

<b>NORTH CAROLINA DIVISION OF AIR QUALITY</b>		<b>Region:</b> Wilmington Regional Office	
<b>Air Permit Review – PSD Preliminary Review</b>		<b>County:</b> Duplin	
<b>Permit Issue Date:</b> <b>XXX, 2008</b>		<b>NC Facility ID:</b> 3100029	
		<b>Inspector's Name:</b> Lynette Bryan	
		<b>Date of Last Inspection:</b> 08/23/2006	
		<b>Compliance Code:</b> 3/In Compliance - Inspection	
<b>Facility Data</b>		<b>Permit Applicability (this application only)</b>	
<b>Applicant (Facility's Name):</b> Valley Proteins Inc. Carolina By Products - Rose Hill Division		<b>SIP:</b> 15A NCAC 2D .0524, 2D .0539, (2Q .0317 of 2D .0530 for SO <sub>2</sub> ), 2D .0530 (for NO <sub>x</sub> )	
<b>Facility Address:</b> Valley Proteins Inc. Carolina By Products - Rose Hill Division 469 Yellow Cut Road Rose Hill, NC 28458		<b>NSPS:</b> Subpart Dc (New Final Rule, in Federal Register on 2/27/2006 and 6/13/2007)	
<b>SIC:</b> 2077 / Animal And Marine Fats And Oil		<b>NESHAP:</b> N/A	
<b>NAICS:</b> 311613 / Rendering and Meat Byproduct Processing		<b>PSD:</b> Nitrogen Dioxide	
<b>Facility Classification: Before:</b> Title V <b>After:</b> Title V		<b>PSD Avoidance:</b> N/A	
<b>Fee Classification: Before:</b> Title V <b>After:</b> Title V		<b>NC Toxics:</b> Avoidance of toxics	
		<b>112(r):</b> N/A	
		<b>Other:</b> N/A	
<b>Contact Data</b>		<b>Application Data</b>	
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 3100029.07A
Eddie Golding General Manager (910) 289-4842 469 Yellow Cut Road Rose Hill NC, 28458	David Frey General Manager (910) 289-3312 469 Yellow Cut Road Rose Hill NC, 28458 dfrey@valleyproteins.com	Thomas Gibson, Jr. Environmental Director for Valley Protein/CBP (540) 877-2590  TGibson@valleyproteins.com	<b>Date Received:</b> 02/15/2007
			<b>Application Type:</b> Modification
			<b>Application Schedule:</b> PSD
			<b>Existing Permit Data</b>
			<b>Existing Permit Number:</b> 05127T18
			<b>Existing Permit Issue Date:</b> 11/16/2006
			<b>Existing Permit Expiration Date:</b> 11/30/2010
<b>Consultant:</b> RMT North Carolina, Inc. 30 Patewood Drive, Suite 100 Contact: Daryl Whitt			
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<b>Review Engineer:</b> Booker Pullen <b>Review Engineer:</b> Dean Carroll		<b>Comments / Recommendations:</b>	
<b>Review Engineer's Signature:</b>		<b>Issue</b> 05127T19	
<b>Begin Date:</b> July 23, 2007		<b>Permit Issue Date:</b> <b>XXXX, 2008</b>	
		<b>Permit Expiration Date:</b> 11/30/2010	

### I. Introduction/Description

The Division of Air Quality received a copy of the PSD modification request from the Carolina By-Products – Rose Hill Division (CBP Rose Hill), located in Rose Hill, Duplin County, North Carolina, on February 15, 2007. The application (3100029.07A) was considered complete on that date.

Valley Proteins, Inc. currently owns and operates a rendering facility in Rose Hill, North Carolina that processes inedible animal parts, mostly chicken blood, feathers, offal (waste parts of butchered animals), and used cooking oils. The rendering facility operates under the name Carolina By-products – Rose Hill Division (CBP Rose Hill).

CBP Rose Hill operates: four oil-fired boilers rated at less than 35 million Btu per hour each, two 320U Supercookers<sup>®</sup>, one waste heat evaporator with a condenser, one feather dryer, and one feather hydrolyzer. The facility is a major source for Title V permitting purposes, and a major source for PSD purposes. This application is the first time that this facility has applied to go through the PSD permitting process. The potential emissions of criteria pollutants from the proposed modification will be less than the PSD significance thresholds except for nitrogen oxides (NO<sub>x</sub>). NO<sub>x</sub> emissions have been estimated to be 120 tons per year for the project based on less than 7,250 hours of annual operation for the new steam boiler (ES-B6).

**I. Introduction/Description - Continued**

Existing control devices at the facility include two venturi scrubbers, one packed bed scrubber, and four oil-fired boilers to control volatile organic compounds (VOCs), particulate matter, and odorous vapors from the rendering process. A cross-flow scrubber is also used to control fugitive VOC and low-intensity odors from the room air at the facility. The existing cookers and feather processing equipment each operate with shell and tube type condensers to collect condensable liquids that flash off from the rendering process.

The closest Class I Area to this facility is the Swan Quarter National Wildlife Refuge which is approximately 157 km away from the site. A copy of the application was sent to Ms. Meredith Bond and Ms. Sandra Silva of the Branch of Air Quality-Permits, U.S. Fish and Wildlife Services, 7333 West Jefferson Avenue, Suite 375, Lake Wood, Colorado 80235. The application was sent as a follow-up to a phone conversation with Ms. Sandra Silva on July 26, 2007.

An additional information letter was sent to the company on October 10, 2007 requesting clarification on the NSPS, Subpart Dc compliance with particulate by using a low efficiency scrubber (CD-13 @79%). The 79% control efficiency was not enough to bring the particulate emissions below the NSPS standard of 0.03 lbs per million Btu heat input. This NSPS was revised on February 27, 2006 and June 13, 2007 to affect boilers that are constructed after February 28, 2005. The October additional information letter also requested the monitoring and recordkeeping methods that would be selected from the Subpart Dc standard that would be used to show compliance at the facility. A response to the additional information letter was received by the DAQ on November 7, 2007 and has been included in this engineering review.

**II. Purpose and Scope**

The purpose of this application is to expand the current plant capacity by adding:

- A. One new 440U Supercooker<sup>®</sup>, which will receive steam from the new boiler only. The new 440U Supercooker<sup>®</sup>, will emit VOCs, PM, and non-condensable gas (NCG: VOCs and odors) when in operation. Emissions from the Supercooker<sup>®</sup> will be collected and routed through a new venturi scrubber (CD-12) which will in turn vent to either the new packed bed scrubber (CD-14) or to the new 78.7 million Btu heat input boiler (ID No. ES-B6). Emissions from the venturi scrubber will vent to the boiler (ES-B6) for incineration approximately 90 percent of cooker operating time and will vent to the packed-bed scrubber approximately 10 percent of cooker operating time.

In addition to the new 440U Supercooker<sup>®</sup>, separation equipment (drainers, pressors, screens, & centrifuges) necessary for the rendering operation will be installed for removal of liquids from solids downstream of the cooker. Emissions from this other rendering equipment will be routed to another new venturi scrubber (CD-16) which will in turn exhaust to the new packed bed scrubber (CD-14) for control of VOCs and high-intensity odors. Fugitive emissions (ES-10) from the rendering process will be captured and controlled by routing the general room air through a new cross-flow scrubber (CD-15).

- B. One new No. 6 fuel oil/No. 4 fuel oil or on-specification recycled equivalent/No. 2 fuel oil/saleable fat-fired, “firetube type construction” boiler (78.7 mmBtu per hour, 2000 boiler horsepower, ID No. ES-B6) to provide steam for the cooker, and other rendering equipment. This new boiler shall not provide steam to any existing equipment.

**III. Summary of Permit Changes to permit No. 05127T18 per application 3100029.07A:**

Old page	New page	Condition No.	Change
<b>Cover Letter</b>			
Page 1	Page 1	Cover page	Changed issue date, added “PSD modification” to first sentence of the first paragraph, changed revision No. T18 to T19, and revised the language of the cover letter, changed received date
Page 2	Page 2	Cover letter	Changed date in heading, changed effective date of the Permit, changed review engineer’s name and contact information
Page 3	Page 3	Cover letter	Reformatted the “insignificant activities” list, added cooling towers
Page 4	Page 4	Cover letter	Reformatted and revised the “changes to the permit” table to reflect modification

-Table continued on the next page-

## III. Summary of Permit Changes to permit No. 05127T18 per application 3100029.07A: Continued

Old page	New page	Condition No.	Change
<b>Body of the Permit, Part I</b>			
Page 1	Page 1	Cover page	Revised permit No. to T19, changed “replaces permit” No. to T18, updated language in the paragraph to match the current shell language, revised the effective date of the permit, added the issue date to the table, revised the permit application number and the complete application date, removed the renewal date from the cover page, revised the permit issue date
Page 3	Page 3	Table of Permitted sources	Added current permit shell language to 1 <sup>st</sup> two paragraphs
Pages 3-5	Pages 3-5	Permitted Emission Sources Table	Reformatted tables, added new sources and control devices to table for sources ES-8, 9, 10, and B6; added information footnotes to the bottom of the table
Page 7	Page 7	Specific Limitations and Conditions	Added “(Method 9) for 12 minutes” to condition 2.1 3. d. ii.
Page 11	Page 11	Specific Limitations and Conditions	Added “(Method 9) for 12 minutes” to condition 2.1 B. 2. c. ii.
N/A	Pages 12-22	Specific Limitations and Conditions	Added boiler (ES-B6) along with the appropriate regulations
N/A	Page 22-24	Specific Limitations and Conditions	Added Supercookor® (ES-8) along with the appropriate regulations
N/A	Pages 28-32	Multiple Emissions	Added regulations for the new sources at this facility involved in the “Feed Ingredient Manufacturing Plant”
Pages 17-25	Pages 33-43	General Conditions	Added the most current set of General Conditions to the permit

## IV. Table of Sources added per application No. 3100029.07A

The following table contains a summary of all permitted emission sources and associated air pollution control devices:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-B6	No. 6 fuel oil/No. 4 fuel oil or on-specification recycled equivalent/No. 2 fuel oil/saleable fat-fired, firetube boiler (78.7 million Btu per hour heat input)	CD-13	Venturi spray tower scrubber (monitoring parameters to be determined during the initial performance test)
ES-8	440U Supercookor®, 70,000 pounds per hour raw material maximum cooking capacity (equipped with integral entrainment tank and one water cooled shell-and-tube condenser)	CD-12	Venturi scrubber (monitoring parameters to be determined during the initial performance test) in series with:
		B-6	No. 6 fuel oil/ No. 4 fuel oil or on-specification recycled equivalent/No. 2 fuel oil/saleable fat-fired boiler (78.7 million Btu per hour heat input, ID No. B-6) in series with:
		CD-13	Venturi spray tower scrubber (monitoring parameters to be determined during the initial performance test, ID No. CD-13)
		CD-14	<b>(Backup control for B-6)</b> Packed bed scrubber (monitoring parameters to be determined during the initial performance test)

-Table continued on the next page-

The following table contains a summary of all permitted emission sources and associated air pollution control devices: continued

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-9	Separation Equipment (Drainers, Presses, Screens, and Centrifuges)	CD-16	Venturi scrubber (monitoring parameters to be determined during the initial performance test) in series with:
		CD-14	Packed bed scrubber (monitoring parameters to be determined during the initial performance test)
ES-10	Room air emissions	CD-15	Cross flow scrubber (monitoring parameters to be determined during the initial performance test)

## V. Regulatory Summary

- A. One No. 6 fuel oil/No. 4 fuel oil or on-specification equivalent/No. 2 fuel oil/saleable fat-fired boiler (78.7 million Btu heat input rate, ID No. ES-B6) with associated venturi spray tower scrubber** (monitoring parameters to be determined during the initial performance test)
1. Description: This No. 6 fuel oil/No. 4 fuel oil or on-specification recycled equivalent/No. 2 fuel oil/saleable fat-fired boiler (ID No. ES-B6) will be installed to provide the steam necessary to operate the 440U Supercookor® (ID No. ES-8). Emissions from the new Supercookor® will be routed to the boiler for destruction during normal operation.
  2. **Applicable Regulatory Requirements:** Boiler (ES-B6) will be placed into operation after permit issuance. This boiler will be manufactured after the 1989 applicability date of NSPS Subpart Dc. Therefore NSPS Subpart Dc **does** apply to this boiler. NSPS, Subpart Dc was revised on February 27, 2006 and June 13, 2007. This boiler will have to comply with the revised Subpart Dc regulations, except when burning saleable animal fat because that alternative fuel does not meet the definition of oil.

The final MACT Rule for boilers was promulgated in the Federal Register on September 13, 2004 with an effective date of November 12, 2004. However, this MACT was vacated by the DC courts on July 30, 2007. Therefore, the boiler MACT does not apply to this boiler at this time.

The following provides a summary of limits and/or standards for the emission source(s) described above.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	<b>Oil:</b> 0.03 lbs per million Btu heat input	15A NCAC 2D .0524 <b>40CFR Part 60, Subpart Dc, §60.43c (e)</b>
	<b>Saleable fat:</b> 0.27 lbs per million Btu heat input	15A NCAC 2D .0503(c)
PM10	Less than 15 tons per year	15A NCAC 2Q .0317 of 2D .0530 <b>(PSD Avoidance )</b>
Sulfur dioxide	<b>Oil:</b> 0.5 lbs per million Btu heat input <b>or</b> not greater than 0.5 weight percent sulfur	15A NCAC 2D .0524 <b>40CFR Part 60, Subpart Dc, §60.42c (d)</b>
	<b>Saleable fat:</b> 2.3 lbs per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity	15A NCAC 2Q .0317 of 2D .0530 <b>(PSD Avoidance )</b>
		15A NCAC 2D .0524 <b>40CFR Part 60, Subpart Dc, §60.43c (c)</b>
Toxic air emissions	Applies to all boilers that have the capability to burn recycled No. 4 fuel oil <b>Multiple Emission Section of Permit</b>	15A NCAC 2Q .0317 of 2D .1100 <b>(Avoidance of 15A NCAC 2D .1100)</b>
Nitrogen dioxide	Less than 120 tons per year <b>See Section VII</b>	15A NCAC 2D .0530

a. **15A NCAC 2D .0524, 40 CFR Part 60, §60.42c, “PARTICULATE EMISSIONS”**

Regulation Analysis:

i. The Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements contained in Environmental Management Commission Standard 15A NCAC 2D .0524 "New Source Performance Standards (NSPS) as promulgated in 40 CFR Part 60 Subpart Dc, including Subpart A "General Provisions." [15A NCAC 2D .0524]

(A) Particulate emissions from burning No. 6 fuel oil, No. 4 fuel oil or on-specification recycled equivalent, saleable fat-fired, in the 78.7 million Btu per hour heat input boiler (ID No. ES-B6) shall be controlled by one venturi spray tower scrubber (ID No. CD-13). This boiler is subject to this NSPS because it will be manufactured after the 1989 applicability date of NSPS Subpart Dc. NSPS, Subpart Dc was revised and placed in the Federal Register on two occasions, February 27, 2006 and June 13, 2007. The revisions changed the particulate emission limit for all boilers that are constructed after February 28, 2005 to **0.03 lbs of PM per million Btu heat input**. Prior to this revision oil-fired boilers did not have a particulate emission rate under NSPS, Subpart Dc. The State regulation will be placed in the permit to limit PM when burning saleable fat.

$$NSPS \text{ Allowable emission rate} = \frac{0.03 \text{ lbs PM}}{\text{million Btu heat input}} \times \frac{78.7 \text{ million Btu}}{\text{hour}} = \frac{2.36 \text{ lbs Filterable PM}}{\text{hour}}$$

*When comparing the particulate emissions under NSPS, Subpart Dc, filterable particulate, as captured in a Method 5 (front half) is the pollutant of concern. Therefore, the filterable particulate is used from the DAQ emission spreadsheet.*

**Example calculation using worst case particulate emissions burning No. 6 fuel oil:**

The actual calculated emission rate of filterable particulate matter from boiler (ID No. ES-B6) using the DAQ spread sheet and AP-42 emission factors for filtered particulate is as follows:

$$Actual \text{ hourly emissions} = \frac{22.5 \text{ lbs PM}}{1,000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150,000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{11.81 \text{ lbs filterable PM}}{\text{hour}}$$

Table of potential emissions of filterable particulate from boiler (ID No. ES-B6)

Fuel	Stack test data *	AP-42 Emission Factor	Potential emissions uncontrolled
No. 6 fuel oil	N/A	22.5 lbs PM/1000 gal.	11.81 lbs filterable PM/hr
No. 4 fuel oil	N/A	7.0 lbs PM/1000 gal.	3.7 lbs filterable PM/hr
No. 2 fuel oil	N/A	2.0 lbs PM/1000 gal.	1.12 lbs filterable PM/hr
Saleable fat *	6.5 lbs/1000 gal.	N/A	3.42 lbs PM/hr

\* Emission factors for fat taken from stack testing for Valley Proteins facilities in Wadesboro and Gastonia, NC, July 1, 2004. Heat content of fuel = 141,341 Btu/gal.

