

**MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY  
AIR QUALITY DIVISION**

December 5, 2019

**PERMIT TO INSTALL**  
104-09G

**ISSUED TO**  
Vertellus Zeeland, LLC

**LOCATED AT**  
215 North Centennial Street  
Zeeland, Michigan

**IN THE COUNTY OF**  
Ottawa

**STATE REGISTRATION NUMBER**  
B2817

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

|  |            |
|--|------------|
| DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203:<br><b>November 14, 2019</b> |            |
| DATE PERMIT TO INSTALL APPROVED:<br><b>December 5, 2019</b>                          | SIGNATURE: |
| DATE PERMIT VOIDED:  | SIGNATURE: |
| DATE PERMIT REVOKED:   | SIGNATURE: |

## PERMIT TO INSTALL

### Table of Contents

|   |    |
|---|----|
| COMMON ACRONYMS .....   | 2  |
| POLLUTANT / MEASUREMENT ABBREVIATIONS.....  | 3  |
| GENERAL CONDITIONS .....  | 4  |
| EMISSION UNIT SPECIAL CONDITIONS.....   | 6  |
| EMISSION UNIT SUMMARY TABLE .....   | 6  |
| EUB026 .....  | 8  |
| EUB031 .....  | 10 |
| EUNEWPILOTPLANT .....   | 14 |
| FLEXIBLE GROUP SPECIAL CONDITIONS.....  | 19 |
| FLEXIBLE GROUP SUMMARY TABLE .....  | 19 |
| FGCONSOLIDATED.....   | 20 |
| FGFACILITY CONDITIONS.....  | 29 |
| APPENDIX 1: Monitoring Requirements.....  | 31 |
| APPENDIX 2: Recordkeeping.....  | 32 |
| APPENDIX 3: Emission Calculations.....  | 33 |
| APPENDIX 4: Determining Categories for Individual TACs Emitted from FGCONSOLIDATED..... | 38 |
| APPENDIX 5: Pressure Testing for EUB031 .....   | 39 |

## COMMON ACRONYMS

|                            |   |
|----------------------------|---|
| AQD                        | Air Quality Division  |
| BACT                       | Best Available Control Technology                           |
| CAA                        | Clean Air Act   |
| CAM                        | Compliance Assurance Monitoring                             |
| CEMS                       | Continuous Emission Monitoring System                       |
| CFR                        | Code of Federal Regulations                                 |
| COMS                       | Continuous Opacity Monitoring System                        |
| Department/department/EGLE | Michigan Department of Environment, Great Lakes, and Energy |
| EU                         | Emission Unit   |
| FG                         | Flexible Group  |
| GACS                       | Gallons of Applied Coating Solids                           |
| GC                         | General Condition   |
| GHGs                       | Greenhouse Gases  |
| HVLP                       | High Volume Low Pressure*                                   |
| ID                         | Identification  |
| IRSL                       | Initial Risk Screening Level                                |
| ITSL                       | Initial Threshold Screening Level                           |
| LAER                       | Lowest Achievable Emission Rate                             |
| MACT                       | Maximum Achievable Control Technology                       |
| MAERS                      | Michigan Air Emissions Reporting System                     |
| MAP                        | Malfunction Abatement Plan                                  |
| MSDS                       | Material Safety Data Sheet                                  |
| NA                         | Not Applicable  |
| NAAQS                      | National Ambient Air Quality Standards                      |
| NESHAP                     | National Emission Standard for Hazardous Air Pollutants     |
| NSPS                       | New Source Performance Standards                            |
| NSR                        | New Source Review   |
| PS                         | Performance Specification                                   |
| PSD                        | Prevention of Significant Deterioration                     |
| PTE                        | Permanent Total Enclosure                                   |
| PTI                        | Permit to Install   |
| RACT                       | Reasonable Available Control Technology                     |
| ROP                        | Renewable Operating Permit                                  |
| SC                         | Special Condition   |
| SCR                        | Selective Catalytic Reduction                               |
| SNCR                       | Selective Non-Catalytic Reduction                           |
| SRN                        | State Registration Number                                   |
| TBD                        | To Be Determined  |
| TEQ                        | Toxicity Equivalence Quotient                               |
| USEPA/EPA                  | United States Environmental Protection Agency               |
| VE                         | Visible Emissions   |

\*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig

### POLLUTANT / MEASUREMENT ABBREVIATIONS

|                   |  |
|-------------------|--|
| acfm              | Actual cubic feet per minute                                     |
| BTU               | British Thermal Unit   |
| °C                | Degrees Celsius  |
| CO                | Carbon Monoxide  |
| CO <sub>2</sub> e | Carbon Dioxide Equivalent  |
| dscf              | Dry standard cubic foot  |
| dscm              | Dry standard cubic meter   |
| °F                | Degrees Fahrenheit   |
| gr                | Grains   |
| HAP               | Hazardous Air Pollutant  |
| Hg                | Mercury  |
| hr                | Hour   |
| HP                | Horsepower   |
| H <sub>2</sub> S  | Hydrogen Sulfide   |
| kW                | Kilowatt   |
| lb                | Pound  |
| m                 | Meter  |
| mg                | Milligram  |
| mm                | Millimeter   |
| MM                | Million  |
| MW                | Megawatts  |
| NMOC              | Non-Methane Organic Compounds                                    |
| NO <sub>x</sub>   | Oxides of Nitrogen   |
| ng                | Nanogram   |
| PM                | Particulate Matter   |
| PM10              | Particulate Matter equal to or less than 10 microns in diameter  |
| PM2.5             | Particulate Matter equal to or less than 2.5 microns in diameter |
| pph               | Pounds per hour  |
| ppm               | Parts per million  |
| ppmv              | Parts per million by volume                                      |
| ppmw              | Parts per million by weight                                      |
| psia              | Pounds per square inch absolute                                  |
| psig              | Pounds per square inch gauge                                     |
| scf               | Standard cubic feet  |
| sec               | Seconds  |
| SO <sub>2</sub>   | Sulfur Dioxide   |
| TAC               | Toxic Air Contaminant  |
| Temp              | Temperature  |
| THC               | Total Hydrocarbons   |
| tpy               | Tons per year  |
| µg                | Microgram  |
| µm                | Micrometer or Micron   |
| VOC               | Volatile Organic Compounds                                       |
| yr                | Year   |

## GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**
5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.
9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
  - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
  - b) A visible emission limit specified by an applicable federal new source performance standard.
  - c) A visible emission limit specified as a condition of this Permit to Install.
12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**
13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

**EMISSION UNIT SPECIAL CONDITIONS**

**EMISSION UNIT SUMMARY TABLE**

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

| <b>Emission Unit ID</b> | <b>Emission Unit Description<br/>(Including Process Equipment &amp; Control Device(s))</b>   | <b>Installation Date /<br/>Modification Date</b>            | <b>Flexible Group ID</b> |
|-------------------------|--|---|--------------------------|
| EUB005                  | Process equipment located in Building 5. Equipment includes reactors, centrifuges, storage tanks, still, scrubber, condenser and ancillary equipment for manufacture of multiple chemical products. The equipment uses a scrubber located outside Building 7.  | 1/1/1990<br>12/20/2013                                      | FGCONSOLIDATED           |
| EUB007                  | Process equipment in Building 7. Equipment includes storage tanks, stills, scrubbers, condensers, vacuum pump and ancillary equipment for manufacture of multiple chemical products.   | 1/1/1993<br>12/20/2013                                      | FGCONSOLIDATED           |
| EUB012                  | Process equipment in Buildings 12 and 15. Equipment includes reactors, autoclaves, storage tanks, still, scrubber, condensers, vacuum pumps and ancillary equipment for manufacture of multiple chemical products.   | 1/1/1952<br>12/20/2013                                      | FGCONSOLIDATED           |
| EUB019                  | Process equipment in Building 19. Equipment includes reactors, drying equipment, centrifuges, storage tanks, stills, scrubber, condensers, vacuum pumps and ancillary equipment for manufacture of multiple chemical products.   | 1/1/1947<br>12/20/2013                                      | FGCONSOLIDATED           |
| EUB026                  | Process equipment in Building 26. Equipment includes reactors, filter, storage tanks, scrubber, condensers and ancillary equipment used in the Vitride manufacturing and filtration process and other chemical products.   | 9/26/1978<br>12/20/2013                                     | NA                       |
| EUB026A                 | Process equipment in Building 26A is called the V-1 still or the Glitsch distillation column. Equipment includes storage tanks, still, scrubber, condensers and ancillary equipment for manufacture of multiple chemical products.   | 1/1/1985<br>12/20/2013                                      | FGCONSOLIDATED           |
| EUB031                  | Process equipment in Building 31. Equipment includes reactors, exhaust fans, blowers, cold traps, separators, receivers, blenders, knock out pots, compressors, hoppers, centrifuges, storage tanks, scrubber, condensers, vacuum pumps, and ancillary equipment for manufacture of ethylene maleic anhydride and other chemical products. Emission control equipment includes the ethylene recovery system, chilled condensers, a ground flare, and a wet scrubber. | 1/1/1989<br>6/4/2016<br>1/23/2018<br>2/22/2019<br>12/5/2019 | NA                       |

| <b>Emission Unit ID</b> | <b>Emission Unit Description<br/>(Including Process Equipment &amp; Control Device(s))</b>   | <b>Installation Date /<br/>Modification Date</b> | <b>Flexible Group ID</b> |
|-------------------------|--|--|--------------------------|
| EUNEWPILOTPLANT         | Process equipment in Building 32. Equipment includes reactors, blowers, cold trap condenser, column, mills, dryers, HEPA filters, centrifuges, storage tanks, stills, scrubbers, vacuum pumps and ancillary equipment for pilot, scale-up research and manufacture of multiple chemical products.                              | 1/7/1996<br>12/20/2013                           | NA                       |
| EUB002                  | Process equipment in Building 2, a reactor and vacuum pump in Building 5, and a dryer in Building 19. Building 2 equipment includes a distillation vessel and column, condenser, centrifuge, knock out pot, receiver vessels, storage tanks, scrubbers, and ancillary equipment for manufacture of multiple chemical products. | 1/1/1960<br>12/20/2013                           | FGCONSOLIDATED           |

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

**EUB026  
 EMISSION UNIT CONDITIONS**

**DESCRIPTION**

Process equipment in Building 26. Equipment includes reactors, filter, storage tanks, scrubber, condensers and ancillary equipment used in the Vitride manufacturing and filtration process and other chemical products.

