



**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 92318**

I. INTRODUCTION

This Class II synthetic minor permit is for the continued operation of Atlas Roofing Corporation's (formerly StarRfoam Manufacturing, Inc) Expandable PolyStyrene (EPS) block molding facility. Permit No. 92318 renews and supersedes Permit No. 65453.

A. Company Information

Facility Name: Atlas Roofing Corporation
Mailing/Facility Address: 4555 Olympic Way, Kingman, AZ 86401

B. Attainment Classification

Mohave County is in attainment with respect to all criteria pollutants.

II. PROCESS DESCRIPTION

A. Process Equipment

Atlas Roofing Corporation operates one (1) pre-expander/fluidized bed dryer, two (2) natural gas fired boilers used for generating steam for the expanding and molding processes, two (2) block molding machines and a Regenerative Thermal Oxidizer (RTO) with a destruction efficiency of 97.4%. Atlas Roofing Corporation has a limitation for a maximum of 5,000 pounds of EPS beads on an hourly basis and 22.4 million pounds of EPS beads on an annual basis.

The foam blocks produced are used for a variety of purposes such as insulation, architectural shapes and panel cores. Actual foam block production values vary depending on the density of the type of foam block that is being produced. Production of EPS foam blocks consists of five steps: pre-expansion, pre-puff aging, block molding, block storage, and block fabrication.

1. Pre-Expansion

EPS beads impregnated with a blowing agent (pentane) is transferred into a bead hopper which is then loaded into the pre-expander. The beads are processed with low pressure steam from the boiler to soften and expand the beads. The pentane released during the process is captured and vented to the room which considered a Permanent Total Enclosure (PTE) as defined in Environmental Protection Agency (EPA) Method 204. At this point, the beads are 40 to 50 times their original volume.

2. Pre-Puff Aging

The steam expansion process results in excess moisture on the pre-expanded beads. The beads are dried with hot air by passing through the fluidized bed dryer. From the dryer, the beads are pneumatically fed into large mesh holding bags to cool and age for a period of time. During this time, most of the residual pentane is released from the beads and replaced with air.

The pentane released from the pre-expander and the bead aging process is accumulated in the PTE. Since pentane is heavier than air, it accumulates at floor level and is vented to the Regenerative Thermal Oxidizer (RTO). After the beads have stabilized, they are pneumatically fed into the block molds.

3. Block Molding

Steam is injected into the mold once it has been filled with beads and locked. The steam causes the beads to soften and expand further by vaporizing more of the pentane and fusing the beads together to form a solid block. The pentene emissions from the molding process are vented to the PTE.

4. Block Storage:

The blocks are stored in the heated block storage room for the first 48 hours. Any emissions during this curing time are captured by PTE system and then vented to the RTO for destruction. The block storage room and PTE is kept at a negative pressure to ensure 100% capture efficiency.

5. Block Fabrication:

In the fabrication area, blocks are cut or sliced into the desired sizes and shapes. There is no emission of pentane in this area since the blocks have been cured in the block storage area. After curing of blocks, 15% of pentane remains unreacted and retained in the blocks.

B. Control Devices

Total pentane emissions released during the first four process steps (pre-expansion, pre-puff aging, block molding, and block storage) are routed to the thermal oxidizer where pentane emissions are oxidized. The oxidizer has an efficiency of 97.4%. Because pentane is heavier than air, it settles to the floor allowing it to be more easily routed from the floor to the RTO. Any un-captured pentane emissions are released as fugitive emissions.

C. Process Flow Diagram

A flow chart for the process is displayed in Figure 1 below.

