	624.25	

Volume of flue gas (acfm)	7016.5
Volume of flue gas (sdcfm)	3349.2
Volume of flue gas (dscfm@7%O2)	4916.5
Volume of flue gas (dscfm@15%O2)	11471.8
Volume of flue gas (dscfm@8%02)	5294.7
Volume of flue gas (dscfm@3%02)	3823.9
Volume of flue gas (dscfm@10%02)	6257.3

Combustion Evaluation - #3 Boiler, #2 Distillate

ISP

Fuel Data (% by weight)

S	0.5
N2	0.2
C	86.4
H2	12.7
H20	0.5
O2	0.2

Fuel burned (lb/hr)	1441.2
Excess air (%)	2
Stk temp (F)	560.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.22	0.85
N2	0.00	0
C	103.67	390.00
H2	45.42	170.86
O2	-0.09	
	149.22	561.70

stioc. comb air = 757.61874 lb.mole/hr

stoic. dry comb air = 665.59926 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.22	14.39
N2	573.04	16045.12
CO2	103.67	4561.54
H2O(comb)	91.52	1647.29
O2	2.98	95.50
H2O(fuel)	0.40	7.21
dry	679.92	
wet	771.84	

Volume of flue gas (acfm)	9588.5
Volume of flue gas (sdcfm)	4302.8
Volume of flue gas (dscfm@7%O2)	6318.3
Volume of flue gas (dscfm@15%O2)	14742.6
Volume of flue gas (dscfm@8%02)	6804.3
Volume of flue gas (dscfm@3%02)	4914.2
Volume of flue gas (dscfm@10%02)	8041.4

Combustion Evaluation - #3 Boiler, #4 Residual

ISP

Fuel Data (% by weight)

S	0.5
N2	0.489
C	86.1
H2	11.9
H20	0.5
O2	0.489

Fuel burned (lb/hr)	1545.4
Excess air (%)	2
Stk temp (F)	560.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.24	0.91
N2	0.00	0
C	110.78	416.75
H2	45.63	171.67
O2	-0.24	
	156.42	589.32

stioc. comb air = 792.99431 lb.mole/hr

stoic. dry comb air = 700.34384 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.24	15.43
N2	601.38	16838.59
CO2	110.78	4874.36
H2O(comb)	91.95	1655.12
O2	3.13	100.11
H2O(fuel)	0.43	7.73
dry	715.53	
wet	807.91	

Volume of flue gas (acfm)	10036.6
Volume of flue gas (sdcfm)	4528.2
Volume of flue gas (dscfm@7%O2)	6648.1
Volume of flue gas (dscfm@15%O2)	15512.2
Volume of flue gas (dscfm@8%O2)	7159.5
Volume of flue gas (dscfm@3%O2)	5170.7
Volume of flue gas (dscfm@10%O2)	8461.2

Combustion Evaluation - #3 Boiler, #5 Residual

ISP

Fuel Data (% by weight)

S	0.5
N2	0.7
C	85.55
H2	11.7
H20	0.5
O2	0.7

Fuel burned (lb/hr)	1587
Excess air (%)	2
Stk temp (F)	560.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.25	0.93
N2	0.00	0
C	113.04	425.23
H2	46.07	173.33
O2	-0.35	
	159.01	599.49

stioc. comb air = 806.44983 lb.mole/hr

stoic. dry comb air = 712.77275 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.25	15.84
N2	611.88	17132.51
CO2	113.04	4973.60
H2O(comb)	92.84	1671.11
O2	3.18	101.77
H2O(fuel)	0.44	7.94
dry	728.34	
wet	821.62	

Volume of flue gas (acfm)	10206.9
Volume of flue gas (sdcfm)	4609.2
Volume of flue gas (dscfm@7%O2)	6766.1
Volume of flue gas (dscfm@15%O2)	15787.5
Volume of flue gas (dscfm@8%02)	7286.5
Volume of flue gas (dscfm@3%02)	5262.5
Volume of flue gas (dscfm@10%02)	8611.4

Combustion Evaluation - #3 Boiler, #6 Residual

ISP

Fuel Data (% by weight)

