



**ENGINEERING AND COMPLIANCE**

**APPLICATION PROCESSING AND CALCULATIONS**

APPL. NO. 443517	DATE: July 25, 2012
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

**EVALUATION REPORT FOR PERMIT TO OPERATE**

**Applicant's Name:** LIFOAM INDUSTRIES, LLC **Facility ID:** 144455

**Mailing Address:** 2340 E 52<sup>ND</sup> STREET  
VERNON, CA 90058

**Equipment Location:** SAME

**EQUIPMENT DESCRIPTION**

Modifications are shown in bold italic, original in bold strike-through.

**Appl. No. 443517**

Change of Conditions to Permit to Construct, by:

- Change NOx emission limit from 12 ppmv to 15 ppmv.
- Change RECLAIM NOx emission reporting concentration from 12 ppmv to 15 ppmv, and
- Addition of fuel usage limit of 51,370 scf per day

Equipment	ID No.	Connected to	RECLAIM Source Type/ Monitoring Unit	Emission and Requirements	Conditions
<b>Process 3: EXTERNAL COMBUSTION</b>					
<b>System 1: BOILER</b>					
BOILER, HURST, <i>FIRE TUBE TYPE</i> , MODEL S4-G-200-150, NATURAL GAS, WITH <b>LOW NOX BURNER, 8.44 MMBTU/HR</b> A/N: 443517  <i>BURNER, INDUSTRIAL COMBUSTION, MODEL LNDG-145P, LOW-NOX BURNER, 8.44 MMBTU/HR</i>	D94		NOX: PROCESS UNIT**	CO: 50 PPMV (4) [RULE <b>1303(a)(1)-BACT, 5-10-1996</b> ; RULE 1303(a)(1)-BACT, 12-6-2002]; CO: 400 PPMV (5) [RULE <b>1146, 11-17-2000</b> ; RULE 1146, 9-5-2008]; CO: 2000 PPMV (5A) [RULE 407, 4-2-1982];  NOX: <b>12 15</b> PPMV (3) [RULE <b>2012, 5-6-2005</b> ] NOX: <b>12 15</b> PPMV (4) [RULE <b>2005, 6-3-2011</b> ]  PM: 0.1 GRAINS/SCF (5) [RULE <b>409, 8-7-1981</b> ] <i>PM: (9) [RULE 404, 2-7-1986]</i>	<i>CI.3, D29.1</i> D323.1, D332.1, <i>K40.2, K67.4</i>



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**PERMIT CONDITIONS**

The following Permit Conditions are changed:

*C1.3 The operator shall limit the fuel usage to no more than 51,370 cubic feet any one day.*

*To comply with this condition, the operator shall install and maintain a(n) non-resettable totalizing fuel meter to accurately indicate the fuel usage of the boiler.*

*[RULE 2005, 6-3-2011; RULE 2012, 5-6-2005]*

*[Devices subject to this condition: D94]*

**D29.1—The operator shall conduct source test(s) for the pollutant(s) identified below:**

<b>Pollutant(s) to be tested</b>	<b>Required Test Method(s)</b>	<b>Averaging Time</b>	<b>Test Location</b>
<b>CO emissions</b>	<b>Approved District method 100.1, or approved District portable analyzer and test method</b>	<b>15 minutes</b>	<b>Outlet</b>
<b>NOX emissions</b>	<b>Approved District method 100.1, or approved District portable analyzer and test method</b>	<b>15 minutes</b>	<b>Outlet</b>

~~The test(s) shall be conducted within 60 days after achieving maximum production rate, but no later than 180 days after start-up.~~

~~The test shall be conducted to demonstrate compliance with BACT.~~

~~In addition to the source test requirements of Section E of this facility permit, the facility permit holder shall submit the protocol to the AQMD engineer no later than 45 days prior to the proposed test date, and notify the District of the date and time of the test at least 10 days prior to the test.~~

~~The test shall be conducted when the equipment is operating under at loads of 100, 75 and 50 percent.~~

~~During the source test(s), the facility permit holder shall also measure the oxygen levels in the exhaust, flue flow rate (CFH), the flue gas rate, and flue gas temperature.~~

~~[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 2005, 5-6-2005]~~

~~[Devices subject to this condition: D94]~~

D323.1 The operator shall conduct an inspection for visible emissions from all stacks and other emission points of this equipment whenever there is a public complaint of visible emissions, whenever visible emissions are observed, and on an annual basis, at least, unless the equipment did not operate during the entire annual period. The routine annual inspection shall be conducted while the equipment is in operation and during daylight hours.

