TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

EXAMPLE A

AMENDED NOTICE OF APPLICATION AND PRELIMINARY DECISION FOR AIR QUALITY PERMITS

AIR QUALITY PERMIT NUMBERS 810, PSDTX1448, AND GHGPSDTX129

APPLICATION AND PRELIMINARY DECISION. INVISTA S.a r.l., PO Box 2626, Victoria, Texas 77902-2626, has applied to the Texas Commission on Environmental Quality (TCEQ) for an amendment to State Air Quality Permit *810*, modification to Prevention of Significant Deterioration (PSD) Air Quality Permit PSDTX1448, and issuance of Greenhouse Gas (GHG) PSD Air Quality Permit GHGPSDTX129 for emissions of GHGs, which would authorize modification to the Adipic Acid Unit located at 2695 Old Bloomington Rd N, Victoria, Victoria County, Texas 77905. This application was processed in an expedited manner, as allowed by the commission's rules in 30 Texas Administrative Code, Chapter 101, Subchapter J. The existing facility will emit the following air contaminants in a significant amount: organic compounds, nitrogen oxides, and greenhouse gases. The existing facility will also emit the following air contaminants: sulfur dioxide, carbon monoxide, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less and hazardous air pollutants.

This application was submitted to the TCEQ on December 22, 2014. The executive director has determined that the emissions of air contaminants from the existing facility which are subject to PSD review will not violate any state or federal air quality regulations and will not have any significant adverse impact on soils, vegetation, or visibility. All air contaminants have been evaluated, and "best available control technology" will be used for the control of these contaminants.

The executive director has completed the technical review of the application and prepared a draft permit which, if approved, would establish the conditions under which the facility must operate. The permit application, executive director's preliminary decision, draft permit, and the executive director's preliminary determination summary and executive director's air quality analysis, will be available for viewing and copying at the TCEQ central office, the TCEQ Corpus Christi regional office, and at the Victoria Public Library, 302 North Main, Victoria, Victoria County, Texas, beginning the first day of publication of this notice. The facility's compliance file, if any exists, is available for public review at the TCEQ Corpus Christi Regional Office, NRC Bldg Ste 1200, 6300 Ocean Dr, Unit 5839, Corpus Christi, Texas.

INFORMATION AVAILABLE ONLINE. These documents are accessible through the Commission's Web site at www.tceq.texas.gov/goto/cid: the executive director's preliminary decision which includes the draft permit, the executive director's preliminary determination summary, air quality analysis, and, once available, the executive director's response to comments and the final decision on this application. Access the Commissioners' Integrated Database (CID) using the above link and enter the permit number for this application. The public location mentioned above, the Victoria Public Library provides public access to the internet. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For exact location, refer to application. http://www.tceq.texas.gov/assets/public/hb610/index.html?lat=28.678055&lng=-96.954722&zoom=13&type=r.

PUBLIC COMMENT/PUBLIC MEETING. You may submit public comments or request a public meeting to the Office of the Chief Clerk at the address below. The purpose of a public meeting is to provide the

opportunity to submit comment or to ask questions about the application. The TCEQ will hold a public meeting if the executive director determines that there is a significant degree of public interest in the application, if requested by an interested person, or if requested by a local legislator. A public meeting is not a contested case hearing. **You may submit additional written public comments within 30 days of the date of newspaper publication of this notice in the manner set forth in the AGENCY CONTACTS AND INFORMATION paragraph below.**

After the deadline for public comment, the executive director will consider the comments and prepare a response to all relevant and material or significant public comment. **The response to comments, along with the executive director's decision on the application, will be mailed to everyone who submitted public comments or is on a mailing list for this application. The mailing will also provide instructions for requesting a contested case hearing or reconsideration of the executive director's decision.**

OPPORTUNITY FOR A CONTESTED CASE HEARING. You may request a contested case hearing regarding the portions of the application for State Air Quality Permit Number 810 and for PSD Air Quality Permit Number PSDTX1448. There is no opportunity to request a contested case hearing regarding the portion of the application for GHG PSD Air Quality Permit Number GHGPSDTX129. A contested case hearing is a legal proceeding similar to a civil trial in a state district court. A person who may be affected by emissions of air contaminants, other than GHGs, from the facility is entitled to request a hearing. A contested case hearing request must include the following: (1) your name (or for a group or association, an official representative), mailing address, daytime phone number; (2) applicant's name and permit number; (3) the statement "I/we request a contested case hearing;" (4) a specific description of how you would be adversely affected by the application and air emissions from the facility in a way not common to the general public; (5) the location and distance of your property relative to the facility; and (6) a description of how you use the property which may be impacted by the facility. If the request is made by a group or association, one or more members who have standing to request a hearing and the interests the group or association seeks to protect must also be identified. You may also submit your proposed adjustments to the application/permit which would satisfy your concerns. Requests for a contested case hearing must be submitted in writing within 30 days following this notice to the Office of the Chief Clerk, at the address provided in the information section below.