**Flexible Group ID:** NA

**POLLUTION CONTROL EQUIPMENT**

Scrubber, Cyclonic Dust Collector (for aluminum dust handling)

**I. EMISSION LIMIT(S)**

| <b>Pollutant</b> | <b>Limit</b> | <b>Time Period / Operating Scenario</b>                                      | <b>Equipment</b> | <b>Monitoring / Testing Method</b> | <b>Underlying Applicable Requirements</b> |
|------------------|--------------|--|------------------|------------------------------------|---|
| 1. VOC           | 2.5 tpy      | 12-month rolling time period as determined at the end of each calendar month | EUB026           | SC VI.1                            | R 336.1702(a)                             |

**II. MATERIAL LIMIT(S)**

| <b>Material</b> | <b>Limit</b>                        | <b>Time Period / Operating Scenario</b>                                      | <b>Equipment</b> | <b>Monitoring / Testing Method</b> | <b>Underlying Applicable Requirements</b> |
|-----------------|-------------------------------------|--|------------------|------------------------------------|---|
| 1. Vitride      | 5,175,000 lbs per year <sup>1</sup> | 12-month rolling time period as determined at the end of each calendar month | EUB026           | SC VI.3                            | R 336.1224                                |

**III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall not operate the EUB026 process unless an approvable preventative maintenance plan is implemented and maintained for the scrubbers and dual cyclonic dust collector. Any modifications to the plan shall be submitted to the AQD District Supervisor. **(R 336.1224, R 336.1225, R 336.1702(a), R 336.1910, R 336.1911)**

**IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. The permittee shall not operate the EUB026 process unless the scrubbers are installed, maintained, and operated in a satisfactory manner. Satisfactory operation includes, but is not limited to, maintaining the scrubber in accordance with the preventative maintenance plan required in SC III.1. **(R 336.1910)**
2. The permittee shall equip and maintain the scrubber SC-7801 with a liquid flow indicator. **(R 336.1910)**
3. The permittee shall not operate the aluminum dust handling operations in the Vitride Process portion of EUB026 unless the dual cyclonic dust collector is installed, maintained, and operated in a satisfactory manner. Satisfactory operation includes, but is not limited to, maintaining the equipment in accordance with the preventative maintenance plan required in SC III.1. **(R 336.1331, R 336.1901, R 336.1910)**
4. The permittee shall maintain a liquid flow rate through scrubber SC-7801 as specified in the preventative maintenance plan. **(R 336.1910)**

**V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

**VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall compile VOC emission records from Vitride monthly, as specified in Appendix 3, in tons per 12-month rolling time period. **(R 336.1702(a))**
2. Liquid flow through scrubbers shall be verified once per batch during operation of process equipment. **(R 336.1910)**
3. The permittee shall compile Vitride production records monthly in tons per 12-month rolling time period. **(R 336.1201(3))**
4. The permittee shall keep all records necessary to document maintenance/duties required by the preventative maintenance plan. **(R 336.1224, R 336.1225, R 336.1702(a), R 336.1910, R 336.1911)**

See Appendix 3

**VII. REPORTING**

NA

**VIII. STACK/VENT RESTRICTION(S)**

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

| <b>Stack &amp; Vent ID</b> | <b>Maximum Exhaust Diameter / Dimensions (inches)</b> | <b>Minimum Height Above Ground (feet)</b> | <b>Underlying Applicable Requirements</b> |
|----------------------------|---|---|---|
| 1. SV054                   | 10  | 40  | R 336.1225, 40 CFR 52.21(c) & (d)         |
| 2. SV113                   | 3   | 20  | R 336.1225, 40 CFR 52.21(c) & (d)         |
| 3. SV166                   | 2   | 30.3                                      | R 336.1225, 40 CFR 52.21(c) & (d)         |
| 4. SV167                   | 2   | 30.3                                      | R 336.1225, 40 CFR 52.21(c) & (d)         |
| 5. SV168                   | 2   | 30.3                                      | R 336.1225, 40 CFR 52.21(c) & (d)         |

**IX. OTHER REQUIREMENT(S)**

NA

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

**EUB031**  
**EMISSION UNIT CONDITIONS**

**DESCRIPTION**

Process equipment in Building 31. Equipment includes reactors, exhaust fans, blowers, cold traps, separators, receivers, blenders, knock out pots, compressors, hoppers, centrifuges, storage tanks, scrubber, condensers, vacuum pumps, and ancillary equipment for manufacture of ethylene maleic anhydride and other chemical products. Emission control equipment includes the ethylene recovery system, chilled condensers, a ground flare, and a wet scrubber.

**Flexible Group ID:** NA

**POLLUTION CONTROL EQUIPMENT**

- Ethylene recovery system and Cold Traps #1 and #2 control process emissions during production of EMA E400
- Ground flare controls emissions from the ethylene recovery system and Cold Traps #1 and #2 during production of EMA E60
- Wet scrubber for product packaging of both EMA E60 and EMA E400
- Vapor balance for maleic anhydride deliveries to bulk storage
- Vapor equalization for transfers from maleic anhydride bulk storage to other maleic anhydride storage equipment in EUB031

**I. EMISSION LIMIT(S)**

| Pollutant | Limit                        | Time Period / Operating Scenario   | Equipment                                      | Monitoring / Testing Method | Underlying Applicable Requirements |
|-----------|------------------------------|--|--|-----------------------------|------------------------------------|
| 1. VOC    | 78.58 tpy                    | 12-month rolling time period as determined at the end of each calendar month | EUB031, including fugitive emissions           | SC VI.1                     | R 336.1702(a)                      |
| 2. VOC    | 90% destruction, mass basis* | Hourly, during production of EMA E60   | EUB031 emissions exhausted to the ground flare | SC V.1, VI.5                | R 336.1702(a)                      |

\* Fugitive emissions are excluded from this emission limit.

**II. MATERIAL LIMIT(S)**

| Material                                  | Limit                               | Time Period / Operating Scenario   | Equipment | Monitoring / Testing Method | Underlying Applicable Requirements |
|---|-------------------------------------|--|-----------|-----------------------------|------------------------------------|
| 1. Ethylene maleic anhydride (EMA) (E60)  | 2,640,000 lbs per year <sup>A</sup> | 12-month rolling time period as determined at the end of each calendar month | EUB031    | SC VI.4                     | R 336.1205(1), R 336.1702(a)       |
| 2. Ethylene maleic anhydride (EMA) (E60)  | 3,960,000 lbs per year <sup>B</sup> | 12-month rolling time period as determined at the end of each calendar month | EUB031    | SC VI.4                     | R 336.1205(1), R 336.1702(a)       |
| 3. Ethylene maleic anhydride (EMA) (E400) | 440,000 lbs per year                | 12-month rolling time period as determined at the end of each calendar month | EUB031    | SC VI.4                     | R 336.1205(1), R 336.1702(a)       |

<sup>A</sup> This limit applies until a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G.  
<sup>B</sup> This limit applies after a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G.

### **III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall not operate EUB031 unless a malfunction abatement plan (MAP) as described in Rule 911(2), for EUB031 operations, has been submitted within 60 days of issuance of Permit to Install No. 104-09F and is implemented and maintained. The MAP shall, at a minimum, specify the following:
  - a) A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
  - b) An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.
  - c) A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. The permittee shall also amend the MAP within 45 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits. **(R 336.1224, R 336.1225, R 336.1331, R 336.1702(a), R 336.1910, R 336.1911, 40 CFR 52.21(c)&(d))**

2. During maintenance activities, the permittee shall neither vent process equipment in Building 31 nor fill the monochlorobenzene storage tank. **(R 336.1702(a))**
3. The permittee shall not vent the ethylene recovery system more than one time per batch. Venting shall not occur for more than 5 seconds during any batch. **(R 336.1225, R 1702(a))**
4. After a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G, during production of EMA E60 the permittee shall not conduct any EUB031 activity listed below unless the emissions from the activity are exhausted to the ground flare and the ground flare is installed, maintained, and operated in a satisfactory manner. Satisfactory operation of the ground flare includes maintaining operating parameters within the ranges specified in the approved MAP as constituting satisfactory operation. Fugitive emissions from the equipment involved in these activities are not subject to this requirement.
  - a) Operate EUB031 equipment exhausted to Cold Trap #1.
  - b) Operate EUB031 equipment exhausted to Cold Trap #2.
  - c) Purge the ethylene compressors.**(R 336.1225, R 336.1702(a), R 336.1910)**
5. The permittee shall not transfer material to maleic anhydride bulk storage from a delivery vessel unless the vapor balance and vapor equalization systems are installed, maintained, and operated in a satisfactory manner. Satisfactory operation of the vapor balance and vapor equalization systems includes following the MAP provisions related to the vapor balance and vapor equalization systems. **(R 336.1225, R 336.1702(a), R 336.1910)**
6. The permittee shall not transfer material from maleic anhydride bulk storage to other maleic anhydride storage equipment in EUB031 unless the vapor equalization system is installed, maintained, and operated in a satisfactory manner. Satisfactory operation of the vapor equalization system includes following the MAP provisions related to the vapor equalization system. **(R 336.1225, R 336.1702(a), R 336.1910)**

7. The permittee shall not package finished product unless the wet scrubber is installed, maintained, and operated in a satisfactory manner. Satisfactory operation of the wet scrubber includes maintaining operating parameters within the ranges specified in the approved malfunction abatement plan as constituting satisfactory operation. **(R 336.1224, R 336.1225, R 336.1301, R 336.1331, R 336.1910, 40 CFR 52.21(c) and (d))**

#### **IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. Until a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G, the permittee shall not operate the process equipment in Building 31 unless the ethylene recovery system and chilled condensers are installed, maintained, and operated in a satisfactory manner, except during maintenance activities. **(R 336.1702(a), R 336.1910)**
2. Until a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G, the permittee shall not operate the monochlorobenzene storage tank unless the chilled condensers (Cold Trap #1 and Cold Trap #2) are installed, maintained, and operated in a satisfactory manner, except during maintenance activities. **(R 336.1702(a), R 336.1910)**
3. Until a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G, the permittee shall equip and maintain the chilled condensers (Cold Trap #1 and Cold Trap #2) with continuous temperature monitors. **(R 336.1910)**
4. The permittee shall equip and maintain the recovered toluene storage tank (ID 99-TK-0103) with a conservation vent. **(R 336.1702(a))**
5. The permittee shall equip and maintain all sampling connections in EUB031 where the process fluid contains toluene in amounts greater than 10% by weight as closed-loop or in-situ sampling connections. **(R 336.1702(a))**
6. The permittee shall equip and maintain each open-ended valve in EUB031 where the process fluid contains toluene in amounts greater than 10% by weight with a cap, plug, or second valve. **(R 336.1702(a))**

#### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. Within 180 days after a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G, the permittee shall verify the VOC destruction efficiency required by SC I.2 for the ground flare during EMA E60 production, by testing at the owner's expense, in accordance with Department requirements. Testing shall be performed using an approved EPA Method listed in 40 CFR Part 60, Appendix A. An alternate method, or a modification to the approved EPA Method, may be specified in an AQD approved Test Protocol. No less than 60 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.1702(a), R 336.2001, R 336.2003, R 336.2004)**

#### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations and records in a format acceptable to the AQD District Supervisor by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1205(1), R 336.1225, R 336.1702(a), R 336.1910)**
2. The permittee shall calculate the VOC emission rate from EUB031 monthly, for the preceding 12-month rolling time period, using the method detailed in Appendix 3 or an alternate method approved by the AQD District Supervisor. The permittee shall keep all records on file at the facility in a format acceptable to the AQD District Supervisor and make them available to the Department upon request. **(R 336.1205(1), R 336.1702(a))**