S	0.5
N2	0.92
C	85.7
H2	10.5
H20	0.5
O2	0.92

Fuel burned (lb/hr)	1642.4
Excess air (%)	2
Stk temp (F)	560.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.26	0.96
N2	0.00	0
C	117.19	440.85
H2	42.79	160.98
O2	-0.47	
	159.76	602.79

stioc. comb air = 807.45559 lb.mole/hr

stoic. dry comb air = 720.23372 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.26	16.39
N2	615.39	17230.80
CO2	117.19	5156.24
H2O(comb)	86.23	1552.07
O2	3.20	102.25
H2O(fuel)	0.46	8.21
dry	736.02	
wet	822.71	

Volume of flue gas (acfm)	10220.4
Volume of flue gas (sdcfm)	4657.9
Volume of flue gas (dscfm@7%O2)	6836.9
Volume of flue gas (dscfm@15%O2)	15952.7
Volume of flue gas (dscfm@8%02)	7362.8
Volume of flue gas (dscfm@3%02)	5317.6
Volume of flue gas (dscfm@10%02)	8701.5

Combustion Evaluation - #3 Boiler, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	2036.8
Excess air (%)	2
Stk temp (F)	560.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	126.71	476.67
H2	117.76	443.00
O2	-0.78	
	243.69	919.67

stioc. comb air = 1284.2177 lb.mole/hr

stoic. dry comb air = 1046.3777 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	938.62	26281.23
CO2	126.71	5575.18
H2O(comb)	237.29	4271.17
O2	4.87	155.96
H20(fuel)	0.00	0.00
dry	1070.20	
wet	1307.48	

Volume of flue gas (acfm)	16242.7
Volume of flue gas (sdcfm)	6772.6
Volume of flue gas (dscfm@7%O2)	9932.8
Volume of flue gas (dscfm@15%O2)	23176.6
Volume of flue gas (dscfm@8%O2)	10696.9
Volume of flue gas (dscfm@3%O2)	7725.5
Volume of flue gas (dscfm@10%O2)	12641.8

Combustion Evaluation - #3 Boiler, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	320
Excess air (%)	2
Stk temp (F)	560.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	21.79	81.98
H2	14.37	54.07
O2	0.00	
	36.17	136.05

stioc. comb air = 186.80477 lb.mole/hr

stoic. dry comb air = 157.84477 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	138.77	3885.63
CO2	21.79	958.91
H2O(comb)	28.96	521.28
O2	0.72	23.15
H2O(fuel)	0.00	0.00
dry	161.29	
wet	190.25	

Volume of flue gas (acfm)	2363.4
Volume of flue gas (sdcfm)	1020.7
Volume of flue gas (dscfm@7%O2)	1498.4
Volume of flue gas (dscfm@15%O2)	3496.2
Volume of flue gas (dscfm@8%O2)	1613.6
Volume of flue gas (dscfm@3%O2)	1165.4
Volume of flue gas (dscfm@10%O2)	1907.0

Combustion Evaluation - Space Heater East, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	79
Excess air (%)	2
Stk temp (F)	310.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	5.38	20.24
H2	3.55	13.35
O2	0.00	
	8.93	33.59

stioc. comb air = 46.117426 lb.mole/hr

stoic. dry comb air = 38.967926 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	34.26	959.26
CO2	5.38	236.73
H2O(comb)	7.15	128.69
O2	0.18	5.71
H2O(fuel)	0.00	0.00
dry	39.82	
wet	46.97	

Volume of flue gas (acfm)	440.6
Volume of flue gas (sdcfm)	252.0
Volume of flue gas (dscfm@7%O2)	369.9
Volume of flue gas (dscfm@15%O2)	863.1
Volume of flue gas (dscfm@8%O2)	398.4
Volume of flue gas (dscfm@3%O2)	287.7
Volume of flue gas (dscfm@10%O2)	470.8

