



# **Air Quality Permitting Technical Analysis**

November 15, 2002

Permit to Construct No. 011-00020

Basic American Foods, Shelley

Project No. P-010302

*Prepared by:*

*Stephen Coe, Permit Writer  
Technical Services Division*

**FINAL PERMIT**

## Acronyms, Units, and Chemical Nomenclature

CO	carbon monoxide
Department	Department of Environmental Quality
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EPA	Environmental Protection Agency
gpm	gallons per minute
gr	grain (1 lb = 7,000 grains)
HAPs	hazardous air pollutants
hp	horsepower
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometer
lb/hr	pound per hour
m	meter(s)
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NSPS	New Source Performance Standards
O <sub>3</sub>	ozone
PM	particulate matter
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
<i>Rules</i>	<i>Rules for the Control of Air Pollution in Idaho</i>
scf	standard cubic feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxides
TSP	total suspended particulate
T/yr	tons per year
µg/m <sup>3</sup>	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

## 1. PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, *Rules for the Control of Air Pollution in Idaho*, for issuing permits to construct (PTC).

## 2. PROJECT SUMMARY

The purpose of this technical memorandum is to address the revisions made to PTC No. 011-00020, issued September 10, 2001. The revisions were made in accordance with IDAPA 58.01.01.209.04 and are explained in the "Discussion" section of this memorandum.

## 3. SUMMARY OF EVENTS

On February 26, 2001, the Idaho Department of Environmental Quality (DEQ) received an application from Basic American Foods Inc. (BAF) to transfer ownership of two existing PTCs (No. 0140-0020 dated November 20, 1986, and No. 0140-0040 dated March 20, 1990) from the Pillsbury Co. to BAF for their Shelley facility. On March 1, 2001, DEQ sent a letter to BAF acknowledging receipt of the ownership transfer request. On June 13, 2001, DEQ issued BAF an incompleteness letter based on the modeling analysis performed by DEQ for using distillate fuel oil in Boilers No. 1, 3, and 4. On July 2, 2001, DEQ received a letter from BAF declaring the exclusive use of natural gas in Boilers No. 1, 3, and 4. The PTC application was declared complete on July 10, 2001. The initial draft permit and technical analysis were developed by DEQ Air Consultant Rick McCormick prior to June 28, 2001, and were subsequently revised by DEQ Air Quality Engineer Steve Ogle.

The two existing PTCs (No. 0140-0020, dated November 20, 1986, and No. 0140-0040, dated March 20, 1990) were combined into PTC No. 011-00020, and issued to BAF on September 10, 2001. BAF appealed the PTC on October 12, 2001, citing numerous issues with provisions of the permit. A meeting between BAF and DEQ personnel was held on October 23, 2001 to discuss and resolve these issues. As a result of this meeting and subsequent meetings, PTC No. 011-00020 has been revised to accurately reflect historic events and current operations at the facility.

## 4. DISCUSSION

### 4.1 Boilers No. 1 and 3

The General Provisions of PTC No. 0140-0020, dated November 20, 1986, state that the permit will expire if construction has not begun within two years of its issue date. BAF maintains that Boilers No. 1 and 3 have not been modified since their original installation in 1973 and 1958, respectively. There is no evidence that the boilers were ever modified or operated as authorized in PTC No. 0140-0020; therefore, PTC No. 0140-0020 has expired and the provisions of the permit no longer exist. Subsequently, all references to Boilers No. 1 and 3 have been removed from PTC No. 011-00020.

### 4.2 Cleaver-Brooks Boiler No. 4

In PTC No. 0140-0040, dated March 20, 1990, the steaming rate of Boiler No. 4 was limited to 60,000 pounds of steam per hour (the rated capacity of the boiler) on a 24-hour average. This operating requirement was incorporated into PTC No. 011-00020, dated September 10,

2001. During the meeting on August 23, 2001, DEQ agreed to remove the steaming rate limit in favor of a fuel usage limit. The fuel usage limit is a daily limit, based on the rated maximum hourly firing rate for the boiler averaged over a 24-hour period. The calculation used to derive this limit is given in Attachment 2.

The monitoring requirements of the PTC were also changed to reflect the fuel usage limit.

#### 4.3 Process B

Permit to Construct No. 0140-0040, dated March 20, 1990, required operation and periodic monitoring of water sprays in the exhaust ducts of the Process B; however, no reduction in emissions was credited for the operation of the sprays. Since emissions from the Process B are currently calculated without accounting for any emissions reduction due to control equipment (i.e., the water sprays), the requirement to monitor and record water sprays in the exhaust ducts of the Process B has been removed in PTC No. 011-00020.

Basic American Foods has also requested clarification of the production rate limit (refer to Permit Condition 2.3.1 in Appendix A) in PTC 011-00020, dated September 10, 2001. This permit condition (Permit Condition 2.2.1) now reads as follows:

*"The average raw-potato infeed rate for Process B shall not exceed 19.9 T/hr. The infeed rate shall be calculated by multiplying the daily average, finished dry-production rate (pounds per hour) by the raw-to-dry factor of 6.02, then dividing by 2,000 pounds per ton, to convert to tons per hour."*

## 5. RECOMMENDATION

Based on review of the PTC application materials, as well as review of all applicable state and federal rules and regulations, DEQ recommends that BAF be issued revised PTC No. 011-00020 for the ownership transfer and amendments discussed herein. No entity requested a comment period, no public comment period was held, and the project does not involve prevention of significant deterioration requirements.

cc: Tiffany Floyd, Pocatello Regional Office  
Stephen Coe, Technical Services  
Sherry Davis, Air Quality Division

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**ATTACHMENT 1**

**PTC No. 011-00020, dated September 10, 2001,  
and  
Technical Analysis, dated September 4, 2001**

**Basic American Foods, Inc. - Shelley**



**Air Pollution  
PERMIT TO CONSTRUCT**  
  
State of Idaho  
Department of Environmental Quality

**PERMIT #** 011-00020

**AQCR:** 061

**CLASS:** A

**SIC:** 2034

**ZONE:** 12

**UTM COORDINATE (km):** 409.0, 4803.5

**1. PERMITTEE**  
Basic American Foods, Incorporated

**2. PROJECT**  
Ownership Transfer (Boilers No. 1, 3, and 4 and Flake Lines No. 2, 3, and 4)

<b>3. MAILING ADDRESS</b> 434 S. Emerson Avenue	<b>CITY</b> Shelley	<b>STATE</b> Idaho	<b>ZIP</b> 83274
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<b>4. FACILITY CONTACT</b> John Voiss	<b>TITLE</b> Environmental Manager	<b>TELEPHONE</b> (208) 357-3402
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<b>5. RESPONSIBLE OFFICIAL</b> Chad Eberhard	<b>TITLE</b> Plant Manager	<b>TELEPHONE</b> (208) 357-3402
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<b>6. EXACT PLANT LOCATION</b> 434 S. Emerson Avenue, Shelley, Idaho 83274	<b>COUNTY</b> Bingham
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**7. GENERAL NATURE OF BUSINESS & KINDS OF PRODUCTS**  
Potato Processing and Packaging

**8. GENERAL CONDITIONS**  
This permit is issued according to the *Rules for the Control of Air Pollution in Idaho*, Section 58.01.01.200, and pertains only to emissions of air contaminants that are regulated by the state of Idaho and to the sources specifically allowed to be constructed by this permit.

This permit (a) does not affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to damage to person or property caused by, resulting from, or arising out of the design, installation, maintenance, or operation of the proposed equipment; (c) does not release the permittee from compliance with other applicable federal, state, tribal, or local laws, regulations, or ordinances; and (d) in no manner implies or suggests that the Idaho Department of Environmental Quality (Department) or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to damage to person or property caused by, resulting from, or arising out of design, installation, maintenance, or operation of the proposed equipment.

This permit is not transferable to another person, place, or piece or set of equipment. This permit will expire if construction has not begun within two years of its issue date or if construction is suspended for one year.

This permit has been granted on the basis of design information presented with its application. Changes of design or equipment may require Department approval pursuant to the *Rules for the Control of Air Pollution in Idaho*, IDAPA 58.01.01.200, et seq.

**DISCLAIMER:** This document may serve as a Preliminary Inspection Finding Form for use by Department personnel in communicating your compliance status upon inspection. It does not constitute a final determination of compliance status with the Idaho Code or any rules promulgated, permits issued, or consent or judicial orders entered into pursuant to the law. The Department reserves the right to supplement this document with additional compliance determinations, and amend, change, or otherwise modify any compliance determination stated in this document. This document in no way restricts the state of Idaho, Department of Environmental Quality from taking any action available under law to address past, present, or future violations of the laws administered by the agency.

  
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**POCATELLO REGIONAL ADMINISTRATOR  
DEPARTMENT OF ENVIRONMENTAL QUALITY**

**DATE ISSUED:** September 10, 2001

AIR QUALITY PERMIT TO CONSTRUCT NUMBER 11-00020

PERMITEE: BASIC AMERICAN FOODS, INCORPORATED

LOCATION: SHELLEY

DATE ISSUED: SEPT. 10, 2001

SOURCE: Boilers No. 1, 3, and 4 and Flake Lines No. 2, 3, and 4

1. EMISSION LIMITS

1.1 Emission Limits

Sulfur dioxide, oxides of nitrogen, carbon monoxide, volatile organic compounds, and particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers emissions shall not exceed any corresponding emission limit listed in the permit appendix.

Emissions of PM<sub>10</sub> emanating from each stack of Boilers No. 1, 3 and 4 shall not exceed 0.015 grains per standard dry cubic foot corrected to three percent oxygen in the stack gas in accordance with IDAPA 58.01.01.676.