3. The temperature of the chilled condensers (Cold Trap #1 & Cold Trap #2) shall be continuously recorded during operation of process equipment. **(R 336.1225, R 336.1702(a), R 336.1910)**
4. The permittee shall maintain monthly records of EMA production in tons per 12-month rolling time period. Records shall be kept for E60 and E400 separately. **(R 336.1205(1), R 336.1702(a))**
5. The permittee shall monitor and keep a record of the operating parameters and other values identified in the approved MAP as indicating satisfactory operation of the ground flare. The permittee shall record the values at the frequency described in the approved MAP in a manner satisfactory to the AQD Supervisor. The permittee shall keep all these records on file at the facility and make them available to the Department upon request. **(R 336.1910)**
6. The permittee shall conduct pressure testing for EUB031 as provided in Appendix 5. The permittee shall keep all records identified in Appendix 5 on file at the facility and make them available to the Department upon request. **(R 336.1205(1), R 336.1702(a))**

**VII. REPORTING**

1. Within 30 days after a pilot flame is first present in the ground flare after issuance of PTI No. 104-09G, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of that fact. **(R 336.1201(7)(a))**

**VIII. STACK/VENT RESTRICTION(S)**

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

| <b>Stack &amp; Vent ID</b>      | <b>Maximum Exhaust Diameter / Dimensions (inches)</b> | <b>Minimum Height Above Ground (feet)</b> | <b>Underlying Applicable Requirements</b> |
|---------------------------------|---|---|---|
| 1. SV0077 (Cold Trap #2) *      | 4   | 58  | R 336.1225, 40 CFR 52.21(c)&(d)           |
| 2. SV0079 (Cold Trap #1) *      | 4   | 58  | R 336.1225, 40 CFR 52.21(c)&(d)           |
| 3. SV0080 (Packaging Vent)      | 25  | 54  | R 336.1225, 40 CFR 52.21(c)&(d)           |
| 4. SV0084 (Compressors purge) * | 3   | 44  | R 336.1225, 40 CFR 52.21(c)&(d)           |
| 5. SV0179 (Ground flare) **     | 30  | 15  | R 336.1225, 40 CFR 52.21(c)&(d)           |

\* This vent is only used for EMA E400 production.

\*\* This vent is only used for EMA E60 production.

**IX. OTHER REQUIREMENT(S)**

NA

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

**EUNEWPLOTPLANT  
 EMISSION UNIT CONDITIONS**

**DESCRIPTION**

Process equipment in Building 32. Equipment includes reactors, blowers, cold trap condenser, column, mills, dryers, HEPA filters, centrifuges, storage tanks, stills, scrubbers, vacuum pumps and ancillary equipment for pilot, scale-up research and manufacture of multiple chemical products.

**Flexible Group ID:** NA

**POLLUTION CONTROL EQUIPMENT**

Two Scrubbers, HEPA Filters

**I. EMISSION LIMIT(S)**

| <b>All of the following emission limits are specific to SV0170 operations that exhaust through stack SV0170</b> |                                       |  |                  |                                    |   |
|---|---------------------------------------|--|------------------|------------------------------------|---|
| <b>Pollutant</b>  | <b>Limit</b>                          | <b>Time Period / Operating Scenario</b>                                      | <b>Equipment</b> | <b>Monitoring / Testing Method</b> | <b>Underlying Applicable Requirements</b> |
| 1. VOC  | 35 lbs per batch                      | Per batch  | EUNEWPLOTPLANT   | SC VI.1, VI.3                      | R 336.1702(a)                             |
| 2. VOC  | 3.7 tpy                               | 12-month rolling time period as determined at the end of each calendar month | EUNEWPLOTPLANT   | SC VI.1, VI.3                      | R 336.1702(a)                             |
| 3. PM   | 0.01 pph <sup>1</sup>                 | Based on daily average   | EUNEWPLOTPLANT   | SC VI.4                            | R 336.1225                                |
| 4. PM   | 0.01 lbs per 1,000 lbs of exhaust gas | Test Protocol*   | EUNEWPLOTPLANT   | GC 13                              | R 336.1331(1)(c)                          |
| 5. Visible Emissions  | 5% Opacity                            | 6-minute average   | EUNEWPLOTPLANT   | SC VI.6                            | R 336.1301(1)(c)                          |

| <b>TACs with a screening level based on an Annual averaging time</b> |   |   |                  |                                    |   |
|--|---|---|------------------|------------------------------------|---|
| <b>Pollutant<sup>A</sup></b>   | <b>Limit<sup>B</sup></b>                | <b>Time Period / Operating Scenario</b> | <b>Equipment</b> | <b>Testing / Monitoring Method</b> | <b>Underlying Applicable Requirements</b> |
| 6.a. Each Category 1 TAC   | 1.0 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.b. Each Category 2 TAC   | 7.0 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.c. Each Category 3 TAC   | 0.00070 pph <sup>1</sup>                | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.d. Each Category 4 TAC   | 0.00696 pph <sup>1</sup>                | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.e. Each Category 5 TAC   | 0.0696 pph <sup>1</sup>                 | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.f. Each Category 6 TAC   | 0.696 pph <sup>1</sup>                  | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.g. Each Category 7 TAC   | 6.956 pph <sup>1</sup>                  | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |
| 6.h. Each Category 8 TAC   | 69.56 pph <sup>1</sup>                  | According to method                     | EUNEWPLOTPLANT   | GC 13, SC VI.1                     | R 336.1225                                |

| <b>TACs with a screening level based on an Annual averaging time</b> |   |   |                  |                                    |   |
|--|---|---|------------------|------------------------------------|---|
| <b>Pollutant<sup>A</sup></b>   | <b>Limit<sup>B</sup></b>                | <b>Time Period / Operating Scenario</b> | <b>Equipment</b> | <b>Testing / Monitoring Method</b> | <b>Underlying Applicable Requirements</b> |
| 6.i. Each Category 1 TAC   | 1.0 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.j. Each Category 2 TAC   | 7.0 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.k. Each Category 3 TAC   | 0.00070 pph <sup>1</sup>                | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.l. Each Category 4 TAC   | 0.00696 pph <sup>1</sup>                | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.m. Each Category 5 TAC   | 0.0696 pph <sup>1</sup>                 | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.n. Each Category 6 TAC   | 0.696 pph <sup>1</sup>                  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.o. Each Category 7 TAC   | 6.956 pph <sup>1</sup>                  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.p. Each Category 8 TAC   | 69.56 pph <sup>1</sup>                  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |

| <b>TACs with a screening level based on an Annual averaging time</b> |   |   |                  |                                    |   |
|--|---|---|------------------|------------------------------------|---|
| <b>Pollutant<sup>A</sup></b>   | <b>Limit<sup>B</sup></b>                | <b>Time Period / Operating Scenario</b> | <b>Equipment</b> | <b>Testing / Monitoring Method</b> | <b>Underlying Applicable Requirements</b> |
| 6.q. Each Category 1 TAC   | 1.0 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.r. Each Category 2 TAC   | 7.0 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.s. Each Category 3 TAC   | 0.00070 pph <sup>1</sup>                | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.t. Each Category 4 TAC   | 0.00696 pph <sup>1</sup>                | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.u. Each Category 5 TAC   | 0.0696 pph <sup>1</sup>                 | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.v. Each Category 6 TAC   | 0.696 pph <sup>1</sup>                  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.w. Each Category 7 TAC   | 6.956 pph <sup>1</sup>                  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.x. Each Category 8 TAC   | 69.56 pph <sup>1</sup>                  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |

| <b>TACs with a screening level based on a 1-hour averaging time</b> |  |   |                  |                                    |   |
|---|--|---|------------------|------------------------------------|---|
| <b>Pollutant<sup>A</sup></b>  | <b>Limit<sup>B</sup></b>                 | <b>Time Period / Operating Scenario</b> | <b>Equipment</b> | <b>Testing / Monitoring Method</b> | <b>Underlying Applicable Requirements</b> |
| 6.y. Each Category 1 TAC  | 1.11 x 10 <sup>-6</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.z. Each Category 2 TAC  | 5.56 x 10 <sup>-6</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.aa. Each Category 3 TAC   | 5.56 x 10 <sup>-5</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.bb. Each Category 4 TAC   | 5.56 x 10 <sup>-4</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.cc. Each Category 5 TAC   | 5.56 x 10 <sup>-3</sup> pph <sup>1</sup> | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |

| <b>TACs with a screening level based on a 1-hour averaging time</b> |                          |   |                  |                                    |   |
|---|--------------------------|---|------------------|------------------------------------|---|
| <b>Pollutant<sup>A</sup></b>  | <b>Limit<sup>B</sup></b> | <b>Time Period / Operating Scenario</b> | <b>Equipment</b> | <b>Testing / Monitoring Method</b> | <b>Underlying Applicable Requirements</b> |
| 6.dd. Each Category 6 TAC   | 0.0556 pph <sup>1</sup>  | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.ee. Each Category 7 TAC   | 0.556 pph <sup>1</sup>   | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |
| 6.ff. Each Category 8 TAC   | 5.56 pph <sup>1</sup>    | According to method                     | EUNEWPILOTPLANT  | GC 13, SC VI.1                     | R 336.1225                                |

\*Test Protocol shall specify averaging time

<sup>A</sup> For EUNEWPILOTPLANT:

- Category 1 pollutants are all TACs with a screening level of 0.0002 to < 0.001
- Category 2 pollutants are all TACs with a screening level of 0.001 to < 0.01
- Category 3 pollutants are all TACs with a screening level of 0.01 to < 0.1
- Category 4 pollutants are all TACs with a screening level of 0.1 to < 1
- Category 5 pollutants are all TACs with a screening level of 1 to < 10
- Category 6 pollutants are all TACs with a screening level of 10 to < 100
- Category 7 pollutants are all TACs with a screening level of 100 to < 1000
- Category 8 pollutants are all TACs with a screening level of ≥ 1000

Screening levels and category criteria are in micrograms per cubic meter.

<sup>B</sup> Each emission limit applies to process vents only and does not include fugitive emissions from the process.

“SV-0170 operations” means operations in EUNEWPILOTPLANT that exhaust through SV-0170. For each TAC emitted, the permittee shall use screening levels determined and listed by the AQD, unless none is listed.