A contested case hearing will only be granted based on disputed issues of fact that are relevant and material to the Commission's decisions on the portions of the application for State Air Quality Permit Number 810 and for PSD Air Quality Permit Number PSDTX1448. Further, the Commission will only grant a hearing on issues submitted by you or others during the public comment period that have not been withdrawn. Issues that are not submitted in public comments may not be considered during a hearing.

EXECUTIVE DIRECTOR ACTION. The executive director may issue final approval of the application for the portion of the application for GHG PSD Air Quality Permit GHGPSDTX129. If a timely contested case hearing request is not received or if all timely contested case hearing requests are withdrawn regarding State Air Quality Permit Number 810 and for PSD Air Quality Permit Number PSDTX1448, the executive director may issue final approval of the application. The response to comments, along with the executive director's decision on the application will be mailed to everyone who submitted public comments or is on a mailing list for this application, and will be posted electronically to the CID. If any timely hearing requests are received and not withdrawn, the executive director will not issue final approval of the State Air Quality Permit Number 810 and for PSD Air Quality Permit Number PSDTX1448 and will forward the application and requests to the Commissioners for their consideration at a scheduled commission meeting.

MAILING LIST. You may ask to be placed on a mailing list to obtain additional information on this application by sending a request to the Office of the Chief Clerk at the address below.

AGENCY CONTACTS AND INFORMATION. Public comments and requests must be submitted either electronically at www.tceq.texas.gov/about/comments.html, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105, P.O. Box 13087, Austin, Texas 78711-3087. If you communicate with the TCEQ electronically, please be aware that your email address, like your physical mailing address, will become part of the agency's public record. For more information about this permit application

or the permitting process, please call the Public Education Program toll free at 1-800-687-4040. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from Invista Sarl at the address stated above or by calling Ms. Amy E. Hodges, Public Affairs Manager, Public Affairs, (361) 572-2137

Amended Notice Issuance Date: August 15, 2016

Special Conditions

Permit Number 810, PSDTX 1448, GHGPSDTX 129

Emission Caps and Individual Limitations

1. This permit authorizes emissions only from those points listed in the attached table entitled "Emission Sources - Maximum Allowable Emission Rates," and the facilities covered by this permit are authorized to emit subject to the emission rate limits on that table and other operating requirements specified in the special conditions. **(02/09)**

2. Annual calendar year production of adipic acid shall not exceed the rate represented in Permit Number 810, Confidential File, in the confidential letter dated December 18, 2014. **(Date)**

3. The maximum combined process air feed rate to OP1 and OP1A shall not exceed the value specified in the Permit Number 810, Confidential File, in the confidential letter dated December 18, 2014. **(Date)**

4. The off-gases from the OP1 and OP1A Low-Pressure Scrubbers (2), the OP1 and OP1A Topper Columns (2), and the OP1 and OP1A Steam Still Decanters (2) shall be vented to the Adipic Acid Power House Boilers for destruction of volatile organic compounds (VOC) and carbon monoxide during normal operations. **(02/09)**

Federal Applicability

5. Reserved **(Date)**

6. These facilities shall comply with all applicable requirements of the EPA regulations on National Emission Standards for Hazardous Air Pollutants (NESHAPS) promulgated for Benzene Waste Operations in Title 40 Code of Federal Regulations Part 61 (40 CFR Part 61), Subparts A and Subpart FF. **(02/09)**

7. These facilities shall comply with all applicable requirements of EPA regulations on NESHAPS for Source Categories promulgated for Miscellaneous Organic Chemical Manufacturing in 40 CFR Part 63, Subparts A, F, G, H, Q, and FFFF. **(Date)**

Fugitive Monitoring

8. Piping, Valves, Connectors, Pumps, Agitators, and Compressors - 28VHP **(07/12)**

    A. The requirements of paragraphs F and G shall not apply (1) where the Volatile Organic Compound (VOC) has an aggregate partial pressure or vapor pressure of less than 0.044 pounds per square inch, absolute (psia) at 68°F or (2) operating pressure is at least 5 kilopascals (0.725 psi) below ambient pressure. Equipment excluded from this condition shall be identified in a list or by one of the methods described below to be made readily available upon request.