Emissions of PM<sub>10</sub> emanating from each stack of Flake Lines No. 2, 3 and 4 shall not exceed 0.2 grains per standard dry cubic foot in the stack gas in accordance with IDAPA 58.01.01.710.08(b).

1.2 Opacity Limit

Emissions from the stacks, vents, or other functionally equivalent openings of Boilers No. 1, 3, and 4 and Flake Lines No. 2,3, and 4 shall not exceed 20 percent opacity for a period or periods aggregating more than three minutes in any 60-minute period as required by IDAPA 58.01.01.625. Opacity shall be determined by the procedures contained in IDAPA 58.01.01.625.

2. OPERATING REQUIREMENTS

2.1 Natural Gas Combustion

The permittee shall combust natural gas exclusively in Boilers No. 1, 3, and 4.

2.2 Fuel Oil Combustion

The permittee shall render Boilers No. 1, 3, and 4 inoperable for fuel oil.

2.3 Throughput Limits

2.3.1 Flake Lines

The maximum hourly throughput for each flake line shall not exceed 5.5 tons per hour based on a daily average.

2.3.2 Boiler No. 4 Steaming Rate

The steaming rate shall be limited to 60,000 pounds steam per hour based on a 24-hour average.

3. MONITORING AND RECORDKEEPING REQUIREMENTS

3.1 Operating Parameters

The most recent two years' compilation of records shall be kept onsite and shall be available to the Department upon request.

3.1.1 Production Rate

The permittee shall monitor and record each day, the average hourly production rate for each flake line during the calendar year.

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER 11-00020**

**PERMITTEE: BASIC AMERICAN FOODS, INCORPORATED**

**LOCATION: SHELLEY**

**DATE ISSUED: SEPT. 10, 2001**

**SOURCE: Boilers No. 1, 3, and 4 and Flake Lines No. 2, 3, and 4**

**3.1.2 Water Sprays**

The permittee shall monitor and record operation of the water sprays in the exhaust ductwork weekly at a minimum.

**3.1.3 Steam Production Monitoring**

The permittee shall install, calibrate, and maintain a monitor to continuously monitor the steaming rate of Boiler No. 4. For this permit, the term "steaming rate" shall mean the amount of steam produced by the boiler (in pounds per hour) averaged over a day's time. This is calculated by summing the 24-hourly steam flow readings divided by 24.

The permittee shall determine and record the steaming rate daily during operation of Boiler No. 4.

**4. REPORTING REQUIREMENTS**

**4.1 Certification of Documents**

All documents submitted to the Department, 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. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER 1-00020**

PERMITEE: BASIC AMERICAN FOODS, INCORPORATED

LOCATION: SHELLEY

DATE ISSUED: SEPT. 10, 2001

**APPENDIX**

**APPENDIX**

**Basic American Foods, Incorporated**

**Emission Limits<sup>1</sup> - Hourly and Annual<sup>2</sup>**

Source Description	SO <sub>2</sub> <sup>1</sup>		NO <sub>x</sub> <sup>1</sup>		CO <sup>1</sup>		PM <sub>10</sub> <sup>1</sup>		VOC <sup>1</sup>	
	lb/hr <sup>3</sup>	T/yr <sup>4</sup>	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Boiler No. 1	0.02	0.09	3.87	16.95	3.25	14.24	0.29	1.29	0.21	0.92
Boiler No. 3	0.02	0.09	2.83	12.40	2.38	10.42	0.22	0.96	0.16	0.7
Boiler No. 4	0.04	0.19	7.07	30.97	5.94	26.00	0.54	2.37	0.39	1.71
Flake Line 2							1.65	6.23		
Flake Line 3							1.65	6.23		
Flake Line 4							1.65	6.23		
<b>Total Emissions</b>	<b>0.08</b>	<b>0.37</b>	<b>13.77</b>	<b>60.32</b>	<b>11.57</b>	<b>50.66</b>	<b>6.00</b>	<b>23.31</b>	<b>0.76</b>	<b>3.33</b>

<sup>1</sup> As determined by a pollutant-specific U.S. Environmental Protection Agency reference method or a Department-approved alternative, or as determined by Department emission estimation methods used in this permit analysis.

<sup>2</sup> 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, or by actual annual production rates.

<sup>3</sup> Sulfur dioxide

<sup>4</sup> Nitrogen oxides

<sup>5</sup> Carbon monoxide

<sup>6</sup> Particulate matter with an aerodynamic diameter of ten microns or less

<sup>7</sup> Volatile organic compounds

<sup>8</sup> Pounds per hour

<sup>9</sup> Tons per year

## AIR QUALITY PERMIT TO CONSTRUCT NUMBER: 011-00020

PERMITTEE: BASIC AMERICAN FOODS, INCORPORATED  
 LOCATION: SHELLEY

DATE ISSUED: SEPT. 10, 2001

## GENERAL PROVISIONS

## PERMIT TO CONSTRUCT GENERAL PROVISIONS

- A. All emissions authorized herein shall be consistent with the terms and conditions of this permit and the *Rules for the Control of Air Pollution in Idaho*. The emission of any pollutant in excess of the limitations specified herein, or noncompliance with any other condition or limitation contained in this permit, shall constitute a violation of this permit, and the *Rules for the Control of Air Pollution in Idaho*, and the Environmental Protection and Health Act, Idaho Code 39-101, et seq.
- B. The permittee shall at all times (except as provided in the *Rules for the Control of Air Pollution in Idaho*) maintain in good working order and operate as efficiently as practicable, all treatment or control facilities or systems installed or used to achieve compliance with the terms and conditions of this permit and other applicable Idaho laws for the control of air pollution.
- C. The permittee shall allow the Director, and/or the authorized representative(s), upon the presentation of credentials:
1. To enter at reasonable times upon the premises where an emission source is located, or in which any records are required to be kept under the terms and conditions of this permit; and
  2. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit, to inspect any monitoring methods required in this permit, and require stack emission testing in conformance with IDAPA 58.01.01.157 when deemed appropriate by the Director.
- D. Nothing in this permit is intended to relieve or exempt the permittee from compliance with any applicable federal, state, or local law or regulation, except as specifically provided herein.
- E. The permittee shall notify the Department, in writing, of the required information for the following events within five working days after occurrence:
1. Initiation of Construction - Date
  2. Completion/Cessation of Construction - Date
  3. Actual Production Startup - Date
  4. Initial Achievement of Maximum Production Rate - Production Rate and Date
- F. If emission testing is specified, the permittee must schedule such testing within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup. Such testing must strictly adhere to the procedures outlined in IDAPA 58.01.01.157 and shall not be conducted on weekends or state holidays without prior written Department approval. Testing procedures and specific time limitations may be modified by the Department by prior negotiation if conditions warrant adjustment. The Department shall be notified at least 15 days prior to the scheduled compliance test. Any records or data generated as a result of such compliance test shall be made available to the Department upon request.
- The maximum allowable operating rate shall be limited to 120 percent of the average operating rate attained during any performance test period, for which a test protocol has been granted prior approval by the Department, unless (1) the test demonstrates noncompliance, (2) a more restrictive operating limit is specified elsewhere in this permit, or (3) at such an operating rate, emissions would exceed any emission limit(s) set forth in this permit.
- G. The provisions of this permit are severable, and if any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

September 4, 2001

**MEMORANDUM**

**TO:** Mark Dietrich, Regional Administrator  
Pocatello Regional Office

**FROM:** Steve Ogle, Air Quality Engineer, EIT  
State Office of Technical Services

**SUBJECT:** **PERMIT TO CONSTRUCT TECHNICAL ANALYSIS**  
P-010302, Basic American Foods, Inc., Shelley, Idaho  
Ownership Transfer/PTC Consolidation into No. 011-00020  
(Boilers No. 1 and No. 3, PTC No. 0140-0020)  
(Clever-Brooks Boiler No. 4 and Flake Lines No. 2, 3, and 4, PTC No. 0140-0040)

**PURPOSE**

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.01.200 (Rules for the Control of Air Pollution in Idaho) for issuing Permits to Construct (PTC).

**PROJECT DESCRIPTION**

Basic American Foods, Inc. (BAF) is proposing to transfer ownership of PTC No. 0140-0020 and PTC No. 0140-0040 from the Pillsbury Company to BAF for their Shelley facility. BAF has indicated that the conditions, emissions, and production limits of the current permits have remained in effect with no modifications to Boilers No. 1, 3, or 4 or Flake Lines No. 2, 3, or 4 since initially constructed. Additionally, BAF has requested to use natural gas exclusively in Boilers No. 1, 3, and 4.

**SUMMARY OF EVENTS**

On February 26, 2001, the Idaho Department of Environmental Quality (DEQ) received an application from BAF to transfer ownership of two existing PTCs (No. 0140-0020 dated November 20, 1986, and No. 0140-0040 dated March 20, 1990) from the Pillsbury Company to BAF for their Shelley facility. On March 1, 2001, a letter acknowledging receipt of the ownership transfer request was sent by DEQ to BAF in Shelley, Idaho. On June 13, 2001, DEQ issued BAF an incompleteness letter based on the modeling analysis performed by DEQ for using distillate fuel oil in Boilers No. 1, 3, and 4. On July 2, 2001, DEQ received a letter from BAF declaring the exclusive use of natural gas in Boilers No. 1, 3, and 4. The PTC application was declared complete on July 10, 2001. The initial draft permit and technical analysis were developed by DEQ Air Quality Engineer Rick McCormick prior to June 28, 2001, and were subsequently revised by DEQ Air Quality Engineer Steve Ogle.