The Supercookor® will emit 30 lbs of PM per hour prior to entering its first control device (CD-12) which then normally exhausts to the boiler (ES-B6) for particulate control (99% control efficiency). When the boiler is on “low fire”, the exhaust from CD-12 will be routed to the new packed bed scrubber (CD-14). PM emissions from the drainers, presses, screens and centrifuges are de minimis. High intensity odors from that separation equipment always vent through a second new venturi scrubber (CD-16) to the new packed bed scrubber.

**Note:** Any particulate removal achieved by the venturi scrubber (CD-12) was not included in calculations of the PM emission vented to the boiler (ES-B6).

The filterable particulate emissions from the combustion of No. 6 fuel oil in the boiler combined with any Supercookor® PM emissions remaining after their boiler incineration must be below the NSPS allowable emission rate after accounting for the PM removal efficiency of the new venturi spray tower (CD-13).

$$\text{Uncontrolled by scrubber (CD-13)} = \frac{11.81 \text{ lbs PM}}{\text{hr}} + \left( \frac{30 \text{ lbs PM}}{\text{hr}} \times (1 - 0.99) \right) = 12.11 \frac{\text{lbs filterable PM}}{\text{hour}}$$

The control efficiency of venturi spray tower scrubber (CD-13) was initially stated to be 79% in the original application submittal. An additional information letter was sent to the facility on October 10, 2007 stating the efficiency of CD-13 was not enough to meet compliance with the new NSPS limit for boiler (ES-B6). The facility responded in writing to the DAQ on November 9, 2007 including an email message attachment from the vendor stating that the scrubber would achieve in excess of 82.5% control for PM.

$$12.11 \text{ lbs filterable PM/hr} (1 - 0.825, \text{ control efficiency CD-13}) = 2.12 \text{ lbs filterable PM/hour}$$

**The worse case scenario calculated emissions (2.12 lbs filterable PM/hour) appears to meet the NSPS allowable emissions (2.36 lbs of filterable PM/hour) when firing No. 6 fuel oil at 2.1% sulfur content using a control efficiency of at least 82.5% for scrubber (CD-13).**

The PM standard applies at all times, except during periods of startup, shutdown, or malfunction.

ii. **Testing Requirements** {40 CFR 60.45c}:

As required by 15A NCAC 2D .0524, the following initial performance tests shall be conducted:

- (A) All performance tests shall be conducted in accordance with EPA Reference Methods, contained in 40 CFR Part 60 Appendix A.
- (B) The EPA Administrator retains the exclusive right to approve equivalent and alternative test methods, continuous monitoring procedures, and requirements.
- (C) Within 60 days after achieving the maximum production rate at which the facility will be operated, but not later than 180 days after the initial start-up of the affected facility, the Permittee shall conduct the required performance test(s) and submit a written report of the test(s) results.
- (D) The source shall be responsible for ensuring, within the limits of practicality, that the equipment or process being tested is operated at or near its maximum normal production rate or at a lesser rate if specified by the Director or his delegate.
- (E) All associated testing costs are the responsibility of the Permittee.

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524 if the test results with the boiler firing oil exceed the particulate emission rate limit specified in NSPS Subpart Dc.

**Monitoring/Recordkeeping**

- iii. Based on the requirements of Performance Specification 1 (40 CFR Part 60, Appendix B, 8.1(2)(i)(3)), a continuous opacity monitor (COMS) is not appropriate for the type of control system (wet venturi spray tower) proposed for boiler (ES-B6) because there is not a point on the outlet side of that control device where condensed water vapor will not be present. Therefore, the applicant has requested that parametric monitoring of the venturi spray tower scrubber be used for opacity and PM compliance. The monitoring and operating parameters will be established during the initial performance test.

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524 if the above monitoring and recordkeeping is not performed.

iv. **Reporting**

The Permittee shall submit a summary report of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

**b. 15A NCAC 2D .0524, 40 CFR 60.42c “SULFUR DIOXIDE EMISSIONS”**

i. The Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements contained in Environmental Management Commission Standard 15A NCAC 2D .0524 "New Source Performance Standards (NSPS) as promulgated in 40 CFR Part 60 Subpart Dc, including Subpart A "General Provisions." [15A NCAC 2D .0524]

(A) Sulfur Dioxide emissions from the 78.7 million Btu per hour heat input boiler (ID No. ES-B6) when firing either No. 6 fuel oil or No. 4 fuel oil or on-specification recycled equivalent, shall be controlled by one venturi spray tower scrubber (ID No. CD-13), with a caustic scrubbing medium.

(B) Sulfur dioxide emissions from the 78.7 million Btu per hour heat input boiler (ID NO. ES-B6) when firing No. 2 fuel oil shall be controlled by the sulfur content in the fuel which shall not exceed 0.5 percent sulfur by weight.

(C) On and after the date on which the initial performance test is completed or required to be completed under §60.8, which ever date comes first, no owner or operator of an affected facility that combusts oil shall cause to be discharged into the atmosphere from that affected facility any gases that contain SO<sub>2</sub> in excess of (0.50 lb/MMBtu) heat input; or, as an alternative, no owner or operator of an affected facility that combusts oil shall combust oil in the affected facility that contains greater than 0.5 weight percent sulfur. The percent reduction requirements are not applicable to affected facilities under this paragraph.

$$Emission_{(NSPS\ allowable)} \Rightarrow \frac{0.50\ lbs\ SO_2}{million\ Btu} \times \frac{78.7\ million\ Btu\ heat\ input}{hour} = \frac{39.35\ lbs\ SO_2}{hour}$$

**Example Calculation using No. 6 fuel oil:**

The actual calculated emission rate of SO<sub>2</sub> from boiler (ID No. ES-B6) firing No. 6 fuel oil, using the DAQ spread sheet and AP-42 emission factors for sulfur dioxide is as follows:

$$Actual\ hourly\ emissions \Rightarrow \frac{330\ lbs\ SO_2}{1000\ gallons} \times \frac{1\ gallon}{150000\ Btu} \times \frac{78.7 \times 10^6\ Btu}{hour} \times (1 - .938, control\ efficiency) = \frac{10.73\ lbs\ SO_2}{hour}$$

**Table of potential emission of sulfur dioxide emissions from boiler (ID No. ES-B6)**

Fuel	Stack test data *	AP-42 Emission Factor	Potential emissions uncontrolled	Potential emissions @ 93.8% efficiency
No. 6 fuel oil	N/A	330 lbs SO <sub>2</sub> /1000 gal.	173 lbs SO <sub>2</sub> /hour	10.73 lbs SO <sub>2</sub> /hour
No. 4 fuel oil	N/A	300 lbs SO <sub>2</sub> /1000 gal.	157 lbs SO <sub>2</sub> /hour	9.73 lbs SO <sub>2</sub> /hour
No. 2 fuel oil	N/A	71 lbs SO <sub>2</sub> /1000 gal	40 lbs SO <sub>2</sub> /hour	2.48 lbs SO <sub>2</sub> /hour
Saleable fat	2.34 lbs/1000 gal.	N/A	1.23 lbs SO <sub>2</sub> /hour	0.076 lbs SO <sub>2</sub> /hour

\* Emission factors for fat taken from stack testing for Valley Proteins facilities in Wadesboro and Gastonia, NC, July 1, 2004. Heat content of fuel = 141,341 Btu/gal.

**The worse case scenario for this boiler is when firing No. 6 fuel oil @ 2.1 sulfur content. Compliance with the NSPS sulfur dioxide standard of 39.35 lbs SO<sub>2</sub> per hour is indicated when the boiler fires oil because the actual emission rate is below the allowable emission rate.**

(D) Except as provided in paragraph (h) of NSPS, Subpart Dc, §60.42c, compliance with the fuel oil sulfur limits, and emission limits of this section shall be determined on a 30-day rolling average basis.

(E) The SO<sub>2</sub> emission limits, and fuel oil sulfur limits, under this section apply at all times, including periods of startup, shutdown, and malfunction.

ii. **Testing** (15A NCAC 2D .0524, 40 CFR Part 60, §60.44c)

- (A) If performance testing is required, the testing shall be performed in accordance with General Condition JJ in Section 3 of the Air Permit. The initial performance test required under §60.8 shall be conducted over 30 consecutive operating days of the steam generating unit. Compliance with the percent reduction requirements and SO<sub>2</sub> emission limits under §60.42c shall be determined using a 30-day average. The first operating day included in the initial performance test shall be scheduled within 30 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after the initial startup of the facility. The steam generating unit load during the 30-day period does not have to be the maximum design heat input capacity, but must be representative of future operating conditions.

If the results of this test on the boiler firing oil are above the applicable NSPS, Subpart Dc limits identified above in this section, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524.

- (1) For affected facilities subject to §60.42c (h)(1) where the owner or operator seeks to demonstrate compliance with the SO<sub>2</sub> standards based on fuel supplier certification, the performance test shall consist of the certification, and the certification from the fuel supplier, as described under §60.48c (f), as applicable.
- (2) For oil-fired affected facilities where the owner or operator seeks to demonstrate compliance with the fuel oil sulfur limits under §60.42c based on shipment fuel sampling, the initial performance test shall consist of sampling and analyzing the oil in the initial tank of oil to be fired in the steam generating unit to demonstrate that the oil contains 0.5 weight percent sulfur or less. Thereafter, the owner or operator of the affected facility shall sample the oil in the fuel tank after each new shipment of oil is received, as described under §60.46c(d)(2).

**Monitoring** (15A NCAC 2D .0524, 40 CFR §60.46c)

- iii. The owner or operator of an affected facility subject to the SO<sub>2</sub> emission limits under §60.42c shall install, calibrate, maintain, and operate a CEMS for measuring SO<sub>2</sub> concentrations and either O<sub>2</sub> or CO<sub>2</sub> concentrations at the outlet of the SO<sub>2</sub> control device (or the outlet of the steam generating unit if no SO<sub>2</sub> control device is used), and shall record the output of the system. The owner or operator of an affected facility subject to the percent reduction requirements under §60.42c shall measure SO<sub>2</sub> concentrations and either O<sub>2</sub> or CO<sub>2</sub> concentrations at both the inlet and outlet of the SO<sub>2</sub> control device; **or**
- iv. As an alternative to operating a CEMS at the outlet of the SO<sub>2</sub> control device, for oil-fired affected facilities where the owner or operator seeks to demonstrate compliance with the fuel oil sulfur limits under §60.42c based on shipment fuel sampling, after the initial performance test, the owner or operator of the affected facility shall sample the oil in the fuel tank after each new shipment of oil is received, as described under §60.46c(d)(2)
- v. **Recordkeeping/Reporting** (15A NCAC 2D .0524, 40 CFR §60.48c)  
The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by §60.7 of this part. This notification shall include:
- (1) The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.
  - (2) The owner or operator of each affected facility subject to the SO<sub>2</sub> emission limits of §60.42c, shall submit to the Administrator the performance test data from the initial and any subsequent performance tests and, if applicable, the performance evaluation of the CEMS and/or COMS using the applicable performance specifications in appendix B of this part.

- (3) The owner or operator of each affected facility subject to the SO<sub>2</sub> emission limits, fuel oil sulfur limits, or percent reduction requirements under §60.42c shall keep records and submit reports as required under §60.48c (d), including the following information, as applicable.
- a. Calendar dates covered in the reporting period.
  - b. Each 30-day average SO<sub>2</sub> emission rate (ng/J or lb/MMBtu), or 30-day average sulfur content (weight percent), calculated during the reporting period, ending with the last 30-day period; reasons for any noncompliance with the emission standards; and a description of corrective actions taken.
  - c. Identification of any steam generating unit operating days for which SO<sub>2</sub> or diluent (O<sub>2</sub> or CO<sub>2</sub>) data have not been obtained by an approved method for at least 75 percent of the operating hours; justification for not obtaining sufficient data; and a description of corrective actions taken.
  - d. Identification of any times when emissions data have been excluded from the calculation of average emission rates; justification for excluding data; and a description of corrective actions taken if data have been excluded for periods other than those during which oil was not combusted in the steam generating unit.
  - e. Identification of the F factor used in calculations, method of determination, and type of fuel combusted.
  - f. Identification of whether averages have been obtained based on CEMS rather than manual sampling methods.
  - g. If a CEMS is used, identification of any times when the pollutant concentration exceeded the full span of the CEMS.
  - h. If a CEMS is used, description of any modifications to the CEMS that could affect the ability of the CEMS to comply with Performance Specifications 2 or 3 of appendix B of this part.
  - i. If a CEMS is used, results of daily CEMS drift tests and quarterly accuracy assessments as required under appendix F, Procedure 1 of this part.
  - j. If fuel supplier certification is used to demonstrate compliance, records of fuel supplier certification is used to demonstrate compliance, records of fuel supplier certification as described under 40 CFR §60.48c (f)(1) or (f)(4) of this section, as applicable. In addition to records of fuel supplier certifications, the report shall include a certified statement signed by the owner or operator of the affected facility that the records of fuel supplier certifications submitted represent all of the fuel combusted during the reporting period.
  - k. Fuel supplier certification shall include the following information:
    - i. For distillate oil:
      - (A) The name of the oil supplier;
      - (B) a statement from the oil supplier that the oil complies with the specifications under the definition of distillate oil in §60.41c, and
      - (C) the sulfur content of the oil.
  - l. The owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.
    - i. All records required under this section shall be maintained by the owner or operator of the affected facility for a period of two years following the date of such record.
    - ii. The reporting period for the reports required under this subpart is each six-month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30<sup>th</sup> day following the end of the reporting period.

c. **15A NCAC 2D .0524, 40 CFR 60.43c "CONTROL OF VISIBLE EMISSIONS"**

Regulation Analysis:

- i. Boiler (ID No. ES-B6) will be manufactured after June 9, 1989 and have a heat input capacity between 10 million and 100 million Btu per hour. Also, this boiler will be built after February 28, 2005 and will be subject to the revised sections of Subpart Dc which were placed in the EPA Federal Register on two occasions, February 27, 2006 and June 13, 2007.
- ii. On and after the date on which the initial performance test is completed or required to be completed under 40 CFR §60.8, whichever date comes first, no owner or operator of an affected facility that combusts coal, wood, or oil and has a heat input capacity of 8.7 MW (30 MMBtu/hr) or greater shall cause to be discharged into the atmosphere from that affected facility any gases that exhibit greater than **20 percent** opacity (6-minute average), except for one 6-minute period per hour of not more than **27 percent** opacity.

The PM and opacity standards under this section apply at all times, except during periods of startup, shutdown, or malfunction.

Monitoring, {40 CFR 60.48b(a)}

- ii. Based on the requirements of Performance Specification 1 (40 CFR Part 60, Appendix B, 8.1(2)(i)(3), a continuous opacity monitor (COMS) is not appropriate for the type of control system (wet venturi scrubber) proposed for boiler (ES-B6) because there is not a point on the outlet side of the venturi scrubber where condensed water vapor will not be present. Therefore, the applicant has requested that parametric monitoring of the venturi scrubber be used for opacity and PM compliance. The monitoring and operating parameters will be established during the initial performance test.

