



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO. 527983 & 527984	DATE: August 29, 2012
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

EVALUATION REPORT FOR PERMIT TO CONSTRUCT/OPERATE

Applicant's Name: FOAM FABRICATORS Facility ID: 012876

Mailing Address: 1810 SOUTH SANTA FE AVENUE  
COMPTON, CALIFORNIA 90221-5319

Equipment Location: SAME

EQUIPMENT DESCRIPTION

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

Appl. No. 527983 – Modification of Air Pollution Control System (P/C 450294)

Modification of Air Pollution Control System, by:

the addition of:

- A Permanent Total Enclosure to the exhaust system

Air Pollution Control System Consisting of:

1. Regenerative Thermal Oxidizer, ~~Afterburner~~, Ship & Shore, ~~Regenerative Type~~, Model ~~No.~~ SSE-05K-95X-RTO, 990,000 BTU per hr., natural gas fired.
2. Moisture trap, water cooled.
3. Pre-filter.
4. *Permanent Total Enclosure, Aging Room, enclosing twenty four pre-expanded bead storage bags.*
5. Exhaust system with a 25-hp blower venting two pre-expanders, ~~twenty four storage bags, and~~ eleven molding presses *and the Aging Room Permanent Total Enclosure.*

Conditions:

1. Operation of this equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below. [RULE 204]
2. This equipment shall be properly maintained and kept in good operating condition at all times. [RULE 204]
3. The operator shall maintain a temperature of not less than 1,500 degrees Fahrenheit in combustion chamber of the regenerative thermal oxidizer whenever venting the equipment which it serves. [RULE 1175; RULE 1303(a)(1)-BACT]



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4. This equipment shall comply with all applicable requirements of Rule 1147.  
[RULE 1147]
5. Effective on July 1, 2022; the NO<sub>x</sub> emissions discharged from this equipment shall not exceed 60 ppmv, calculated as NO<sub>2</sub>, by volume on a dry basis at 3% O<sub>2</sub>. For the purpose of this condition, the emission limit shall apply solely when burning 100% fuel and not when the burner is incinerating air toxic, VOCs, or other vapors.  
[RULE 1147]
6. The total manufacturing emissions and post-manufacturing emissions assuming all blowing agent is released from the product, shall not exceed 2.4 pounds per 100 pounds of raw material processed.  
[RULE 1175]
7. The permanent total enclosure shall be maintained and operated in compliance with criteria specified in EPA method 204 – Criteria for and Verification of a Permanent or Temporary Total Enclosure, whenever the basic equipment it serves are in operation.  
[RULE 1175, RULE 1303(A)(1)-BACT]
8. The operator shall maintain the permanent total enclosure under a negative pressure of at least 0.007 inches water column.  
[RULE 1175; RULE 1303(a)(1)-BACT]
9. The operator shall install and maintain a differential pressure monitoring device for permanent total enclosure, which monitors the differential pressure between the inside and outside of the permanent total enclosure.  
[RULE 1175; RULE 1303(a)(1)-BACT]
10. The operator of this equipment shall conduct a source test as follows:
  - A. The source test shall be conducted no later than 180 days after the issuance of the operating permit of this equipment unless otherwise approved in writing by the District.
  - B. The source test shall be performed to verify compliance with USEPA Method 204 - Criteria for and Verification of a Permanent or Temporary Total Enclosure.
  - C. The source test shall consist of, but not be limited to, testing at the permanent total enclosure for:
    - (1) Total enclosure surface area,
    - (2) Total area of all Natural Draft Opening (NDO),
    - (3) Percentage areas of all NDO's of the total enclosure surface area,
    - (4) Distance from NDO to the aging silos,
    - (5) Exhaust flow rate, in actual and standard cubic feet per minute (acfm and scfm),
    - (6) The average facial velocity (FV) of air through all NDO's, in feet per minute (fpm), and



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- (7) Differential pressures of the permanent total enclosure, in inches water column.
- D. The Facility Permit holder shall notify the District of the date and time of the test at least 10 days prior to the test.
- E. Notwithstanding the requirements of Section E conditions, the source test results shall be submitted to the District no later than 60 days after the source test was conducted. The operator shall submit two complete copies of the source test report to the District [addressed to South Coast Air Quality Management District, P.O. Box 4941, Diamond Bar, CA 91765] within 60 days after the test