**II. MATERIAL LIMIT(S)**

NA

**III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall not charge solid material to any pilot plant reactor unless both scrubbers are installed and operating properly. (R 336.1224, R 336.1225, R 336.1331(1)(c), R 336.1702(a), R 336.1910)
2. The permittee shall not operate any process steps vented to the scrubbers unless both scrubbers are installed and operating properly. (R 336.1224, R 336.1225, R 336.1331(1)(c), R 336.1702(a), R 336.1910)
3. The permittee shall not perform solids handling operation in the clean room unless the HEPA filters are installed and operating properly. (R 336.1225, R 336.1331(1)(c), R 336.1910)
4. The permittee shall maintain a liquid flow through the scrubbers as specified in an approvable preventative maintenance plan. (R 336.1225, R 336.1331(1)(c), R 336.1910)
5. The permittee shall maintain a negative pressure in the clean room during processing as specified in an approvable preventative maintenance plan. (R 336.1224, R 336.1225, R 336.1331(1)(c), R 336.1702(a), R 336.1910)
6. The permittee shall not operate the EUNEWPILOTPLANT process unless an approvable preventative maintenance plan is implemented and maintained. Any modifications to the plan shall be submitted to the AQD District Supervisor. (R 336.1224, R 336.1225, R 336.1702(a), R 336.1910)

**IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. The permittee shall equip and maintain the two scrubbers with liquid flow indicators. (R 336.1224, R 336.1225, R 336.1331(1)(c), R 336.1702(a), R 336.1910)

2. The permittee shall equip and maintain the clean room with a pressure indicator. **(R 336.1225, R 336.1331(1)(c), R 336.1910)**

#### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

#### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall keep records for each batch processed in EUNEWPILOTPLANT. The records shall include: **(R 336.1224, R 336.1225, R 336.1331(1)(c), R 336.1702(a), R 336.1910)**
  - a) Primary solvents and include a determination of the emission factor for each batch using the method described in Appendix 2 or Appendix 3.
  - b) Number of batches processed each month.
  - c) If the primary solvents in a process have emission factors higher than the generic emission factors listed in Appendix 2, then the permittee shall develop an emission factor for that specific process using the method described in Appendix 3. The permittee shall submit to the AQD District Supervisor, and maintain, a list of those solvents having emissions higher than the generic emission factors.
  - d) Information needed to demonstrate how emissions from the process comply with the emission limits in EUNEWPILOTPLANT SC I.6.a through SC I.6.ff. The permittee shall keep all descriptions on file at the facility and make them available to the Department upon request
2. Liquid flow through both scrubbers shall be verified once per batch during operation of process equipment. **(R 336.1224, R 336.1225, R 336.1331(1)(c), R 336.1702(a), R 336.1910)**
3. The permittee shall compile VOC emission records monthly in:
  - a) Pounds per batch. **(R 336.1702(a))**
  - b) Tons per 12-month rolling time period. **(R 336.1702(a))**
4. The permittee shall compile particulate emissions calculations monthly in pounds per hour based on a daily average.<sup>1</sup> **(R 336.1225)**
5. The permittee shall record the pressure in the clean room once per batch during operation of process equipment. **(R 336.1331(1)(c))**
6. The permittee shall perform and maintain records of (non-certified) visual observations for opacity four days of every calendar week when the emission unit is in operation during daylight hours. **(R 336.1301(1)(c))**
7. The permittee shall keep all records necessary to document maintenance/duties required by the preventative maintenance plan. **(R 336.1910)**

**See Appendices 1, 2 and 3**

#### **VII. REPORTING**

NA

#### **VIII. STACK/VENT RESTRICTION(S)**

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

| <b>Stack &amp; Vent ID</b> | <b>Maximum Exhaust Diameter / Dimensions (inches)</b> | <b>Minimum Height Above Ground (feet)</b> | <b>Underlying Applicable Requirements</b> |
|----------------------------|---|---|---|
| 1. SV0170                  | 10  | 50  | R 336.1225, 40 CFR 52.21(c)&(d)           |

**IX. OTHER REQUIREMENT(S)**

NA

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

### FLEXIBLE GROUP SPECIAL CONDITIONS

#### FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

| <b>Flexible Group ID</b> | <b>Flexible Group Description</b>                            | <b>Associated Emission Unit IDs</b>                   |
|--------------------------|--|---|
| FGCONSOLIDATED           | Process equipment in Buildings 2, 5, 7, 12, 15, 19, and 26A. | EUB002, EUB005,<br>EUB007, EUB012,<br>EUB019, EUB026A |

**FGCONSOLIDATED  
 FLEXIBLE GROUP CONDITIONS**

**DESCRIPTION**

Process equipment in Buildings 2, 5, 7, 12, 15, 19, and 26A.

**Emission Unit:** EUB002, EUB005, EUB007, EUB012, EUB019, EUB026A

**POLLUTION CONTROL EQUIPMENT**

EUB002: Scrubber (Stack SV0006); EUB005: Scrubber (Stack SV0177); EUB007: Dust collector (Stack SV0163), Scrubber (Stack SV0177); EUB012: Scrubber (Stack SV0056); EUB019: Scrubber (Stack SV0177), Dust collector (Stack SV0174); EUB026A: Scrubber (Stack SV0047)

**I. EMISSION LIMIT(S)**

| <b>Pollutant</b>     | <b>Limit</b>                                | <b>Time Period / Operating Scenario</b>                                      | <b>Equipment</b>  | <b>Monitoring / Testing Method</b> | <b>Underlying Applicable Requirements</b> |
|----------------------|---|--|---|------------------------------------|---|
| 1. VOC               | 43.4 tpy                                    | 12-month rolling time period as determined at the end of each calendar month | FGCONSOLIDATED  | SC VI.6                            | R 336.1702(a)                             |
| 2. VOC               | 0.03 lbs per lb of product, except ethylene | Per batch  | FGCONSOLIDATED  | SC VI.1                            | R 336.1702(a)                             |
| 3. Ethylene          | 1.0 lbs per lb of product                   | Per batch  | FGCONSOLIDATED  | SC VI.1                            | R 336.1702(a)                             |
| 4. PM                | 0.01 lbs per 1,000 lbs of exhaust gas       | Test Protocol*   | EUB007, flaking and grinding  | GC 13                              | R 336.1225, R 336.1331(1)(c)              |
| 5. PM                | 0.175 pph <sup>1</sup>                      | Test Protocol*   | EUB007, flaking and grinding  | GC 13                              | R 336.1224, R 336.1225                    |
| 6. PM                | 0.01 lbs per 1,000 lbs of exhaust gas       | Test Protocol*   | EUB019 and EUB005, drying and packaging operations and centrifuge unloading | GC 13                              | R 336.1225, R 336.1331(1)(c)              |
| 7. PM                | 0.025 pph <sup>1</sup>                      | Test Protocol*   | EUB019 and EUB005, drying and packaging operations and centrifuge unloading | GC 13                              | R 336.1224, R 336.1225                    |
| 8. Visible Emissions | 5% Opacity                                  | 6-minute average   | EUB007, flaking and grinding  | SC VI.4                            | R 336.1301(1)(c), R 336.1910              |
| 9. Visible Emissions | 5% Opacity                                  | 6-minute average   | EUB019 and EUB005, drying, packaging operations                             | SC VI.4                            | R 336.1301(1)(c), R 336.1910              |

| <b>TACs with a screening level based on an annual averaging time.</b> |                                       |  |                   |  |   |
|---|---------------------------------------|--|-------------------|--|---|
| <b>Pollutant <sup>A</sup></b>   | <b>Limit <sup>B</sup></b>             | <b>Time Period/<br/>Operating Scenario</b> | <b>Equipment</b>  | <b>Testing /<br/>Monitoring<br/>Method</b> | <b>Underlying<br/>Applicable<br/>Requirements</b> |
| <b>TAC emission limits for SV0177 operations<sup>C</sup></b>          |                                       |  |                   |  |   |
| 10.a. Each Category 1 TAC   | 5.7×10 <sup>-5</sup> pph <sup>1</sup> | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.b. Each Category 2 TAC   | 2.8×10 <sup>-4</sup> pph <sup>1</sup> | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.c. Each Category 3 TAC   | 0.0028 pph <sup>1</sup>               | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.d. Each Category 4 TAC   | 0.028 pph <sup>1</sup>                | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.e. Each Category 5 TAC   | 0.28 pph <sup>1</sup>                 | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.f. Each Category 6 TAC   | 2.8 pph <sup>1</sup>                  | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.g. Each Category 7 TAC   | 28 pph <sup>1</sup>                   | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 10.h. Each Category 8 TAC   | 283 pph <sup>1</sup>                  | Annual average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| <b>TAC emission limits for SV0056 operations<sup>C</sup></b>          |                                       |  |                   |  |   |
| 10.i. Each Category 1 TAC   | 4.0×10 <sup>-6</sup> pph <sup>1</sup> | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.j. Each Category 2 TAC   | 2.5×10 <sup>-5</sup> pph <sup>1</sup> | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.k. Each Category 3 TAC   | 2.5×10 <sup>-4</sup> pph <sup>1</sup> | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.l. Each Category 4 TAC   | 0.0025 pph <sup>1</sup>               | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.m. Each Category 5 TAC   | 0.025 pph <sup>1</sup>                | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.n. Each Category 6 TAC   | 0.25 pph <sup>1</sup>                 | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.o. Each Category 7 TAC   | 2.5 pph <sup>1</sup>                  | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 10.p. Each Category 8 TAC   | 25 pph <sup>1</sup>                   | Annual average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| <b>TAC emission limits for SV0047 operations<sup>C</sup></b>          |                                       |  |                   |  |   |
| 10.q. Each Category 1 TAC   | 4.0×10 <sup>-5</sup> pph <sup>1</sup> | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.r. Each Category 2 TAC   | 2.3×10 <sup>-4</sup> pph <sup>1</sup> | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.s. Each Category 3 TAC   | 0.0023 pph <sup>1</sup>               | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.t. Each Category 4 TAC   | 0.023 pph <sup>1</sup>                | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.u. Each Category 5 TAC   | 0.23 pph <sup>1</sup>                 | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.v. Each Category 6 TAC   | 2.25 pph <sup>1</sup>                 | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.w. Each Category 7 TAC   | 22.5 pph <sup>1</sup>                 | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 10.x. Each Category 8 TAC   | 225 pph <sup>1</sup>                  | Annual average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| <b>TAC emission limits for SV0006 operations<sup>C</sup></b>          |                                       |  |                   |  |   |

| Pollutant <sup>A</sup>        | Limit <sup>B</sup>                    | Time Period/<br>Operating Scenario | Equipment         | Testing /<br>Monitoring<br>Method | Underlying<br>Applicable<br>Requirements |
|-------------------------------|---------------------------------------|------------------------------------|-------------------|-----------------------------------|--|
| 10.y. Each<br>Category 1 TAC  | 6.8×10 <sup>-5</sup> pph <sup>1</sup> | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.z. Each<br>Category 2 TAC  | 3.4×10 <sup>-4</sup> pph <sup>1</sup> | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.aa. Each<br>Category 3 TAC | 0.0034 pph <sup>1</sup>               | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.bb. Each<br>Category 4 TAC | 0.034 pph <sup>1</sup>                | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.cc. Each<br>Category 5 TAC | 0.34 pph <sup>1</sup>                 | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.dd. Each<br>Category 6 TAC | 3.39 pph <sup>1</sup>                 | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.ee. Each<br>Category 7 TAC | 33.9 pph <sup>1</sup>                 | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |
| 10.ff. Each<br>Category 8 TAC | 339 pph <sup>1</sup>                  | Annual average                     | SV0006 operations | GC 13; VI.1                       | R 336.1225                               |