Combustion Evaluation - Space Heater East, Natural Gas

ISP

Fuel Data (% by weight)	
S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	715.5
Excess air (%)	2
Stk temp (F)	310.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	44.51	167.45
H2	41.37	155.62
O2	-0.27	
	85.61	323.07

stioc. comb air = 451.12813 lb.mole/hr

stoic. dry comb air = 367.57817 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	329.72	9232.24
CO2	44.51	1958.48
H2O(comb)	83.36	1500.40
O2	1.71	54.79
H2O(fuel)	0.00	0.00
dry	375.95	
wet	459.30	

Volume of flue gas (acfm)	4308.4
Volume of flue gas (sdcfm)	2379.1
Volume of flue gas (dscfm@7%O2)	3489.3
Volume of flue gas (dscfm@15%O2)	8141.6
Volume of flue gas (dscfm@8%02)	3757.7
Volume of flue gas (dscfm@3%02)	2713.9
Volume of flue gas (dscfm@10%02)	4440.9

Combustion Evaluation - Space Heater South & North, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	383
Excess air (%)	2
Stk temp (F)	310.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	23.83	89.63
H2	22.14	83.30
O2	-0.15	
	45.82	172.93

stioc. comb air = 241.48438 lb.mole/hr

stoic. dry comb air = 196.76092 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	176.50	4941.92
CO2	23.83	1048.36
H2O(comb)	44.62	803.15
O2	0.92	29.33
H2O(fuel)	0.00	0.00
dry	201.24	
wet	245.86	

Volume of flue gas (acfm)	2306.3
Volume of flue gas (sdcfm)	1273.5
Volume of flue gas (dscfm@7%O2)	1867.8
Volume of flue gas (dscfm@15%O2)	4358.1
Volume of flue gas (dscfm@8%02)	2011.4
Volume of flue gas (dscfm@3%02)	1452.7
Volume of flue gas (dscfm@10%02)	2377.2

Combustion Evaluation - Space Heater South & North, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	42
Excess air (%)	2
Stk temp (F)	310.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	2.86	10.76
H2	1.89	7.10
O2	0.00	
	4.75	17.86

stioc. comb air = 24.518125 lb.mole/hr

stoic. dry comb air = 20.717125 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	18.21	509.99
CO2	2.86	125.86
H2O(comb)	3.80	68.42
O2	0.09	3.04
H2O(fuel)	0.00	0.00
dry	21.17	
wet	24.97	

Volume of flue gas (acfm)	234.2
Volume of flue gas (sdcfm)	134.0
Volume of flue gas (dscfm@7%O2)	196.7
Volume of flue gas (dscfm@15%O2)	458.9
Volume of flue gas (dscfm@8%O2)	211.8
Volume of flue gas (dscfm@3%O2)	153.0
Volume of flue gas (dscfm@10%O2)	250.3

Combustion Evaluation - Misc Space Heaters, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	95.9
Excess air (%)	2
Stk temp (F)	310.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	5.97	22.44
H2	5.54	20.86
O2	-0.04	
	11.47	43.30

stioc. comb air = 60.465671 lb.mole/hr

stoic. dry comb air = 49.267291 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	44.19	1237.42
CO2	5.97	262.50
H2O(comb)	11.17	201.10
O2	0.23	7.34
H20(fuel)	0.00	0.00
dry	50.39	
wet	61.56	

Volume of flue gas (acfm)	577.5
Volume of flue gas (sdcfm)	318.9
Volume of flue gas (dscfm@7%O2)	467.7
Volume of flue gas (dscfm@15%O2)	1091.2
Volume of flue gas (dscfm@8%02)	503.6
Volume of flue gas (dscfm@3%02)	363.7
Volume of flue gas (dscfm@10%02)	595.2

Combustion Evaluation - Misc Space Heaters, Propane

ISP

Fuel Data (% by weight)	
S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	1.1
Excess air (%)	2
Stk temp (F)	310.78
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	0.75	2.82
H2	0.49	1.86
O2	0.00	
	1.24	4.68