[RULE 1175; RULE 1303(a)(1)-BACT]

**Periodic Monitoring:**

- 11. The operator of this equipment shall conduct source tests as follows:
  - A. A source test shall be conducted once every five years.
  - B. The source test shall be performed to verify the VOC emission limit specified by condition no. 6 above, using the test methods specified in Rule 1175.
  - C. Notwithstanding the source test requirements of Section E of this facility permit, the facility permit holder shall submit the protocol to the AQMD engineer at least 365 days prior to the expiration date of this Title V Facility Permit unless otherwise approved in writing by the District, and notify the District of the date and time of the test at least 10 days prior to the test.
  - D. The test shall be conducted at least 180 days prior to the expiration date of this Title V Facility Permit unless otherwise approved in writing by the District.
  - E. Source test shall be conducted in accordance with the equipment configuration and operation specified in the test protocol approved in writing by the District.
  - F. The source test shall be conducted while the equipment vented to the regenerative thermal oxidizer is operating at maximum capacity, and processing raw beads which have the maximum pentane content of all EPS beads processed at the facility.
  - G. The product residual blowing agent concentration shall be determined from samples taken from the centers of the thickest, and thinnest cross sections of a small, medium, and large shapes, within 15 minutes after the shape was molded.
  - H. The source test shall be conducted when this equipment is operating at a temperature of not less than the minimum operating temperature specified in this permit. If the operating temperature during the source test is greater than the minimum operating temperature specified in this permit, the minimum operating temperature may be increased to reflect the operating temperature during the source test.
  - I. The source test shall be conducted according to a District approved protocol.



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[RULE 1175; RULE 1303(a)(1)-BACT; RULE 3004(a)(4)-Periodic Monitoring]

12. The operator shall submit two complete copies of the source test report to the District [addressed to South Coast Air Quality Management District, P.O. Box 4941, Diamond Bar, CA 91765] within 60 days after the test. The report shall include, but not be limited to VOC emissions in pounds per hour at the inlet and outlet of the regenerative thermal oxidizer. The following operating data shall also be included:
- A. The inlet flow rate of the regenerative thermal oxidizer, in Actual Cubic Feet per Minute [ACFM].
  - B. The VOC emissions at the inlet of the regenerative thermal oxidizer, in pounds per hour.
  - C. The concentration of pentane in the raw EPS beads.
  - D. The concentration of pentane in the final product.
  - E. The frequency of the regenerative thermal oxidizer flow reversals during the source test.
  - F. The temperature in combustion chamber of the regenerative thermal oxidizer, in degrees F.
  - G. The VOC emissions at the outlet of the regenerative thermal oxidizer, in pounds per hour.
  - H. The processing rate of EPS processed by the pre-expander.
  - I. The processing rate of EPS molded into final products.
  - J. The total quantity of EPS in the bead storage bags.
  - K. The test shall be conducted by a testing laboratory certified by the California Air Resources Board in the required test methods for criteria pollutant to be measured, and in compliance with District Rule 304 [No Conflict of Interest].
  - L. Sampling facilities shall comply with the District Guidelines for Construction of Sampling and Testing Facilities, pursuant to Rule 217.

[RULE 1175; RULE 1303(a)(1)-BACT; RULE 3004(a)(4)-Periodic Monitoring]

13. The operator shall operate and maintain this equipment according to the following requirements:

The combustion chamber temperature shall be maintained at a minimum of 1,500 degrees Fahrenheit whenever the equipment it serves is in operation.

The operator shall operate and maintain a temperature measuring and recording system to continuously measure and record the combustion chamber temperature pursuant to the operation and maintenance requirements specified in 40 CFR Part 64.7. Such a system shall have an accuracy of within 1% of the temperature being monitored and shall be inspected, maintained, and calibrated on an annual basis in accordance with the manufacturer's specifications using an applicable AQMD or EPA approved method.

For the purpose of this condition, a deviation shall be defined as when a combustion chamber temperature of less than 1,500 degrees Fahrenheit occurs during normal operation of the



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equipment it serves. The operator shall review the records of the combustion chamber temperature on a daily basis to determine if a deviation occurs or shall install an alarm system to alert the operator when a deviation occurs.