| <b>TACs with a screening level based on a 24-hour averaging time</b> |                                       |                 |                   |             |            |
|--|---------------------------------------|-----------------|-------------------|-------------|------------|
| <b>TAC emission limits for SV0177 operations<sup>C</sup></b>         |                                       |                 |                   |             |            |
| 11.a. Each<br>Category 1 TAC   | 1.1×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.b. Each<br>Category 2 TAC   | 5.7×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.c. Each<br>Category 3 TAC   | 5.7×10 <sup>-4</sup> pph <sup>1</sup> | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.d. Each<br>Category 4 TAC   | 0.0057 pph <sup>1</sup>               | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.e. Each<br>Category 5 TAC   | 0.057 pph <sup>1</sup>                | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.f. Each<br>Category 6 TAC   | 0.57 pph <sup>1</sup>                 | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.g. Each<br>Category 7 TAC   | 5.7 pph <sup>1</sup>                  | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| 11.h. Each<br>Category 8 TAC   | 57 pph <sup>1</sup>                   | 24-hour average | SV0177 operations | GC 13; VI.1 | R 336.1225 |
| <b>TAC emission limits for SV0056 operations<sup>C</sup></b>         |                                       |                 |                   |             |            |
| 11.i. Each<br>Category 1 TAC   | 1.0×10 <sup>-6</sup> pph <sup>1</sup> | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.j. Each<br>Category 2 TAC   | 5.0×10 <sup>-6</sup> pph <sup>1</sup> | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.k. Each<br>Category 3 TAC   | 5.0×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.l. Each<br>Category 4 TAC   | 0.0050 pph <sup>1</sup>               | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.m. Each<br>Category 5 TAC   | 0.0050 pph <sup>1</sup>               | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.n. Each<br>Category 6 TAC   | 0.050 pph <sup>1</sup>                | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.o. Each<br>Category 7 TAC   | 0.50 pph <sup>1</sup>                 | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |
| 11.p. Each<br>Category 8 TAC   | 5.0 pph <sup>1</sup>                  | 24-hour average | SV0056 operations | GC 13; VI.1 | R 336.1225 |

| <b>TAC emission limits for SV0047 operations<sup>c</sup></b> |                                       |  |                   |  |   |
|--|---------------------------------------|--|-------------------|--|---|
| <b>Pollutant<sup>A</sup></b>                                 | <b>Limit<sup>B</sup></b>              | <b>Time Period/<br/>Operating Scenario</b> | <b>Equipment</b>  | <b>Testing /<br/>Monitoring<br/>Method</b> | <b>Underlying<br/>Applicable<br/>Requirements</b> |
| 11.q. Each Category 1 TAC                                    | 1.0×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.r. Each Category 2 TAC                                    | 4.5×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.s. Each Category 3 TAC                                    | 0.00045 pph <sup>1</sup>              | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.t. Each Category 4 TAC                                    | 0.0045 pph <sup>1</sup>               | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.u. Each Category 5 TAC                                    | 0.045 pph <sup>1</sup>                | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.v. Each Category 6 TAC                                    | 0.45 pph <sup>1</sup>                 | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.w. Each Category 7 TAC                                    | 4.5 pph <sup>1</sup>                  | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 11.x. Each Category 8 TAC                                    | 45 pph <sup>1</sup>                   | 24-hour average                            | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| <b>TAC emission limits for SV0006 operations<sup>c</sup></b> |                                       |  |                   |  |   |
| 11.y. Each Category 1 TAC                                    | 1.4×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.z. Each Category 2 TAC                                    | 6.8×10 <sup>-5</sup> pph <sup>1</sup> | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.aa. Each Category 3 TAC                                   | 0.00068 pph <sup>1</sup>              | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.bb. Each Category 4 TAC                                   | 0.0068 pph <sup>1</sup>               | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.cc. Each Category 5 TAC                                   | 0.068 pph <sup>1</sup>                | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.dd. Each Category 6 TAC                                   | 0.68 pph <sup>1</sup>                 | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.ee. Each Category 7 TAC                                   | 6.79 pph <sup>1</sup>                 | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |
| 11.ff. Each Category 8 TAC                                   | 67.9 pph <sup>1</sup>                 | 24-hour average                            | SV0006 operations | GC 13; VI.1                                | R 336.1225  |

| <b>TACs with a screening level based on an 8-hour averaging time</b> |                                       |  |                   |  |   |
|--|---------------------------------------|--|-------------------|--|---|
| <b>Pollutant<sup>A</sup></b>   | <b>Limit<sup>B</sup></b>              | <b>Time Period/<br/>Operating Scenario</b> | <b>Equipment</b>  | <b>Testing /<br/>Monitoring<br/>Method</b> | <b>Underlying<br/>Applicable<br/>Requirements</b> |
| <b>TAC emission limits for SV0177 operations<sup>c</sup></b>         |                                       |  |                   |  |   |
| 12.a. Each Category 1 TAC  | 6.5×10 <sup>-6</sup> pph <sup>1</sup> | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 12.b. Each Category 2 TAC  | 3.2×10 <sup>-5</sup> pph <sup>1</sup> | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 12.c. Each Category 3 TAC  | 3.2×10 <sup>-4</sup> pph <sup>1</sup> | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 12.d. Each Category 4 TAC  | 0.0032 pph <sup>1</sup>               | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 12.e. Each Category 5 TAC  | 0.032 pph <sup>1</sup>                | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 12.f. Each Category 6 TAC  | 0.32 pph <sup>1</sup>                 | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 12.g. Each Category 7 TAC  | 3.2 pph <sup>1</sup>                  | 8-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |

| Pollutant <sup>A</sup>                                       | Limit <sup>B</sup>                    | Time Period/<br>Operating Scenario | Equipment            | Testing /<br>Monitoring<br>Method | Underlying<br>Applicable<br>Requirements |
|--|---------------------------------------|------------------------------------|----------------------|-----------------------------------|--|
| 12.h. Each<br>Category 8 TAC                                 | 32 pph <sup>1</sup>                   | 8-hour average                     | SV0177<br>operations | GC 13; VI.1                       | R 336.1225                               |
| <b>TAC emission limits for SV0056 operations<sup>C</sup></b> |                                       |                                    |                      |                                   |  |
| 12.i. Each<br>Category 1 TAC                                 | 5.7×10 <sup>-7</sup> pph <sup>1</sup> | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.j. Each<br>Category 2 TAC                                 | 2.9×10 <sup>-6</sup> pph <sup>1</sup> | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.k. Each<br>Category 3 TAC                                 | 2.9×10 <sup>-5</sup> pph <sup>1</sup> | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.l. Each<br>Category 4 TAC                                 | 2.9×10 <sup>-4</sup> pph <sup>1</sup> | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.m. Each<br>Category 5 TAC                                 | 0.0029 pph <sup>1</sup>               | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.n. Each<br>Category 6 TAC                                 | 0.029 pph <sup>1</sup>                | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.o. Each<br>Category 7 TAC                                 | 0.29 pph <sup>1</sup>                 | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.p. Each<br>Category 8 TAC                                 | 2.9 pph <sup>1</sup>                  | 8-hour average                     | SV0056<br>operations | GC 13; VI.1                       | R 336.1225                               |
| <b>TAC emission limits for SV0047 operations<sup>C</sup></b> |                                       |                                    |                      |                                   |  |
| 12.q. Each<br>Category 1 TAC                                 | 1.0×10 <sup>-5</sup> pph <sup>1</sup> | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.r. Each<br>Category 2 TAC                                 | 2.6×10 <sup>-5</sup> pph <sup>1</sup> | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.s. Each<br>Category 3 TAC                                 | 2.6×10 <sup>-4</sup> pph <sup>1</sup> | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.t. Each<br>Category 4 TAC                                 | 0.0026 pph <sup>1</sup>               | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.u. Each<br>Category 5 TAC                                 | 0.026 pph <sup>1</sup>                | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.v. Each<br>Category 6 TAC                                 | 0.26 pph <sup>1</sup>                 | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.w. Each<br>Category 7 TAC                                 | 2.6 pph <sup>1</sup>                  | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.x. Each<br>Category 8 TAC                                 | 26 pph <sup>1</sup>                   | 8-hour average                     | SV0047<br>operations | GC 13; VI.1                       | R 336.1225                               |
| <b>TAC emission limits for SV0006 operations<sup>C</sup></b> |                                       |                                    |                      |                                   |  |
| 12.y. Each<br>Category 1 TAC                                 | 7.8×10 <sup>-6</sup> pph <sup>1</sup> | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.z. Each<br>Category 2 TAC                                 | 3.9×10 <sup>-5</sup> pph <sup>1</sup> | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.aa. Each<br>Category 3 TAC                                | 0.00039 pph <sup>1</sup>              | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.bb. Each<br>Category 4 TAC                                | 0.0039 pph <sup>1</sup>               | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.cc. Each<br>Category 5 TAC                                | 0.039 pph <sup>1</sup>                | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.dd. Each<br>Category 6 TAC                                | 0.39 pph <sup>1</sup>                 | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.ee. Each<br>Category 7 TAC                                | 3.88 pph <sup>1</sup>                 | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 12.ff. Each<br>Category 8 TAC                                | 38.8 pph <sup>1</sup>                 | 8-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |

| <b>TACs with a screening level based on a one-hour averaging time</b> |                                       |  |                   |  |   |
|---|---------------------------------------|--|-------------------|--|---|
| <b>TAC emission limits for SV0177 operations<sup>C</sup></b>          |                                       |  |                   |  |   |
| <b>Pollutant <sup>A</sup></b>   | <b>Limit <sup>B</sup></b>             | <b>Time Period/<br/>Operating Scenario</b> | <b>Equipment</b>  | <b>Testing /<br/>Monitoring<br/>Method</b> | <b>Underlying<br/>Applicable<br/>Requirements</b> |
| 13.a. Each Category 1 TAC   | 4.5×10 <sup>-6</sup> pph <sup>1</sup> | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.b. Each Category 2 TAC   | 2.3×10 <sup>-5</sup> pph <sup>1</sup> | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.c. Each Category 3 TAC   | 2.3×10 <sup>-4</sup> pph <sup>1</sup> | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.d. Each Category 4 TAC   | 0.0023 pph <sup>1</sup>               | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.e. Each Category 5 TAC   | 0.023 pph <sup>1</sup>                | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.f. Each Category 6 TAC   | 0.23 pph <sup>1</sup>                 | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.g. Each Category 7 TAC   | 2.3 pph <sup>1</sup>                  | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| 13.h. Each Category 8 TAC   | 23 pph <sup>1</sup>                   | 1-hour average                             | SV0177 operations | GC 13; VI.1                                | R 336.1225  |
| <b>TAC emission limits for SV0056 operations<sup>C</sup></b>          |                                       |  |                   |  |   |
| 13.i. Each Category 1 TAC   | 4.0×10 <sup>-7</sup> pph <sup>1</sup> | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.j. Each Category 2 TAC   | 2.0×10 <sup>-6</sup> pph <sup>1</sup> | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.k. Each Category 3 TAC   | 2.0×10 <sup>-5</sup> pph <sup>1</sup> | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.l. Each Category 4 TAC   | 2.0×10 <sup>-4</sup> pph <sup>1</sup> | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.m. Each Category 5 TAC   | 0.0020 pph <sup>1</sup>               | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.n. Each Category 6 TAC   | 0.020 pph <sup>1</sup>                | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.o. Each Category 7 TAC   | 0.20 pph <sup>1</sup>                 | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| 13.p. Each Category 8 TAC   | 20 pph <sup>1</sup>                   | 1-hour average                             | SV0056 operations | GC 13; VI.1                                | R 336.1225  |
| <b>TAC emission limits for SV0047 operations<sup>C</sup></b>          |                                       |  |                   |  |   |
| 13.q. Each Category 1 TAC   | 3.6×10 <sup>-6</sup> pph <sup>1</sup> | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.r. Each Category 2 TAC   | 1.8×10 <sup>-5</sup> pph <sup>1</sup> | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.s. Each Category 3 TAC   | 1.8×10 <sup>-4</sup> pph <sup>1</sup> | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.t. Each Category 4 TAC   | 0.0018 pph <sup>1</sup>               | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.u. Each Category 5 TAC   | 0.018 pph <sup>1</sup>                | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.v. Each Category 6 TAC   | 0.18 pph <sup>1</sup>                 | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.w. Each Category 7 TAC   | 1.8 pph <sup>1</sup>                  | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |
| 13.x. Each Category 8 TAC   | 18 pph <sup>1</sup>                   | 1-hour average                             | SV0047 operations | GC 13; VI.1                                | R 336.1225  |