The two existing PTCs (No. 0140-0020 dated November 20, 1986 and No. 0140-0040 dated March 20, 1990) were combined into PTC No. 011-00020.

**DISCUSSION**

1. **Process Description**

1.1 **Boilers No. 1 and 3**

Conventional boilers No.1 and No. 3 are presently fueled with natural gas, but have the capability of using No. 2 fuel oil. Boilers No. 1 and No. 3 shall be rendered inoperable for any grade of fuel oil. Natural gas will be used exclusively to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS). No controls are applied to these boilers.

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1.2 Cleaver-Brooks Boiler No. 4

Boiler No. 4, rated at approximately 72.14 million British thermal units per hour (MMBtu/hr), provides 60,000 pounds of steam per hour (lb steam/hr) of low pressure steam. This boiler is fired with natural gas, but has the capability to fire No. 1 fuel oil. In order to assure NAAQS compliance, Boiler No. 4 will be fueled by natural gas exclusively and shall be rendered inoperable for any grade of fuel oil. No controls are applied to this boiler.

1.3 Flake Lines No. 2, 3, and 4

Flake Lines No. 2, 3, and 4 take washed, cooked potatoes and produce dry potato flakes using steam-heated drying drums. A total of six drying drums are used to produce potato flakes. Potato flakes are then sized and sent for packaging.

No controls for particulate emissions are used. However, water sprays are used in the vertical ductwork to prevent the build-up of minor losses in the ductwork. The emissions primarily consist of water vapor from the drying process.

2. Equipment Listing

2.1 Boilers No. 1 and 3

- Boiler No. 1: Cleaver-Brooks, Model D-52, rated at 36.6 MMBtu/hr
- Boiler No. 3: B. Keeler Company, Serial No. 13446, rated at 28.9 MMBtu/hr

Upon review of the source file information for the Shelley facility, DEQ determined that PTC No. 0140-0020, dated November 20, 1986, contained incorrect stack information. Table 1 shows current stack information as verified by the Shelley facility for Boilers No. 1 and 3.

Table 1. Stack Information for Boilers No. 1 and 3

Stack Data and Building Dimensions	Boiler No.1	Boiler No. 3
Stack height from ground level (ft) <sup>1</sup>	37	37
Stack exit diameter (ft)	3.0	2.6
Stack exit gas flow rate (acfm) <sup>2</sup>	12,000	7,600
Stack exit temperature (°F) <sup>3</sup>	380	320
Building height (ft)	27	27
Building/area length (ft)	75	75
Building/area width (ft)	25	25

<sup>1</sup>Feet

<sup>2</sup>Actual cubic feet per minute

<sup>3</sup>Degrees Fahrenheit

According to BAF, the above stack data and building dimensions have not changed since originally constructed by the Pillsbury Company. Additionally, BAF confirmed that Boilers No. 1 and 3 have never vented through a common stack (as described in PTC No. 0140-0020), but through separate stacks.

2.2 Boiler No. 4

- Boiler No. 4: Cleaver-Brooks, rated at approximately 72.14 MMBtu/hr.
- The Boiler stack: 47 feet high by four feet diameter.

Upon review of the source file information for the Shelley facility, DEQ determined that PTC No. 0140-0040, dated March 20, 1990, contained incorrect stack information. The following

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information was verified by the Shelley facility for Boiler No. 4:

- Stack height from ground level = 47 feet
- Building/area length = 50 feet
- Building/area width = 35 feet

According to BAF, the above stack data and building dimensions have not changed since originally constructed by the Pillsbury Company.

2.3 Flake Lines 2, 3, and 4

- One single exhaust stack per flake line; each 38 feet high by four feet diameter.
- Gas volume is approximately 36,000 actual cubic feet per minute (acfm) per stack.

3. Emissions Estimates

Emissions estimates for Boilers No. 1 and 3 were calculated based on the current *Compilation of Air Pollutant Emission Factors (AP-42, Version 7/98)* Natural Gas Emission Factors and current stack data to demonstrate compliance with NAAQS. Emission estimates were based on operating 8,760 hours per year (hr/yr). DEQ has provided emissions calculations supporting the natural gas emissions limits in Appendix A.

Emissions estimates for Boiler No. 4 were calculated based on the current AP-42 Natural Gas Emission Factors and current stack data to demonstrate compliance with the NAAQS. Emissions estimates were based on operating 8,760 hr/yr. DEQ has provided emissions calculations supporting the natural gas emissions limits in Appendix B.

For all three boilers, 100 percent of particulate matter was assumed to be particulate matter with an aerodynamic diameter of ten microns or less (PM<sub>10</sub>).

Emissions estimates for Flake Lines No. 2, 3, and 4 were taken from initial PTC No. 0140-0040 issued March 20, 1990.

Table 2 presents a summary of the uncontrolled emissions from the boilers and flake lines; these emissions do not represent facility-wide emissions.

Table 2. Summary of Uncontrolled Emissions From the Boilers and Flake Lines

Source Description	SO <sub>2</sub> <sup>1</sup>		NO <sub>x</sub> <sup>2</sup>		CO <sup>3</sup>		PM <sub>10</sub> <sup>4</sup>		VOC <sup>5</sup>	
	lb/hr <sup>6</sup>	T/yr <sup>7</sup>	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Boiler No. 1	0.02	0.09	3.87	16.96	3.25	14.24	0.29	1.29	0.21	0.92
Boiler No. 3	0.02	0.09	2.83	12.40	2.38	10.42	0.22	0.96	0.16	0.7
Boiler No. 4	0.04	0.19	7.07	30.97	5.94	26.00	0.54	2.37	0.39	1.71
Flake Line 2							1.65	6.23		
Flake Line 3							1.65	6.23		
Flake Line 4							1.65	6.23		
<b>Total Emissions</b>	<b>0.08</b>	<b>0.37</b>	<b>13.77</b>	<b>60.32</b>	<b>11.57</b>	<b>50.66</b>	<b>6.00</b>	<b>23.31</b>	<b>0.76</b>	<b>3.33</b>

<sup>1</sup>Sulfur dioxide  
<sup>2</sup>Nitrogen oxides  
<sup>3</sup>Carbon monoxide  
<sup>4</sup>Particulate matter with an aerodynamic diameter of ten microns or less  
<sup>5</sup>Volatile organic compounds  
<sup>6</sup>Pounds per hour  
<sup>7</sup>Tons per year

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4. Modeling

The U.S. Environmental Protection Agency (EPA)-approved SCREEN3 model was used to predict the impact that Boilers No. 1, 3 and 4 may have on the ambient air. The ambient concentrations that did not cause a significant contribution as defined by IDAPA 58.01.01.006.93 include carbon monoxide, PM<sub>10</sub>, and sulfur oxides (SO<sub>x</sub>). Therefore, no further modeling analysis is required for these criteria pollutants.

The ambient concentration for oxides of nitrogen (NO<sub>x</sub>) exceeded the significant contribution (IDAPA 58.01.01.006.93) of one microgram per cubic meter (µg/m<sup>3</sup>) for the NO<sub>x</sub> annual average. The SCREEN3 output file for Boilers No. 1 and 3 is included in Appendix C, and the output file for Boiler No. 4 is in Appendix D.

Modeling Assumptions:

- Input parameters: Rural dispersion characteristics, simple terrain, worst-case meteorological data, building downwash, and a conservative emission rate of one pound per hour.
- Model used the applicable persistence factors multiplied by the one-hour SCREEN3 modeled concentration and the pound per hour emission limit.

Modeling Impact:

- Boilers No. 1 and 3: NO<sub>x</sub> Annual = (28.09 µg/m<sup>3</sup> /lb/hr) x (0.08) x (2.83 lb/hr) = 6.36 µg/m<sup>3</sup>
- Boiler No. 4: NO<sub>x</sub> Annual = (10.83 µg/m<sup>3</sup> /lb/hr) x (0.08) x (7.07 lb/hr) = 6.13 µg/m<sup>3</sup>

As seen in the results in Table 3, the modeled NO<sub>x</sub> concentration demonstrates compliance with the NAAQS.

Table 3. Ambient Impact Summary for Boilers No. 1, 3, and 4

Pollutant/NAAQS <sup>1</sup> Standard	SCREEN3 Modeled Impact (µg/m <sup>3</sup> ) <sup>2</sup>	State Background (µg/m <sup>3</sup> )	Total Ambient Impact (µg/m <sup>3</sup> )
Annual NO <sub>x</sub> <sup>3</sup> / 100 µg/m <sup>3</sup>	12.49	40	52.49

<sup>1</sup>National Ambient Air Quality Standards

<sup>2</sup>Micrograms per cubic meter

<sup>3</sup>Nitrogen oxides

No modeling impact was conducted for the flake lines. At the time of issuance of the PTCs Nos. 0140-0020 and 0140-0040, it was proven to the satisfaction of DEQ that the flake lines were in compliance with all applicable emissions standards. Since BAF continues to operate the flake lines as originally permitted, the flake lines are assumed to currently be in compliance with all applicable emissions standards.

5. Facility Classification

BAF-Shelley is a major facility as defined by IDAPA 58.01.01.006.55, due to a potential to emit PM<sub>10</sub> and NO<sub>x</sub> at rates exceeding 100 tons per year (T/yr). The facility is not a designated facility as defined by IDAPA 58.01.01.006.27. The facility is subject to federal New Source Performance Standards (NSPS) in accordance with 40 CFR 60.40c (a), Subpart Dc. The facility is not subject to federal National Emission Standards for Hazardous Air Pollutants in accordance with 40 CFR 61 or federal Maximum Achievable Control Technology standards in accordance with 40 CFR 63. The Standard Industrial Code of the facility is 2034, and the facility classification is A.