The exempted components may be identified by one or more of the following methods:

(1) piping and instrumentation diagram (PID);

(2) a written or electronic database or electronic file;

(3) color coding;

(4) a form of weatherproof identification; or

(5) designation of exempted process unit boundaries.

B. Construction of new and reworked piping, valves, pump systems, and compressor systems shall conform to applicable American National Standards Institute (ANSI), American Petroleum Institute (API), American Society of Mechanical Engineers (ASME), or equivalent codes.

C. New and reworked underground process pipelines shall contain no buried valves such that fugitive emission monitoring is rendered impractical. New and reworked buried connectors shall be welded.

D. To the extent that good engineering practice will permit, new and reworked valves and piping connections shall be so located to be reasonably accessible for leak-checking during plant operation. Difficult-to-monitor and unsafe-to-monitor valves, as defined by Title 30 Texas Administrative Code Chapter 115 (30 TAC Chapter 115), shall be identified in a list to be made readily available upon request. The difficult-to-monitor and unsafe-to-monitor valves may be identified by one or more of the methods described in subparagraph A above. If an unsafe-to-monitor component is not considered safe to monitor within a calendar year, then it shall be monitored as soon as possible during safe-to-monitor times. A difficult-to-monitor component for which quarterly monitoring is specified may instead be monitored annually.

E. New and reworked piping connections shall be welded or flanged. Screwed connections are permissible only on piping smaller than two-inch diameter. Gas or hydraulic testing of the new and reworked piping connections at no less than operating pressure shall be performed prior to returning the components to service or they shall be monitored for leaks using an approved gas analyzer within 15 days of the components being returned to service. Adjustments shall be made as necessary to obtain leak-free performance. Connectors shall be inspected by visual, audible, and/or olfactory means at least weekly by operating personnel walk-through.

Each open-ended valve or line shall be equipped with an appropriately sized cap, blind flange, plug, or a second valve to seal the line. Except during sampling, both valves shall be closed. If the isolation of equipment for hot work or the removal of a component for repair or replacement results in an open ended line or valve, it is exempt from the requirement to install a cap, blind flange, plug, or second valve for 72 hours. If the repair or replacement is not completed within 72 hours, the permit holder must complete either of the following actions within that time period;

(1) a cap, blind flange, plug, or second valve must be installed on the line or valve; or

(2) the open-ended valve or line shall be monitored once for leaks above background for a plant or unit turnaround lasting up to 45 days with an approved gas analyzer and the results recorded. For all other situations, the open-ended valve or line shall be monitored once within the 72 hour period following the creation of the open ended line and monthly thereafter with an approved gas analyzer and the results recorded. For turnarounds and all other situations, leaks are indicated by readings of 500 ppmv and must be repaired within 24 hours or a cap, blind flange, plug, or second valve must be installed on the line or valve.

F. Accessible valves shall be monitored by leak-checking for fugitive emissions at least quarterly using an approved gas analyzer. Sealless/leakless valves (including, but not limited to, welded bonnet bellows and diaphragm valves) and relief valves equipped with a rupture disc upstream or venting to a control device are not required to be monitored. If a relief valve is equipped with rupture disc, a pressure-sensing device shall be installed between the relief valve and rupture disc to monitor disc integrity.

A check of the reading of the pressure-sensing device to verify disc integrity shall be performed at least quarterly and recorded in the unit log or equivalent. Pressure-sensing devices that are continuously monitored with alarms are exempt from recordkeeping requirements specified in this paragraph. All leaking discs shall be replaced at the earliest opportunity but no later than the next process shutdown.

The gas analyzer shall conform to requirements listed in Method 21 of 40 CFR part 60, appendix A. The gas analyzer shall be calibrated with methane. In addition, the response factor of the instrument for a specific VOC of interest shall be determined and meet the requirements of Section 8 of Method 21. If a mixture of VOCs is being monitored, the response factor shall be calculated for the average composition of the process fluid. A calculated average is not required when all of the compounds in the mixture have a response factor less than 10 using methane. If a response factor less than 10 cannot be achieved using methane, then the instrument may be calibrated with one of the VOC to be measured or any other VOC so long as the instrument has a response factor of less than 10 for each of the VOC to be measured.