| TAC emission limits for SV0006 operations <sup>C</sup> |                                       |                                    |                      |                                   |  |
|--|---------------------------------------|------------------------------------|----------------------|-----------------------------------|--|
| Pollutant <sup>A</sup>                                 | Limit <sup>B</sup>                    | Time Period/<br>Operating Scenario | Equipment            | Testing /<br>Monitoring<br>Method | Underlying<br>Applicable<br>Requirements |
| 13.y. Each<br>Category 1 TAC                           | 5.4×10 <sup>-6</sup> pph <sup>1</sup> | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.z. Each<br>Category 2 TAC                           | 2.7×10 <sup>-5</sup> pph <sup>1</sup> | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.aa. Each<br>Category 3 TAC                          | 0.00027 pph <sup>1</sup>              | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.bb. Each<br>Category 4 TAC                          | 0.0027 pph <sup>1</sup>               | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.cc. Each<br>Category 5 TAC                          | 0.027 pph <sup>1</sup>                | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.dd. Each<br>Category 6 TAC                          | 0.27 pph <sup>1</sup>                 | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.ee. Each<br>Category 7 TAC                          | 2.72 pph <sup>1</sup>                 | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |
| 13.ff. Each<br>Category 8 TAC                          | 27.2 pph <sup>1</sup>                 | 1-hour average                     | SV0006<br>operations | GC 13; VI.1                       | R 336.1225                               |

\*Test Protocol shall specify averaging time  
<sup>A</sup> Pollutant Categories are defined in Appendix 4.  
<sup>B</sup> Each emission limit applies to process vents only and does not include fugitive emissions from the process.  
<sup>C</sup> "SV0177 operations" means operations in FGCONSOLIDATED that exhaust through SV0177. "SV0056 operations" means operations in FGCONSOLIDATED that exhaust through SV0056. "SV0047 operations" means operations in FGCONSOLIDATED that exhaust through SV0047. "SV0006 operations" means operations in FGCONSOLIDATED that exhaust through SV0006.

14. The permittee shall determine the category of each individual toxic air contaminant (TAC) emitted from FGCONSOLIDATED SV0177 Operations, SV0056 Operations, SV0047 Operations, and SV0006 Operations using the method in Appendix 4. The permittee shall not allow TAC emissions from FGCONSOLIDATED SV0177 Operations, SV0056 Operations, SV0047 Operations, or SV0006 Operations to exceed any of the emission limits from SC I.10 through SC I.13. These emission limits are in addition to, and do not replace, any other applicable emission limits.<sup>1</sup> **(R 336.1225)**

**II. MATERIAL LIMIT(S)**

1. The permittee shall not manufacture more than 1.5 million pounds of any one product in EUB002 per year, based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d), 40 CFR Part 63 Subpart VVVVVV)**
2. The permittee shall not allow a throughput of more than 10 million pounds of total material through the EUB007 grinding and flaking operations per year, based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1225, R 336.1331, 40 CFR 52.21(c) & (d), 40 CFR Part 63 Subpart VVVVVV)**
3. The permittee shall not allow a throughput of more than 40 million pounds of total material through the EUB019 drying operations per year, based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1225, R 336.1331, 40 CFR 52.21(c) & (d), 40 CFR Part 63 Subpart VVVVVV)**

**III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall not operate the solids handling equipment located in EUB019 normally vented through the cartridge filter, unless the cartridge filter is installed and operating properly. **(R 336.1224, R 336.1331(1)(c))**

2. The permittee shall not conduct flaking or grinding in EUB007 unless the dust collector is installed and operating properly. **(R 336.1224, R 336.1331(1)(c))**
3. The permittee shall maintain a pressure drop across each dust collector as specified in the preventative maintenance plan. **(R 336.1331(1)(c), R 336.1910)**
4. The permittee shall maintain a liquid flow through each scrubber as specified in the preventative maintenance plan. **(R 336.1702(a))**
5. The permittee shall not operate the FGCONSOLIDATED process unless an approvable preventative maintenance plan is implemented and maintained. Any modifications to the plan shall be submitted to the AQD District Supervisor. **(R 336.1910, R 336.1911)**
6. The permittee shall process chrome containing compounds in only EUB002 equipment venting to stack SV0006, EUB007 equipment venting to stack SV0163, and EUB019 equipment venting to SV0174. **(R 336.1205, R 336.1225, R 336.1331, 40 CFR 52.21(c) & (d), 40 CFR Part 63 Subpart VVVVVV)**

#### **IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. The permittee shall not operate any equipment normally vented through a scrubber(s) and/or a scrubber tank(s) unless the scrubber(s) and/or scrubber tank(s) is/are installed and operating properly. **(R 336.1702(a))**
2. The permittee shall equip and maintain all scrubbers with liquid flow indicators. **(R 336.1702(a), R 336.1910)**
3. The permittee shall equip and maintain all the dust collectors with pressure drop indicators. **(R 336.1910)**

#### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

#### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall keep, in a satisfactory manner, a description of each process carried out in FGCONSOLIDATED. The description for each process shall include the following:
  - a) Chemical composition of each raw material used, including weight percent of each component,
  - b) Chemical composition of each product, including weight percent of each component,
  - c) Chemical composition of each byproduct, including weight percent of each component,
  - d) Chemical composition of each waste generated, including weight percent of each component,
  - e) Process step descriptions,
  - f) Process operating variable set points,
  - g) Emission calculations of all pollutants emitted,
  - h) Production rate for each product manufactured in FGCONSOLIDATED,
  - i) Production hours, by batch, and
  - j) Other information needed to demonstrate how emissions from the process comply with the emission limits in FGCONSOLIDATED SC I.1 through I.14 and with any emission rates approved by the AQD through Appendix 4.

The data may consist of Safety Data Sheets, manufacturer's formulation data, or both as deemed acceptable by the AQD District Supervisor. The permittee shall keep all descriptions on file at the facility and make them available to the Department upon request. **(R 336.1224, R 336.1225, R 336.1702(a))**

2. The liquid flow through the scrubbers shall be verified once per batch during operation of process equipment. **(R 336.1702(a))**
3. The pressure drop through the dust collectors shall be recorded once per batch during operation of process equipment. **(R 336.1331(1)(c), R 336.1910)**

4. The permittee shall perform and maintain records of (non-certified) visual observations for opacity once per day for four days of every calendar week when the emission unit is in operation during daylight hours. **(R 336.1301(1)(c))**
5. The permittee shall keep all records necessary to document maintenance/duties required by the preventative maintenance plan. **(R 336.1910)**
6. The permittee shall calculate the VOC emission rate from FGCONSOLIDATED monthly, for the preceding 12-month rolling time period, using a method acceptable to the AQD District Supervisor. The permittee shall keep all records on file at the facility and make them available to the Department upon request. **(R 336.1702(a))**

See Appendices 1, 3, and 4

## VII. REPORTING

NA

## VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

| <b>Stack &amp; Vent ID</b> | <b>Maximum Exhaust Diameter / Dimensions (inches)</b> | <b>Minimum Height Above Ground (feet)</b> | <b>Underlying Applicable Requirements</b> |
|----------------------------|---|---|---|
| 1. SV0047                  | 2 <sup>1</sup>  | 65 <sup>1</sup>                           | R 336.1225                                |
| 2. SV0056                  | 14 <sup>1</sup>                                       | 30 <sup>1</sup>                           | R 336.1225                                |
| 3. SV0163                  | 6 <sup>1</sup>  | 50 <sup>1</sup>                           | R 336.1225                                |
| 4. SV0171                  | 6 <sup>1</sup>  | 50 <sup>1</sup>                           | R 336.1225                                |
| 5. SV0174                  | 12 <sup>1</sup>                                       | 23 <sup>1</sup>                           | R 336.1225                                |
| 6. SV0177                  | 6 <sup>1</sup>  | 59 <sup>1</sup>                           | R 336.1225                                |
| 7. SV0006                  | 24 <sup>1</sup>                                       | 30 <sup>1</sup>                           | R 336.1225                                |

## IX. OTHER REQUIREMENT(S)

NA

### Footnotes:

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

## FGFACILITY CONDITIONS

### DESCRIPTION

The following conditions apply source-wide to all process equipment including equipment covered by other permits, grand-fathered equipment and exempt equipment.

### POLLUTION CONTROL EQUIPMENT

Various

#### I. EMISSION LIMIT(S)

| <b>Pollutant</b>         | <b>Limit</b>      | <b>Time Period / Operating Scenario</b>                                      | <b>Equipment</b> | <b>Monitoring / Testing Method</b> | <b>Underlying Applicable Requirements</b> |
|--------------------------|-------------------|--|------------------|------------------------------------|---|
| 1. VOC                   | Less than 100 tpy | 12-month rolling time period as determined at the end of each calendar month | FGFACILITY       | SC VI.1                            | R 336.1205(1)                             |
| 2. HAP (Each individual) | Less than 10 tpy  | 12-month rolling time period as determined at the end of each calendar month | FGFACILITY       | SC VI.2                            | R 336.1205(1)                             |
| 3. HAPs (Aggregate)      | Less than 25 tpy  | 12-month rolling time period as determined at the end of each calendar month | FGFACILITY       | SC VI.2                            | R 336.1205(1)                             |

#### II. MATERIAL LIMIT(S)

NA

#### III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall not operate FGFACILITY unless an approvable preventative maintenance/malfunction abatement plan has been implemented and is maintained. **(R 336.1910, R 336.1911)**

#### IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

#### V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

#### VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall compile the following VOC emissions records: **(R 336.1205(1))**
  - a) VOC mass emission calculations determining the monthly emission rate in tons per calendar month.
  - b) VOC mass emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
2. The permittee shall compile the following HAP emissions records: **(R 336.1205(1))**
  - a) Individual and aggregate HAP emission calculations determining the monthly emission rate of each in tons per calendar month.

- b) Individual and aggregate HAP emission calculations determining the annual emission rate of each in tons per 12-month rolling time period as determined at the end of each calendar month.

**VII. REPORTING**

NA

**VIII. STACK/VENT RESTRICTION(S)**

NA

**IX. OTHER REQUIREMENT(S)**

1. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subpart A and Subpart VVVVVV for Chemical Manufacturing Area Sources. **(40 CFR Part 63, Subpart A and Subpart VVVVVV)**

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

### **APPENDIX 1: Monitoring Requirements**

The following monitoring procedures, methods, or specifications are the details to the monitoring requirements identified and referenced in the Special Conditions for EUNEWPILOTPLANT and FGCONSOLIDATED.