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6. Area Classification

This facility is located in the city of Shelley, Bingham County, Idaho. The area is designated as an attainment or unclassifiable area for all regulated criteria air pollutants. Bingham County is located in Air Quality Control Region 61 and Zone 12.

7. Regulatory Review

7.1 IDAPA 58.01.01.201 Permit to Construct Required

PTC requirements apply. The transfer of ownership from Pillsbury to BAF requires a new PTC because Section 8 of the General Conditions, located on the first page of the permit, states that the permit is not transferable.

7.3 IDAPA 58.01.01.676 Fuel Burning Equipment - Particulate Matter

Boilers No. 1, 3, and 4 are subject to a grain loading standard (IDAPA 58.01.01.676) of 0.015 *gr/dscf* (grains per dry standard cubic foot) corrected to three percent oxygen. Appendix E of this technical memorandum contains combustion analyses showing a continual demonstration of compliance with the grain loading standard for all three boilers, so long as BAF does not exceed the lb/hr  $PM_{10}$  emissions limits set forth in the Appendix of PTC No. 011-00020. The calculations in Appendix E are based on the maximum BTU/hr rating of each boiler, combustion of natural gas, and the lb/hr  $PM_{10}$  emissions limits for each boiler as listed in the PTC. Physical properties for natural gas are average values taken from the EPA's *Combustion Evaluation for Air Pollution Control* (Version 3/84).

7.2 IDAPA 58.01.01.702 Particulate Matter - Existing Process Weight Limitations

Flake Lines No. 2, 3, and 4 are process equipment and are therefore subject to IDAPA 58.01.01.702. The throughput limit for each flake line is 5.5 tons per hour (T/hr) (Permit Condition 2.4.1); therefore, the process weight applied to the equation listed at IDAPA 58.01.01.702(a) is 11,000 pounds per hour (lb/hr). This process weight rate results in an allowable emission rate of 11.97 lb/hr (refer to Appendix F for the calculation). The process weight emission limit is much less than the hourly emission rate limit established to preserve the NAAQS for  $PM_{10}$  (1.65 lb/hr in the Appendix of PTC No. 011-00020). All particulate matter is assumed to be  $PM_{10}$ . Therefore, so long as the facility does not violate the  $PM_{10}$  emission limit in the Appendix of the PTC or the operating limit in Permit Condition 2.4.1, compliance is demonstrated with IDAPA 58.01.01.702.

7.3 IDAPA 58.01.01.710 Particulate Matter - Process Equipment Limitations On Or After July 1, 2000

Flake Lines No. 2, 3, and 4 are process equipment and are therefore subject to IDAPA 58.01.01.710; however, IDAPA 58.01.01.710.04 states that Subsection 710.05 shall not apply to process equipment at Tier I sources until Section 710 is State Implementation Plan-approved by the EPA. Although Section 710 has not currently been approved by the EPA, the facility is a Tier I source; however, in anticipation of future EPA approval, it was determined that this requirement should be addressed. Appendix G contains a month-long mass balance demonstrating that the grain-loading process lines are well below the 0.2 *gr/dscf* limit specified in Section 710, so long as the throughput limit of 5.5 T/hr (refer to Section 8.2.4) is not exceeded.

7.4 40 CFR 62 Prevention of Significant Deterioration

The facility is not a designated facility and does not emit 250 T/yr or more of any regulated air pollutant. In accordance with IDAPA 58.01.01.205.04(a), the facility is exempt from the requirements of IDAPA 58.01.01.205.01(b).

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#### 7.5 40 CFR 60 New Source Performance Standards

Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, was reviewed to determine if Boiler No. 4 is subject to NSPS. Boiler No. 4 is an "affected facility" in accordance with 40 CFR 60.40c(e). Subpart Dc is applicable to the boiler by virtue of the heat input capacity between 10 and 100 MMBtu/hr. As long as the boiler combusts only natural gas, none of the emissions standards (SO<sub>2</sub> and particulate matter) or the monitoring and testing requirements associated with those standards apply. However, specific reporting and recordkeeping requirements do apply for natural gas combustion including 60.48c(a, g, and i).

The permittee is required to record daily operating hours when natural gas is combusted in Boiler No. 4 during the calendar year in accordance with 40 CFR 60.48c(g). Records are to be recorded in a log kept at the facility for the most recent two-year period and include the following information in accordance with 40 CFR 60.48c(i).

Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units, was reviewed to determine if Boilers No. 1 and 3 are subject to NSPS. Boilers No. 1 and 3 each commenced construction after June 18, 1984, but are not applicable by virtue of heat input ratings of less than 100 MMBtu/hr for each boiler. Therefore, NSPS operating procedures, monitoring, and reporting requirements do not apply to Boilers No.1 and 3.

#### 7.8 40 CFR 61 and 63 National Emission Standards for Hazardous Air Pollutants and Maximum Achievable Control Technology

Not applicable (refer to Section 5 of this memorandum).

#### 8. Permit Requirements

##### 8.1 Emission Limits

###### 8.1.1 Boilers No. 1, 3, and 4

Emission limits for Boilers No. 1 and 3 were based on current AP-42 Natural Gas Emission Factors for boilers operating 8,760 hr/yr. Emission limits for Boiler No. 4 were based on current AP-42 Natural Gas Emission Factors for boilers operating 8,760 hr/yr. Emission limits for Flake Lines No. 2, 3, and 4 were based on PTC No. 0140-0040 issued March 20, 1990.

Boilers No. 1, 3, and 4 are subject to a grain loading standard (IDAPA 58.01.01.876) of 0.015 grains per dry standard cubic foot corrected to three percent oxygen. Appendix E of this technical memorandum contains combustion analyses showing a continual demonstration of compliance with the grain loading standard for all three boilers, so long as BAF does not exceed the lb/hr PM<sub>10</sub> emissions limits set forth in the Appendix of PTC No. 011-00020. No further demonstration of compliance is required.

A previous permit requirement limiting NO<sub>x</sub> emissions from boiler No. 4 to less than one pound per million Btu heat input, specified in Section 2.3 of PTC 0140-0040, dated March 20, 1990, was found to be not applicable in 40 CFR 60 Subpart Dc. This requirement has been removed from the PTC.

###### 8.1.2 Flake Lines No. 2, 3, and 4

Flake Lines No. 2, 3, and 4 are process equipment and are therefore subject to IDAPA 58.01.01.710. Appendix G of this technical memorandum contains a mass balance demonstrating that the grain-loading process lines are well below the 0.2 g/dscf limit specified in Section 710, so long as the throughput limit of 5.5 T/hr (refer to Section 8.2.4) is not exceeded.

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No further demonstration of compliance is required.

8.2. Operating Requirements

8.2.1 Boilers No. 1 and 3

Boilers No. 1 and 3 will be exclusively fueled by natural gas. Additionally, Boilers No. 1 and 3 will be rendered inoperable for fuel oil.

8.2.3 Boiler No. 4

Boiler No. 4 will be exclusively fueled by natural gas. Additionally, Boiler No. 4 will be rendered inoperable for fuel oil. The throughput and hours of operation limits were established, and retained, from PTC No. 0140-0040, issued March 20, 1990.

Boiler No. 4 is also subject to a steaming rate limit of 60,000 lb steam/hr, taken from PTC No. 0140-0040.

8.2.4 Flake Lines No. 2, 3, and 4

The maximum daily hours of operation is limited by the maximum hourly throughput for each flake line based on a daily average not to exceed 5.5 T/hr; therefore, there is no hourly operating limit.

9. Permit Coordination

The terms and conditions of PTCs No. 0140-0020 and 0140-0040 have been combined into one single PTC, No. 011-00020, and ownership has been transferred from the Pillsbury Company to BAF. The emission and production limits initially established in 1986 and 1990 have been changed to reflect current applicable state and federal rules and regulations.

BAF has submitted a Tier I operating permit to DEQ. The conditions of PTC No. 011-00020 will be drafted into the Tier I operating permit when it is written.

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10. Aerometric Information Retrieval System (AIRS) Information

This permit does not represent a new source at the BAF facility, therefore, no Abbreviated AIRS Data Entry Sheet is required.

**AIRSI/AFS<sup>1</sup> FACILITY-WIDE CLASSIFICATION<sup>2</sup> DATA ENTRY FORM**

Air Program Description	SIP <sup>3</sup>	PSD <sup>4</sup>	NESHAP <sup>5</sup>	NSPS <sup>6</sup>	MACT <sup>7</sup>	TITLE V	AREA CLASSIFICATION
							A - Attainment U - Unclassifiable N - Nonattainment
SO <sub>2</sub> <sup>8</sup>	B			B		B	A
NOx <sup>9</sup>	A					A	A
CO <sup>10</sup>	B					B	A
PM <sub>10</sub> <sup>11</sup>	A					A	A
PM <sub>2.5</sub> <sup>12</sup>	A			B		A	A
VOC <sup>13</sup>	B					B	U
Total HAPs <sup>14</sup>	B					B	U
VE/FE/FD 15	ND	ND	ND	ND	ND	ND	

- 1 Aerometric Information Retrieval System/AIRS Facility Subsystem
- 2 AIRSI/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 (Tpy) threshold, but which contributes to a plant total in excess of 25 Tpy 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 oxide
- 10 Carbon monoxide
- 11 Particulate matter with an aerodynamic diameter of ten microns or less
- 12 Particulate matter
- 13 Volatile organic compounds
- 14 Hazardous air pollutants
- 15 VE/FE/FD (viable emissions, fugitive emissions, and fugitive dust) are entered for compliance purposes only and do not require evaluation by the permit engineer.