Recordkeeping/Reporting, {40 CFR 60.49b}

- iii. The Permittee shall submit **semi-annual reports** to the Division of Air Quality in accordance with 40 CFR Part 60.49b. Records shall be kept for two years following the date of such record. The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524 if the above monitoring and recordkeeping is not performed or if visible emissions exceed the limit specified above.

d. **15A NCAC 2D .0503: PARTICULATES FROM FUEL BURNING INDIRECT HEAT EXCHANGERS WHEN FIRING SALEABLE FAT**

- i. Emissions of particulate matter from the combustion of saleable fat, that are discharged from this source into the atmosphere shall not exceed **0.27 pounds per million Btu heat input**. [15A NCAC 02D .0503(a)]

$$E = 1.09 \times Q^{-0.2594}$$

Where: E = allowable PM emission rate (pounds per million Btu heat input)

Q = total heat input at the facility for all indirect fired heat exchangers

$$Q = 33.5 + 33.5 + 33.5 + 34.5 + 78.7 = 213.7 \text{ million Btu per hour}$$

$$E = 1.09 \times (213.7)^{-0.2594} = 0.27 \text{ lbs PM per million Btu heat input}$$

Testing [15A NCAC 2D .2609]

- ii. If emissions testing is required, the testing shall be performed in accordance General Condition JJ. If the results of this test are above the limit given in Section V. A. 2. d. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 02D .0503.

Monitoring/Recordkeeping/Reporting [15A NCAC 02Q .0508(f)]

- iii. No monitoring, recordkeeping, or reporting is required for particulate emissions from the firing of saleable fat in boiler ID No. ES-B6.

**e. 15A NCAC 2D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES WHEN FIRING SALEABLE FAT**

- i. Emissions of sulfur dioxide from this boiler shall not exceed **2.3 pounds per million Btu heat input**. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. [15A NCAC 2D .0516]

**Testing** [15A NCAC 2D .2611]

- ii. If emission testing is required, the testing shall be performed in accordance with General Condition JJ. If the results of this test are above the limit given in Section V. A. 2. e. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0516.

**Monitoring/Recordkeeping** [15A NCAC 2Q .0508(f)]

- iii. No monitoring, recordkeeping, or reporting is required for sulfur dioxide emissions from the firing of saleable fat in boiler ID No. ES-B6.

**f. 15A NCAC 2Q. 0317: AVOIDANCE CONDITIONS for 15A NCAC 2D. 0530: PREVENTION OF SIGNIFICANT DETERIORATION – Total PM (Filterable + Condensable)**

From the original application, it was assumed that the venturi scrubber would operate whenever the boiler operated regardless of the fuel that was burned. Therefore, a PSD Avoidance condition for PM was not included. The applicant wishes to operate the boiler (ES-B6) without operation of the venturi spray tower scrubber (CD-13) when firing saleable fat and No. 2 fuel oil (@ 0.5% by weight sulfur content).

*Note: For PSD significant increase comparisons in the State of North Carolina, total PM is used instead of Filterable PM in accordance with 15A NCAC 2D .2609.*

- i. In order to avoid applicability of 15A NCAC 2D .0530 (g) for major sources and major modifications, boiler ES-B6 shall discharge into the atmosphere less than **25 tons of total PM. The boiler shall operate 7,250 hours or less** (as requested in the application for the NOx BACT analysis) per consecutive 12-month period. [15A NCAC 2D .0530]

The worse case total PM emissions will occur while firing No. 6 fuel oil. PM emissions will be controlled by venturi spray tower scrubber (CD-13) on boiler (ES-B6) when firing No. 6 fuel oil and have a control efficiency of 82.5% operating at less than 7,250 hours per year. *Note: the BACT analysis was performed on a 7,250 hour per year operation schedule, therefore this becomes a limit in the permit.*

When the boiler is firing No. 2 fuel oil and/or saleable fat, the scrubber will not be used to control PM emissions.

Since this facility has the flexibility to fire No. 6 fuel oil, No. 4 fuel oil or on specification recycled equivalent, No. 2 fuel oil, and saleable fat in boiler ES-B6 at any time during a consecutive 12 month period, the PM calculation will be performed using the following equation.

- ii. The Permittee shall make the following calculations on a monthly basis:  
(A) The monthly pounds of total PM emissions from boiler B6 and cooker ES-8 using the following equation:

$$E_{PM} = \{[(V_{HS6})(24.0) + (V_{HS4})(8.50) + (V_{LS6scrubbed})(9.32) + (V_{LS4scrubbed})(8.50)] \times (1 - 0.825)\} +$$

$$(V_{LS6} - V_{LS6scrubbed})(9.32) + (V_{LS4} - V_{LS4scrubbed})(8.50) + (V_2)(3.3) + (V_{fat})(6.5) + 312$$

**Where:**

- $V_{HS6}$  = Monthly total volume of High-Sulfur #6 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{HS4}$  = Monthly total volume of High-Sulfur #4 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{LS6}$  = Monthly total volume of Low-Sulfur #6 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{LS6scrubbed}$  = Monthly volume of Low-Sulfur #6 oil burned in boiler B6 while spray tower scrubber (CD-13) was operating (in 10<sup>3</sup> gal/mo);

- $V_{LS4}$  = Monthly total volume of Low-Sulfur #4 oil burned in boiler B6 (in  $10^3$  gal/mo);
- $V_{LS4scrubbed}$  = Monthly volume of Low-Sulfur #4 oil burned in boiler B6 while packed tower scrubber (CD-13) was operating (in  $10^3$  gal/mo);
- $V_2$  = Monthly total volume of #2 oil burned in boiler B6 (in  $10^3$  gal/mo);
- $V_{fat}$  = Monthly total volume of saleable fat burned in boiler B6 (in  $10^3$  gal/mo);
- 312 = Monthly total pounds of PM10 emitted by cooker ES-8 (in lbs/mo)

- iii. The monthly tons of total PM emitted from boiler B6 and cooker ES-8 by dividing  $E_{PM10}$  by 2000 lb/ton;
- iv. The rolling 12-month tons of PM emissions from boiler B6 and cooker ES-8 by adding those units' monthly tons of total PM emissions for the current month to the sum of their monthly tons of total PM emissions for the preceding 11 months.
- v. Monthly calculations are based upon the Permittee's use of the following DAQ-approved emissions factors for PM:

<u>Fuel</u>	<u>AP-42 PM, lb/10<sup>3</sup> gal</u>
#6 oil with sulfur content > 0.5 wt.%	24.0
#6 oil with sulfur content < 0.5 wt.%	9.32
#4 oil or recycled equivalent with sulfur content > 0.5 wt.%	8.50
#4 oil or recycled equivalent with sulfur content < 0.5 wt.%	8.50
#2 oil	3.30
Saleable fat	6.5 (from applicant)
312 = Monthly total pounds of PM10 emitted by cooker ES-8 (in lbs/mo)	

**Testing** [15A NCAC 2D .2609]

- vi. If emissions testing is required, the Permittee shall perform such testing in accordance with General Condition JJ. If the results of this test are above the limit given in Section V. A. 2. f. i., the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

**Monitoring** [15A NCAC 2Q .0508 (f)]

- vii. The Permittee shall keep daily records of the hours of boiler operation, the amount (in gallons) and type of fuels used, the sulfur content, including certification of the fuel, in a logbook (written or in electronic format).

In addition to the records required above, the Permittee shall keep the following records:

- (A) Daily volumes (in gallons) of the following fuels burned in boiler B6:
  - (1) Low-Sulfur (<0.5 wt%) #6 oil burned while spray tower CD-13 was operating;
  - (2) Low-Sulfur (<0.5 wt%) #4 oil and recycled equivalent burned while spray tower CD-13 was operating;

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530 if the parameters identified herein are not monitored and records kept.

**Reporting**

- viii. The Permittee shall submit a semi-annual summary report, acceptable to the regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:
  - (A) The monthly PM emissions from boiler B6 and cooker ES-8 for the previous 17 months. The annual emissions must also be calculated for each of the 12-month periods over those previous 17 months;
  - (A) The monthly values for each of the following parameters during the previous 17 months:  $V_{HS6}$ ,  $V_{HS4}$ ,  $V_{LS6}$ ,  $V_{LS6scrubbed}$ ,  $V_{LS4}$ ,  $V_{LS4scrubbed}$ ,  $V_2$ , and  $V_{fat}$

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530 if the fuel records and hours of operation are not monitored and records kept.

**g. 15A NCAC 2Q. 0317: AVOIDANCE CONDITIONS for 15A NCAC 2D. 0530: PREVENTION OF SIGNIFICANT DETERIORATION – Total PM10 (filterable + condensable)**

From the original application, it was assumed that the venturi scrubber would operate whenever the boiler operated regardless of the fuel that was burned. Therefore, a PSD Avoidance condition for PM10 was not included. The applicant wishes to operate the boiler (ES-B6) without operation of the venturi spray tower scrubber (CD-13) when firing saleable fat and No. 2 fuel oil (@ 0.5% by weight sulfur content).

- i. In order to avoid applicability of 15A NCAC 2D .0530 (g) for major sources and major modifications, boiler ES-B6 shall discharge into the atmosphere less than **15 tons of total PM10. The boiler shall operate less than 7,250 hours total** (as requested in the application for the NOx BACT analysis) per consecutive 12-month period. [15A NCAC 2D .0530]

**Note: For PSD significant increase comparisons in the State of North Carolina, total PM10 (filterable + condensable) instead of only Filterable PM10 in accordance with 15A NCAC 2D .2609.**

The worse case total PM10 emissions will occur while firing No. 6 fuel oil. PM10 emissions will be controlled by venturi spray tower scrubber (CD-13) on boiler (ES-B6) when firing No. 6 fuel oil and have a control efficiency of 82.5% operating at less than 7,250 hours per year. **Note: the BACT analysis was performed on a 7,250 hour per year operation schedule, therefore this becomes a limit in the permit.**

When the boiler is firing No. 2 fuel oil and/or saleable fat, the scrubber will not be used to control PM10 emissions.

Since this facility has the flexibility to fire No. 6 fuel oil, No. 4 fuel oil or on-specification recycled equivalent, No. 2 fuel oil, and saleable fat in boiler ES-B6 at any time during a consecutive 12 month period, the PM10 calculation will be performed using the following equation.

- ii. The Permittee shall make the following calculations on a monthly basis:
  - (A) The monthly pounds of total PM10 emissions from boiler B6 and cooker ES-8 using the following equation:

$$E_{PM10} = \{[(V_{HS6})(21.0) + (V_{HS4})(5.84) + (V_{LS6scrubbed})(8.17) + (V_{LS4scrubbed})(5.84)] \times (1 - 0.825)\} + (V_{LS6} - V_{LS6scrubbed})(8.17) + (V_{LS4} - V_{LS4scrubbed})(5.84) + (V_2)(2.3) + (V_{fat})(6.5) + 312$$

**Where:**

- $V_{HS6}$  = Monthly total volume of High-Sulfur #6 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{HS4}$  = Monthly total volume of High-Sulfur #4 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{LS6}$  = Monthly total volume of Low-Sulfur #6 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{LS6scrubbed}$  = Monthly volume of Low-Sulfur #6 oil burned in boiler B6 while spray tower scrubber (CD-13) was operating (in 10<sup>3</sup> gal/mo);
- $V_{LS4}$  = Monthly total volume of Low-Sulfur #4 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{LS4scrubbed}$  = Monthly volume of Low-Sulfur #4 oil burned in boiler B6 while packed tower scrubber (CD-13) was operating (in 10<sup>3</sup> gal/mo);
- $V_2$  = Monthly total volume of #2 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- $V_{fat}$  = Monthly total volume of saleable fat burned in boiler B6 (in 10<sup>3</sup> gal/mo);

- iii. The monthly tons of total PM10 emitted from boiler B6 and cooker ES-8 by dividing  $E_{PM10}$  by 2000 lb/ton;
- iv. The rolling 12-month tons of PM10 emissions from boiler B6 and cooker ES-8 by adding those units' monthly tons of total PM10 emissions for the current month to the sum of their monthly tons of total PM10 emissions for the preceding 11 months.
- v. Monthly calculations are based upon the Permittee's use of the following DAQ-approved emissions factors for total PM10:

<u>Fuel</u>	<u>AP-42 PM10, lb/10<sup>3</sup> gal</u>
#6 oil with sulfur content > 0.5 wt.%	21.0
#6 oil with sulfur content < 0.5 wt.%	8.17
#4 oil or recycled equivalent with sulfur content > 0.5 wt.%	5.84
#4 oil or recycled equivalent with sulfur content < 0.5 wt.%	5.84
#2 oil	2.3
Saleable fat	6.5 (from applicant)
312 = Monthly total pounds of PM10 emitted by cooker ES-8 (in lbs/mo)	

**Testing** [15A NCAC 2D .2601]

- vi. If emissions testing is required, the Permittee shall perform such testing in accordance with General Condition JJ. If the results of this test are above the limit given in Section V. A. 2. g. i., the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

**Monitoring** [15A NCAC 2Q .0508 (f)]

- vii. The Permittee shall keep daily records of the hours of boiler operation, the amount (in gallons) and type of fuels used, the sulfur content, including certification of the fuel, in a logbook (written or in electronic format).

In addition to the records required above, the Permittee shall keep the following records:

- (A) Daily volumes (in gallons) of the following fuels burned in boiler B6:
  - (1) Low-Sulfur (<0.5 wt%) #6 oil burned while spray tower CD-13 was operating;
  - (2) Low-Sulfur (<0.5 wt%) #4 oil and recycled equivalent burned while spray tower CD-13 was operating;

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530 if the parameters identified herein are not monitored and records kept.

**Reporting**

- viii. The Permittee shall submit a semi-annual summary report, acceptable to the regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:
  - (A) The monthly PM10 emissions from boiler B6 and cooker ES-8 for the previous 17 months. The annual emissions must also be calculated for each of the 12-month periods over those previous 17 months;
  - (B) The monthly values for each of the following parameters during the previous 17 months:  $V_{HS6}$ ,  $V_{HS4}$ ,  $V_{LS6}$ ,  $V_{LS6scrubbed}$ ,  $V_{LS4}$ ,  $V_{LS4scrubbed}$ ,  $V_2$ , and  $V_{fat}$

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530 if the fuel records and hours of operation are not monitored and records kept.

**h. 15A NCAC 2Q. 0317: AVOIDANCE CONDITIONS for 15A NCAC 2D. 0530: PREVENTION OF SIGNIFICANT DETERIORATION – Sulfur Dioxide**

From the original application, the venturi scrubber would operate whenever the boiler operated regardless of the fuel that was burned. The applicant wishes to operate the boiler (ES-B6) without operation of the venturi spray tower scrubber (CD-13) when firing saleable fat and No. 2 fuel oil (@ 0.5% by weight sulfur content).

- i. In order to avoid applicability of 15A NCAC 2D .0530 (g) for major sources and major modifications, boiler ES-B6 shall discharge into the atmosphere less than **40 tons of total sulfur dioxide**. **The boiler shall operate 7,250 hours or less** (as requested in the application for the BACT analysis) per consecutive 12-month period. [15A NCAC 2D .0530]

Sulfur dioxide emissions will be controlled by venturi spray tower scrubber (CD-13) on boiler (ES-B6) when firing No. 6 fuel oil, No. 4 fuel oil/recycled equivalent, and have a control efficiency of 93.8% operating at less than 7250 hours per year. *Note: the BACT analysis was performed on a 7250 hour per year operation schedule, therefore this becomes a limit in the permit*. When the boiler is firing No. 2 fuel oil and/or saleable fat, the scrubber will not be used to control sulfur dioxide emissions.

Since this facility has the flexibility to fire No. 6 fuel oil, No. 4 fuel oil or on-specification recycled equivalent, No. 2 fuel oil, and saleable fat in boiler ES-B6 at any time during a consecutive 12 month period, the following equation will be placed into the permit to calculate SO<sub>2</sub> emissions.