The permittee shall record the following information if visible emissions are observed during non-certified visual observations for opacity:

- a) Color of the emissions.
- b) Whether the emissions are representative of normal operations. Normal is defined as no visible emissions.
- c) If not normal, the cause of the abnormal emissions.
- d) Total duration of the emissions.
- e) Corrective actions taken.

**APPENDIX 2: Recordkeeping**

- The permittee shall use the following approved formats and procedures for the recordkeeping requirements referenced in the Special Conditions for EUNEWPILOTPLANT. Alternative formats must be approved by the AQD District Supervisor.

| <b>Batch Emission Factor Summary<br/>                     For EUNEWPILOTPLANT</b>  |                                   |                       |                         |                  |                   |
|--|-----------------------------------|-----------------------|-------------------------|------------------|-------------------|
| The following emission factors have been developed for each unit of operation. As a process is defined, the appropriate emission factors may be applied to determine the emissions per batch for recordkeeping purposes. |                                   |                       |                         |                  |                   |
| Unit Operations  | Emission Factor (EF) <sup>D</sup> | Emission Factor Units | Multiplier <sup>E</sup> | Multiplier Units | Emission lb/batch |
| Charging   | 0.0008                            | lb/gal                |                         | gallons          |                   |
| Heat reactor   | 0.0109                            | lb/batch              |                         | no. batches      |                   |
| Reaction, with gas evolution   | 11.2304                           | lb/batch              |                         | no. batches      |                   |
| Depressurization   | 0.01                              | lb/batch              |                         | no. batches      |                   |
| Evacuation   | 0.0246                            | lb/batch              |                         | no. batches      |                   |
| Distillation   | 0.0058                            | lb/gal                |                         | gallons          |                   |
| Vacuum operation   | 0.0236                            | lb/gal                |                         | gallons          |                   |
| Cleaning each equipment item:  |                                   |                       |                         |                  |                   |
| 500 gallon system  | 0.21                              | lb/equipment          |                         | no. equipment    |                   |
| 100 gallon system  | 0.042                             | lb/equipment          |                         | no. equipment    |                   |
| Inerting   | 0.8392                            | lb/equipment          |                         | no. equipment    |                   |
| Drying:  |                                   |                       |                         |                  |                   |
| 500 gallon system  | 6.966                             | lb/batch              |                         | no. batches      |                   |
| 100 gallon system  | 1.3932                            | lb/batch              |                         | no. batches      |                   |
| <b>Total VOC Emission in pounds per batch.</b>   |                                   |                       |                         |                  |                   |

<sup>D</sup> These emission factors are specific to the operation.

<sup>E</sup> The multiplier is dependent on the units of the emission factor. The multiplier is what must be multiplied by the emission factor to determine the total pounds per batch of emission for each operation. For example, an emission factor with units in lb/gal must be multiplied by the batch size in gallons in order to determine the total emission in pound per batch.

### APPENDIX 3: Emission Calculations

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in Tables EUB026, EUB031, EUNEWPLOTPLANT, and FGCONSOLIDATED:

#### For pound per hour and pound per batch emission calculations:

##### Charging

This method is used when a vessel containing a liquid VOC is charged with a liquid.

$$V_R = (L_R) (0.134 \text{ ft}^3/\text{gal}) (60 \text{ min/hr})$$

- $V_R$  = The rate of air displacement,  $\text{ft}^3/\text{hr}$
- $L_R$  = Liquid pumping rate, gpm (Input) moles of  $i$  in liquid mix
- $X_i$  = mole fraction of VOC  $i$  in liquid mixture
- $X_i = 1.0$  when only one volatile component present

$$Se_i = \frac{P_i X_i V_R MW_i}{RT}$$

- $Se_i$  = lbs/hr of VOC emitted
- $P_i$  = Vapor pressure of VOC  $i$ , at  $T$  in mm Hg
- $X_i$  = Mole fraction of VOC in liquid mix
- $V_R$  = Rate of displacement,  $\text{ft}^3/\text{hr}$
- $R$  = 999 mm Hg  $\text{ft}^3/\text{lb mole } ^\circ\text{K}$
- $T$  = Temperature in  $^\circ\text{K}$
- $MW_i$  = Molecular weight of VOC, lb/lbmole

The calculation is repeated for each VOC used in the process.

##### Evacuation/Depressuring

This method is used to calculate emissions from the evacuation (or depressuring) of any vessel containing a VOC and a "noncondensable". Usually the vessel will be a still and the "noncondensable" will be air or nitrogen.

Calculate  $X_i$  for each VOC in solution:

Calculate the vapor pressure,  $P_i$ , of each VOC at the vessel temperature.

$$V_i = \frac{(Pa_1 - \sum(P_i X_i)) F_s}{760}$$

$$V_f = \frac{(Pa_2 - \sum(P_i X_i)) F_s}{760}$$

- $V_i$  = The final air volume in the vessel,  $\text{ft}^3$
- $V_i$  = The initial air volume in the vessel,  $\text{ft}^3$
- $\sum (P_i X_i)$  = The sum of the products of the vapor pressure and the mole fractions of each VOC in the solution
- $Pa_1$  = Initial pressure, mm Hg
- $Pa_2$  = Final air pressure in the vessel, mm Hg
- $F_s$  = Free space in the vessel,  $\text{ft}^3$

$$V_R = \frac{V_i - V_f}{t}$$

$V_R$  = The rate of air removal from vessel in ft<sup>3</sup>/hr  
 $t$  = Time of evacuation of vessel in hours

$$R_i = \frac{Pa_1 - \sum(P_i X_i)}{\sum(P_i X_i)}$$

$$R_f = \frac{Pa_2 - \sum(P_i X_i)}{\sum(P_i X_i)}$$

$R_i$  = Initial ratio of air to total VOC vapor  
 $R_f$  = Final ratio of moles air to moles total VOC

$$R_a = \frac{R_i + R_f}{2}$$

$R_a$  = Average ratio of moles of air to moles of total VOC  
 $V_{RS}$  = VOC emission from the system in ft<sup>3</sup>/hr

$$V_{RS} = \frac{V_R}{R_a}$$

As defined earlier, the lbs/hr of VOC emitted equals  $Se_i$ :

$$Se_i = \frac{P_i X_i V_{RS} MW_i}{RT}$$

### Heating

This method is used to calculate the emissions from the heating of a still containing a VOC and a "noncondensable", usually air.

Calculate  $X_i$  and  $P_i$  for each VOC, at the initial temperature ( $T_1$ )

$$Pa_1 = 760 - \sum (P_i X_i)_{T_1}$$

- 760 = Atmospheric pressure in mm Hg
- $P_{a1}$  = The initial air pressure in the still in mm Hg
- $\sum (P_i X_i)_{T_1}$  = The sum of the products of the vapor pressure and the mole fractions of each VOC at the initial temperature

Calculate  $P_i$  for each VOC at the final temperature  $T_2$ .

$$Pa_2 = 760 - \sum (P_i X_i)_{T_2}$$

- $P_{a2}$  = The final air pressure in the still in mm Hg
- $\sum (P_i X_i)_{T_2}$  = The sum of the products of the vapor pressure and the mole fractions of each VOC at the final temperature

$$(n_1 - n_2) = \frac{V}{R} \times \left( \frac{Pa_1}{T_1} - \frac{Pa_2}{T_2} \right)$$

- $(n_1 - n_2)$  = Number of lb of moles of air displaced to the receiver
- V = Volume of free space in still in  $ft^3$
- R = Gas law constant, 999 mm Hg  $ft^3/lbmole$   $^{\circ}K$
- $P_{a1}$  = Initial air pressure in still in mm Hg
- $P_{a2}$  = Final air pressure in still in mm Hg
- $T_1$  = Initial temperature in still in  $^{\circ}K$
- $T_2$  = Final temperature in still in  $^{\circ}K$

$$n_s = \frac{\sum (P_i X_i)_{T_R}}{760 - \sum (P_i X_i)_{T_R}} \times (n_1 - n_2)$$

- $n_s$  = lbmole of VOC vapor displaced from the receiver
- $(P_i X_i)_{T_R}$  = Sum of products of vapor pressures and mole fractions for each VOC at the temperature of the receiver

$$Se_i = n_s (MW_i) \times \frac{(P_i X_i)_{T_R}}{\sum (P_i X_i)_{T_R}}$$

- $Se_i$  = Lbs of VOC vapor emitted
- $n_s$  = Number of lb of moles of all VOC vapor emitted
- $MW_i$  = Molecular weight of VOC (i)

Vacuum Operation and Distillations

Air leak rate is first calculated in lb/hr, or using test measurements of other means.

$$w = c V^{2/3}$$

where: w = air leak rate in lb/hr  
 c = constant  
 = 0.2 when  $P_{\text{system}} > 90$  mm Hg  
 = 0.08 when  $3 < P_{\text{system}} < 20$  mm Hg  
 = 0.025 when  $P_{\text{system}} < 1$  mm Hg  
 V = system volume in  $\text{ft}^3$   
 $P_{\text{system}}$  = operating pressure of emission unit

Calculate VOC emission rate in lb/hr:

$$Se_i = \frac{MW_i \times w}{29} \times \frac{P_i X_i}{P_{rcvr} - \sum(P_i X_i)}$$

where:  $Se_i$  = rate of VOC emission in lb/hr  
 $MW_i$  = molecular weight of VOC in lb/lbmole  
 $P_{rcvr}$  = absolute pressure of receiver, mm Hg  
 $P_i$  = Vapor pressure of VOC at receiver temperature mm Hg  
 $X_i$  = Liquid mole fraction of the VOC in the emission unit  
 29 = Molecular weight of air (will change if other non-condensibles are present)

Nitrogen or Air Sweep

This method is used to calculate emissions when nitrogen, air, or another "noncondensable" is used to purge or sweep a vessel or other device.

$$V_{R1} = N_s \times 60 \text{ min/hr}$$

$V_{R1}$  = The rate of  $N_2$  sweep in  $\text{ft}^3/\text{hr}$   
 $N_s$  = The rate of  $N_2$  sweep in  $\text{ft}^3/\text{min}$

Calculate  $X_i$  and  $P_i$  for each VOC at the exit temperature.

$$V_{R2} = V_{R1} \times \frac{Pt}{Pt - \sum(P_i X_i)}$$

$V_{R2}$  = Rate of gas displaced from vessel from vessel in  $\text{ft}^3/\text{hr}$   
 $V_{R1}$  = Rate of  $N_2$  sweep in  $\text{ft}^3/\text{hr}$   
 $\sum(P_i X_i)$  = The sum of the products of the vapor pressures and mole fractions for each VOC  
 $P_t$  = Total pressure of vapor space in mm Hg

The lbs/hr of VOC emitted equals  $Se_i$ ;

$$Se_i = \frac{P_i X_i \times V_{R2} \times MW_i}{RT}$$

Gas Evolution

This method is used to calculate emissions when a gas is generated as the result of a chemical reaction.

$$V_{R1} = \frac{W_g \times RT}{P \times MW_g}$$

- $V_{R1}$  = The rate of gas evolution in ft<sup>3</sup>/hr
- $R$  = The gas law constant, 999 mm Hg ft<sup>3</sup>/lbmole °K
- $T$  = The temperature at the exit in °K
- $W_g$  = The rate of gas evolution in lb/hr
- $P$  = The pressure in the vessel in mm Hg.
- $MW_g$  = The molecular weight of the gas in lb/lbmole

Calculate  $X_i$  and  $P_i$  for each VOC at the exit temperature.

$$V_{R2} = V_{R1} \times \frac{760}{760 - \sum(P_i X_i)}$$

- $V_{R2}$  = Rate of gas displacement in ft<sup>3</sup>/hr
- 760 = Atmospheric pressure in mm Hg
- $\sum(P_i X_i)$  = The sum of the products of the vapor pressure and the mole fraction of each VOC at the exit temperature

$$Se_i = \frac{P_i X_i \times V_{R2} \times MW_i}{RT}$$

The above equation can be used to calculate the lb/hr

#### Drying

This method is used to calculate VOC emissions from either batch or continuous drying operations. (Dry Basis)

$$Se_i = \frac{B}{t} \times \left( \frac{PS_1}{100 - PS_1} - \frac{PS_2}{100 - PS_2} \right)$$

- $S_e$  = Rate of VOC emission in lb/hr
- $B$  = Weight of batch (dry) in lb
- $t$  = Time of drying operations in hr
- $PS_1$  = Percent of VOC in wet material into dryer
- $PS_2$  = Percent of VOC in less wet material from dryer

When using the above equations for calculation of pound per hour limits, the permittee shall also use appropriate averaging times.