**FEES**

The BAF facility is a major facility as defined in IDAPA 58.01.01.008.10 and is therefore subject to registration and registration fees in accordance with IDAPA 58.01.01.827. According to the Air Emissions Data Base Master List for 2001, the BAF Shelley facility has registered 276 tons of pollutants by paying fees.

**RECOMMENDATION**

Based on review of the PTC application materials as well as review of all applicable state and federal rules and regulations, DEQ recommends that BAF be issued amended PTC No. 0140-0040 for the ownership transfer and amendments discussed herein. No public comment period is recommended, no entity has

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FROM: IDAHO DEQ

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requested a comment period, and the project does not involve PSD requirements.

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## **APPENDIX A**

**Emission Estimates  
Ownership Transfer  
(Boilers No. 1 and 3)**

**Basic American Foods, Inc. - Shelley**

- Boiler No. 1 of 375 MMBTU/hr
- AP-42 (7/98) Natural Gas Emission Factors are applied from Tables 1.4.1 & 1.4.2
- Conversion is scf/1000 BTU

NO<sub>x</sub>, Small Boiler (< 100 MMBTU/hr), Uncontrolled

$$\left(\frac{39.5 \text{ MMBTU}}{\text{hr}}\right) \left(\frac{100 \text{ lb}}{\text{MMscf}}\right) \left(\frac{\text{scf}}{1000 \text{ BTU}}\right) = 3.95 \frac{\text{lb}}{\text{hr}} \text{ NO}_x$$

$$\left(\frac{3.95 \text{ lb}}{\text{hr}}\right) \left(\frac{8760 \text{ hrs}}{\text{yr}}\right) \left(\frac{\text{ton}}{2000 \text{ lb}}\right) = 16.95 \text{ tpy NO}_x$$

CO, Small Boiler (< 100 MMBTU/hr), Uncontrolled

$$\left(\frac{39.5 \text{ MMBTU}}{\text{hr}}\right) \left(\frac{84 \text{ lb}}{\text{MMscf}}\right) \left(\frac{\text{scf}}{1000 \text{ BTU}}\right) = 3.32 \frac{\text{lb}}{\text{hr}} \text{ CO}$$

$$\left(\frac{3.32 \text{ lb}}{\text{hr}}\right) \left(\frac{8760 \text{ hrs}}{\text{yr}}\right) \left(\frac{\text{ton}}{2000 \text{ lb}}\right) = 14.24 \text{ tpy CO}$$

Assume PM<sub>total</sub> is equal to PM<sub>10</sub>:

$$\left(\frac{39.5 \text{ MMBTU}}{\text{hr}}\right) \left(\frac{7.6 \text{ lb}}{\text{MMscf}}\right) \left(\frac{\text{scf}}{1000 \text{ BTU}}\right) = 0.29 \frac{\text{lb}}{\text{hr}} \text{ PM}_{10}$$

$$\left(\frac{0.29 \text{ lb}}{\text{hr}}\right) \left(\frac{8760 \text{ hrs}}{\text{yr}}\right) \left(\frac{\text{ton}}{2000 \text{ lb}}\right) = 1.27 \text{ tpy PM}_{10}$$

SO<sub>2</sub> based on 100% conversion of Fuel Sulfur to SO<sub>2</sub>

$$\left(\frac{39.5 \text{ MMBTU}}{\text{hr}}\right) \left(\frac{0.6 \text{ lb}}{\text{MMscf}}\right) \left(\frac{\text{scf}}{1000 \text{ BTU}}\right) = 0.02 \frac{\text{lb}}{\text{hr}} \text{ SO}_2$$

$$\left(\frac{0.02 \text{ lb}}{\text{hr}}\right) \left(\frac{8760 \text{ hrs}}{\text{yr}}\right) \left(\frac{\text{ton}}{2000 \text{ lb}}\right) = 0.09 \text{ tpy SO}_2$$

VOC:

$$\left(\frac{39.5 \text{ MMBTU}}{\text{hr}}\right) \left(\frac{5.5 \text{ lb}}{\text{MMscf}}\right) \left(\frac{\text{scf}}{1000 \text{ BTU}}\right) = 0.21 \frac{\text{lb}}{\text{hr}} \text{ VOC}$$

$$\left(\frac{0.21 \text{ lb}}{\text{hr}}\right) \left(\frac{8760 \text{ hrs}}{\text{yr}}\right) \left(\frac{\text{ton}}{2000 \text{ lb}}\right) = 0.92 \text{ tpy VOC}$$

- Boiler No. 3 of 8.9 MM BTU/hr
- AP-42 (7/98) Natural Gas Emission Factors are applied from Tables 1.4.1 & 1.4.2
- Conversion is scf/1000 BTU

NO<sub>x</sub>, Small Boiler (< 100 MM BTU/hr), Uncontrolled

$$\left( \frac{28.9 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{100 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1000 \text{ BTU}} \right) = 2.89 \frac{\text{lb}}{\text{hr}} \text{ NO}_x$$

$$\left( 2.89 \frac{\text{lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{1 \text{ yr}}{2000 \text{ lb}} \right) = 12.40 \text{ tpy NO}_x$$

CO, Small Boiler (< 100 MM BTU/hr), Uncontrolled

$$\left( \frac{28.9 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{84 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1000 \text{ BTU}} \right) = 2.43 \frac{\text{lb}}{\text{hr}} \text{ CO}$$

$$\left( 2.43 \frac{\text{lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{1 \text{ yr}}{2000 \text{ lb}} \right) = 10.42 \text{ tpy CO}$$

Assume PM<sub>total</sub> is equal to PM<sub>10</sub>:

$$\left( \frac{28.9 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{76 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1000 \text{ BTU}} \right) = 0.22 \frac{\text{lb}}{\text{hr}} \text{ PM}_{10}$$

$$\left( 0.22 \frac{\text{lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{1 \text{ yr}}{2000 \text{ lb}} \right) = 0.96 \text{ tpy PM}_{10}$$

SO<sub>2</sub>, based on 100% conversion of Fuel Sulfur to SO<sub>2</sub>

$$\left( \frac{28.9 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{0.16 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1000 \text{ BTU}} \right) = 0.0046 \frac{\text{lb}}{\text{hr}} \text{ SO}_2$$

$$\left( 0.0046 \frac{\text{lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{1 \text{ yr}}{2000 \text{ lb}} \right) = 0.02 \text{ tpy SO}_2$$

VOC:

$$\left( \frac{28.9 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{5.5 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1000 \text{ BTU}} \right) = 0.16 \frac{\text{lb}}{\text{hr}} \text{ VOC}$$

$$\left( 0.16 \frac{\text{lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{1 \text{ yr}}{2000 \text{ lb}} \right) = 0.7 \text{ tpy VOC}$$

## **APPENDIX B**

**Emission Estimates  
Ownership Transfer  
(Cleaver-Brooks Boiler No. 4)**

**Basic American Foods, Inc. - Shelley**

DMT - 2001/11

1700 HW

- Boiler No. 4 Rated Capacity of 72.14 MM BTU/hr
- AP 42 (7/16) Natural Gas Emission Factors are applied from Tables 1.4.1 & 1.4.2.
- Conversion Factor is scf/MM BTU

$\text{NO}_x$ , Small Boilers (< 100 MM BTU/hr), Uncontrolled

$$\left( \frac{72.14 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{100 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1070 \text{ BTU}} \right) = 7.07 \frac{\text{lb}}{\text{hr}} \text{NO}_x$$

$$\left( \frac{7.07 \text{ lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{\text{ton}}{2000 \text{ lb}} \right) = 30.97 \text{ tpy NO}_x$$

CO, Small Boilers (< 100 MM BTU/hr), Uncontrolled

$$\left( \frac{72.14 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{84 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1070 \text{ BTU}} \right) = 5.94 \frac{\text{lb}}{\text{hr}} \text{CO}$$

$$\left( \frac{5.94 \text{ lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{\text{ton}}{2000 \text{ lb}} \right) = 26 \text{ tpy CO}$$

Assume  $\text{PM}_{\text{TOTAL}}$  is equal to  $\text{PM}_{10}$ :

$$\left( \frac{72.14 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{7.6 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1070 \text{ BTU}} \right) = 0.54 \frac{\text{lb}}{\text{hr}} \text{PM}_{10}$$

$$\left( \frac{0.54 \text{ lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{\text{ton}}{2000 \text{ lb}} \right) = 2.37 \text{ tpy PM}_{10}$$

$\text{SO}_2$ , based on 100% conversion of Fuel Sulfur to  $\text{SO}_2$

$$\left( \frac{72.14 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{0.6 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1070 \text{ BTU}} \right) = 0.04 \frac{\text{lb}}{\text{hr}} \text{SO}_2$$

$$\left( \frac{0.04 \text{ lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{\text{ton}}{2000 \text{ lb}} \right) = 0.19 \text{ tpy SO}_2$$

VOC:

$$\left( \frac{72.14 \text{ MM BTU}}{\text{hr}} \right) \left( \frac{5.3 \text{ lb}}{\text{MM scf}} \right) \left( \frac{\text{scf}}{1070 \text{ BTU}} \right) = 0.39 \frac{\text{lb}}{\text{hr}} \text{VOC}$$

$$\left( \frac{0.39 \text{ lb}}{\text{hr}} \right) \left( \frac{8760 \text{ hrs}}{\text{yr}} \right) \left( \frac{\text{ton}}{2000 \text{ lb}} \right) = 1.71 \text{ tpy VOC}$$

## **APPENDIX C**

**Modelling Demonstration  
Ownership Transfer  
(Boilers No. 1 and 3)**

**Basic American Foods, Inc. - Shelley**

06/01/01  
10:37:07

\*\*\* SCREENS MODEL RUN \*\*\*  
\*\*\* VERSION DATED 96043 \*\*\*

RAF-Boiler 1 and Boiler 3

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.126000
STACK HEIGHT (M)	=	11.2776
STK INSIDE DIAM (M)	=	0.7620
STK EXIT VELOCITY (M/S)	=	7.7617
STK GAS EXIT TEMP (K)	=	433.1500
AMBIENT AIR TEMP (K)	=	293.1500
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	8.2296
MIN HORIZ BLDG DIM (M)	=	7.8200
MAX HORIZ BLDG DIM (M)	=	22.8600

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.  
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 3.571 M\*\*4/S\*\*3; MOM. FLUX = 5.919 M\*\*4/S\*\*2.