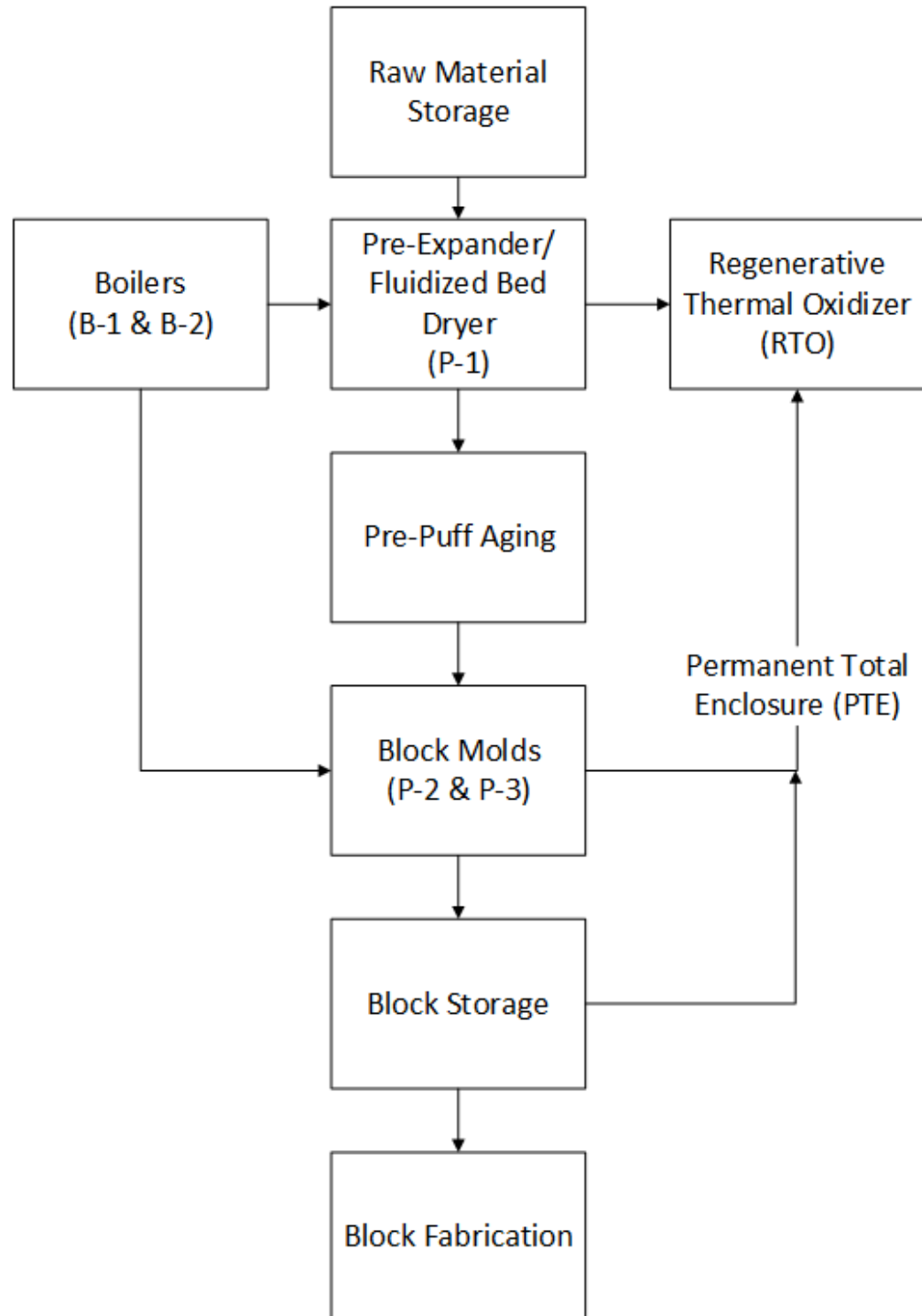


Figure 1 - Flow Chart Adapted from Atlas Roofing Corporation Renewal Application

III. LEARNING SITE EVALUATION

In accordance with Arizona Department of Environmental Quality's (ADEQ) Environmental Permits and Approvals near Learning Sites Policy, the Department is required to conduct an evaluation to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

This permit renewal will not result in any increase in emissions as there are no changes to the process or equipment. Hence the facility is exempt from the learning sites evaluation.

IV. COMPLIANCE HISTORY

A. Facility Inspections & Report Reviews

Atlas Roofing Corporation was inspected one time during the last permit term on August 30, 2017. The inspection did not result in any violations of the permit.