If any visible emissions (not including condensed water vapor) are detected that last more than three minutes in any one hour, the operator shall verify and certify within 24 hours that the equipment causing the



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emission and any associated air pollution control equipment are operating normally according to their design and standard procedures and under the same conditions under which compliance was achieved in the past, and either:

- 1). Take corrective action(s) that eliminates the visible emissions within 24 hours and report the visible emissions as a potential deviation in accordance with the reporting requirements in Section K of this permit; or
- 2). Have a CARB-certified smoke reader determine compliance with the opacity standard, using EPA Method 9 or the procedures in the CARB manual "Visible Emission Evaluation", within three business days and report any deviations to AQMD.

The operator shall keep the records in accordance with the recordkeeping requirements in Section K of this permit and the following records:

- 1). Stack or emission point identification;
- 2). Description of any corrective actions taken to abate visible emissions;
- 3). Date and time visible emission was abated; and
- 4). All visible emission observation records by operator or a certified smoke reader.

**[RULE 3004(a)(4)-Periodic Monitoring, 12-12-2007]**

[Devices subject to this condition: D94]

D332.1 The operator shall determine compliance with the CO emission limit(s) by conducting a test at least once every five years using a portable analyzer and AQMD-approved test method or, if not available, a non-AQMD approved test method. The test shall be conducted when the equipment is operating under normal conditions to demonstrate compliance with CO concentration limits. The operator shall comply with all general testing, reporting, and recordkeeping requirements in Sections E and K of this permit.

**[RULE 3004(a)(4)-Periodic Monitoring, 12-12-2007]**

[Devices subject to this condition: D94]

~~K40.2 The operator shall provide to the District a source test report in accordance with the following specifications:~~

~~Source test results shall be submitted to the District no later than 30 days after the source test was conducted.~~

~~Emission data shall be expressed in terms of concentration (ppmv), corrected to 3 percent oxygen, dry basis.~~

~~Emission data shall be expressed in terms of mass rate (lbs/hr). In addition, solid PM emissions, if required to be tested, shall also be reported in terms of grains per DSCF.~~

~~Source test results shall also include fuel flow rate under which the test was conducted.~~

~~[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 2005, 5-6-2005]~~

~~[Devices subject to this condition: D94]~~



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**K67.4** *The operator shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):*

*The date and time that the boiler is in operation*

*The fuel meter readings before and after the boiler operation*

*All records required by this condition shall be retained on the premises for at least five calendar years, and shall be made available to the Executive Officer or representative upon request.*

*[RULE 2005, 6-3-2011; RULE 2012, 5-6-2005]*

*[Devices subject to this condition: D94]*

**BACKGROUND/HISTORY**

Lifoam Industries, LLC (Lifoam) operates an expanded polystyrene (EPS) foam plant in Vernon, California. Lifoam manufactures expanded polystyrene (EPS) foam products such as small coolers, food containers, packaging material, and various custom molded products. This facility operates one polystyrene foam expansion/molding system and two boilers. The polystyrene foam expansion/molding system consists of two pre-expanders, 29 aging silos, 19 shape molding presses, and associated conveyors and hoppers. The VOC emissions from the polystyrene foam expansion/molding system are controlled by a regenerative thermal oxidizer. Lifoam has a Title V permit effective on February 13, 2009.

Lifoam facility type:

<u>RECLAIM</u>		<u>Title V</u>
SO <sub>x</sub>	NO <sub>x</sub>	
No	Yes	Yes

**Application No. 443517 (Hurst Boiler, D94)**

The Hurst Boiler D94 application was originally submitted on 3/14/2001 under Life-Like Products (ID: 57892) A/N: 383618 (P/C was issued on 5/10/2001). On March 28, 2006, the Permit to Construct was transferred to the current owner/operator, Lifoam (ID: 144455), under A/N: 443517. According to the facility, the Hurst Boiler is used as a back-up boiler to the main boiler D128.

A source test was performed on boiler D94 on July 21, 2004, and the source test report (dated August 19, 2004) was submitted to the District on March 24, 2006. The report was approved by the M&STE on May 14, 2008 (Reference: 007249). The source test results are indicated as follows:

Pollutant	Actual	Allowed	units	Compliance
NO <sub>x</sub>	8.11	12	ppmV @ 3% O <sub>2</sub>	Yes
CO	44.01	50	ppmV @ 3% O <sub>2</sub>	Yes

The boiler is designated as a Process Unit under RECLAIM. Per Rule 2012, this boiler is required to be tested once in five years. The 2<sup>nd</sup> source test was performed on boiler D94 on September 28, 2009, and the source test report (dated October 23, 2009) was submitted to the District on July 20, 2012. The report has not been forwarded to Source Testing Engineering for review. The source test results are indicated as follows:



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	Pollutant	Actual	Allowed	units	Compliance
Run #1	NOx	13.0	12	ppmV @ 3% O <sub>2</sub>	<b>No</b>
	CO	<21.1	50	ppmV @ 3% O <sub>2</sub>	<b>Yes</b>
Run #2	NOx	12.5	12	ppmV @ 3% O <sub>2</sub>	<b>No</b>
	CO	<20.0	50	ppmV @ 3% O <sub>2</sub>	<b>Yes</b>
Run #3	NOx	10.4	12	ppmV @ 3% O <sub>2</sub>	<b>Yes</b>
	CO	26.2	50	ppmV @ 3% O <sub>2</sub>	<b>Yes</b>

Two of three test runs on September 28, 2009 indicated the NOx emissions are slightly exceeded the limit. The average of the three test runs is 11.97 ppmv, which is right at the border of the limit. The 1<sup>st</sup> test run shows NOx emissions exceeded the permit limit by 8.3% and the 2<sup>nd</sup> test run exceeded the limit by 4.2%. Both are still within the allowed margin of error of 20% for the compliance determination purpose. In addition, based on the Inspector’s report, the facility has not operated the boiler other than the required maintenance and tuning since September 28, 2009.

Since the usage of the boiler will be very minimal as it is a back-up to the main boiler D128, the facility requested to issuing Permit to Operate with an increased the NOx emission limit and a fuel usage cap. The combination of the new NOx concentration limit and the fuel usage limit will ensure the NOx emissions to be less than the BACT threshold. The proposal was send via an email on July 20, 2012 and the changes are proposed as follows:

- Change NOx emission limit from 12 ppmv to 15 ppmv.
- Change RECLAIM NOx emission reporting concentration from 12 ppmv to 15 ppmv, and
- Addition of fuel usage limit of 51,370 scf per day

The facility is under Cycle 2 RECLAIM. Thus, the 3<sup>rd</sup> source test for this boiler should be performed in the 5-year period of 7/1/10 – 6/30/15. The facility currently has no plan for the 3<sup>rd</sup> test for this boiler at this point.

**PROCESS DESCRIPTION**

Same with P/C evaluation report under A/N: 383618.

**EMISSION CALCULATIONS**

Emission Factors

$$\text{Emission}_{\text{ROG,SOX,PM10}} (\text{lb/MMBtu}) = EF_{\text{ROG,SOX,PM10}} \left( \frac{\text{lb}}{\text{MMscf}} \right) \times \frac{1\text{MMscf}}{1050\text{MMBtu}}$$

$$\text{Emission}_{\text{NOX,CO}} (\text{lb/MMBtu}) = \frac{MW \times N_{@3\%O_2} \times \text{ppm}}{H}$$

Where: H= Heating value of fuel (Btu/lb) (for natural gas= 23,440 btu/lb)  
N<sub>@3%O<sub>2</sub></sub>= 0.618 mole of dry gas per lb of natural gas.  
MW= Molecular weight (lb/lb-mole)



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Emission Factor Summary - Natural Gas

Pollutant	Emission Factor (from manufacturer) ppmV @ 3% O <sub>2</sub>	Emission Factor (AQMD Default) lb/mmscf	Emission Factor (for this report) lb/MMBtu
VOC	-	5.5	0.00524
SO <sub>x</sub>	-	0.6	0.000571
PM <sub>10</sub>	-	7.6	0.00724
NO <sub>x</sub>	15	-	0.0182
CO	50	-	0.0369

Operating Schedule: 24 hrs/day; 7 days/week; 52 weeks/yr  
 Burner Rating: 8.4 MMBtu/hr  
 Natural Gas Usage Limit: 51,370 scf/day

**EMISSION SUMMARY**

		Hourly (lb/hr)	Daily (lb/day)	Annually (lb/yr)	30 day ave. (lb/day)
R1=R2	VOC	0.04400	0.28	101.71	0.28
R1=R2	SO <sub>x</sub>	0.00480	0.03	11.10	0.03
R1=R2	PM <sub>10</sub>	0.0608	0.39	140.55	0.39
R1=R2	NO <sub>x</sub>	0.1528	0.98	353.25	0.98
R1=R2	CO	0.310	1.99	716.74	1.99

Hourly (lb/hr) = (Emission Factor, lb/MMBtu) (8.4 MMBtu/hr)  
 Daily (lb/day) = (Emission Factor, lb/MMBtu) (1 MMBtu / 1,050 MMscf) (51,370 scf/day)  
 30 day-ave. = Daily, lb/day  
 Annually (lbs/yr) = (30 day-ave) (30 day/mo) (12 mo/yr)