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	4.77	133.57
CO2	0.75	32.96
H2O(comb)	1.00	17.92
O2	0.02	0.80
H2O(fuel)	0.00	0.00
dry	5.54	
wet	6.54	

stioc. comb air = 6.4214138 lb.mole/hr

stoic. dry comb air = 5.4259138 lb.mole/hr

Volume of flue gas (acfm)	61.3
Volume of flue gas (sdcfm)	35.1
Volume of flue gas (dscfm@7%O2)	51.5
Volume of flue gas (dscfm@15%O2)	120.2
Volume of flue gas (dscfm@8%O2)	55.5
Volume of flue gas (dscfm@3%O2)	40.1
Volume of flue gas (dscfm@10%O2)	65.6

Combustion Evaluation - Fluidized Bed Dryer, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	325.1
Excess air (%)	2
Stk temp (F)	321
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	20.22	76.08
H2	18.80	70.71
O2	-0.12	
	38.90	146.79

stioc. comb air = 204.97799 lb.mole/hr

stoic. dry comb air = 167.0156 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	149.82	4194.83
CO2	20.22	889.87
H2O(comb)	37.87	681.73
O2	0.78	24.89
H2O(fuel)	0.00	0.00
dry	170.82	
wet	208.69	

Volume of flue gas (acfm)	1983.6
Volume of flue gas (sdcfm)	1081.0
Volume of flue gas (dscfm@7%O2)	1585.4
Volume of flue gas (dscfm@15%O2)	3699.3
Volume of flue gas (dscfm@8%O2)	1707.4
Volume of flue gas (dscfm@3%O2)	1233.1
Volume of flue gas (dscfm@10%O2)	2017.8

Combustion Evaluation - Fluidized Bed Dryer, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	78
Excess air (%)	2
Stk temp (F)	321
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	5.31	19.98
H2	3.50	13.18
O2	0.00	
	8.82	33.16

stioc. comb air = 45.533662 lb.mole/hr

stoic. dry comb air = 38.474662 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	33.83	947.12
CO2	5.31	233.73
H2O(comb)	7.06	127.06
O2	0.18	5.64
H2O(fuel)	0.00	0.00
dry	39.31	
wet	46.37	

Volume of flue gas (acfm)	440.8
Volume of flue gas (sdcfm)	248.8
Volume of flue gas (dscfm@7%O2)	365.2
Volume of flue gas (dscfm@15%O2)	852.2
Volume of flue gas (dscfm@8%O2)	393.3
Volume of flue gas (dscfm@3%O2)	284.1
Volume of flue gas (dscfm@10%O2)	464.8

Combustion Evaluation - Dryers Stage A, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	391.9
Excess air (%)	2
Stk temp (F)	366.33
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	24.38	91.72
H2	22.66	85.24
O2	-0.15	
	46.89	176.95

stioc. comb air = 247.0959 lb.mole/hr

stoic. dry comb air = 201.33317 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	180.60	5056.76
CO2	24.38	1072.72
H2O(comb)	45.66	821.81
O2	0.94	30.01
H2O(fuel)	0.00	0.00
dry	205.92	
wet	251.57	

Volume of flue gas (acfm)	2529.9
Volume of flue gas (sdcfm)	1303.1
Volume of flue gas (dscfm@7%02)	1911.2
Volume of flue gas (dscfm@15%02)	4459.4
Volume of flue gas (dscfm@8%02)	2058.2
Volume of flue gas (dscfm@3%02)	1486.5
Volume of flue gas (dscfm@10%02)	2432.4

Combustion Evaluation - Dryer A, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	45.2
Excess air (%)	2
Stk temp (F)	366.33
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	3.08	11.58
H2	2.03	7.64
O2	0.00	
	5.11	19.22

stioc. comb air = 26.386173 lb.mole/hr

stoic. dry comb air = 22.295573 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	19.60	548.84
CO2	3.08	135.45
H2O(comb)	4.09	73.63
O2	0.10	3.27
H2O(fuel)	0.00	0.00
dry	22.78	
wet	26.87	

Volume of flue gas (acfm)	270.2
Volume of flue gas (sdcfm)	144.2
Volume of flue gas (dscfm@7%O2)	211.6
Volume of flue gas (dscfm@15%O2)	493.8
Volume of flue gas (dscfm@8%O2)	227.9
Volume of flue gas (dscfm@3%O2)	164.6
Volume of flue gas (dscfm@10%O2)	269.4