During the last permit term, the facility submitted five (5) annual compliance certifications to the ADEQ certifying compliance with the permit. The report reviews did not document any violations of the permit.

B. Excess Emissions and Permit Deviation Reports

The facility submitted three (3) permit deviation reports on October 29, 2020. Two (2) deviations were as a result of COVID-19 resulting in a three-month overdue performance test for the RTO and a lapsed Method-9 Certification. The third deviation was for a late submittal of the annual compliance certification due to issues with the myDEQ portal. The facility corrected the deviations and the report reviews did not result in a Notice of Opportunity to Correct (NOC) or Notice of Violation (NOV).

C. Informal Enforcement (Case No. 173810)

A NOV was issued to Atlas Roofing Corporation on February 7, 2018 based on a phone call from the facility on January, 31, 2018. The facility reported that the annual performance test for the PTE was not conducted in the year 2017, the last test had been conducted on March 1, 2016. The facility submitted a response ensuring that the PTE conformed to the criteria of the performance test and scheduled a performance test for the PTE. No further action was required after the performance test was conducted and showed passing results.

D. Performance Tests

The facility has conducted six (6) performance tests during the permit term. There were four (4) tests performed on Bead Room and Block Room capture efficiency using EPA Method 204. In addition, there were two (2) tests performed on the RTO destruction efficiency using EPA Methods 1, 2, 3A, 4, 18, and 25A. All of the tests conducted resulted

in passing results. No reporting deficiencies were noted in the reports. The results to the performance tests conducted during the permit term are presented in Table 1 below.

Table 1: Performance Test Results

| Date of Test | Emission Unit | Pollutant | Limit | Results of Performance Test |
|--------------|-------------------------------|---|--|--|
| 4/3/2018 | RTO Destruction Efficiency | VOC | $\geq 97.4\%$ | PASS -0.2741 inH2O |
| | Bead Room Capture Efficiency | Air Flow Direction ΔP | ≤ -0.007 inH2O | PASS -0.3445 inH2O |
| | Block Room Capture Efficiency | Air Flow Direction ΔP | ≤ -0.007 inH2O | PASS 99.1% |
| 4/5/2019 | Bead Room Capture Efficiency | Air Flow Direction ΔP Facial Velocity | Inward ≤ -0.007 inH2O ≥ 200 ft/min | PASS Inward -0.4435 inH2O 927 ft/min |
| | Block Room Capture Efficiency | Air Flow Direction ΔP Facial Velocity | Inward ≤ -0.007 inH2O ≥ 200 ft/min | PASS Inward -0.3334 inH2O 295 ft/min |
| 6/4/2020 | RTO Destruction Efficiency | VOC | $\geq 97.4\%$ | PASS 98.5% |
| | Bead Room Capture Efficiency | Air Flow Direction ΔP | ≤ -0.007 inH2O | PASS Inward -0.4773 inH2O |
| | Block Room Capture Efficiency | Air Flow Direction ΔP | ≤ -0.007 inH2O | PASS Inward -0.1319 inH2O |
| 7/29/2021 | Bead Room Capture Efficiency | Air Flow Direction ΔP Facial Velocity | Inward ≤ -0.007 inH2O ≥ 200 ft/min | PASS Inward -0.0926 inH2O 1360 ft/min |
| | Block Room Capture Efficiency | Air Flow Direction ΔP Facial Velocity | Inward ≤ -0.007 inH2O ≥ 200 ft/min | PASS Inward -0.1029 inH2O 216 ft/min |

V. EMISSIONS

Atlas Roofing Corporation has the potential-to-emit (PTE) nitrogen oxides (NO_x), particulate matter nominally less than 10 micrometers (PM₁₀), particulate matter nominally less than 2.5 micrometers (PM_{2.5}), carbon monoxide (CO), sulfur dioxide (SO₂), volatile organic compounds (VOC), and hazardous air pollutant (HAP).

The emission rates were calculated using the maximum process rates for the facility, applicable control efficiencies, and the corresponding emission factors. Emission factors were established using voluntarily accepted emission limits; the Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition (AP-42), and U.S. EPA reference documents. The facility has voluntarily accepted a limit on usage of EPS beads to 5,000 pounds per hour and 22,400,000 pounds per year per Condition I.B.2 of Att. "B".