- ii. The Permittee shall make the following calculations on a monthly basis:
  - (A) The monthly pounds of total sulfur dioxide emissions from boiler ES-B6 using the following equation:

$$E_{SO_2} = CEM + \{ [157(S_{LS6})(V_{SL6}) + 150(S_{LS4})(V_{LS4})] \times (1 - 0.825) \} + 142(S_2)(V_2) + (V_{fat})(2.34)$$

**Where:**

- CEM = Monthly total mass of SO<sub>2</sub> emissions from boiler ES-B6 due to burning oil with the venturi spray tower scrubber operating, as measured downstream of the venturi spray tower scrubber (CD-13) by the SO<sub>2</sub> CEMS (in lbs/mo)
- S<sub>LS6</sub> = Monthly average (volume-weighted) sulfur content of Low-Sulfur #6 oil burned in boiler ES-B6 (in 10<sup>3</sup> gal/mo)
- S<sub>LS4</sub> = Monthly average (volume-weighted) sulfur content of Low-Sulfur #4 oil burned in boiler ES-B6 (in 10<sup>3</sup> gal/mo)
- S<sub>2</sub> = Monthly average (volume-weighted) sulfur content of #2 oil burned in boiler ES-B6 (in 10<sup>3</sup> gal/mo)
- V<sub>LS6</sub> = Monthly total volume of Low-Sulfur #6 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- V<sub>LS4</sub> = Monthly total volume of Low-Sulfur #4 oil burned in boiler B6 (in 10<sup>3</sup> gal/mo);
- V<sub>2</sub> = Monthly total volume of #2 oil burned in boiler ES-B6 (in 10<sup>3</sup> gal/mo);
- V<sub>fat</sub> = Monthly total volume of saleable fat burned in boiler ES-B6 (in 10<sup>3</sup> gal/mo);

- iii. The monthly tons of total sulfur dioxide emitted from boiler ES-B6 by dividing E<sub>PM10</sub> by 2000 lb/ton;
- iv. The rolling 12-month tons of sulfur dioxide emissions from boiler ES-B6 by adding those units' monthly tons of total sulfur dioxide for the current month to the sum of their monthly tons of total sulfur dioxide emissions for the preceding 11 months.
- v. Monthly calculations are based upon Permittee's use of the following DAQ-approved emissions factors for sulfur dioxide:

**Testing** [15A NCAC 2D .2611]

- iv. If emissions testing is required, the Permittee shall perform such testing in accordance with General Condition JJ. If the results of this test are above the limit given in Section V. A. 2. h. i., the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

**Monitoring [15A NCAC 2Q .0508 (f)]**

- v. The Permittee shall keep daily records of the hours of boiler operation, the amount (in gallons) and type of fuels used, the sulfur content, including certification of the fuel, in a logbook (written or in electronic format).

In addition to the records required above, the Permittee shall keep the following records:

- (A) Daily volumes (in gallons) of the following fuels burned in boiler B6:
  - (1) Low-Sulfur (<0.5 wt%) #6 oil burned while spray tower CD-13 was operating;
  - (2) Low-Sulfur (<0.5 wt%) #4 oil and recycled equivalent burned while spray tower CD-13 was operating;

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530 if the parameters identified herein are not monitored and records kept.

**Reporting**

- vi. The Permittee shall submit a semi-annual summary report, acceptable to the regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:

- (A) The monthly sulfur dioxide emissions from boiler ES-B6 and cooker ES-8 for the previous 17 months. The annual emissions must also be calculated for each of the 12-month periods over those previous 17 months;
- (B) The monthly values for each of the following parameters during the previous 17 months: CEM,  $S_{LS6}$ ,  $S_{LS4}$ ,  $S_2$ ,  $V_{LS6}$ ,  $V_{LS4}$ ,  $V_2$  and  $V_{fat}$

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530 if the fuel records and hours of operation are not monitored and records kept.

**B. One 440U Supercooker®, 70,000 pounds per hour of raw materials, maximum cooking capacity (equipped with integral entrainment tank and one water-cooled shell-tube condenser)**

1. **Description:** This vessel cooks inedible animal by-products (mostly chicken blood, offal, and feathers) for rendering (to reduce, convert, or melt down fat by heating). Heat is supplied to the Supercooker® from steam from boiler ES-B6. The cooker is equipped with an integral entrainment tank and one water-cooled shell-tube condenser for removal of solids and condensables that flash off from the cooker. The gas exiting the air-cooled condensers will be routed to the new venturi scrubber (CD-12), which vents to either the new boiler (ES-B6) or the new packed bed scrubber (CD-14). The new boiler will vent to a new venturi spray tower scrubber (CD-13). Emissions from the venturi scrubber (CD-12) will vent to the boiler for incineration 90% of cooker’s operation time and will vent to the packed-bed scrubber (CD-14) 10% of the cooker’s operating time.

2. **Applicable Regulatory Requirements:** There is no NSPS that applies to this Supercooker®.

The following provides a summary of limits and/or standards for the emission source(s) described above.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	$E = 55.0 P^{0.11} - 40$ Where E = allowable emission rate in pounds per hour P = process weight rate in tons per hour	15A NCAC 2D .0515
Visible emissions	20 percent opacity	15A NCAC 2D .0521
Odorous emissions	Suitable control measures <b>See Multiple Emissions Section VI</b>	15A NCAC 2D .0539

a. **15A NCAC 2D .0515: PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES**

- i. Emissions of particulate matter from this source shall not exceed an allowable emission rate as calculated by the following equation: [15A NCAC 2D .0515(a)]

$$E = 55.0 P^{0.11} - 40 \quad (\text{equation for process emission rates greater than 30 tons per hour})$$

Where E = allowable emission rate in pounds per hour

P = process weight rate in tons per hour

Liquid and gaseous fuels and combustion air are not considered as part of the process weight.

$$E_{\text{allowable}} = E = 55.0 (35)^{0.11} - 40$$

$$E_{\text{allowable}} = 41.32 \text{ lbs PM per hour}$$

**The estimated uncontrolled PM emission factor from the application is 1.0 ton PM/ton of product placed in the Supercooker®.**

The venturi scrubber (CD-12) and packed-bed scrubber (CD-14) combination is stated to yield a 95% control efficiency. The venturi scrubber (CD-12) and boiler (ES-B6) combination is stated to yield a 99% control efficiency.

**Example calculation of particulate emissions from Supercooker® without the control devices is:**

$$\text{Actual hourly emissions} \Rightarrow \frac{1.0 \text{ lbs PM}}{\text{ton of product}} \times \frac{35 \text{ tons product}}{\text{hour}} = \frac{35.0 \text{ lbs PM}}{\text{hour}}$$

**The 440U Supercooker® appears to be in compliance with the miscellaneous particulate standard because the calculated actual emissions without control (35.0 lbs/hr) are less than the allowable emissions (41.32 lbs/hr).**

**CAM for particulate emissions from the Supercooker® will not be required for this source because the control devices are not necessary to meet the applicable standard.**

**Testing** [15A NCAC 2D .2609]

- ii. If emissions testing is required, the testing shall be performed in accordance with General Condition JJ. If the results of this test are above the limit given in Section V. B. 2. a. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0515.

**Monitoring/Recordkeeping** [15A NCAC 2Q .0508(f)]

- iii. Particulate matter emissions from the Supercooker® shall be controlled by one water-cooled condenser venting to one venturi scrubber (CD-12), venting to either boiler (ES-B6) or packed bed scrubber (CD-14). To assure compliance, the Permittee shall perform inspections and maintenance as recommended by the manufacturer. In addition to the manufacturers inspection and maintenance recommendations, or if there is no manufacturers inspection and maintenance recommendations, as a minimum, the inspection and maintenance requirement shall include the following:
- i. a monthly visual inspection of the system ductwork and material collection unit for leaks; and
  - ii. an annual (for each 12 month period following the initial inspection) internal inspection of the scrubbers' structural integrity.

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0515 if the ductwork, boiler, and scrubbers are not inspected and maintained.

- iv. The results of inspection and maintenance shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook shall record the following:
  - (A) the date and time of each recorded action;
  - (B) the results of each inspection;
  - (C) the results of any maintenance performed on the scrubbers; and
  - (D) any variance from manufacturer's recommendations, if any, and corrections made.The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0515 if these records are not maintained.

**Reporting** [15A NCAC 2Q .0508(f)]

- v. The Permittee shall submit the results of any maintenance performed on the boiler (ES-B6) or scrubbers (CD-12 and CD-14), within 30 days of a written request by the DAQ.
- vi. The Permittee shall submit a summary report of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

**b. 15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS**

- i. Visible emissions from the Supercookor® (ID No. ES-8) exhaust point shall not be more than **20 percent opacity** when averaged over a six-minute period. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity. [15A NCAC 2D .0521 (d)]

**Testing** [15A NCAC 2D .2610]

- ii. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(8) and General Condition JJ. If the results of this test are above the limit given in Section VI. B. 2. b above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0521.

**Monitoring** [15A NCAC 2Q .0508(f)]

- iii. To assure compliance, once a day the Permittee shall observe the exhaust from the packed bed scrubber when the cookor is in operation, for visible emissions above normal. The daily observation must be made for each day of the calendar year period to ensure compliance with this requirement. The Permittee shall be allowed three (3) days of absent observations per semi-annual period. The Permittee shall establish Anormal $\cong$  for the source in the first 30 days following startup. If visible emissions from this source are observed to be above normal, the Permittee shall either:
  - i. take appropriate action to correct the above-normal emissions as soon as practicable and within the monitoring period and record the action taken as provided in the recordkeeping requirements below, or
  - ii. demonstrate that the percent opacity from the emission points of the emission source in accordance with 15A NCAC 2D .0501(c)(8), (Method 9) for 12 minutes, is below the limit given in Section VI.B.2.b. i. above.

If the above-normal emissions are not corrected per (i) above or if the demonstration in (ii) above cannot be made, the Permittee shall be deemed to be in noncompliance with 15A NCAC 2D .0521.

**Recordkeeping** [15A NCAC 2Q .0508(f)]

- iv. The results of the monitoring shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook shall record the following:
  - i. the date and time of each recorded action;
  - ii. the results of each observation and/or test noting those sources with emissions that were observed to be in noncompliance along with any corrective actions taken to reduce visible emissions; and
  - iii. the results of any corrective actions performed.
 The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0521 if these records are not maintained.

**Reporting** [15A NCAC 2Q .0508(f)]

- v. The Permittee shall submit a summary report of the observations postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

**C. Separation/Rendering Equipment (drainers, presses, screens) {ID No. ES-9} with associated packed-tower scrubber (CD-14) or venting to fuel oil-fired boiler (ES-B6), and Room Air Emissions (ID No. ES-10) with associated cross flow scrubber (CD-15).**

1. **Description:** These drainers, presses, screens, and centrifuges are necessary for the rendering operation. They are used for the removal of liquids from solids downstream of the cooker. After cooking, the material is discharged into a drainer, which contains screens that separate the liquid fat from the protein solids. From the drain pan, the protein solids, which still contain about 25 percent fat, are conveyed to the screw press. The screw press completes the separation of fat from solids, and yields protein solids that have a residual fat content of about 10 percent. These solids, called cracklings, are then ground and screened to produce protein meal. The fat from both the screw press and the drain pan is pumped to the crude animal fat tank, centrifuged or filtered to remove any remaining protein solids, and stored in the animal fat storage tank. Emissions from this rendering equipment will be routed to a second new venturi scrubber (CD-16) and then to the new packed bed scrubber (CD-14) for control of VOC and high-intensity odors. Fugitive emissions from the rendering process will be captured and controlled by routing the general room air through a new cross-flow scrubber (CD-16).
2. **Applicable Regulatory Requirements:** There is no NSPS that applies to these operations.

The following provides a summary of limits and/or standards for the emission source(s) described above.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Odorous emissions	Suitable control measures <b>See Multiple Emissions Section VI</b>	15A NCAC 2D .0539

**VI. Multiple Emission Section**

**A. All emission sources associated with the production of animal feed ingredients**

**STATE ONLY REQUIREMENT:**

1. **15A NCAC 2D .0539: ODOR CONTROL OF FEED INGREDIENT MANUFACTURING PLANTS**  
Any device, machine, equipment, or other contrivance used to process material for the production of feed-grade animal proteins or feed-grade animal fats and oils, except for any portions that are engaged exclusively in the process of food for human consumption, shall be operated in compliance with the following requirements:

- a. Control Device Requirement: The Permittee shall not allow, cause, or permit the operation of any device, machine, equipment, or other contrivance unless all gases, vapors, and gas-entrained effluents from these processes are passed through condensers to remove all steam and other condensable materials. All noncondensable gases passing through the condensers shall be incinerated at 1200 degrees Fahrenheit for a period of not less than 0.3 seconds, or treated in an equally effective manner.
- b. Measurement and Recording Requirements: The Permittee processing or incinerating gases, vapors, or gas-entrained matter as required by condition VI.A.1. a. above shall install, operate, calibrate, and maintain in good working order continuous operating parameter measuring and recording devices to document equipment operation in accordance with 2D .0539. In addition, the Permittee shall follow the approved quality assurance program for all monitoring devices and systems that include:
  - i. procedures and frequencies for calibration,
  - ii. standards traceability,
  - iii. operational checks,
  - iv. maintenance schedules and procedures,
  - v. auditing schedules and procedures,
  - v. data validation, and
  - vi. schedule for implementing the quality assurance program.
- c. Expeller Requirement: The Permittee shall not allow, cause, or permit the installation or operation of expeller units unless they are properly hooded and all exhaust gases are collected or ducted to odor control equipment.
- d. Handling, Transport, and Storage Requirement: The Permittee shall not cause or permit any raw material to be handled, transported, or stored, or to undertake the preparation of any raw material without taking reasonable precautions to prevent odors from being discharged. Such raw material is in "storage" after it has been unloaded at a facility or after it has been located at the facility for at least 24 hours. Reasonable precautions shall include the following:
  - i. storage of all raw material before or in the process of preparation, in properly enclosed and vented equipment or areas, together with the use of effective devices and methods to prevent the discharge of odor bearing gases;
  - ii. use of covered vehicles or containers of watertight construction for the handling and transporting of any raw material; and
  - iii. use of hoods and fans to enclose and vent the storage, handling, preparation, and conveying of any odorous materials together with effective devices or methods, or both, to prevent emissions of odors or odor bearing gases.
- e. Notification of Release of Excessive and Malodorous Gases or Vapors: The Permittee shall notify the regional air quality supervisor of the appropriate regional office within two business days after conditions are encountered that cause or may cause release of excessive and malodorous gases or vapors.
- f. Compliance Statement: The Permittee shall continue to operate in compliance as described in the compliance determination submitted on (*parameter to be determined during the initial performance test*) pursuant to 15A NCAC 2D .0539(h)(1). The Division of Air Quality may request addition information at a later date upon further review of the compliance documentation.
- g. To ensure compliance with 15A NCAC 2D .0539, the Permittee shall:
  - i. Wash raw material truck trailers interiors after unloading and before they are moved to a staging or parking area;
  - ii. Daily clean up spilled or leaked materials, to include materials in the parking area as well as in other areas not controlled with odor control equipment;
  - iii. Conduct monthly odor surveys of processes and storage areas around the plant in order to minimize odors and record the results of the survey. At a minimum, the survey should include areas identified for improvement and corrective action taken;

- iv. Wash the raw material parking area a minimum of three times per week when daily temperatures are above freezing and record the washes in a logbook; and
- v. Maintain a negative pressure in the meat processing area. Entrance doors to the meat processing area may be opened for the entrance and exit of trucks, and the doors may remain open as long as a negative pressure is maintained.
- h. Recordkeeping: The Permittee shall record the time that reasonable precautions were taken for each raw material load relative to the maximum 24 hour storage time without taking those precautions. Each exceedence of the 24-hour storage time limit and the associated calendar date shall be recorded in a logbook that shall be made available for review by the Regional Office inspector.
- i. Reporting: The Permittee shall submit semi-annual reports by January 30, and July 30 of each calendar year relative to the storage of raw material. Each semi-annual report shall include:
  - (A) Calendar dates covered in that period; and
  - (B) Exceedences of the 24-hour storage time limit.
- j. To prevent odorous emissions from the proposed process, the optimum control efficiency of the new venturi scrubbers (**ID Nos. CD-12 and CD-16**), the new packed tower scrubber (**ID No. CD-14**), the new cross-flow scrubber (**ID No. CD-15**), condenser (internal to Supercookor® ES-8), and boiler (**ID No. B6**) shall be maintained. To ensure these control devices are maintained, the Permittee shall perform inspections and maintenance as recommended by the manufacturer.
- k. Inspection and Maintenance Requirements: The inspection and maintenance conditions apply to each control device regardless of whether the control device is in service at any given point in time.
  - i. To comply with the provisions of this Permit and ensure that maximum control efficiency is maintained, the Permittee shall perform periodic inspections and maintenance as recommended by the manufacturer. As a minimum, the inspection and maintenance program will include:
    - (A) Weekly inspection of scrubbers, including spray nozzles, packing material, and chemical feed system (chlorine dioxide or equivalent) to ensure proper operation.
    - (B) Weekly inspection of mist eliminators to ensure that each system is draining properly,
    - (C) Weekly visual inspection of condensers, including ductwork leading to and coming from the condenser.
    - (D) Weekly inspection and replacement, as needed, of all instrumentation associated with control devices (including pH meters, pressure gauges, temperature gauges, etc.).
    - (E) Semi-annual calibration of chlorine dioxide generation system.
    - (F) Daily inspection and replacement, as needed, of flow meters associated with fuel rate to boiler.
    - (G) Annual internal inspection of the control devices and external inspection of associated ductwork to ensure structural integrity.
  - ii. Non-condensable vapor from the Supercookor® (**ID No. ES-8**), cannot be exhausted from the venturi scrubber (**ID No. CD-12**) to the packed bed scrubber (**ID No. CD-14**) (backup control) unless boiler (**ID No. B6**) cannot be used for odorous emission combustion per 2D .0539.