Any assumptions regarding variables used in the above calculations must have supporting documentation or recordkeeping to insure "worst case" values were used to assure compliance with limits.

#### **For pound per 8-hour and pound per 24-hour period emission calculations:**

The permittee shall use the above pound per hour calculations as well as the total hours of operation for the time period to calculate the pound per time period emission rate.

#### **For pound per pound of product emission calculations:**

The permittee shall use the above pound per batch calculations as well as total pounds of product per batch to calculate the pound per pound of product rate.

#### **For pound per month emission calculations:**

The permittee shall use the above pound per pound of product emission calculations as well as the total pounds of product produced per month to calculate the pound per month emission rate.

#### **For fugitive emissions from EUB031 components:**

Ethylene, toluene, and maleic anhydride contributions to VOC emissions shall be determined from emission factors for leaking components.

**APPENDIX 4: Determining Categories for Individual TACs Emitted from FGCONSOLIDATED**

Each toxic air contaminant (TAC) that is subject to FGCONSOLIDATED SC I.14 must meet all applicable emission limits of FGCONSOLIDATED SC I.10 through SC I.13. The permittee shall determine the TAC Category for SC I.10 through SC I.13 by using the following method.

Steps

1. For each TAC emitted, determine all of the TAC’s initial threshold screening levels (ITSL) and initial risk screening levels (IRSL) and the associated averaging times. Secondary risk screening levels (SRSL) shall not be used with this Appendix.
  - a) For each TAC, the permittee shall use screening levels listed by the AQD, unless the AQD has not listed any screening levels for the TAC.
  - b) If the AQD has not listed any screening levels for a TAC, the permittee shall either request approval for specified emissions of the TAC or propose screening levels according to Rules 229, 231, and 232 (R 336.1229, R 336.1231, and R 336.1232) for AQD review.
    - 1) The permittee shall submit proposed emission rates and, if applicable, proposed screening levels and supporting data, to the AQD Toxics Unit Supervisor and to the AQD District Supervisor. Proposed emission rates shall include maximum emissions for any one-hour period, any eight-hour period, any 24-hour period, and any month.
    - 2) The AQD will establish screening levels or otherwise determine the acceptability of the proposed emission within 30 days of receipt of the submittal.
2. For each TAC ITSL and IRSL, identify which of the following Categories apply. Note that some TACs may have more than one screening level and may be in different categories for different averaging times.

| Category | Screening Level in micrograms per cubic meter |
|----------|---|
| 1        | 0.0002 to <0.001                              |
| 2        | 0.001 to <0.01                                |
| 3        | 0.01 to <0.1                                  |
| 4        | 0.1 to < 1                                    |
| 5        | 1 to < 10                                     |
| 6        | 10 to < 100                                   |
| 7        | 100 to < 1000                                 |
| 8        | ≥ 1000  |

**Example:**

Pollutant X is emitted from FGCONSOLIDATED SV0177 Operations and has the following two screening levels listed by AQD.

| Averaging time | Initial Threshold Screening Level (µg/m³) | Initial Risk Screening Level (µg/m³) |
|----------------|---|--------------------------------------|
| One hour       | 200                                       | -                                    |
| Annual         | -   | 5                                    |

Therefore, Pollutant X will be a Category 7 TAC for one hour averaging time and a Category 5 TAC for annual averaging time. Pollutant X would be subject to the emission limits in both FGCONSOLIDATED SC I.10.e and SC I.13.g.

### APPENDIX 5: Pressure Testing for EUB031

As required below, the permittee shall perform pressure-testing for all equipment in EUB031 that contains or contacts fluids containing 10% or more toluene by weight at any time during normal process operation. The purpose of the pressure testing is to identify and repair leaks from this equipment in order to maintain the equipment in a state consistent with calculating fugitive emissions from leaking components based on a leak definition of 10,000 ppmv.

- (1) *Reconfiguration.* Each time equipment in EUB031 is reconfigured for production of a different product or intermediate, the batch product-process equipment train shall be pressure-tested for leaks before VOCs are first fed to the equipment and the equipment is placed in service where it contacts or contains fluids containing 10% or more toluene by weight.
  - (i) When the batch product-process equipment train is reconfigured to produce a different product, pressure testing is required only for the new or disturbed equipment.
  - (ii) EUB031 shall be pressure-tested at least once during each calendar year that any equipment in the emission unit operates while it contacts or contains fluids containing 10% or more toluene by weight.
  - (iii) Pressure testing is not required for routine seal breaks, such as changing hoses or filters, that are not part of the reconfiguration to produce a different product or intermediate.
- (2) *Testing procedures.* The batch product-process equipment shall be tested either using the procedures specified in requirement (5) of this appendix for pressure vacuum loss or with a liquid using the procedures specified in requirement (6) of this appendix.
- (3) *Leak detection.*
  - (i) For pressure or vacuum tests using a gas, a leak is detected if the rate of change in pressure is greater than 6.9 kilopascals (1 pound per square inch gauge) in 1 hour or if there is visible, audible, or olfactory evidence of fluid loss.
  - (ii) For pressure tests using a liquid, a leak is detected if there are indications of liquids dripping or if there is other evidence of fluid loss.
- (4) *Leak repair.*
  - (i) If a leak is detected, it shall be repaired, and the batch product-process equipment shall be retested before startup of the process.
  - (ii) If a batch product-process fails the retest (the second of two consecutive pressure tests), it shall be repaired as soon as practical but not later than 30 calendar days after the second pressure test, except as specified in requirement (8) of this appendix.
- (5) *Gas pressure test procedure for pressure or vacuum loss.* The following procedures shall be used to pressure test batch product-process equipment for pressure or vacuum loss to demonstrate compliance with requirement (3)(i) of this appendix:
  - (i) The batch product-process equipment train shall be pressurized with a gas to a pressure less than the set pressure of any safety relief devices or valves or to a pressure slightly above the operating pressure of the equipment, or alternatively the equipment shall be placed under a vacuum.
  - (ii) Once the test pressure is obtained, the gas source or vacuum source shall be shut off.
  - (iii) The test shall continue for not less than 15 minutes unless it can be determined in a shorter period of time that the allowable rate of pressure drop or of pressure rise was exceeded. The pressure in the batch product-process equipment shall be measured after the gas or vacuum source is shut off and at the end of the test period. The rate of change in pressure in the batch product-process equipment shall be calculated using the equation below:

$$\Delta\left(\frac{P}{t}\right) = (|P_f - P_i|)/(|t_f - t_i|)$$

Where:

$\Delta(P/t)$  = Change in pressure, pounds per square inch gauge/hr.

$P_f$  = Final pressure, pounds per square inch gauge.

$P_i$  = Initial pressure, pounds per square inch gauge.

$t_f - t_i$  = Elapsed time, hours.

- (iv) The pressure shall be measured using a pressure measurement device (gauge, manometer, or equivalent) that has a precision of  $\pm 2.5$  millimeters mercury (0.10 inch of mercury) in the range of test

pressure and is capable of measuring pressures up to the relief set pressure of the pressure relief device. If such a pressure measurement device is not reasonably available, the owner or operator shall use a pressure measurement device with a precision of at least  $\pm 10$  percent of the test pressure of the equipment and shall extend the duration of the test for the time necessary to detect a pressure loss or rise that equals a rate of 1 pound per square inch gauge per hour (7 kilopascals per hour).

- (v) Following written approval by the AQD District Supervisor, an alternative procedure may be used for leak testing the equipment if the owner or operator demonstrates the alternative procedure is capable of detecting a pressure loss or rise.
- (6) *Pressure test procedure using test liquid.* The following procedures shall be used to pressure test batch product-process equipment using a liquid to demonstrate compliance with requirement (3)(ii) of this appendix:
- (i) The batch product-process equipment train or section of the equipment train shall be filled with the test liquid (for example, water, alcohol) until normal operating pressure is obtained. Once the equipment is filled, the liquid source shall be shut off.
  - (ii) The test shall be conducted for a period of at least 60 minutes unless it can be determined in a shorter period of time that the test is a failure.
  - (iii) Each seal in the equipment being tested shall be inspected for indications of liquid dripping or other indications of fluid loss. If there are any indications of liquids dripping or of fluid loss, a leak is detected.
  - (iv) Following written approval by the AQD District Supervisor, an alternative procedure may be used for leak testing the equipment if the owner or operator demonstrates the alternative procedure is capable of detecting losses of fluid.
- (7) *Pressure testing recordkeeping.* The permittee shall maintain records of the information specified below.
- (i) The identification of each product or product code produced during the calendar year. It is not necessary to identify individual items of equipment in a batch product-process equipment train.
  - (ii) Physical tagging of the equipment to identify that it contacts or contains fluids containing 10% or more toluene by weight and is subject to the requirements of this appendix is not required. Equipment subject to the requirements of this appendix may be identified on a plant site plan, in log entries, or by other appropriate methods.
  - (iii) The dates of each pressure test required in this appendix, the test pressure, the pressure drop observed during the test, and identification of the equipment tested.
  - (iv) Records of any visible, audible, or olfactory evidence of fluid loss.
  - (v) When a batch product-process equipment train does not pass two consecutive pressure tests, as specified in requirement (4)(ii) of this appendix, all the following information shall be recorded in a log and kept for five years:
    - (A) The date of each pressure test and the date of each leak repair attempt;
    - (B) Repair methods applied in each attempt to repair the leak;
    - (C) The reason for the delay of repair;
    - (D) The expected date for delivery of the replacement equipment and the actual date of delivery of the replacement equipment; and
    - (E) The date of successful repair.
- (8) *Delay of repair.* Delay of repair of equipment for which leaks have been detected is allowed if the replacement equipment is not available provided the following conditions are met:
- (i) Equipment supplies have been depleted and supplies had been sufficiently stocked before the supplies were depleted.
  - (ii) The repair is made no later than 10 calendar days after delivery of the replacement equipment.