A. EPS Block Manufacturing Process

The uncontrolled pentane (VOC) emissions for the EPS Block Manufacturing Process were determined by multiplying the annual EPS bead processing rate by the pentane content in the EPS beads, then by the percent of pentane not retained in the final product. Based on the EPA document "Control of VOC Emissions from Polystyrene Foam Manufacturing", Table 5-1 and Figure 5-1 an average of 15% of pentane remains in the finished molded product after 48 hours. The annual controlled pentane emissions were then determined using a control efficiency of 97.4% for the RTO per Condition III.B.5 of Att. "B".

B. Boilers & RTO

The combustion emissions from the two (2) 6.3 MMBtu/hr boilers and the 4.0 MMBtu/hr RTO were determined using emission factors from AP-42, Tables 1.4-1 and 1.4-2 (07/98) for uncontrolled natural gas combustion less than 100 MMBtu/hr. The assumption was made that the uncontrolled PM₁₀ and PM_{2.5} emissions were equal to the PM emissions based on footnote "c" in AP-42, Table 1.4-2 (07/98). A gas heat content of 1,020 British thermal units per standard cubic foot (Btu/scf) was used.

The facility has a potential-to-emit more than the permitting thresholds of VOC. The facility's PTE is provided in Table 2 below:

Table 2: Potential to Emit (tpy)

| Pollutant | Emissions | Significant Thresholds |
|-------------------|------------------|-------------------------------|
| NO _x | 7.13 | 40 |
| PM ₁₀ | 0.54 | 15 |
| PM _{2.5} | 0.54 | 10 |
| CO | 5.99 | 100 |
| SO ₂ | 0.04 | 40 |
| VOC | 25.14 | 40 |
| HAPs | 0.13 | 10 (single)/ 25 (combined) |

VI. MINOR NEW SOURCE REVIEW (NSR)

This permit renewal application does not propose to make any changes that would increase potential to emit in excess of the permitting exemption thresholds. As a result, minor NSR does not apply.

VII. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The permit contains the following voluntary emission limitations and standards:

A. Facility Wide (Condition I.B.2 of Att. "B")

The facility accepted a voluntary operational limit of 5,000 pounds per hour of EPS beads or a total of 22,400,000 pounds EPS beads in any twelve-month rolling period. This limit was incorporated to avoid becoming a major source for VOCs due to an increase in production in Significant Permit Revision No. 63545 issued in 2016.

B. EPS Block Manufacturing Process Air Pollution Control Requirements

1. Pentane Accumulation Total Permanent Enclosure and Regenerative Thermal Oxidizer (Conditions III.B.1 – 2, 4 of Att. "B")

The facility accepted the requirements to:

- a. Route all emissions from production through the PTE to the RTO;
- b. Operate the PTE at negative pressure so as to capture and route VOC emissions to the RTO at all times when beads or blocks are in process; and
- c. Operate and maintain the RTO at all times when beads or blocks are in process from introduction into the raw bead hopper through block storage.

These requirements were incorporated to avoid becoming a major source for VOCs into Permit No. 38250 issued in 2006.

2. RTO Destruction Efficiency (Condition III.B.5 of Att. "B")

The facility accepted a requirement to operate the RTO in a way that achieves a minimum 97.4% destruction efficiency. This limit was incorporated to avoid becoming a major source for VOCs due to an increase in production in Significant Permit Revision No. 63545 issued in 2016.

VIII. APPLICABLE REGULATIONS

Table 3 identifies applicable regulations and verification as to why that standard applies. The table also contains a discussion of any regulations the emission unit is exempt from.