\*\*\* FULL METEOROLOGY \*\*\*

\*\*\*\*\*  
\*\*\* SCREEN AUTOMATED DISTANCES \*\*\*  
\*\*\*\*\*

\*\*\* TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES \*\*\*

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	0	0.0	0.0	0.0	0.00	0.00	0.00	NA
100.	24.09	5	5.0	5.2	10000.0	14.28	6.12	7.17	SS
200.	18.42	4	5.0	5.3	1600.0	14.90	15.86	11.02	SS
300.	14.42	4	4.5	4.6	1440.0	15.96	22.61	13.95	SS
400.	11.64	4	3.5	3.6	1120.0	19.40	28.45	16.66	SS
500.	9.731	4	3.5	3.6	1120.0	19.40	36.15	19.63	SS
600.	8.389	4	3.0	3.1	960.0	22.22	42.72	22.25	SS
700.	7.349	4	2.5	2.5	800.0	26.33	49.19	24.71	SS
800.	6.521	4	2.5	2.5	800.0	26.33	55.57	27.44	SS
900.	5.861	4	2.0	2.0	640.0	32.62	61.88	29.66	SS
1000.	5.374	4	2.0	2.0	640.0	32.62	68.13	32.09	SS
1100.	4.918	4	2.0	2.0	640.0	32.62	74.31	34.12	SS
1200.	4.531	6	3.5	3.7	10000.0	27.03	40.01	17.20	SS
1300.	4.473	6	3.5	3.7	10000.0	27.03	43.04	17.97	SS
1400.	4.440	6	3.0	3.2	10000.0	28.66	46.05	18.56	SS
1500.	4.386	6	3.0	3.2	10000.0	28.66	49.03	19.29	SS
1600.	4.356	6	2.5	2.7	10000.0	30.78	51.99	19.79	SS
1700.	4.322	6	2.5	2.7	10000.0	30.78	54.94	20.51	SS
1800.	4.288	6	2.5	2.7	10000.0	30.78	57.87	21.21	SS

1900.	4.248	6	2.0	2.1	10000.0	33.66	60.78	21.61	SS
2000.	4.121	6	2.0	2.1	10000.0	33.66	63.68	21.86	SS
2100.	4.080	6	2.0	2.1	10000.0	33.66	66.56	22.44	SS
2200.	4.029	6	2.0	2.1	10000.0	33.66	69.42	23.01	SS
2300.	3.972	6	2.0	2.1	10000.0	33.66	72.28	23.56	SS
2400.	3.961	6	1.5	1.6	10000.0	37.90	75.12	23.89	SS
2500.	3.943	6	1.5	1.6	10000.0	37.90	77.95	24.42	SS
2600.	3.918	6	1.5	1.6	10000.0	37.90	80.76	24.95	SS
2700.	3.886	6	1.5	1.6	10000.0	37.90	83.57	25.47	SS
2800.	3.848	6	1.5	1.6	10000.0	37.90	86.36	25.98	SS
2900.	3.807	6	1.5	1.6	10000.0	37.90	89.15	26.48	SS
3000.	3.772	6	1.0	1.1	10000.0	44.97	91.92	26.98	SS
3500.	3.677	6	1.0	1.1	10000.0	44.97	105.65	28.98	SS
4000.	3.527	6	1.0	1.1	10000.0	44.97	119.17	30.84	SS
4500.	3.383	6	1.0	1.1	10000.0	44.97	132.50	32.57	SS
5000.	3.174	6	1.0	1.1	10000.0	44.97	145.67	34.21	SS
5500.	3.000	6	1.0	1.1	10000.0	44.97	158.69	35.76	SS
6000.	2.833	6	1.0	1.1	10000.0	44.97	171.58	37.23	SS
6500.	2.677	6	1.0	1.1	10000.0	44.97	184.34	38.64	SS
7000.	2.532	6	1.0	1.1	10000.0	44.97	196.99	40.00	SS
7500.	2.396	6	1.0	1.1	10000.0	44.97	209.54	41.36	SS
8000.	2.272	6	1.0	1.1	10000.0	44.97	221.99	42.28	SS
8500.	2.157	6	1.0	1.1	10000.0	44.97	234.34	43.16	SS
9000.	2.053	6	1.0	1.1	10000.0	44.97	246.61	44.40	SS
9500.	1.986	6	1.0	1.1	10000.0	44.97	258.79	45.41	SS
10000.	1.867	6	1.0	1.1	10000.0	44.97	270.90	46.38	SS
15000.	1.289	6	1.0	1.1	10000.0	44.97	388.43	54.88	SS
20000.	0.9410	6	1.0	1.1	10000.0	44.97	500.95	60.29	SS
25000.	0.7464	6	1.0	1.1	10000.0	44.97	609.75	64.86	SS
30000.	0.6156	6	1.0	1.1	10000.0	44.97	715.59	68.84	SS
40000.	0.4564	6	1.0	1.1	10000.0	44.97	920.22	74.49	SS
50000.	0.3610	6	1.0	1.1	10000.0	44.97	1127.43	79.19	SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:  
 75. 28.09 5 8.0 5.2 10000.0 13.21 4.75 6.27 SS

DWASH- MEANS NO CALC MADE (CONC = 0.0)  
 DWASH-NO MEANS NO BUILDING DOWNWASH USED  
 DWASH-HS MEANS HUBER-SWYDER DOWNWASH USED  
 DWASH-SS MEANS SCHULMAN-SCIRE DOWNWASH USED  
 DWASH-NA MEANS DOWNWASH NOT APPLICABLE, X<3\*LB

\*\*\*\*\*  
 \*\*\* REGULATORY (Default) \*\*\*  
 PERFORMING CAVITY CALCULATIONS  
 WITH ORIGINAL SCREEN CAVITY MODEL  
 (BRODE, 1988)  
 \*\*\*\*\*

\*\*\* CAVITY CALCULATION - 1 \*\*\*  
 CONC (UG/M\*\*3) = 123.7  
 CRIT WS @10M (M/S) = 7.05  
 CRIT WS @ HS (M/S) = 7.22  
 DILUTION WS (M/S) = 3.61  
 CAVITY HT (M) = 12.18  
 CAVITY LENGTH (M) = 28.27

\*\*\* CAVITY CALCULATION - 2 \*\*\*  
 CONC (UG/M\*\*3) = 0.000  
 CRIT WS @10M (M/S) = 99.99  
 CRIT WS @ HS (M/S) = 99.99  
 DILUTION WS (M/S) = 99.99  
 CAVITY HT (M) = 8.89  
 CAVITY LENGTH (M) = 10.83

ALONGWIND DIM (M) = 7.62 ALONGWIND DIM (M) = 22.86

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S. CONC SET = 0.0

\*\*\*\*\*  
END OF CAVITY CALCULATIONS  
\*\*\*\*\*

\*\*\* INVERSION BREAK-UP FUMIGATION CALC. \*\*\*  
CONC (UG/M\*\*3) = 0.000  
DIST TO MAX (M) = 882.44

DIST TO MAX IS < 2000. M. CONC SET = 0.0

\*\*\*\*\*  
\*\*\* SUMMARY OF SCREEN MODEL RESULTS \*\*\*  
\*\*\*\*\*

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SINGLE TERRAIN	28.09	75.	0.
BLDG. CAVITY-1	123.7	28.	-- (DIST = CAVITY LENGTH)
BLDG. CAVITY-2	0.000	11.	-- (DIST = CAVITY LENGTH)

SEP-06-2001 13:38 FROM-IDANO DEQ  
Boiler # 1

2083730143

T-023 P.020/033 F-443

$$M = \frac{h_s \sqrt{T_s}}{Q} ; V_s = \frac{\pi}{4} d_s^2 v_s$$

$$V_s = \frac{\pi}{4} (0.9144 \text{ m})^2 (8.6241 \text{ m/s}) = 5.66 \text{ m}^3/\text{s}$$

$$M_s = \frac{(11.28 \text{ m}) (5.66 \text{ m}^3/\text{s}) (472 \text{ K})}{(0.176 \frac{\text{g}}{\text{s}})} = 239,165$$

Boiler # 3:

$$V_s = \frac{\pi}{4} (0.762 \text{ m})^2 (7.76 \text{ m/s}) = 3.54 \text{ m}^3/\text{s}$$

$$M_s = \frac{(11.28 \text{ m}) (3.54 \text{ m}^3/\text{s}) (433.15 \text{ K})}{(0.176 \frac{\text{g}}{\text{s}})} = 137,771$$

Representative Stock

## **APPENDIX D**

**Modeling Demonstration  
Ownership Transfer  
(Cleaver-Brooks Boiler No. 4)**

**Basic American Foods, Inc. - Shelley**

06/03/01  
10:48:07

\*\*\* SCREEN MODEL RUN \*\*\*  
\*\*\* VERSION DATED 96043 \*\*\*

BAF-Boiler No. 4

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT  
EMISSION RATE (G/S) = 0.126000  
STACK HEIGHT (M) = 14.3256  
STK INSIDE DIAM (M) = 1.2192  
STK EXIT VELOCITY (M/S) = 8.8936  
STK GAS EXIT TEMP (K) = 455.3722  
AMBIENT AIR TEMP (K) = 293.1500  
RECEPTOR HEIGHT (M) = 0.0000  
URBAN/RURAL OPTION = RURAL  
BUILDING HEIGHT (M) = 8.2296  
MIN HORIZ BLDG DIM (M) = 10.6680  
MAX HORIZ BLDG DIM (M) = 15.2400

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.  
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 11.545 M\*\*4/S\*\*3; MOM. FLUX = 19.922 M\*\*4/S\*\*2.