**For Odor Control Devices:**

- l. Monitoring Requirements: The Permittee shall monitor and record which control devices are used during all hours of operation. If the control device is not operating within the permitted operating parameter a maintenance request shall be recorded in a logbook as well as the date that the corrective action was completed. *Note: \*\*\* monitoring and operational values are to be determined during the initial performance test.*

**Scrubbers:**

- i. The Permittee shall ensure the proper performance of the scrubber by monitoring scrubbant flow pressure, oxidation reduction potential, and exit gas temperature, as indicated for each scrubber. The packing of each packed tower scrubber shall be cleaned or replaced on a weekly basis to ensure proper operation in lieu of monitoring of pressure drop across the tower. In addition, each venturi scrubber shall be inspected internally and cleaned weekly to ensure proper operation.

**Non-Condensable and High Intensity Systems Scrubbers:**

- (A) Venturi scrubber (**ID No. CD-12 and CD-16**) shall maintain a minimum scrubbant (water) flow pressure of \*\*\* psig, and the pressure shall be recorded once a day. The maximum temperature of the gas exiting the scrubber shall not exceed \*\*\* degrees Fahrenheit, and the exit gas temperature shall be recorded once a day. Daily monitoring of the pressure and the gas temperature shall be performed to ensure proper operation.
- (B) Packed bed scrubber (**ID No. CD-14**) shall maintain a scrubbant (chlorine dioxide or equivalent) flow pressure of \*\*\* to \*\*\*, and the pressure shall be recorded once a day. This scrubber shall utilize chlorine dioxide or an equivalent oxidizing agent to control odors. The oxidation-reduction potential shall be monitored continuously utilizing hourly averaging and shall not fall below \*\*\* for more than four hours.

An oxidation/reduction potential below for more than four hours is a reportable exceedance. Daily monitoring of the scrubbant flow pressure, hourly monitoring of the oxidation/reduction potential, and the minimum oxidation/reduction potential (as described above) shall be performed to ensure proper operation.

**Fugitive Room Air: Facility-wide Rendering Process**

- (C) Cross-flow scrubber (**ID No. CD-15**) shall maintain a scrubbant (chlorine dioxide or equivalent) flow pressure of \*\*\* to \*\*\*, and the pressure shall be recorded once a day. The maximum temperature of the gas exiting the scrubber shall not exceed \*\*\* degrees Fahrenheit, and the exit gas temperature shall be recorded once a day. Daily monitoring of the pressure and the gas temperature shall be performed to ensure proper operation.

**Boiler:**

- ii. Boiler (ID No. ES-B6) when used as a control device shall be equipped with a device to continuously measure and record the amount of fuel flow into the boiler. The Permittee shall daily record the date, time, and the fuel flow rate into the boiler while the boiler is being used as a control device.

**Recordkeeping** [15A NCAC 2Q .0508(f)]

- m. The Permittee shall maintain a logbook (written or electronic format) for each control device. This logbook(s) shall include the results of all inspection and maintenance and monitoring activities. The logbook(s) shall be kept on site and made available to the authorized DAQ representative upon request.
  - i. The results of the inspection and maintenance performed shall be maintained in a logbook (written or electronic format). This logbook shall be on site and made available to the authorized DAQ representative.
    - (A) Date and time of actions;
    - (B) The results of each inspection;
    - (C) The results of any maintenance performed on the control devices and/or chemical feed system; and
    - (D) Any variance from the manufacturer's recommendations, if any, and corrections made.

- ii. The results of the required monitoring shall be maintained in a logbook (written or electronic format) on site and made available to the authorized DAQ representative upon request. The logbook shall record the following:
  - (A) The proper operating range for each parameter being monitored;
  - (B) The observed operating parameter at the time it was monitored;
  - (C) Date and time of this observation;
  - (D) Corrective action taken if the control device is not operating in the proper operating range; and
  - (E) Date and time corrective action completed.

**Reporting** [15A NCAC 2Q .0508(f)]

- n. The Permittee shall submit the results of any maintenance performed on the condenser, venturi scrubbers, packed tower scrubber, cross-flow scrubber and process boiler used as control devices within 30 days of a written request by the DAQ.
- o. The Permittee shall submit a summary report of monitoring and record keeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

**VII. PREVENTION OF SIGNIFICANT DETERIORATION (PSD)**

PSD regulations apply to major “sources” of pollutants. Since CBP Rose Hill facility is considered a major source with regards to PSD and because the facility is being modified, PSD applies to each regulated pollutant with a significant emissions increase resulting from the project and a significant net emissions increase from the source. The significance thresholds for PSD are summarized in Table 4 below along with the proposed emissions from the project.

- A. Valley Protein proposes the operating time for the new boiler and the new Supercookor® be limited to not more than 7,250 hours per year. They plan to fire the new boiler (ES-B6) with No. 6 fuel oil (maximum sulfur content 2.1%), No. 4 fuel oil (maximum sulfur content 2.0%), No. 2 fuel oil (0.5% maximum sulfur content in NC), and saleable fat.

The boiler is to be controlled by a venturi spray tower scrubber (CD-13) with caustic injection to meet the PM and the SO<sub>2</sub> requirements of NSPS Subpart Dc. The monitoring parameters will be determined during the initial performance test.

The emission factors used to calculate potential emissions are taken from the USEPA’s AP-42, fifth edition Compilation of Air Pollution Emissions Factors, Volume 1, and data supplied by CBP - Rose Hill. For PSD, the particulate emission rate is for both total particulate (filterable + condensable) and total PM10 (filterable + condensable).

PM and VOCs will be emitted by the new Supercookor®. Emissions of other criteria pollutants are not expected. The Supercookor® emissions will be collected and routed through a venturi scrubber (CD-12) with water injection, and then optionally to the new boiler (CD-B6) for incineration or through the new packed bed scrubber (CD-14) with chlorine dioxide or equivalent injection where PM and VOC emissions are partially removed.

Fugitive emissions from the process will be captured via room air and routed through the new cross flow scrubber (CD-15) with chlorine dioxide injection or equivalent. The controlled VOC emission are based on a conservative emission factor contained in a NC DAQ memorandum, Estimation of Emission of VOCs from Rendering facilities, dated August 14, 2000 from Mr. B. Keith Overcash. Because the boiler will be limited to a maximum emission rate for PM and the amount of VOCs to be incinerated is very small in comparison to the amount of fuel burned, the effect or rendering emissions when processed through boiler are insignificant and not quantifiable beyond the emissions from fuel burning.

**Table 1: AP-42 fuel emission factors except for “fat” which is a factor supplied by Valley Protein**

Description	No. 6 (2.1% sulfur)	No. 4 (2.0% sulfur)	No. 2 (0.5% sulfur)	Fat
Total PM	24 lbs/1000 gallons	8.5lbs/1000 gallons	3.3 lbs/1000 gallons	6.5 lbs/1000 gallons
Total PM10	21.0 lbs/1000 gallons	5.84 lbs/1000 gal.	2.3 lbs/1000 gallons	N/A
SO <sub>2</sub>	330 lbs/1000 gallons	300 lbs/1000 gallons	71 lbs/1000 gallons	2.34 lbs/1000 gallons
NO <sub>x</sub>	55 lbs/1000 gallons	20 lbs/1000 gallons	20 lbs/1000 gallons	38.1 lbs/1000 gallons
CO	5.0 lbs/1000 gallons	5.0 lbs/1000 gallons	5.0 lbs/1000 gallons	2.21 lbs/1000 gallons
VOC	0.28 lbs/1000 gallons	0.34 lbs/1000 gal.	0.2 lbs/1000 gallons	0.135 lbs/1000 gallons
Lead	.0015 lbs/1000 gal.	.0015 lbs/1000 gal.	.00126 lbs/1000 gal.	N/A
H <sub>2</sub> SO <sub>4</sub>	5.15 lbs/1000 gallons	5.15 lbs/1000 gal.	5.15 lbs/1000 gallons	0.04 lbs/1000 gallons
Flourides	.0373 lbs/1000 gal.	.0373 lbs/1000 gal.	.0373 lbs/1000 gal.	N/A

**Example calculations using AP-42 emission factors and Valley Protein Data:**

*Worse Case uncontrolled particulate emission rate from boiler ES-B6 is when firing No. 6 fuel oil and the Supercooker® is being vented to the boiler through control device (CD-12). Note: the application did not give a control efficiency for the scrubber (CD-12) alone, therefore the entire amount emitted by the Supercooker® has been included in the following calculation.*

$$\text{lbs Total PM / hour with boiler firing No.6 fuel oil} = \frac{24 \text{ lbs PM}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{12.6 \text{ lbs total PM}}{\text{hour}}$$

$$\text{lbs Total PM / hour from supercooker through boiler} = \frac{1.0 \text{ lbs Total PM}}{\text{ton of product}} \times \frac{35 \text{ tons product}}{\text{hour}} \times (1 - 0.99, \text{ boiler}) = \frac{0.35 \text{ lbs total PM}}{\text{hour}}$$

$$\text{Combined total PM emission rate} = 10.23 + 0.35 = 12.95 \text{ lbs total PM/hour}$$

*Worse Case uncontrolled total PM10 rate from boiler ES-B6 is when firing No. 6 fuel oil and the supercooker® is being vented to the boiler through control device (CD-12).*

$$\text{lbs Total PM10 / hour from fuel oil} = \frac{21.0 \text{ lbs Total PM10}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{11.02 \text{ lbs Total PM10}}{\text{hour}}$$

$$\text{lbs Total PM / hour from supercooker through boiler} = \frac{1.0 \text{ lbs Total PM}}{\text{ton of product}} \times \frac{35 \text{ tons product}}{\text{hour}} \times (1 - 0.99, \text{ boiler}) = \frac{0.35 \text{ lbs Total PM10}}{\text{hour}}$$

$$\text{Combined total emission rate} = 11.02 + 0.35 = 11.37 \text{ lbs total PM/hour}$$

**Worse Case uncontrolled particulate matter and PM10 from supercooker® (ES-8)**

$$\text{lbs Total PM / hour} = \frac{1.0 \text{ lbs Total PM}}{\text{ton of product}} \times \frac{35 \text{ tons product}}{\text{hour}} = \frac{35.0 \text{ lbs Total PM10}}{\text{hour}}$$

**Worse Case uncontrolled sulfur dioxide emission rate from boiler ES-B6 is when firing No. 6 fuel oil.**

$$\text{lbs SO}_2 \text{ / hour with boiler No. 6 firing fuel oil} = \frac{330 \text{ lbs SO}_2}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{173.14 \text{ lbs SO}_2}{\text{hour}}$$

**Worse Case uncontrolled carbon monoxide emission rate from boiler ES-B6 is when firing No. 6 fuel oil.**

$$\text{lbs CO / hour with boiler No. 6 firing fuel oil} = \frac{5.0 \text{ lbs CO}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{2.62 \text{ lbs CO}}{\text{hour}}$$

**Worse Case uncontrolled nitrogen dioxide emission rate from boiler ES-B6 is when firing No. 6 fuel oil.**

$$\text{lbs NO}_x / \text{hour with boiler No. 6 firing fuel oil} = \frac{55.0 \text{ lbs NO}_2}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{28.86 \text{ lbs NO}_2}{\text{hour}}$$

**Worse Case uncontrolled volatile organic compound emission rate from boiler ES-B6 is when firing No. 4 fuel oil.**

$$\text{lbs VOCs / hour with boiler No. 4 firing fuel oil} = \frac{0.34 \text{ lbs VOCs}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{0.18 \text{ lbs VOCs}}{\text{hour}}$$

**Worse Case controlled volatile organic compound emission rate from the room air emissions (ES-10) using a crossflow scrubber were calculated using the August 14, 2000 letter from the DAQ, Keith Overcash**

$$\text{lbs VOCs / hour from room air emissions} = \frac{0.0917 \text{ lbs VOCs}}{\text{ton feedstock}} \times \frac{35 \text{ tons feedstock}}{\text{hour}} = \frac{3.21 \text{ lbs VOCs}}{\text{hour}}$$

**Worse Case controlled volatile organic compound emission rate from the Supercookor® (ES-8) using the packedbed scrubber only were calculated using the August 14, 2000 letter from the DAQ, Keith Overcash**

$$\text{lbs VOCs / hour from room air emissions} = \frac{0.0994 \text{ lbs VOCs}}{\text{ton feedstock}} \times \frac{35 \text{ tons feedstock}}{\text{hour}} = \frac{3.5 \text{ lbs VOCs}}{\text{hour}}$$

**Worse Case uncontrolled fluoride emission rate from boiler ES-B6 is when firing No. 6 fuel oil.**

$$\text{lbs flouride / hour from boiler} = \frac{0.0373 \text{ lbs flouride}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150,000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{0.0196 \text{ lbs flouride}}{\text{hour}}$$

**Worse Case uncontrolled H<sub>2</sub>SO<sub>4</sub> emission rate from boiler ES-B6 is when firing No. 6 fuel oil.**

$$\text{lbs H}_2\text{SO}_4 / \text{hour from boiler} = \frac{5.15 \text{ lbs flouride}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{150,000 \text{ Btu}} \times \frac{78.7 \times 10^6 \text{ Btu}}{\text{hour}} = \frac{2.70 \text{ lbs H}_2\text{SO}_4}{\text{hour}}$$

**Table 2: Total worse case uncontrolled/controlled emissions from calculations above (pounds per hour)**

Pollutant	Uncontrolled boiler & controlled Supercookor®	Controlled Cookor® Emissions	Controlled Room Air Emissions	Separation/Rendering Equipment Emissions
Total PM	12.95 lbs PM/hr	Varies with control scenario	N/A	N/A
Total PM <sub>10</sub>	11.37 lbs PM10/hr	Varies with control scenario	N/A	N/A
SO <sub>2</sub>	173.14 lbs SO <sub>2</sub> /hr	N/A	N/A	N/A
CO	2.62 lbs CO/hr	N/A	N/A	N/A
NO <sub>x</sub>	28.86 lbs NO <sub>x</sub> /hr	N/A	N/A	N/A
VOCs	0.18 lbs VOCs/hr	3.5 lbs/hour (stack test data)	3.21 lbs/hour (stack test data)	Included in cookor® emissions
Pb	0.0 lbs Pb/hr	N/A	N/A	N/A
Fluorides	0.0196 lbs Fluorides/hr	N/A	N/A	N/A
H <sub>2</sub> SO <sub>4</sub>	2.7 lbs H <sub>2</sub> SO <sub>4</sub> /hr	N/A	N/A	N/A