**RULE 407 CALCULATIONS:**

$$SOX \text{ (ppm)} = \frac{R_1}{\frac{Q(\text{btu} / \text{hr})}{H(\text{btu} / \text{lb})} \times MW \times N_{@3\%O_2}}$$

Where : Q= maximum, rated input (Btu/hr)=8,400,000 Btu/hr  
 H= Heating value of fuel (Btu/lb) (for natural gas= 23,440 btu/lb)  
 N<sub>@3%O<sub>2</sub></sub>= 0.618 mole of dry gas per lb of fuel.

$$SO_x \text{ (ppm)} = \frac{0.0048 \text{ lb} / \text{hr}}{\frac{8,400,000 \text{ btu} / \text{hr}}{23,440 \text{ btu} / \text{lb}} \times 64 \frac{\text{lb}}{\text{mol}} \times 0.618 \frac{\text{mol}}{\text{lb}}} = 0.34 \text{ ppm}$$



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**RULE 409 CALCULATIONS:**

AQMD Default PM<sub>10</sub> emission factor = 7.6 lb/mmscf

$$PM_{10} \text{ Concentration} = (7.6 \text{ lb/mmscf}) (7,000 \text{ grains/lb}) / (1,000,000 \text{ scf/mmscf}) = 0.0532 \text{ grains/ft}^3$$

**RULES AND REGULATIONS EVALUATION**

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

§ 60.40c Applicability and delegation of authority.

The subject boiler is rated at 8.4 MMBtu/hr (**less than 10 MMBtu/hr**); thus, **this boiler is NOT subject to this rule.**

**Rule 212: Standards for Approving Permits** – The facility is not located within 1,000 feet of a K-12 school (a map is attached). In addition, no emission increase is associated with the administrative change application. A Public Notice is not required.

**Rule 401: Visible Emissions**

Based on the attached inspection reports, compliance with this rule is achieved.

**Rule 402: Public Nuisance**

Based on the attached inspection reports, compliance with this rule is achieved.

**Rule 1146: Emissions of NO<sub>x</sub> from Industrial, Institutional, and Commercial Boilers:**

Lifoam is a NO<sub>x</sub> RECLAIM facility; thus, the NO<sub>x</sub> emissions from this boiler are exempt from this rule per Rule 2001(j).

(c)(4) limits the CO emissions from this boiler at 400 ppmv @ 3% O<sub>2</sub>. The source tests indicated the CO emissions are less than 50 ppmv @ 3% O<sub>2</sub>. Compliance is achieved.

(d)(9) requires this boiler to be tested for CO emissions once every five years.

**Rule 2005: BACT**

Following are BACT guidelines for the boiler:

Subcategory/ Rating/Size	Criteria Pollutants				
	VOC	NO <sub>x</sub>	SO <sub>x</sub>	CO	PM <sub>10</sub>
Natural Gas or Propane Fired, < 20 MMBtu/HR		≤ 12 ppmv dry corrected to 3% O <sub>2</sub> (10-20-2000)	Natural Gas (10-20-2000)	≤50 ppmv for firetube type, ≤ 100 ppmv for watertube type, dry corrected to 3% O <sub>2</sub> (04-10-98)	Natural Gas (04-10-98)



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NOx emissions – Based on the daily maximum fuel usage of 51,370 scf/day and the maximum NOx concentration of 15 ppmv NO<sub>x</sub> @ 3% O<sub>2</sub>, the maximum daily NOx emissions are 0.98 lb/day, which is less than the one (1) lb/day threshold; thus, BACT analysis is not required.

CO emissions – The boiler is a fire-tube type. The source tests indicated the boiler achieves less than 50 ppmv CO @ 3% O<sub>2</sub>. Compliance with BACT is achieved.

**Reg XXX: Title V Permit**

Lifoam (Facility ID: 144455) has an active Title V permit. The revision reflects issuing a Permit to Operate for the Boiler D94, which was previously issued with a Permit to Construct. The revision consists of changes with NOx emission limit and an additional condition to limit the boiler daily fuel usage. These changes will allow the boiler to be operated with the NOx emissions to be less than the BACT threshold (one pound per day); therefore, the BACT NOx emission requirement will be removed from the permit. This permit revision is considered as De Minimis Significant Permit Revision of Title V Facility Permit and it is subject to a 45-day EPA review prior to final revision of the Title V Facility Permit (Application No. 443517).

**CONCLUSION AND RECOMMENDATIONS**

Based on this evaluation, the subject equipment is operated in compliance with all applicable District Rules and Regulations. I recommend to issuing the Permit to Operate for the boiler.