Table 3: Applicable Regulations

| Unit & year | Control Device | Rule | Discussion |
|----------------------------------|---|---|--|
| Boilers (2014 & 2015) | None | (Arizona Administrative Code) A.A.C. R-18-2-724 New Source Performance Standards (NSPS) 40 CFR Subpart Dc National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart JJJJJ | The boilers are subject to Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment, A.A.C. R18-2-724. NSPS Subpart Dc is applicable to boilers with capacity between 10 to 100 MMBtu/hr, and manufactured after June 1989. The rated capacity of the boilers is 6.3 MMBtu each. Therefore, NSPS Subpart Dc is not applicable to these boilers. NESHAP Subpart JJJJJ is not applicable because “gas-fired boilers” as defined ipn the subpart are exempt. |
| EPS Block Manufacturing | Thermal oxidizer | A.A.C. R18-2-730 | These standards are applicable to unclassified sources. |
| Fugitive dust sources | Water Trucks, Dust Suppressants | A.A.C. R18-2 Article 6 A.A.C. R18-2-702 | These standards are applicable to all fugitive dust sources at the facility. |
| Abrasive Blasting | Wet blasting; Dust collecting equipment; Other approved methods | A.A.C. R-18-2-702 A.A.C. R-18-2-726 | These standards are applicable to any abrasive blasting operation. |
| Spray Painting | Enclosures | A.A.C. R18-2-702 A.A.C. R-18-2-727 | These standards are applicable to any spray-painting operation. |
| Demolition/renovation Operations | N/A | A.A.C. R18-2-1101.A.8 | This standard is applicable to any asbestos related demolition or renovation operations. |

IX. PREVIOUS PERMIT REVISIONS AND CONDITIONS**A. Previous Permit Revisions**

Table 4 provides a description of the permit revisions made to Permit No. 65453 during the previous permit term.

Table 4: Permit Revisions to Permit No. 65453

| Permit Revision No. | Permit Revision Type | Brief Description |
|----------------------------|-----------------------------------|---|
| 85634 | Class II Administrative Amendment | Permit transfer from StarRfoam Manufacturing Inc. to Atlas Roofing. |

B. Changes to Current Renewal

Table 5 addresses the changes made to the sections and conditions from Permit No. 92318:

Table 5: Previous Permit Conditions

| Section No. | Determination | | | Comments |
|-------------------------|----------------------|----------------|----------------|---|
| | Added | Revised | Deleted | |
| Att. "A" | | X | | General Provisions: Revised to represent the most recent template language |
| Att. "B" Section I | | X | | Facility Wide Requirements: Revised to represent the most recent template language. |
| Att. "B" Section II | | | X | Opacity Incorporated the applicable requirements into Section I of Permit No. 92318. |
| Att. "B" Section II | | X | | Boilers Updated the applicable visible emissions requirements. Formerly Section III of Permit No. 65453. |
| Att. "B" Section III | | X | | EPS Block Manufacturing Process Requirements Removed requirements for initial performance test because it has already been conducted. Formerly Section IV of Permit No. 65453. |
| Att. "B" Section IV | | X | | Fugitive Dust Requirements Revised to represent the most recent template language. Formerly Section V of Permit No. 65453. |

Table 5: Previous Permit Conditions

| Section No. | Determination | | | Comments |
|------------------------|---------------|---------|---------|--|
| | Added | Revised | Deleted | |
| Att. "B" Section V | | X | | Other Periodic Activities Revised to represent the most recent template language. Formerly Section VII of Permit No. 65453 |
| Att. "B" Section VI | | | X | Mobile Source Requirements Removed from permit because the requirements did not apply to the facility. |
| Att. "C" | | X | | Equipment List: Revised to reflect the most recent equipment operating at the facility and to include equipment information provided. |

X. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 6 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit.