\*\*\* FULL METEOROLOGY \*\*\*

\*\*\*\*\*  
\*\*\* SCREEN AUTOMATED DISTANCES \*\*\*  
\*\*\*\*\*

\*\*\* TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES \*\*\*

DIST (M)	CONC (UG/M**3)	STAR	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.0	320.0	145.18	1.89	1.85	NO
100.	7.994	4	15.0	15.8	4800.0	16.94	8.32	10.61	NS
200.	4.190	4	15.0	15.8	4800.0	19.85	15.72	13.93	NS
300.	3.238	4	10.0	10.6	3200.0	25.44	22.90	17.23	NS
400.	2.863	4	10.0	10.6	3200.0	25.44	29.68	20.14	NS
500.	2.550	4	8.0	8.4	2560.0	29.13	34.43	23.12	NS
600.	2.267	4	8.0	8.4	2560.0	29.13	42.96	25.86	NS
700.	2.065	4	5.0	5.3	1600.0	39.76	49.72	29.09	NS
800.	1.947	4	5.0	5.3	1600.0	39.76	56.05	31.67	NS
900.	1.772	4	5.0	5.3	1600.0	39.76	62.31	32.35	NS
1000.	1.668	4	4.5	4.7	1440.0	42.58	68.60	34.64	NS
1100.	1.573	4	4.0	4.2	1280.0	46.11	74.86	36.80	NS
1200.	1.491	4	4.0	4.2	1280.0	46.11	80.98	38.67	NS
1300.	1.423	4	3.5	3.7	1120.0	50.65	87.14	40.80	NS
1400.	1.349	4	3.5	3.7	1120.0	50.65	93.13	42.56	NS
1500.	1.286	4	3.5	3.7	1120.0	50.65	99.09	44.29	NS
1600.	1.230	4	3.0	3.2	960.0	56.71	105.19	46.40	NS
1700.	1.183	4	3.0	3.2	960.0	56.71	111.07	48.04	NS
1800.	1.137	4	3.0	3.2	960.0	56.71	116.91	49.66	NS

1900.	1.054	5	1.0	1.1	10000.0	78.75	93.18	37.28	NO
2000.	1.136	5	1.0	1.1	10000.0	78.75	97.46	38.21	NO
2100.	1.165	5	1.0	1.1	10000.0	78.75	102.71	39.06	NO
2200.	1.190	5	1.0	1.1	10000.0	78.75	106.95	39.87	NO
2300.	1.211	5	1.0	1.1	10000.0	78.75	110.17	40.68	NO
2400.	1.229	5	1.0	1.1	10000.0	78.75	114.38	41.47	NO
2500.	1.243	5	1.0	1.1	10000.0	78.75	118.58	42.26	NO
2600.	1.255	5	1.0	1.1	10000.0	78.75	122.76	43.04	NO
2700.	1.264	5	1.0	1.1	10000.0	78.75	126.93	43.81	NO
2800.	1.270	5	1.0	1.1	10000.0	78.75	131.08	44.57	NO
2900.	1.275	5	1.0	1.1	10000.0	78.75	135.23	45.32	NO
3000.	1.277	5	1.0	1.1	10000.0	78.75	139.38	46.06	NO
3500.	1.267	5	1.0	1.1	10000.0	78.75	159.82	49.65	NO
4000.	1.231	5	1.0	1.1	10000.0	78.75	180.00	53.06	NO
4500.	1.229	6	1.0	1.2	10000.0	66.52	133.34	35.82	NO
5000.	1.229	6	1.0	1.2	10000.0	66.52	146.43	37.32	NO
5500.	1.220	6	1.0	1.2	10000.0	66.52	159.39	38.74	NO
6000.	1.204	6	1.0	1.2	10000.0	66.52	172.23	40.11	NO
6500.	1.183	6	1.0	1.2	10000.0	66.52	184.94	41.42	NO
7000.	1.159	6	1.0	1.2	10000.0	66.52	197.56	42.69	NO
7500.	1.128	6	1.0	1.2	10000.0	66.52	210.07	43.78	NO
8000.	1.097	6	1.0	1.2	10000.0	66.52	222.49	44.81	NO
8500.	1.067	6	1.0	1.2	10000.0	66.52	234.81	45.85	NO
9000.	1.037	6	1.0	1.2	10000.0	66.52	247.06	46.84	NO
9500.	1.009	6	1.0	1.2	10000.0	66.52	259.22	47.79	NO
10000.	0.9803	6	1.0	1.2	10000.0	66.52	271.31	48.72	NO
15000.	0.7511	6	1.0	1.2	10000.0	66.52	388.71	56.87	NO
20000.	0.5958	6	1.0	1.2	10000.0	66.52	501.17	62.11	NO
25000.	0.4928	6	1.0	1.2	10000.0	66.52	609.93	66.55	NO
30000.	0.4179	6	1.0	1.2	10000.0	66.52	715.74	70.43	NO
40000.	0.3208	6	1.0	1.2	10000.0	66.52	920.34	78.97	NO
50000.	0.2599	6	1.0	1.2	10000.0	66.52	1117.52	88.58	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:  
 25. 10.83 4 20.0 21.1 6400.0 13.20 2.38 5.86 NS

DWASH- MEANS NO CALC MADE (CONC = 0.0)  
 DWASH=NO MEANS NO BUILDING DOWNWASH USED  
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED  
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED  
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3\*LB

\*\*\*\*\*  
 \*\*\* REGULATORY (Default) \*\*\*  
 PERFORMING CAVITY CALCULATIONS  
 WITH ORIGINAL SCREEN CAVITY MODEL  
 (BROOK, 1988)  
 \*\*\*\*\*

*** CAVITY CALCULATION - 1 ***	*** CAVITY CALCULATION - 2 ***
CONC (UG/M**3) = 0.000	CONC (UG/M**3) = 0.000
CRIT WS @10W (M/S) = 99.99	CRIT WS @10W (M/S) = 99.99
CRIT WS @ HS (M/S) = 99.99	CRIT WS @ HS (M/S) = 99.99
DILUTION WS (M/S) = 99.99	DILUTION WS (M/S) = 99.99
CAVITY HT (M) = 10.67	CAVITY HT (M) = 9.42
CAVITY LENGTH (M) = 17.12	CAVITY LENGTH (M) = 9.58

ALONGWIND DIN (M) = 10.67      ALONGWIND DIN (M) = 15.24

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S. CONC SET = 0.0

\*\*\*\*\*  
END OF CAVITY CALCULATIONS  
\*\*\*\*\*

\*\*\* INVERSION BREAK-UP FUMIGATION CALC. \*\*\*  
CONC (UG/M\*\*3) = 2.613  
DIST TO MAX (M) = 2052.66

\*\*\*\*\*  
\*\*\* SUMMARY OF SCREEN MODEL RESULTS \*\*\*  
\*\*\*\*\*

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	10.03	25.	0.
INV BREAKUP FUMI	2.613	2053.	--

DEC-18-2001 TUE 11:55 AM

FMA NO.

SEP-06-2001 12:40

FROM-IDAHO DEQ

2003730148

T-023 P.025/033 F-443

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## **APPENDIX E**

**Grain Loading Compliance Demonstration for Boilers  
Ownership Transfer  
(Cleaver-Brooks Boiler No. 4)**

**Basic American Foods, Inc. - Shelley**

Combustion Evaluation

BAF-Boiler No.1

Fuel Data (% by weight)		Fuel burned (lb/hr)	1793.3
		Excess air (%)	100
		Stk temp (°F)	300
		Stk press (atm)	1
S	0		
N2	0.76		
C	74.72		
H2	23.3		
H2O	0		
O2	1.22	1.22	

	Combustion Air Required		Flue Products	
	O2 lb.mole	N2 lb.mole	lb.mole	lb/hr
S	0	0	SO2	0
N2	0	0	N2	1821.4076
C	111.66281	420.06487	CO2	111.66281
H2	104.45979	392.96754	H2O(comb)	208.91946
O2	-0.6836968	-2.6719978	O2	215.43884
	<u>215.43884</u>	<u>810.46041</u>	H2O(fuel)	0.00
				<u>1948.5082</u>
stioc. comb air =	1131.5294 lb.mole/hr		dry	1948.5082
stoic. dry comb air =	922.12322 lb.mole/hr		wet	2157.4287

Volume of flue gas (scfm)	22317.521
Volume of flue gas (adcfm)	12330.946
Volume of flue gas (dscfm@7%O2)	8753.3469
Volume of flue gas (dscfm@15%O2)	20424.478
Volume of flue gas (dscfm@8%O2)	9426.6813
<u>Volume of flue gas (dscfm@3%O2)</u>	<u>6808.1587</u>
Volume of flue gas (dscfm@10%O2)	11140.823