**Facility control operating scenarios for this project:**

**(Particulate control)**

scenario (1) = Venturi spray tower scrubber (CD-13, @ 82.5% efficiency) on boiler exhaust (ES-B6)

scenario (2) = Boiler (ES-6) and venturi scrubber (CD-12) on Supercookor® exhaust (ES-8) = total of 99.0% efficiency

scenario (3) = Packed Bed scrubber (CD-14) and venturi scrubber (CD-12) on Supercookor® exhaust (ES-8) = 95%

**(Sulfur dioxide control)**

scenario (1) = Venturi Spray tower scrubber (CD-13) on boiler (ES-B6) emissions = 93.8% for sulfur dioxide

**(Volatile Organic Compounds)**

scenario (2) = Boiler (CD-B6) and venturi scrubber (CD-12) on Supercookor® exhaust (ES-8) (data from stack test used to calculate after control emissions)

scenario (3) = Packed Bed Scrubber (CD-14) and venturi scrubber (CD-12) on Supercookor® exhaust (ES-8) = (data from stack test used to calculate after control emissions)

**Example calculations using the worse case controlled operating scenarios:**

Tons per year of total PM from Supercookor® (ES-8) vented through CD-12 and CD-14.

$$= \frac{35 \text{ lbs PM}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times (1 - 0.95, \text{ scenario 3}) \times 10\% \text{ of time} = \frac{0.63 \text{ tons PM}}{\text{year}}$$

Tons per year of total PM from boiler (ES-6) vented through CD-13.

$$= \frac{12.95 \text{ lbs PM}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times (1 - 0.825, \text{ scenario 1}) = \frac{8.22 \text{ tons PM}}{\text{year}}$$

\*\*\*\*\*

Tons per year of total PM10 from Supercookor® (ES-8) vented through CD-12 and CD-14.

$$= \frac{35 \text{ lbs total PM10}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times (1 - 0.95, \text{ scenario 3}) \times 10\% \text{ of time} = \frac{0.63 \text{ tons total PM10}}{\text{year}}$$

Tons per year of total PM10 from boiler (ES-6) vented through CD-13.

$$= \frac{11.37 \text{ lbs total PM10}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times (1 - 0.825, \text{ scenario 1}) = \frac{7.21 \text{ tons total PM10}}{\text{year}}$$

\*\*\*\*\*

Tons per year of SO<sub>2</sub> from boiler (ES-6) vented through CD-13.

$$= \frac{173.14 \text{ lbs SO}_2}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times (1 - 0.938, \text{ scenario 1}) = \frac{38.9 \text{ tons SO}_2}{\text{year}}$$

\*\*\*\*\*

Tons per year of CO from boiler (ES-6) vented through CD-13.

$$\text{tpy CO from boiler} = \frac{2.62 \text{ lbs CO}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{9.5 \text{ tons CO}}{\text{year}}$$

Tons per year of NOx from boiler (ES-6) vented through CD-13.

$$= \frac{28.86 \text{ lbs } NO_x}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{104.62 \text{ tons } NO_x}{\text{year}}$$

\*\*\*\*\*

Tons per year of VOCs from Supercookor® vented through packed bed scrubber (CD-14) and Room air vented through crossflow scrubber (CD-15).

$$\text{tpy VOCs from cooker} = \frac{3.5 \text{ lbs VOCs (control efficiency included)}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{12.69 \text{ tons VOCs}}{\text{year}}$$

$$\text{tpy VOCs from room air (crossflow scrubber)} = \frac{3.21 \text{ lbs VOCs (control efficiency included)}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{11.64 \text{ tons VOCs}}{\text{year}}$$

$$\text{tpy flourides from boiler} = \frac{0.0196 \text{ lbs flourides}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{0.07 \text{ tons flouride}}{\text{year}}$$

$$\text{tpy } H_2SO_4 \text{ from boiler} = \frac{2.7 \text{ lbs } H_2SO_4}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times (1 - 0.938, \text{scenario 1}) = \frac{0.61 \text{ tons } H_2SO_4}{\text{year}}$$

**Table 3: Emissions at 7250 hours per year**

Pollutant	CD-13 on B-6, on CD-12, and CD-12 on ES-8,	CD-14 on CD-12 on on ES-8	Controlled Room Air Emissions (CD-15)	Controlled Rendering Equipment (CD-14 only)	Controlled Rendering Equipment (CD-B6 & CD-13)
Total PM	8.22 tpy	0.63 tpy	N/A	N/A	N/A
Total PM10	7.99 tpy	0.63 tpy	N/A	N/A	N/A
SO <sub>2</sub>	38.91 tpy	N/A	N/A	N/A	N/A
CO	9.5 tpy	N/A	N/A	N/A	N/A
NOx	104.62 tpy	N/A	N/A	N/A	N/A
VOCs	0.65 tpy	12.69 tpy	11.64 tpy	Included with cooker (ES-8) emissions	Included with cooker (ES-8) emissions
Pb	0.0 tpy	N/A	N/A	N/A	N/A
Fluorides	0.07 tpy	N/A	N/A	N/A	N/A
H <sub>2</sub> SO <sub>4</sub> mist	0.61 tpy	N/A	N/A	N/A	N/A

**Table 4: Comparison of emissions to PSD Significant Thresholds (annual operation of 7250 hours)**

Pollutant	Boiler	Process	Worse case total emissions	Significant Threshold	Significant ?
Total PM	8.22 tpy	0.63 tpy	8.85 tpy	25 tons per year	No
Total PM10	6.5 tpy	0.63 tpy	7.13 tpy	15 tons per year	No
SO <sub>2</sub>	38.91 tpy	0.0 tpy	38.91 tpy	40 tons per year	No
CO	9.5 tpy	0.0 tpy	9.5 tpy	100 tons per year	No
NOx	104.62 tpy	0.0 tpy	104.62 tpy (applicant requested limit = 120 tpy)	40 tons per year	Yes
VOCs	0.65 tpy	24.33 tpy	24.98 tpy	40 tons per year	No
Pb	0.0 tpy	0.0 tpy	0.0 tpy	0.6 tons per year	No
Fluorides	0.07 tpy	0.0 tpy	0.07 tpy	3 tons per year	No
H <sub>2</sub> SO <sub>4</sub> mist	0.61 tpy	0.0 tpy	0.61 tpy	7 tons per year	No

The **requested** NOx emissions for the project (120 tons per year, which includes limited hours of annual operation), will be greater than the “significant threshold” (40 tons per year), Valley Proteins is required to go through the PSD procedure and evaluate BACT for NOx emissions.

**VIII. Best Available Control Technology (BACT)**

Under PSD regulations, the basic control technology requirement is the evaluation and application of BACT. BACT is defined as follows [40 CFR 51.155 (b)(12)]:

*An emissions limitation...based on the maximum degree of reduction for each pollutant... which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable... for control of such a pollutant.*

As evidenced by the statutory definition of BACT, this technology determination must include a consideration of numerous factors. The structural and procedural framework upon which a decision should be made is not prescribed by Congress under the Act. This void in procedure has been filled by several guidance documents issued by the federal EPA. The only final guidance available is the October 1980 "Prevention of Significant Deterioration – Workshop Manual." As the EPA states on page II-B-1, "A BACT determination is dependent on the specific nature of the factors for that particular case. The depth of a BACT analysis should be based on the quantity and type of pollutants emitted and the degree of expected air quality impacts." (emphasis added). The EPA has issued additional DRAFT guidance suggesting the use a "top-down" BACT determination method. While the EPA Environmental Appeals Board recognizes the "top-down" for delegated state agencies, this procedure has never undergone rulemaking and as such, the "top-down" process is not binding on fully approved states, including North Carolina.

The Division prefers to follow closely the statutory language when making a BACT determination and therefore the BACT determination is based on an evaluation of the statutory factors contained in the definition of BACT in the Clean Air Act. As stated in the legislative history and in EPA's final October 1980 PSD Workshop Manual, each case is different and the state must decide how to weigh each of the various BACT factors. The following are passages from the legislative history of the Clean Air Act and provide valuable insight for state agencies when making BACT decisions.

*The decision regarding the actual implementation of best available technology is a key one, and the committee places this responsibility with the State, to be determined on a case-by-case judgment. It is recognized that the phrase has broad flexibility in how it should and can be interpreted, depending on site.*

*In making this key decision on the technology to be used, the State is to take into account energy, environmental, and economic impacts and other costs of the application of best available control technology. The weight to be assigned to such factors is to be determined by the State. Such a flexible approach allows the adoption of improvements in technology to become widespread far more rapidly than would occur with a uniform Federal standard. The only Federal guidelines are the EPA new source performance and hazardous emissions standards, which represent a floor for the State's decision.*

*This directive enables the State to consider the size of the plant, the increment of air quality which will be absorbed by any particular major emitting facility, and such other considerations as anticipated and desired economic growth for the area. This allows the States and local communities to judge how much of the defined increment of significant deterioration will be devoted to any major emitting facility. If, under the design which a major facility proposes, the percentage of increment would effectively prevent growth after the proposed major facility was completed, the State or local community could refuse to permit construction, or limit its size. This is strictly a State and local decision; this legislation provides the parameters for that decision.*

*One of the cornerstones of a policy to keep clean areas clean is to require that new sources use the best available technology available to clean up pollution. One objection which has been raised to requiring the use of the best available pollution control technology is that a technology demonstrated to be applicable in one area of the country is not applicable at a new facility in another area because of the differences in feedstock material, plant configuration, or other reasons.*

*For this and other reasons the Committee voted to permit emission limits based on the best available technology on a case-by-case judgment at the State level. [emphasis added]. This flexibility should allow for such differences to be accommodated and still maximize the use of improved technology.*

Legislative History of the Clean Air Act Amendments of 1977 (p. \_\_\_\_).

**A. RBLC Database Search Results Summary for Nitrogen Oxides Controls**

A BACT analysis was conducted for NOx emissions for boiler (ES-B6) assuming a baseline scenario of combustion of No. 6 fuel oil with a nitrogen content of 0.4 percent by weight. The RBLC database was queried for emission sources and control devices of NOx emissions for boilers. Specifically the following parameters were entered into the search page:

- Permit dates: 01/01/96 – 02/16/2006
- Processes information: 13.210 – Residual Fuel oil (ASTM #4, 5, 6)
- Process name: Blank
- Pollutant Name: NOx
- Corporate/Company or Facility Name Contains: Blank
- Facility State: All States

**RBLC Database Search Results Summary For Nitrogen Oxides Controls**

RBLC ID	Boiler Capacity (mmBtu/hr heat input)	Fuel	Emission limit (lbs/mmBtu heat input)	Emission Limit (lbs/hour)	Control Method
WA-0313	50.20	No. 6 fuel oil	0.099	4.52	Low NOx burners, flue gas recirculation, and steam atomization
OK-0092	145.00	Fuel oil	0.045	6.53	Ultra-low NOx burners
OK-0092	135.00	Fuel oil	0.059	8.04	Ultra-low NOx burners
DE-0017	75.00	No. 6 fuel oil	None	None	Low NOx burner annual burner tune-up required. No emission rate limit, controls only
ME-0017	98.67	Residual oil	0.300	6.76	Low NOx burners, staged air, flue gas recirculation
NY-0089	67.00	No. 6 fuel oil	0.4250	28.48 and 31.8*	Burner timing/ oxygen trim, oil use restricted to 1,000,000 gallons per year
NJ-0046	94.00	No. 6 fuel oil	0.2798	26.3	Low NOx burner

\* tons per year due to restriction on total fuel usage

In the RBLC, no add on control devices were identified as being applicable to this type of boiler (firetube) installation. The control methods that were employed include burner controls to achieve the NOx levels in the form of fuel usage restrictions, low or ultra-low NOx burners, and other burner controls.

Low NOx burners and staged air are not applicable to fire tube boilers. Low NOx burners apply to water tube boilers (tubes filled with water, and firebox surrounds tubing). The Low NOx technology requires sufficient volume and distance for mixing and controlled combustion of the flame to reduce the production of thermal NOx. A fire-tube boiler does not have sufficient volume to accomplish reduction in NOx emissions. Also, controlled combustion is only effective for thermal NOx. Fuel-bound NOx production is not affected. Therefore, low NOx burners are not an available option for the fire tube boiler.

The vendor for the proposed boiler also indicated that flue gas recirculation is not a viable control technology. The vendor's boilers have never been equipped or retrofitted with flue gas recirculation. The size of the boiler and the level of particulates and acid gases make flue gas recirculation technically infeasible.

Steam atomization is the most economical and common method of atomization for No. 6 fuel oil. Steam atomization lowers NOx formation by reducing flame temperatures. This is a technically feasible option.

The remaining control technology employed on the boiler listed in the RBLC table is an annual burner tune-up. This is a technically feasible option.

**B. Clean Air Technology Center (CATC) Technical Bulletins and Air Pollution Technology Fact Sheets**

The CATC Fact sheets were also reviewed to determine if any other control technologies for NOx emissions from combustion are available. The review indicated that SNCR or SCR may be applicable add on control technologies for the proposed boiler.

- Air staging
- Burners out of Service (BOOS)
- Catalytic Combustion
- Flue Gas Recirculation
- Combustion Optimization (Annual burner tune up and reduced air preheat)
- Fuel Staging
- Low NOx Burners (LNB)
- Less Excess Air (LEA)
- Overfire Air (OFA)
- Water or Steam Injection
- Natural Gas Reburning (NGR)/Fuel Reburning (FR)
- Low Nitrogen Fuels (No. 2 and No. 4)
- Steam Atomization (No. 6)

**Elimination of Technically Infeasible Control Options**

**BOOS** – applies to liquid, gaseous, or pulverized solid fuel boilers with multiple burners. The proposed boiler has only one burner. *Therefore, this control option is not technically feasible.*

**Catalytic Combustion** is only applicable to sources that combust fuels without significant quantities of ash such as gas and distillate oils. Fuels with ash will tend to plug the catalyst bed or blind the catalyst reducing the effectiveness. Further more, the gases exiting the catalyst bed are at a significantly lower temperature than conventional combustion techniques. The lower temperatures require significantly more heat transfer surface to achieve the desired temperatures increase in heat transfer fluid and reduce the efficiency of the boiler. *Due to the ash content of residual fuel, this option is not technically feasible.*

**NGR/FR** requires the addition of a secondary combustion stage to the boiler where a low-nitrogen fuel such as natural gas is injected into the flue gas. This technology is primarily applicable to large (much greater than 100 mmBtu per hour heat input) fluidized bed boilers. The vendors of the proposed boiler do not manufacture a unit with a secondary combustion chamber. *Therefore, this option is technically infeasible for control of the emissions from the proposed boiler.*

SCR involves passing the boiler exhaust gases across a catalyst bed that selectively converts the NOx emissions to nitrogen and oxygen. These catalyst beds are normally applied in low-sulfur and low – particulate applications because the sulfur and particulate emissions reduce the chemical activity of the catalyst, eventually rendering it ineffective. The ideal application is combustion of natural gas because of the low particulate and sulfur emissions. Fuel oil by comparison has high sulfur and particulate concentrations. Despite these considerations, SCR is technically feasible. However, the total NOx emissions from this boiler are such that there is no reasonable expectation that the cost of installing SCR on a unit of this size would be cost effective. *Therefore, this technology is not feasible.*

SNCR involves the injection of ammonia into the combustion chamber to reduce NOx compounds into nitrogen and water. This technology has been shown to achieve 50 percent reduction of NOx emission in certain applications. Two critical design factors for SNCR system are temperature and residence time. In general, ammonia must be injected into the boiler in such a manner that the temperature is maintained between 1,550 degrees F and 1,950 degrees F. The temperature must remain in this range for at least one second. The inherent design of the fire-tube boiler is not capable of maintaining the temperature at this level for the necessary timeframe. *Therefore, this technology is not feasible.*

**Low NOx Burners/FGR/Air-fuel Staging/Steam injection/LEA/OFA** are considered combustion control technologies for reduction of NOx emissions employed in low NOx burner design. Low NOx burners and these associated technologies are not technically feasible because of the boiler design which does not have a large combustion chamber. Typical low NOx firing is achieved by inducing flue-gas recirculation (FGR) through the fresh air fan. Putting FGR on oil firing is not a good practice and does not yield as much NOx reduction as it does on natural gas because of the fuel bound nitrogen content in the oil. Pulling an exhaust stream containing ash particles across a fan or other burner surfaces causes erosion. *Therefore, this technology is not feasible.*

Steam atomization is a potentially viable technology for BACT (requires steam produced by the boiler to be used in the combustion process). This is a technically feasible option.