Table 6: Permit No. 92318

| Emission Unit | Pollutant | Emission Limit | Monitoring Requirements | Recordkeeping Requirements | Reporting Requirements |
|---------------|-----------|---|--|---|--|
| Facility Wide | VOC | EPS Beads: 5,000 lbs/hr or 22,400,000 lbs per 12-month rolling period | N/A | Record the hourly usage of EPS beads. Calculate and record the rolling 12-month total usage of EPS beads at the end of every month Maintain records of all purchase orders and invoices associated EPS beads and all other VOC containing materials Maintain (Safety Data Sheets SDS) for EPS beads, and all other VOC containing materials consumed in the EPS foam manufacturing operation. | N/A |
| Boilers | PM | 15% opacity | Conduct quarterly-opacity monitoring of the stacks of all boilers. | Records of fuel supplier certifications for the fuel used in all the boilers. | Report all 6-minute periods during which the visible emissions exceed 15% opacity. |

| Emission Unit | Pollutant | Emission Limit | Monitoring Requirements | Recordkeeping Requirements | Reporting Requirements |
|---------------------------------|-----------|---|---|---|------------------------|
| EPS Block Manufacturing Process | VOC | N/A | <p>Monitor and record the combustion chamber temperature of the RTO at all times during the bead processing operations</p> <p>Monitor and record the pressure differential between the inside and outside of the PTE.</p> | Keep records of the weekly maintenance inspection performed of the VOC capture system and duct work. | N/A |
| Fugitive Dust | PM | 40% Opacity | A Method 9 observer is required to conduct a monthly survey of visible emissions. | Record of the dates and types of dust control measures employed, and if applicable, the results of any Method 9 observations, and any corrective action taken to lower the opacity of any excess emissions. | N/A |
| Abrasive Blasting | PM | 20% Opacity | N/A | Record the date, duration and pollution control measures of any abrasive blasting project. | N/A |
| Spray Painting | VOC | 20% Opacity Control 96% of the overspray | N/A | Maintain records of the date, duration, quantity of paint used, any applicable SDS, and pollution control measures of any spray-painting project. | N/A |

| Emission Unit | Pollutant | Emission Limit | Monitoring Requirements | Recordkeeping Requirements | Reporting Requirements |
|---------------------------|-----------|----------------|-------------------------|---|------------------------|
| Demolition/ Renovation | Asbestos | N/A | N/A | Maintain records of all asbestos related demolition or renovation projects including the “NESHAP Notification for Renovation and Demolition Activities” form and all supporting documents | N/A |

XI. PERFORMANCE TESTING REQUIREMENTS**A. Permanent Total Enclosure**

The Permittee is required to conduct an annual test of the PTE to demonstrate compliance of the 5-point criteria specified in Condition III.B.3.a-e of Attachment “B” of the permit in accordance with the test methods set forth in EPA Reference Method 204.

The 5-point criteria are used to determine if an existing building or enclosure meets the requirements of permanent total enclosure. If the 5-point criteria are met and if the exhaust gases from the enclosure are ducted to the control device, then it can be assumed that the VOC capture efficiency is 100%.

B. Regenerative Thermal Oxidizer

The Permittee is being required to conduct a performance test every two years to establish a temperature value or range at which a destructive efficiency of 97.4% by weight of the VOCs is achieved. The performance test shall be conducted in accordance with Reference Method 25A in 40 CFR 60, Appendix A.

XII. LIST OF ABBREVIATIONS

| | |
|-------------------|--|
| A.A.C. | Arizona Administrative Code |
| ADEQ | Arizona Department of Environmental Quality |
| Btu/scf | British thermal units per standard cubic foot |
| CFR | Code of Federal Regulations |
| CH ₄ | Methane |
| CO | Carbon Monoxide |
| EPA | Environmental Protection Agency |
| EPS | Expandable Polystyrene Beads |
| HAP | Hazardous Air Pollutant |
| hr | Hour |
| IC | Internal Combustion |
| MMBtu/hr | Million British Thermal Units per hour |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NOC | Notice of Opportunity to Correct |
| NOV | Notice of Violation |
| NO _x | Nitrogen Oxides |
| NSPS | New Source Performance Standards |
| PM | Particulate Matter |
| PM ₁₀ | Particulate Matter less than 10 µm nominal aerodynamic diameter |
| PM _{2.5} | Particulate Matter less than 2.5 µm nominal aerodynamic diameter |
| PTE | Pentane Accumulation Permanent Total Enclosure |
| PTE | Potential to Emit |
| SDS | Safety Data Sheets |
| TPY | Tons per Year |
| VOC | Volatile Organic Compound |
| yr | Year |