Combustion Evaluation - Dryers Stage B & C, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	156.7
Excess air (%)	2
Stk temp (F)	366.33
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	9.75	36.67
H2	9.06	34.08
O2	-0.06	
	18.75	70.75

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	72.21	2021.93
CO2	9.75	428.92
H2O(comb)	18.26	328.60
O2	0.37	12.00
H2O(fuel)	0.00	0.00
dry	82.34	
wet	100.59	

stioc. comb air = 98.800528 lb.mole/hr

stoic. dry comb air = 80.502445 lb.mole/hr

Volume of flue gas (acfm)	1011.6
Volume of flue gas (sdcfm)	521.0
Volume of flue gas (dscfm@7%O2)	764.2
Volume of flue gas (dscfm@15%O2)	1783.1
Volume of flue gas (dscfm@8%O2)	823.0
Volume of flue gas (dscfm@3%O2)	594.4
Volume of flue gas (dscfm@10%O2)	972.6

Combustion Evaluation - Dryers B & C, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	18
Excess air (%)	2
Stk temp (F)	366.33
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	1.23	4.61
H2	0.81	3.04
O2	0.00	
	2.03	7.65

stioc. comb air = 10.507768 lb.mole/hr

stoic. dry comb air = 8.8787681 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	7.81	218.57
CO2	1.23	53.94
H2O(comb)	1.63	29.32
O2	0.04	1.30
H2O(fuel)	0.00	0.00
dry	9.07	
wet	10.70	

Volume of flue gas (acfm)	107.6
Volume of flue gas (sdcfm)	57.4
Volume of flue gas (dscfm@7%O2)	84.3
Volume of flue gas (dscfm@15%O2)	196.7
Volume of flue gas (dscfm@8%O2)	90.8
Volume of flue gas (dscfm@3%O2)	65.6
Volume of flue gas (dscfm@10%O2)	107.3

Combustion Evaluation - Secondary Dryer, Natural Gas

ISP

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H20	0
O2	1.22

Fuel burned (lb/hr)	27
Excess air (%)	2
Stk temp (F)	293
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	1.68	6.32
H2	1.56	5.87
O2	-0.01	
	3.23	12.19

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	12.44	348.39
CO2	1.68	73.91
H2O(comb)	3.15	56.62
O2	0.06	2.07
H2O(fuel)	0.00	0.00
dry	14.19	
wet	17.33	

stioc. comb air = 17.023703 lb.mole/hr

stoic. dry comb air = 13.870874 lb.mole/hr

Volume of flue gas (acfm)	158.8
Volume of flue gas (sdcfm)	89.8
Volume of flue gas (dscfm@7%O2)	131.7
Volume of flue gas (dscfm@15%O2)	307.2
Volume of flue gas (dscfm@8%O2)	141.8
Volume of flue gas (dscfm@3%O2)	102.4
Volume of flue gas (dscfm@10%O2)	167.6

Combustion Evaluation - Secondary Dryer, Propane

ISP

Fuel Data (% by weight)

S	0
N2	0
C	81.8
H2	18.1
H20	0
O2	0

Fuel burned (lb/hr)	3.1
Excess air (%)	2
Stk temp (F)	293
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.00	0.00
N2	0.00	0
C	0.21	0.79
H2	0.14	0.52
O2	0.00	
	0.35	1.32

Flue Products

	lb.mole	lb/hr
SO2	0.00	0.00
N2	1.34	37.64
CO2	0.21	9.29
H2O(comb)	0.28	5.05
O2	0.01	0.22
H2O(fuel)	0.00	0.00
dry	1.56	
wet	1.84	

stioc. comb air = 1.8096712 lb.mole/hr

stoic. dry comb air = 1.5291212 lb.mole/hr

Volume of flue gas (acfm)	16.9
Volume of flue gas (sdcfm)	9.9
Volume of flue gas (dscfm@7%O2)	14.5
Volume of flue gas (dscfm@15%O2)	33.9
Volume of flue gas (dscfm@8%O2)	15.6
Volume of flue gas (dscfm@3%O2)	11.3
Volume of flue gas (dscfm@10%O2)	18.5