Replacements for leaking components shall be re-monitored within 15 days of being placed back into VOC service.

G. Except as may be provided for in the special conditions of this permit, all pump, compressor, and agitator seals shall be monitored with an approved gas analyzer at least quarterly or be equipped with a shaft sealing system that prevents or detects emissions of VOC from the seal. Seal systems designed and operated to prevent emissions or seals equipped with an automatic seal failure detection and alarm system need not be monitored. These seal systems may include (but are not limited to) dual pump seals with barrier fluid at higher pressure than process pressure, seals degassing to vent control systems kept in good working order, or seals equipped with an automatic seal failure detection and alarm system. Submerged pumps or sealless pumps (including, but not limited to, diaphragm, canned, or magnetic-driven

pumps) may be used to satisfy the requirements of this condition and need not be monitored.

H. Damaged or leaking valves or connectors found to be emitting VOC in excess of 500 parts per million by volume (ppmv) or found by visual inspection to be leaking (e.g., dripping process fluids) shall be tagged and replaced or repaired. Damaged or leaking pump, compressor, and agitator seals found to be emitting VOC in excess of 2,000 ppmv or found by visual inspection to be leaking (e.g., dripping process fluids) shall be tagged and replaced or repaired. A first attempt to repair the leak must be made within 5 days and a record of the attempt shall be maintained.

I. A leaking component shall be repaired as soon as practicable, but no later than 15 days after the leak is found. If the repair of a component would require a unit shutdown that would create more emissions than the repair would eliminate, the repair may be delayed until the next scheduled shutdown. All leaking components which cannot be repaired until a scheduled shutdown shall be identified for such repair by tagging within 15 days of the detection of the leak. A listing of all components that qualify for delay of repair shall be maintained on a delay of repair list. The cumulative daily emissions from all components on the delay of repair list shall be estimated by multiplying by 24 the mass emission rate for each component calculated in accordance with the instructions in 30 TAC 115.782 (c)(1)(B)(i)(II). The calculations of the cumulative daily emissions from all components on the delay of repair list shall be updated within ten days of when the latest leaking component is added to the delay of repair list. When the cumulative daily emission rate of all components on the delay of repair list times the number of days until the next scheduled unit shutdown is equal to or exceeds the total emissions from a unit shutdown as calculated in accordance with 30 TAC 115.782 (c)(1)(B)(i)(I), the TCEQ Regional Manager and any local programs shall be notified and may require early unit shutdown or other appropriate action based on the number and severity of tagged leaks awaiting shutdown. This notification shall be made within 15 days of making this determination.

J. Records of repairs shall include date of repairs, repair results, justification for delay of repairs, and corrective actions taken for all components. Records of instrument monitoring shall indicate dates and times, test methods, and instrument readings. The instrument monitoring record shall include the time that monitoring took place for no less than 95% of the instrument readings recorded. Records of physical inspections shall be noted in the operator's log or equivalent.

K. Alternative monitoring frequency schedules of 30 TAC §§ 115.352 - 115.359 or National Emission Standards for Organic Hazardous Air Pollutants, 40 CFR Part 63, Subpart H, may be used in lieu of Items F through G of this condition.

L. Compliance with the requirements of this condition does not assure compliance with requirements of 30 TAC Chapter 115, an applicable New Source Performance Standard (NSPS), or an applicable National Emission Standard for Hazardous Air Pollutants (NESHAPS) and does not constitute approval of alternative standards for these regulations.

9. Due to safety concerns presented in the confidential documentation dated January 12, 2012 Open Ended Lines are allowed for lines in Nitric Acid service. **(07/12)**

Storage Tanks

10. Storage tanks are subject to the following requirements: The control requirements specified in parts A-C of this condition shall not apply (1) where the VOC has an aggregate partial pressure of less than 0.50 psia at the maximum feed temperature or 95°F, whichever is greater, or (2) to storage tanks smaller than 25,000 gallons. **(9/15)**

    A. The tank emissions must be controlled as specified in one of the paragraphs below:

        (1) An internal floating deck or "roof" shall be installed. A domed external floating roof tank is equivalent to an internal floating roof tank. The floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the floating roof: (1) a liquid-mounted seal, (2) two continuous seals mounted one above the other, or (3) a mechanical shoe seal.