Whenever a deviation occurs, the operator shall inspect this equipment to identify the cause of such a deviation, take immediate corrective action to maintain the combustion chamber temperature at or above 1,500 degrees Fahrenheit, and keep records of the duration and cause (including unknown cause, if applicable) of the deviation and the corrective action taken.

All deviations shall be reported to the AQMD on a semi-annual basis pursuant to the requirements specified in 40 CFR Part 64.9 and Condition Nos. 22 and 23 in Section K of this permit. The semi-annual monitoring report shall include the total operating time of this equipment and the total accumulated duration of all deviations for each semi-annual reporting period specified in Condition No. 23 in Section K of this permit.

The operator shall submit an application with a Quality Improvement Plan (QIP) in accordance with 40 CFR Part 64.8 to the AQMD if an accumulation of deviations exceeds 5 percent duration of this equipment's total operating time for any semi-annual reporting period specified in Condition No. 23 in Section K of this permit. The required QIP shall be submitted to the AQMD within 90 calendar days after the due date for the semi-annual monitoring report.

The operator shall inspect and maintain all components of this equipment on an annual basis in accordance with the manufacturer's specifications.

The operator shall keep adequate records in a format that is acceptable to the AQMD to demonstrate compliance with all applicable requirements specified in this condition and 40 CFR Part 64.9 for a minimum of five years.

[RULE 1175; RULE 1303(a)(1)-BACT; RULE 3004(a)(4)-Periodic Monitoring; 40CFR Part 64]

**Emissions And Requirements:**

14. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

CO: 2000 PPMV, RULE 407  
PM: 0.1 gr/scf, RULE 409  
PM: RULE 404, SEE APPENDIX B FOR EMISSION LIMITS  
NOX: RULE 1147  
VOC: RULE 1175

**Appl. No. 527984 – Minor Title V Facility Permit Revision**

Revision of Title V Facility Permit per Rule 301(l)(7).



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**BACKGROUND/HISTORY**

Foam Fabricators manufactures polystyrene foam shapes for packaging. Foam Fabricators currently operates one EPS softening and pre-expansion system, 11 molding presses and one boiler. The EPS softening and pre-expansion system consists of two pre-expanders, 24 aging silos and associated conveyors and hoppers. The VOC emissions from the EPS softening and pre-expansion system and 11 molding presses are being controlled by a regenerative thermal oxidizer (RTO).

Foam Fabricators facility type:

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

Foam Fabricators is a Title V facility. The existing Title V Permit for the facility will expire on August 24, 2016.

On October 6, 2011, Foam Fabricators submitted the following permit applications:

<u>Appl. No.</u>	<u>Type</u>	<u>Previous P/O</u>	<u>Equipment</u>	<u>Fee Sch.</u>	<u>Expedited?</u>
527983	Modification	PC 450294	RTO	Sch. D	No
527984	Plan	N/A	N/A	Title V Rev.	N/A

Appl. No. 527983 is submitted as a class-I application to modify the emission collection system in order for the APC system to meet with 90% collection efficiency as required by Rule 1175. The proposed modifications to the emission collection system are indicated as follows:

- Change the existing Aging Room to a Permanent Total Enclosure (PTE) type. The existing Aging Room encloses the 24 aging silos and it will be tested to demonstrate compliance with the EPA Method 204.

The modification to the APC System will not change the emissions. However, additional testing and monitoring requirements shall be implemented.

Appl. No. 527984 is submitted as a plan application for the minor revision of the Title V permit as specified in Rule 301.

**PROCESS DESCRIPTION**

**EPS Foam Shapes Manufacturing**

The polystyrene foam shapes are manufactured via EPS Pre-expanding Process, Pre-expanded Bead Aging Process and Shape Molding Process. The EPS Foam Shape Manufacturing process is subject to Rule 1175 requirements.



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EPS Pre-expanding Process

The EPS Pre-expanding Process is to soften and expand partially the raw polystyrene beads which contain pentane as the blowing agent. The pentane contents of the raw beads are currently limited at 4.5% (PO: F85984).