ALLOWABLE PM EMISSIONS: 0.29 lb/hr (100% PM<sub>10</sub> = 100% PM)

$$0.29 \text{ lb/hr} \left( \frac{2000 \text{ yr}}{1 \text{ yr}} \right) = 2030 \text{ yr/hr}$$

$$\therefore \text{grain-loading} = \frac{2030 \text{ yr/hr} \left( \frac{\text{hr}}{60 \text{ min}} \right)}{6808.2 \text{ dscfm}} = \underline{\underline{0.005 \text{ yr/dscfm} @ 3\% \text{ O}_2}}$$

Combustion Evaluation

BAF-Boiler No.3

Fuel Data (% by weight)

S	0
N2	0.76
C	74.72
H2	23.3
H2O	0
O2	1.22

Fuel burned (lb/hr)	1298
Excess air (%)	100
Stk temp (F)	320
Stk press (atm)	1

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0	0
N2	0	0
C	80.822133	304.04517
H2	75.6085	284.43188
O2	-0.4948625	-1.8616256
<b>Total</b>	<b>155.93677</b>	<b>586.61562</b>

Flue Products

	lb.mole	lb/hr
SO2	0	0
N2	1173.6634	32860.334
CO2	80.822133	3556.1739
H2O(comb)	161.217	2721.906
O2	155.93677	4989.9447
H2O(fuel)	0.00	0

stioc. comb air = 819.00697 lb.mole/hr  
 stioic. dry comb air = 667.43785 lb.mole/hr

dry 1410.3413  
 wet 1561.5583

Volume of flue gas (acfm)	14823.248
Volume of flue gas (scfm)	8925.2036
Volume of flue gas (dscfm@7%O2)	6335.7187
Volume of flue gas (dscfm@15%O2)	14783.344
Volume of flue gas (dscfm@8%O2)	6823.0816
<u>Volume of flue gas (dscfm@3%O2)</u>	<u>4927.7612</u>
Volume of flue gas (dscfm@10%O2)	8065.6419

ALLOWABLE PM EMISSIONS: 0.22 lb/hr (ASSUMED 100% PM = 100% PM<sub>10</sub>)

$$0.22 \text{ lb/hr} \left( \frac{7000 \text{ gr}}{\text{lb}} \right) = 1540 \text{ gr/hr}$$

$$\therefore \text{ grain-loading} = \frac{1540 \text{ gr/hr} \left( \frac{\text{hr}}{60 \text{ min}} \right)}{4927.8 \text{ dscfm}} = \underline{\underline{0.005 \text{ gr/dscfm @ 3\% O}_2}}$$

Combustion Evaluation

BAF-Boiler No.4

Fuel Data (% by weight)		Fuel burned (lb/hr)	3273
		Excess air (%)	100
		Stk temp (F)	380
		Stk press (atm)	1
S	0		
N2	0.76		
C	74.72		
H2	23.3		
H2O	0		
O2	1.22	1.22	

Combustion Air Required		Flue Products			
	O2 lb.mole	N2 lb.mole			
S	0	0	SO2	0	0
N2	0	0	N2	2969.2748	62859.898
C	203.7988	766.67168	CO2	203.7988	8967.1472
H2	190.65225	717.21561	H2O(comb)	381.3045	6863.481
O2	-1.2478313	-4.6842223	O2	393.20322	12582.508
	<u>393.20322</u>	<u>1479.1931</u>	H2O(fuel)	0.00	0
				<u>3566.2766</u>	
stoc. comb air =	2066.1847 lb.mole/hr		dry	3566.2766	
stoc. dry comb air =	1682.9919 lb.mole/hr		wet	3937.581	

Volume of flue gas (acfm)	39284.896
Volume of flue gas (scfm)	22505.54
Volume of flue gas (dscfm@7%O2)	15975.969
Volume of flue gas (dscfm@15%O2)	37277.28
Volume of flue gas (dscfm@8%O2)	17204.889
<u>Volume of flue gas (dscfm@3%O2)</u>	<u>12425.763</u>
Volume of flue gas (dscfm@10%O2)	20333.051

ALLOWABLE PM EMISSIONS: 0.54 lb/hr (100% PM<sub>10</sub> = 120% PM)

$$0.54 \text{ lb/hr} \left( \frac{7000 \text{ ac}}{16} \right) = 3780 \text{ gr/hr}$$

$$\therefore \text{grain-loading} = \frac{3780 \text{ gr/hr} \left( \frac{\text{hr}}{60 \text{ min}} \right)}{12425.8 \text{ dscfm}}$$

$$= \underline{\underline{0.005 \text{ gr/dscf @ 3\% O}_2}}$$

## **APPENDIX F**

**Process Weight Rate Compliance Demonstration for Flake Lines  
Ownership Transfer  
(Cleaver-Brooks Boiler No. 4)**

**Basic American Foods, Inc. - Shelley**

---

- PERMITTED THROUGHPUT: 5.5 T/hr (FOR EACH LINE)

$$\therefore 5.5 \text{ T/hr} \left( \frac{2000 \text{ lb}}{\text{T}} \right) = 11000 \text{ lb/hr}$$

- PROCESS WEIGHT EQUATION (DAPA SBDI.DI.702(a)):  $E = 0.045(A)^{0.66}$

$$\begin{aligned} \therefore E &= 0.045(11,000 \text{ lb/hr})^{0.66} \\ &= \underline{11.97 \text{ lb/hr}} \end{aligned}$$

## **APPENDIX G**

**Grain Loading Compliance Demonstration for Boilers  
Ownership Transfer  
(Cleaver-Brooks Boiler No. 4)**

**Basic American Foods, Inc. - Shelley**

---

1. The 3D-ray mass balance indicates that the average grain loading was 0.004 gr/dscf for an average input of 3,516,934 lb/30-day period.

• THE throughput limit in the PTC is 5.5 T/hr. Therefore, THE ACTUAL THROUGHPUT WAS SCALED UP TO THE PERMITTED LIMIT, and the grain-loading WAS SCALED-UP EQUALLY.

$$\begin{aligned} \text{A) ACTUAL THROUGHPUT} &= 3,516,934 \text{ lb/30-days} \\ &\therefore 3516934 \left(\frac{\text{lb}}{30 \text{ days}}\right) \left(\frac{1}{2400 \text{ hr}}\right) \left(\frac{\text{d}}{24 \text{ hrs}}\right) \\ &= 2.44 \text{ T/hr} \end{aligned}$$

$$\text{B) SCALE-UP RATIO} = \frac{2.44 \text{ T/hr}}{5.5 \text{ T/hr}} = 0.44$$

C) APPLY RATIO FROM B) AND SCALE-UP GRAIN-LOADING:

$$\text{- AT } 2.44 \text{ T/hr} \Rightarrow 0.004 \text{ gr/dscf}$$

$$\therefore \text{ AT } 5.5 \text{ T/hr} \Rightarrow \frac{0.004 \text{ gr/dscf}}{0.44}$$

$$= 0.009 \text{ gr/dscf}$$

\* THEREFORE, SO LONG AS THE PERMITTED THROUGHPUT LIMIT OF 5.5 T/hr IS NOT EXCEEDED, THE GRAIN-LOADING STANDARD OF 0.2 gr/dscf WILL NOT BE EXCEEDED.

FL2 Mass Balance

BAF 5halley

Date 4/28-6/2  
Operating Days 30

Order #	Raw Solids 9.20				Dry Solids 0.92			Mash Loss Solids 0.24		
	Raw	Peel Loss	Raw to FL2	BDS to FL2	Addback	WIP	Dry Losses	Mash Losses	BDS out of FL2	
12832	4,224,800	366,120	3,858,680	780,680	32,851	783,337	10,700	91,800	785,473	
12858	4,382,800	385,860	3,996,940	812,928	46,785	782,567	14,132	94,820	804,368	
12889	4,253,100	387,111	3,865,989	792,218	24,990	771,180	8,050	77,800	782,854	
12918	3,583,709	329,836	3,253,784	666,781	23,700	658,854	9,850	72,800	657,087	
12951	2,443,300	226,100	2,217,200	454,349	18,900	426,551	4,800	44,800	426,916	
			Total In	3,518,934				Total Out	3,443,468	
								Total Capture	3,443,468	

2.49 T/hr

Fan cfm 36000  
Grains/lb 7000

Losses  
Production 73,466  
Per Day 2,449  
RO/Starch/Process Losses lbs/day 2,359  
Total #Day 89  
Per Line/twin 0.021  
Lbs/cf 0.0000008  
Grains/cf 0.0040

RO/Starch/Process Losses lbs/day  
Floor 37  
Slabbing 1,344  
Precooker 6,384  
Cooler 2,873  
Cooker 739  
Total 11,514  
Total BDS 2,359

4490

**ATTACHMENT 2**

**Fuel Usage Estimates for Cleaver-Brooks Boiler No. 4**

**Basic American Foods, Inc. - Shelley**



Idaho Department of Environmental Quality  
Office of Technical Services

CALCULATION SHEET

Sheet 1 of 1

Project PTC #011-00020 REACTION Work Order \_\_\_\_\_ File No. \_\_\_\_\_

Title of Calculation FUEL USAGE LIMIT BOILER #4 Prepared By [Signature] Date 11/20/01

Item \_\_\_\_\_ Checked By \_\_\_\_\_ Date \_\_\_\_\_

MAX. RATED CAPACITY = 72.14 MM BTU/hr  
OPERATING HOURS = 8760 hrs/yr

$$\therefore \text{DAILY FUEL USAGE} = (72.14 \text{ MM BTU/hr}) \left( \frac{24 \text{ hr}}{d} \right) \left( \frac{\text{dscf}}{1020 \text{ BTU}} \right)$$
$$= \underline{\underline{1.70 \text{ MM dscf/d}}}$$