**Effectiveness of the remaining Control Technologies**

The potential effectiveness of the remaining control options has been evaluated by reviewing manufacturer information, USEPA documents, and other sources of data. The remaining control options and their associated anticipated efficiency.

**Table 6: Effectiveness of Feasible NOx Control technologies**

<b>Control Option</b>	<b>Efficiency</b>
No. 5 Fuel Oil (inherently lower nitrogen)	33%
No. 4 Fuel Oil (inherently lower nitrogen)	34%
No. 2 Fuel Oil (inherently lower nitrogen)	71%
Steam Atomization	14%
Combustion optimization	0% <sup>(1)</sup>

<sup>1</sup> Baseline emissions from the proposed boiler

Vendor data indicates that an average emission rate of 0.49 lbs NOx/mmBtu can be achieved by incorporating good combustion practices in the boiler/burner design. These combustion practices may include combustion optimization and reduced air preheat. Vendors also recommend annual inspections and maintenance of the burner assembly to ensure that the burner operates as it was designed. **This emission factor (0.49 lbs NOx/mmBtu) does not include the selected control technology (steam injection).**

NOx emissions can be reduced through use of low-nitrogen fuels and steam atomization. The reduction in nitrogen content results in a direct reduction of fuel-bound NOx emissions. Steam atomization can reduce NOx formation by reducing flame temperatures, thereby reducing NOx formation.

**Evaluation of Most Effective Control Technologies and Selection of BACT**

The BACT analysis is a three-part investigation that includes economic, energy, and environmental impacts. Each of the remaining options was reviewed with respect to the impacts to determine if they meet BACT requirements.

**Economic Analysis:**

The economic analysis is composed of a calculation of the control technology’s average cost effectiveness (ACE) based on a comparison of the cost of each feasible control technology in terms of cost per mass of pollutant removed.

The ACE was determined by estimating the capital cost for an installed system and the resulting annual operating and maintenance costs. Vendor costs were utilized to estimate the capital investment and the annual operation and maintenance cost for each of the technically feasible control options.

$$ACE = \frac{(Control\ Option\ Annual\ Cost)}{(Baseline\ Emission\ Rate - Control\ Option\ Emission\ Rate)}$$

The baseline NOx emission are based on operation at peak capacity and an emission factor of 0.49 lbs NOx per million Btu heat input (Boiler manufacturer data), will yield an annual potential NOx emission rate of 140 ton per year operating at 7250 hours per year.

$$Baseline\ Emission\ Rate = \frac{0.49\ lbs\ NOx}{10^6\ Btu} \times \frac{78.7 \times 10^6\ Btu}{hour} \times \frac{7,250\ hours}{year} \times \frac{1\ ton\ NOx}{2000\ lbs\ NOx} = \frac{139.8\ tons\ NOx}{year} (140\ tpy)$$

**Table C-2: Uncontrolled Pollutant Potential-To-Emit From Fuel Burning**

Fuel →	0.4% Nitrogen 2.1% Sulfur No. 6 fuel oil	0.4% Nitrogen 1.5% Sulfur No. 6 fuel oil	0.4% Nitrogen 0.5% Sulfur No. 6 fuel oil	0.195% Nitrogen 1.5-2% Sulfur No. 5 fuel oil	0.15% Nitrogen 1.0-1.5% Sulfur No. 4 fuel oil	< 500 ppm Sulfur No. 2 fuel oil
Boiler Capacity	78.7	78.7	78.7	78.7	78.7	78.7
Fuel Consumption Rate (1000-gal/hr)	0.522	0.529	0.531	0.535	0.541	0.562
Annual Boiler Operating Time (hrs/yr)	7,250	7,250	7,250	7,250	7,250	7,250
Annual Total Fuel Consumption (1000-gal/yr)	3,7814	3,835	3,847	3,880	3,923	4,075
NOx Emission (tpy)	139.8	139.8	139.8	106.8	92.1	40.8

The control option emission rate is estimated by multiplying the baseline emission rate by 1 minus the control efficiency. As an example, the control option emission rate for an emission reduction of 71% (using low nitrogen No. 2 fuel oil) is calculated as follows:

$$(139.8\ tpy) \times (0.71) = 99.26\ tons\ removed\ (using\ the\ low\ sulfur\ No.\ 2\ fuel\ oil\ as\ the\ example)$$

**Table C-3: Alternative Fuel Removal Efficiency**

Fuel →	0.4% Nitrogen 2.1% Sulfur No. 6 fuel oil	0.4% Nitrogen 1.5% Sulfur No. 6 fuel oil	0.4% Nitrogen 0.5% Sulfur No. 6 fuel oil	0.195% Nitrogen 1.5-2% Sulfur No. 5 fuel oil	0.15% Nitrogen 1.0-1.5% Sulfur No. 4 fuel oil	Less than 500 ppm Sulfur No. 2 fuel oil
NOx Emission Reduction	0 tpy	0 tpy	0 tpy	33.0	47.7	99.0
NOx Emission Reduction Efficiency	0%	0%	0%	24%	34%	71%

**The control technology removal efficiency for NOx emissions using Steam Atomization is 14% and is based on data supplied by the manufacturer.**

The values listed in table C-6 were calculated in the following manner when using No. 2 fuel oil (negligible nitrogen content, and < 500 ppm S content) as the example:

$$\text{Direct and Annual Costs} = \frac{562 \text{ gallons No.2 fuel oil}}{\text{hour}} \times \frac{7,250 \text{ hours}}{\text{year}} \times \frac{\$2.765}{\text{gallon No.6 fuel oil}} = \frac{\$11,268,000}{\text{year}}$$

The increase in annual costs for using No. 2 fuel oil with negligible nitrogen content, and < 500 ppm S as compared to using the cheaper base line fuel (0.4% nitrogen, 2.1% S No. 6) is as follows:

$$\$11,268,000 - \$6,934,000 = \$4,334,000$$

$$\begin{aligned} \text{Annualized Cost of Fuel Substitution} &= \text{increased fuel cost} + \text{annualized capital cost} \\ \$4,334,000 + \$12,000 &= \$4,346,000 \end{aligned}$$

To determine the average cost effectiveness (ACE) for this example, the ACE equation is used.

$$ACE = \frac{(\text{Control Option Annual Cost})}{(\text{Baseline Emission Rate} - \text{Control Option Emission Rate})}$$

$$ACE = \frac{\$4,346,000 / \text{year}}{(139.8 \text{ tons} / \text{year} - 40.8 \text{ tons} / \text{year})} = \frac{\$43,899}{\text{ton}}$$

Table C-6: Fuel Substitution Direct and Annual Costs

Parameter	Fuel Oil Type					
	0.4% N <sub>2</sub> 2.1% S No. 6	0.4% N <sub>2</sub> 1.5% S No. 6	0.4% N <sub>2</sub> 0.5% S No. 6	0.195 N <sub>2</sub> 1.5-2.0% S No. 5	0.195 N <sub>2</sub> 1.0-1.5% S No. 4	Negligible N <sub>2</sub> <500 ppm S No. 2
Boiler Capacity (mmBtu/hr)	78.7	78.7	78.7	78.7	78.7	78.7
Fuel Heat Content (Btu/gal) <sup>1</sup>	150,900	148,765	148,300	147,050	145,450	140,000
Fuel Consumption Rate (\$1000-gal/hr) <sup>2</sup>	0.522	0.529	0.531	0.535	0.541	0.562
Annual Boiler Operating Time (hrs/yr)	7,250	7,250	7,250	7,250	7,250	7,250
Annual Total Fuel Consumption (1000-gal/yr) <sup>3</sup>	3,781	3,835	3,847	3,880	3,923	4,075
Fuel Unit Cost (\$/gal) <sup>4</sup>	1.834	2.169	2.171	2.175	2.318	2.765
Annual Fuel Cost (\$1000/yr) <sup>5</sup>	6,934	8,319	8,353	8,439	9,092	11,268
Increased Annual Fuel Cost (\$1000/yr) <sup>6</sup>	0	1,385	1,419	1,505	2,158	4,334
Annualized Total Capital Investment (\$1000/yr) <sup>7</sup>	0	12	12	12	12	12
Annual Cost of Fuel Substitution (\$1000/yr) <sup>8</sup>	0	1,397	1,431	1,517	2,170	4,346
NOx Emission Reduction (tpy)	0	0	0	32.97	47.66	99.03
Cost Effectiveness of Fuel Substitution (\$/ton)	N/A	N/A	N/A	46,006	45,522	43,883

<sup>1</sup> Heat content from Supplier Marketing Specifications and AP-42, Table 1.3-1; heat content for Fat Bypoduct provided by Valley Proteins.

<sup>2</sup> Consumption Rate (1000-gal/hr) = Boiler Capacity (mmBtu/hr) \* 10<sup>6</sup> (Btu/mmBtu)/Fuel heat Content (Btu/gal) \* 0.001 (1000 gal/gal)

<sup>3</sup> Annual Consumption Rate (1000 gal/hr) \* Annual Boiler Operating Time (hr/yr)

<sup>4</sup> Cost of fuel oils and fat taken from quoted averages costs for week of 1/28/2008.

<sup>5</sup> Annual Fuel Cost (\$1000/yr) = Annual total Fuel Consumption (1000-gal/yr) \* Fuel Unit Cost (\$/gal)

<sup>6</sup> Increased Annual Fuel Cost (\$1000/yr) = Annual Fuel Cost (\$1000/yr) – Annual Fuel Cost (\$1000/yr, 2.1%No. 6 F.O.)

<sup>7</sup> Total Capital Investment estimated to be \$120,000/yr; annualized at 10%/yr

<sup>8</sup> Annual Costs of Fuel Substitution (\$1000/yr) = Increased Annual Fuel Cost (\$1000/yr) + Annualized Total Capital Investment (\$1000/yr)

The control option for NOx emissions other than the fuel substitution is steam atomization. In this control option, “dry” steam produced by the boiler, is used in the combustion process to reduce NOx emission by reducing flame temperature. The basic operation of this control option is that jets of steam at a pressure of about 80psi to 120psi are directed upon a stream of pre-heated fuel oil. High velocity, high kinetic energy steam collides with the fuel oil stream. By imparting its kinetic energy to the fuel oil stream, the fuel oil is disintegrated into minuscule droplets about 0.01mm or less in diameter. The disintegrated fuel oil particles are referred to as pulverized fuel oil.

Table C-7: Steam Atomization Direct and Annual Costs

Cost Item	Cost	Totals
<b>Total Capital Investment (same as on previous page)</b>	<b>TCI</b>	\$12,000
<b>Direct Annual Costs</b>		
Fuel Consumption (1% of steam output)	\$69,760	
Total Direct Annual Costs	<b>TDAC</b>	\$69,760
<b>Indirect Annual Costs (IAC)</b>		
Capital recovery (0.10 * TCI)	1,200	
Total Indirect Costs	<b>TIAC</b>	\$1,200
<b>Total Annual Operating Costs</b>		\$70,960.4
NOx Emission Reduction (tpy) @ 14% control efficiency		20.0
<b>Cost Effectiveness of Fuel Substitution (\$/ton)</b>		≈ \$3,600

Table C-8: Average Cost Effectiveness of Nitrogen Oxides Control Options

Control Option	Average Cost Effectiveness (\$/ton)
No. 5 Fuel Oil (lower nitrogen)	\$46,000/ ton
No. 4 Fuel Oil (lower nitrogen)	\$45,500 /ton
No. 2 Fuel Oil (lower nitrogen)	\$43,900 /ton
Steam Atomization @ 14% control efficiency	\$3,600 /ton
Combustion Optimization	N/A <sup>(1)</sup>

*(1) Baseline emissions from the proposed boiler*

#### **Energy Analysis:**

An energy impact analysis is used to identify if the technically feasible control options result in any significant or unusual energy penalties or benefits. The feasible control options have been evaluated and it has been determined that no unusual energy penalties exist. Energy cost were included in the average cost effectiveness calculation for the steam atomization control option because this technology requires steam produced by the boilers to be used in the combustion process, but the heat content is not recovered.

The energy for steam atomization is not considered unusual or burdensome and the effect has been considered in the average effectiveness calculation. An analysis of energy benefits was also considered. The control options do not appear to result in any energy benefit for the facility.

#### **NOx BACT Conclusion for Boiler (ES-B6)**

*The BACT analysis was conducted for NOx emissions for the boiler assuming a baseline scenario of combustion on No. 6 fuel oil with a nitrogen content of 0.4 percent by weight and a sulfur content of 2.1%. Based upon the energy, environmental, and economic impact associated with the technically feasible control options, the add on control equipment options such as SNCR and SCR, are not technically feasible for control of NOx emissions from this boiler. Other control techniques related to good combustion practices have been incorporated into the proposed boiler’s design and operation where applicable and technically feasible.*

*BACT for NOx emissions from the proposed boiler is steam atomization, good combustion practices for boiler design, annual burner tune-ups in accordance with the manufacturer’s instruction.*

*Based on the above analysis, the NCDAQ agrees with the applicant's proposed BACT level of 0.42 lbs NOx per million Btu heat input based on the use of steam atomization, good combustion practices for boiler design, annual burner tune-ups in accordance with the manufacturer's instruction.*

**IX. PSD Dispersion Modeling Analysis/Increment Analysis**

The PSD Dispersion modeling analysis was performed by the Air Quality Analysis Branch. A full NAAQS and Increment analysis was performed for NOx. The Air Quality Analysis Branch stated in their review, that the modeling analysis shows that this facility will not cause or contribute to an exceedance, on a source-by source basis, to the Class II NAAQS and PSD Increment, North Carolina Ambient Analysis Standard (NCAAQS), and any NC toxic air pollutants Acceptable Ambient Levels (AALs). Also, per discussions with the Federal Land Manager, this facility will have no impact on any Class I areas.

**Increment Analysis:**

The Major Source Trigger date for NOx is February 8, 1988. The Minor Source Baseline date for NOx in Duplin County was September 22, 1989 by Duplin City Cogeneration.

**Permit revision R11** (dated April 4, 1996) replaced the existing boiler B4 with a similar boiler. The existing boiler (ES-B4) replaced by an identical boiler, and kept the same identification number. The engineering review for revision R11 states that there was no increase in potential emissions. Therefore, actual emissions of NOx are assumed to have not increased, and the replacement of boiler ES-B4 did not consume increment for PSD analysis purposes.

**Permit revision T15** (signed May 2, 2002) added new boiler No. B5 (34.5 million Btu/hour to replace existing boiler B1 (38.44 million Btu/hr). Boiler B1 burned up.

The existing permit at that time (T14) contained a PSD Avoidance condition of 250 tons per year for sulfur dioxide for boilers (B1 and B2), and another PSD Avoidance condition of 250 tons per year for boiler (B3 and B4). After the facility was approved to burn animal fat in each of the boilers, a 100 ton per year PSD Avoidance condition was taken for CO.