The raw beads are transferred pneumatically from Gaylord super sacks which weighs 1,000 or 1,500 pound each, to one of the two pre-expanders. Both pre-expanders are vented to the RTO. One pre-expander is a batch type which has an integral cooling/drying chamber, and the other is a continuous type which requires an external fluidized bed dryer to cool and dry the pre-expanded beads. The process rate of each pre-expander is approximately 800 pounds per hour. Normally, both pre-expanders are not operated simultaneously.

Pre-expanded Bead Aging Process

After the beads are pre-expanded, the beads are transferred pneumatically to one of the 24 bead storage bags in the aging room. The air required for pneumatic conveying are withdrawn from the aging room so that there is no net pressure gain in the aging room. The pre-expanded beads reside in the aging room for approximately 1/2 to 48 hours before it is molded, depending on the pentane concentration of the raw beads. The bead storage bags are semi-permeable. The aging room is under vacuum and vented to the RTO.

Shape Molding Process

After aging, a pneumatic conveyor is used to transfer the aged beads to one of the eleven vacuum molding machines which are used to produce the finished packaging foam shapes. The air required for pneumatic conveying are withdrawn from the aging room and vented to the RTO after the aged beads are collected in the molding machines. The density of finished products is typically 1.25 pounds per cubic foot. All molding machines are vented to the RTO. The products are packaged immediately after molding, and then loaded directly into trucks because the facility does not have the warehouse capacity to store the final shapes.

Source Test

On July 26, 2007; a source test to demonstrate compliance with Rule 1175 was perform at this facility. The source test was performed under an approved source test protocol (Ref: 07008, approved on May 24, 2007). The test report was prepared by EMCC LLC on September 26, 2007. This test report was deemed as "Conditionally Acceptable" by the District M&STE on October 24, 2008 (Reference: 07008 Revised). The test report indicated the following results:

- The exhaust system collection efficiency: 104.8%
- The RTO destruction efficiency: 96.2%
- The pentane content in raw EPS beads: 3.45% w/w
- The residual pentane content in products: 1.40% w/w
- Rule 1175(c)(2) compliance calculation: **1.51 lbs per 100 lbs raw materials processed** <sup>α</sup>



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Note

α: EMCC indicated the calculation was based on 100% collection efficiency because it cannot be greater than 100%.

**Air Pollution Control System**

Emission Collection System

The Air Pollution Control System is equipped with a 25-hp blower, 5,000cfm capacity, venting the following exhaust air streams:

- 250 cfm from Pre-Expander No. 1 (contains steam)
- 100 cfm from Pre-Expander No. 2 (contains steam)
- 1,000 cfm from the 11 molding machines (contains steam)
- 3,500 cfm from the Aging Room (dry air)
- 100-150 cfm from the vacuum system, which pneumatically conveys aged beads from aging bags to the molding machines (dry air)

The 1,350cfm exhaust airstream from the two pre-expanders and 11 molding machines contains steam from expansion process; thus, it is vented through a water cooled moisture trap before it is combined with the dry airstream from the aging room and vacuum system.

The combined 5,000 cfm exhaust air stream is pre-filtered for particulates before entering the RTO. The pre-filter prevents damage from stray polystyrene beads collected by the collection system. The RTO cannot be operated without the pre-filter because stray polystyrene beads can foul the heat recovery beds by melting and gumming up the heat transfer media which may cause channeling and/or plugging the airflow. The pre-filter may be replaced without shutting down the APC system by sliding in a new filter which pushes the old filter out the opposite side of the duct.

RTO

The RTO is manufactured by Ship & Shore. The RTO has two heat exchanging chambers and a combustion chamber. The burner is rated at 0.99 MMBtu/hr and it is natural gas fired. A source test result on July 26, 2007 indicated this RTO has destruction efficiency of 96.2% (M&STE Source Test File 07008 REVISED).

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This application is to change the existing Aging Room to a PTE type. A PTE meeting with EPA Method 204 is considered with 100% collection efficiency. The Aging Room PTE will be tested to show compliance with the EPA Method 204.



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**EMISSION CALCULATIONS**

This application is to modify the emission collection system in order for the APC system to meet with 90% collection efficiency as required by Rule 1175; thus, no emission increases are expected due to this modification. The following calculation is to update the NSR entry.

**Combustion Emissions from the RTO**

Data

Operation (Maximum): 24 hrs/day, 7 days/wk, 52 wks/yr  
 Burner Rating: 0.99 MMBtu/hr  
 Fuel Type: Natural gas only  
 Retention time at normal operating temperature: 0.5 sec at 1,500 °F

Emission Factors

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

Emission Factor Summary - Natural Gas

Pollutant	Emission Factor (AQMD Default) lb/mmscf	Emission Factor (for this report) lb/MMBtu
VOC	7	0.00667
SOx	0.6	0.000571
PM10	7.5	0.00714
NOx	130	0.12381
CO	35	0.03333

AQMD Default emission factors for a natural gas fired afterburner were taken from “General Instruction Book for the AQMD 2007-2008 Annual Emission Reporting Program”, Appendix A- Table 1):

Combustion Emissions

The calculated combustion emission results are indicated below:



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A/N 527983		Hourly (lbs/hr)	Daily (lbs/day)	Annually (lbs/yr)	30 day ave. (lbs/day)	30 day NSR (lbs/day)
R1=R2	VOC	0.0066	0.16	57.66	0.16	0
R1=R2	SOx	0.00057	0.01	4.94	0.01	0
R1=R2	PM10	0.0071	0.17	61.78	0.17	0
R1=R2	NOX	0.1226	2.94	1070.78	2.94	3
R1=R2	CO	0.033	0.79	288.29	0.79	1

Hourly (lbs/hr) = (Emission Factor, lbs/MMBtu) (0.99 MMBtu/hr)

Daily (lbs/day) = (Hourly, lbs/hr) (24 hrs/day)

Annually (lbs/yr) = (daily lbs/day) (7 days/wk) (52 wks/yr)

**RULES AND REGULATIONS EVALUATION**

**Rule 112: Standards for Approving Permits**

Based on a review of the Google maps, it appears that the Bell Gardens High School is located to the south of the facility across Randolph Street. However, since there is no emission increase with this modification, a Public Notice is not required.

**Rule 401: Visible Emissions** – Compliance is expected from well maintained and properly operated equipment.

**Rule 402: Public Nuisance** – With proper operation and maintenance, the equipment is not likely to create a public nuisance.

**Rule 1147: NOx Reductions from Miscellaneous Sources**

Application A/N 527983 - RTO

(c)(1) – this RTO was installed in 2007, therefore it is subject to NOx emission limit of 60 ppm or 0.073 lb/mmBtu by July 1, 2022 (2007 + 15 years).

(c)(7) – On or after January 1, 2010, the operator shall perform combustion system maintenance in accordance with the manufacturer’s schedule and specifications as identified in the manual and other written materials supplied by the manufacturer or distributor. Condition No. 4 is added to ensure the compliance with this rule.

(c)(8) – This RTO will be subject to a NOx concentration limit by July 1, 2022; thus, it is not required to have a fuel meter.

**Rule 1175: Control of Emissions from the Manufacture of Polymeric Cellular (Foam) Products**

A source test performed on July 26, 2007 demonstrated compliance with Rule 1175. The source test was performed under an approved source test protocol (Ref: 07008, approved on May 24, 2007). The test report was prepared by EMCC LLC on September 26, 2007. This test report was deemed as “Conditionally Acceptable” by the District M&STE on October 24, 2008 (Reference: 07008 Revised).



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**REG XIII:** **New Source Review** - There are no emission increase associated with the proposed modification. No emission offset is required for this application.

**Reg XXX:** **Title V Permit**

Foam Fabricators (Facility ID: 12876) is a Title V facility. The current Title V Permit for the facility will expire on August 24, 2016.

Application no. 527983 is to change the current aging room to be PTE type for the VOC emission collection system. No emission increase is expected for this modification project. Therefore, application no. 527983 is considered Minor Permit Revisions 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. 527984).

**CONCLUSION AND RECOMMENDATIONS**

Based on this evaluation, it is expected that the subject equipment will be operated in compliance with all applicable District Rules and Regulations. The Permit to Construct/Operate is recommended to be issued.