**SO<sub>2</sub> netting exercise for boilers B1, B2, and B5**

PSD limit for B1 and B2 in 2002 (fuel oil only)	Less than 250 tpy
Actual B1 emission while firing fuel oil (1999/2000 average)	117.9 tpy
New limit for boiler B2 (250 tpy – 117.9 tpy)	Less than 132.1 tpy
Limit for boiler B5 (while firing any fuel) (117.9 + 40 tpy)	Less than 157.9 tpy

*The modification performed (2002) in revision T15 to replace boiler B1 with a new boiler B5 did not consume increment.*

*Therefore, for the PSD increment analysis, these two modifications (R11 and T15) were not included in the PSD increment analysis. The source included were the proposed sources the new 440U Supercookor<sup>®</sup>, the new boiler (ES-6) and existing external sources at the Rose Hill Animal Disease Diagnostic Laboratory and the Murphy-Brown Chief Feed Mill in Rose Hill.*

**Preliminary Impact Air Quality Modeling Analysis**

An air quality preliminary impact analysis was conducted for the pollutants exceeding the corresponding SER. The modeling results were then compared to applicable Significant Impact Levels (SILs) as defined in the NSR Workshop Manual to determine if a full impact air quality analysis would be required for that pollutant.

The Valley Proteins facility is located near Rose Hill, North Carolina, which is in Duplin County. The facility area is in the coastal plains with terrain being predominantly flat and is generally agricultural and forest land. For modeling purposes, the area, including and surrounding the site, is classified rural, based on the land use type scheme established by Auer 1978.

Valley Proteins evaluated NO<sub>x</sub> significant emissions using the EPA AERMOD model. Terrain elevations were included, as were normal regulatory defaults. Sufficient receptors were placed in ambient air beginning at the fenceline (as proposed) to establish maximum impacts. Also, they used five years of pre-processed meteorology obtained from NCDAQ consisting of on-site surface data and upper air data from the National Weather surface station at Newport, NC. The processed meteorology was approved in an earlier submission to this office. Emission rates for this specific project were used, and the maximum impact was then compared to the SIL. Since the results showed an impact above the SIL, further modeling was required. The Significant Impact Area established by the SIL modeling had a radius of 2.1 km. The results are displayed in Table 2.

**Table 2 - Class II Significant Impact Results (ug/m<sup>3</sup>)**

<b>Pollutant</b>	<b>Averaging Period<sup>1</sup></b>	<b>Facility maximum Impact</b>	<b>Class II Significant Impact</b>
NO <sub>x</sub>	Annual	49	1

<sup>1</sup> High First-High (H1H) modeled impact

**Class II Area Full Impact Air Quality Modeling Analysis**

A Class II Area NAAQS and PSD increment analysis was performed for NO<sub>x</sub> to include offsite source emissions and background concentrations (NAAQS). Valley Proteins used AERMOD and modeling methodology as described above. Off-site source inventories for both increment and NAAQS modeling were obtained from NCDAQ and then refined by Valley Proteins by the NCDAQ approved “Q/D=20” guideline. Use of the screening tool was approved in DAQ’s protocol response letter. Five offsite sources were thus used in the NAAQS modeling, and three were used in the increment modeling.

In the NAAQS analysis, a total of 10 point sources were modeled for NO<sub>x</sub> as shown in Table 3. Receptors were placed from the proposed fenceline out to the SIA as determined from the SIL modeling. The NO<sub>x</sub> modeling results are shown in Table 4 and indicate compliance with NO<sub>x</sub> annual NAAQS.

**Table 3 - Class II Area NAAQS Emission Sources / Emission Rates**

<b>Source ID</b>	<b>Source Description</b>	<b>NOX (lb/hr)</b>
EP07	Boiler No. 6 Scrubber Stack	27.3576
B2E1	Boiler No. 2 Stack	9.031898
B3E1	Boiler No. 3 Stack	9.031898
B4E1	Boiler No. 4Stack	9.031898
B5E1	Boiler No. 5 Stack	9.031898
RHADL	RH Animal Disease Lab	0.001032
NJF	Nash Johnson Farms	6.119151
RADF	House of Raeford Farms	1.920667
MBCM1	Murphy Brown Chief Mill Boilers	6.055657
MBCM2	Murphy Brown Chief Mill Generators	4.960401

**Table 4 - Class II Area NAAQS Modeling Results**

Pollutant	Averaging Period	Max Facility Impact (ug/m3)	Offsite Source Impact (ug/m3)	Background Concentration (ug/m3)	Total Impact (ug/m3)	NAAQS (ug/m3)	% NAAQS
NO <sub>x</sub>	Annual	49.87	0.3	5.26	55.43	100	55

In the CLASS II Area increment analysis, Valley Proteins used a total of four sources (one onsite), and the same fence line declared in the NAAQS analysis. The parameters and emission rates modeled are provided in Table 5. The Class II Area increment modeling results are shown in Table 6 and indicate compliance with the NO<sub>x</sub> Class II Area annual increment.

**Table 5 - Class II Area Increment Emission Sources / Emission Rates**

Source ID	Source Description					NO <sub>x</sub> (lb/hr)
EP07	Boiler No. 6 Scrubber Stack					27.3576
RHADL	RH Animal Disease Lab					1.13494
MBCM1	Murphy Brown Chief Mill Boilers					6.055657
MBCM2	Murphy Brown Chief Mill Generators					4.960401

**Table 6 - Class II Area PSD Increment Modeling Results**

Pollutant	Averaging Period	Max Facility Impact (ug/m3)	Offsite Source Impact (ug/m3)	Total Impact (ug/m3)	PSD Increment (ug/m3)	% Increment
NO <sub>x</sub>	Annual	23.84	0.09	23.93	25	96

#### **Class I Area - Additional Requirements**

The closest Class I Area, Swan Quarter National Wildlife Refuge (NWR), is located approximately 157 km from the Valley Proteins facility. Because of the level of NO<sub>x</sub> emissions and the distance to the Class I Area, the appropriate Federal Land Manager (FLM) did believe AQRV modeling was warranted; subsequently, a Class I Area visibility and increment analysis was not conducted.

#### **Additional Impact Analysis**

Additional impact analyses were conducted for growth, soils and vegetation, and visibility impairment.

#### **Growth Impacts**

Only 10 new employees are anticipated with this project. With this small number of additional employees, no growth impact in the area is expected.

#### **Soils and Vegetation**

The facility is located in the coastal plain of North Carolina. The local geography is flat with a mix of forests, agricultural crops, and herbaceous vegetation. Valley Proteins modeled NO<sub>x</sub> emissions in the full NAAQS mode utilizing the highest hourly values as opposed to annualized rates. They then compared these results to those published by EPA as causing harm to vegetation. The results showed that Valley Proteins' (plus off-site sources) impacts were below the minimum levels that would be expected to harm soils and vegetation.

#### **Visibility Impairment Analysis**

A Level 1 visibility impairment analysis was performed using the EPA VISCREEN model to demonstrate screening criteria were not exceeded at the nearest Class I Area. Since there are no special protected visibility areas in the region (aside from the closest Class I area), no further visibility analysis was required.

**PSD Air Quality Modeling Result Summary**

Based on the PSD air quality ambient impact analysis performed, the proposed Valley Proteins project will not cause or contribute to any violation of the Class II NAAQS, PSD increments, Class I Increments, or any FLM AQRVs. A summary of the modeling results is presented in Table 7.

TABLE 7 - VALLEY PROTEIN PSD AIR QUALITY MODELING RESULTS							
SER Evaluation							
Pollutant	Annual E/R (Tons)	SER (Tons/yr)					
NO <sub>x</sub>	120	40					
SIL Analysis							
Pollutant	Averaging Period	Maximum Impact (ug/m <sup>3</sup> )	SIL (ug/m <sup>3</sup> )				
NO <sub>x</sub>	Annual	49	1				

-Table continued on the next page-

**TABLE 7 - VALLEY PROTEIN PSD AIR QUALITY MODELING RESULTS (Continued)**

Class II NAAQS Analysis						
Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m <sup>3</sup> )	Back Ground Conc (ug/m <sup>3</sup> )	Total Impact (ug/m <sup>3</sup> )	NAAQS (ug/m <sup>3</sup> )	% NAAQS
NO <sub>x</sub>	Annual	50.17	5.26	55.43	100	55
Class II PSD Increment Analysis						
Pollutant	Averaging Period	Maximum Onsite & Offsite Source Impacts (ug/m <sup>3</sup> )	Back Ground Conc (ug/m <sup>3</sup> )	Total Impact (ug/m <sup>3</sup> )	PSD Increment (ug/m <sup>3</sup> )	% PSD
NO <sub>x</sub>	Annual	23.93	n/a	23.93	25	96

- X. **Air Toxics:** Air toxics **does not** apply to this modification. Even though the new boiler will burn fuel oils, No. 6, 4, and 2, and will emit several compounds listed as toxic air pollutants, these pollutants are emitted as a result of the combustion process. These emissions are currently exempt from triggering an air toxics review in accordance with 15A NCAC 2Q .0702 (a)(18) “Exemptions -Combustion Sources”.
- XI. **MACT:** On July 30, 2007 the DC courts decided to vacate the Boiler MACT. Therefore, the new No. 6, No. 4, No. 2., saleable fat-fired, 78.7 million Btu per hour heat input boiler is not subject to the Boiler MACT, Subpart DDDDD. None of the other new emissions sources are subject to a MACT.
- XII. **NO<sub>x</sub> Rules under 15A NCAC 2D .1400:** This regulation does not apply to the new boiler because it is not considered a large industrial or utility boiler and does not meet the criteria for applicability of this regulation.
- XIII. **Odors under 15A NCAC 2D .1806 “Control of Odorous Emissions”:** The sources at this facility are exempt from this regulation in accordance with 2D .1806(d)(2), because there is a specific odor regulation specifically for Feed Ingredient Manufacturing Plants (15A NCAC 2D .0539).

**XIV. NonAttainment:** Duplin County has not been designated nonattainment for the eight-hour ozone standard.

**XV. CAM:** Compliance Assurance Monitoring does not apply to the emissions (VOC, PM, SO<sub>2</sub>) from Boiler (ID No. ES-B6) because particulate and SO<sub>2</sub> emissions from the boiler are regulated by the revised (February 27, 2006) NSPS, Subpart Dc, and the VOC emissions from the boiler are less than 100 tons per year. This exemption is per the CAM rule as listed in 40 CFR §64.2(b) for sources that are controlled by a New Source Standard or NESHAP proposed after November 15, 1990.

CAM is not required for the PM emissions from the 440U Supercookor<sup>®</sup> because the control devices CD-12, CD-15, and CD-14 are not required to meet the applicable particulate standard limit (2D .0515).

CAM is not required for the VOC emissions from the 440U Supercookor<sup>®</sup> because the control devices CD-12, CD-15, and CD-14 are not required to meet the applicable VOC standard limit (2D .0539).

**XVI.** A consistency determination **is required** and was received by this Division on February 14, 2007 from Duplin County, and on February 26, 2007 from the Town of Rose Hill. The determination letter from Duplin County was signed by County Planner Randal G. Tyndall and the determination letter from the Town of Rose Hill was signed by Town Administrator Thomas G. Drum. The letter from Duplin County stated that this facility was located in the extra-jurisdictional zone of the Town of Rose Hill. The letter from Rose Hill stated that the proposed operation at Valley Protein is consistent with applicable zoning and subdivision ordinances.

**XVII.** A Professional Engineer's seal was included with the original application. Mr. Michael B. Parker, a Professional Engineer, who is currently registered in the State of North Carolina, sealed the application for the portions containing the engineering plans, calculations, and all supporting documentation.

The application was revised on June 17, 2008 and Mr. Daryl Whitt, Professional Engineer, who is currently registered in the State of North Carolina, sealed the application for the portions containing the engineering plans, calculations, and all supporting documentation.

**XVIII.** An application fee in the amount of **\$12,982.00 is required** and was received with the application on February 15, 2007.

**XIX. This facility is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in the Rule.**

**XX. PSD Increment Tracking:**

The Minor Source Baseline date for Duplin County was triggered for PM-10, SO<sub>2</sub> in December 1983, and NO<sub>x</sub> in September 1989.

Using the calculated values on page 26 of this review:

$$PM_{10} \text{ Hourly Emissions after control} = \frac{(0.63 + 7.21) \text{ tons total } PM_{10}}{\text{year}} \times \frac{1 \text{ year}}{7250 \text{ hours}} \times \frac{2000 \text{ lbs}}{\text{ton}} = \frac{2.16 \text{ lbs total } PM_{10}}{\text{hour}}$$

$$SO_2 \text{ Hourly Emissions after control} = \frac{38.9 \text{ tons } SO_2}{\text{year}} \times \frac{1 \text{ year}}{7250 \text{ hours}} \times \frac{2000 \text{ lbs}}{\text{ton}} = \frac{10.73 \text{ } SO_2}{\text{hour}}$$

$$NO_x \text{ Hourly Emissions after control @ requested PSD emission rate} = \frac{120 \text{ tons } NO_x}{\text{year}} \times \frac{1 \text{ year}}{7250 \text{ hours}} \times \frac{2000 \text{ lbs}}{\text{ton}} = \frac{33.1 \text{ lbs } NO_x}{\text{hour}}$$

For PSD increment tracking purposes, **NO<sub>x</sub>** emissions have increased by **33.1** pounds per hour, SO<sub>2</sub> emissions have increased by pounds **10.73** per hour, and PM-10 emission have increased by **2.16** pounds per hour as a result of this modification

**XXI. Applicant Comments:**

The final “draft permit” prior to public notice of permit 05127T19 was sent to the applicant on April 28, 2008. The applicant responded via email (with attachment) with some administrative corrections and some additional requests to be added into the permit.

- A. Change the description of insignificant activity IEX1 to “Four silos on site: one feather meal silo, and three poultry meal silos”.
- A. Change capacity of insignificant activity IWWTP-1 from “200,000 gal/day to 300,000 gal/day”.
- C. Add insignificant activity ICT-1 to cover letter.
- D. Add a new venturi scrubber (CD-16) to the permit to control high intensity odors coming from the drainors, pressors, screens, and centrifuges. This scrubber will be placed upstream of scrubber (CD-14) and the high intensity odors will no longer be vented to the boiler (B6).
- E. Change the design throughput of the new Supercookor® from. 60,000 lbs per hour to 70,000 lbs per hour.
- F. Numerous administrative type changes.

**XXII. Public Comment:**

Public Notice Requirements – 40 CFR 51.166(q) requires that the permitting agency make available to the public a preliminary determination on the proposed project, including all materials considered in making this determination. With respect to this preliminary determination, the NCDAQ:

- A. Will make available in the XXXXXX, located at XXXXXXXXXXX, North Carolina, all materials submitted, a copy of the preliminary determination, and all other information submitted and considered. In addition a copy of this same information will be available at the NCDAQ Wilmington Regional Office and the NCDAQ Central Office in Raleigh, NC.
- B. Will publish a public notice, by advertisement in a local paper (XXXX) including the preliminary decision and the opportunity for public comment.
- C. Send a copy of the public notice to:
  - 1. The applicant for comments
  - 2. EPA Region IV for comments.
  - 3. Officials having cognizance over the location of the location of the project as follows:
    - a. Any affected state/local air agency – No other state or local agencies are expected to be affected by this project.
    - b. Chief Executives of the city and county in which the proposed project is to be located. Notices will be sent to the City Manager for the City of \_\_\_\_\_.
    - c. Federal Land Manager – the Federal Land Manager for the closest Class I area, Swan Quarter National Wilderness, did not request any analysis to be performed.

**XXII. Conclusion**

Based on the application submitted and the review of this proposal by the NCDAQ, the NCDAQ is making a preliminary determination that the project can be approved and a permit issued. A final determination will be made following public notice and comment and consideration of all comments.

The Wilmington Regional Office concurs with the issuance of the PSD Permit to Valley Protein, located in Rose Hill, Duplin County, North Carolina. A response was received from the WiRO in XXXXXXXXXXX with XXXX adverse comments.

**Issue Permit No. 05127T19**