        (2) An open-top tank shall contain a floating roof (external floating roof tank) which uses double seal or secondary seal technology provided the primary seal consists of either a mechanical shoe seal or a liquid-mounted seal and the secondary seal is rim-mounted. A weathershield is not approvable as a secondary seal unless specifically reviewed and determined to be vapor-tight.

    B. The No. 2 Cyane Storage Tank, No. 3 Cyane Storage Tank, and the No. 4 Cyane Storage Tank (Emission Point Nos. [EPNs] 06TFL-014, 06TFL-015, and 06TFL-016, respectively) shall each be inspected once every 12 months as specified in 40 CFR § 60.113b(a)(2), Testing and Procedures (as amended at 54 FR 32973, Aug. 11, 1989), to verify fitting and seal integrity. Records shall be maintained of the dates that internal roof and seals were inspected, results of inspections, and actions taken to correct any deficiencies noted. **(04/14)**

    C. The floating roof design shall incorporate sufficient flotation to conform to the requirements of API Code 650 dated November 1, 1998 except that an internal floating cover need not be designed to meet rainfall support requirements and the materials of construction may be steel or other materials.

    D. Except for labels, logos, etc. not to exceed 15 percent of the tank total surface area, uninsulated tank exterior surfaces exposed to the sun shall be white or unpainted aluminum. Storage tanks must be equipped with permanent submerged fill pipes or bottom loading.

    E. The permit holder shall maintain a record of tank throughput for the previous month and the past consecutive 12-month period for each tank.

11. The non-painted stainless Steel Tanks identified as 06TFX012, 06TFX032, 06TFX035, 06TFX038, 06TFX056, and 06TFX060 may be left unpainted. Also, the non-painted fiberglass tanks identified as 06TFX034, 06TFX048, and 06TFX051 may be left

unpainted. This special condition supersedes for these nine tanks the exterior surfaces color requirements in SC No. 10.D. **(07/12)**

12. Maximum filling rates and maximum throughput are limited to the following:

EPN	Tank No.	Service	Fill Rate (gallons/hour)	Rolling 12-Month Throughput (gallons)
06TFX048	3113-1013-01	VOC	9,000	15,000
06TFX051	3118-1012-1	VOC	9,000	40,000
06TFX034	3211-7010-1	VOC	9,000	40,000
06TFX035	3219-7011-5	VOC	9,000	15,000
06TFX056	3224-7012-1	VOC	32,700	20,452,000
06TFX038	3224-7012-11	VOC	32,700	20,452,000
06TFX012	3224-7014-1	VOC	9,900	190,000
06TFX013	3280-7010-10	VOC	30,000	30,678,000

For tanks with service described as VOC, the identity of the products stored may be found in the confidential letter dated December 18, 2014. **(Date)**

Relief Valves

13. Non-fugitive emissions from relief valves, safety valves, or rupture discs of gases containing VOC at a concentration of greater than 1 percent are not authorized by this permit unless authorized on the maintenance, start-up, and shutdown (MAERT). Any releases directly to atmosphere, from relief valves, safety valves, or rupture discs of gases containing VOC at a concentration greater than 1 weight percent, are not consistent with good practice for minimizing emissions with the exception of those listed in Attachment 1. **(02/09)**

Baghouses and Particulate Scrubbers

14. The vents covered by this permit shall not operate unless control devices and associated equipment are maintained in good working order and operating. All vents will be inspected for visible emissions once per day when the associated baghouse and particulate scrubbers are in operation. Records shall be maintained of all inspections and maintenance performed. **(Date)**

15. Particulate matter outlet grain loading shall not exceed 0.01 grain per dscf of air from any baghouse or particulate scrubbers vent. There shall be no visible emissions exceeding 30 seconds in any six-minute period as determined using EPA Test Method 22. **(Date)**

16. The differential pressure across each baghouse in operation shall be continuously monitored and be recorded at least once an hour. The hourly rolling average pressure drop shall be at least the minimum shown on the table which follows this special condition and shall not exceed the hourly rolling average of the maximum shown on that table.

Each monitoring device shall be calibrated at a frequency in accordance with the manufacturer's specifications or at least annually, whichever is more frequent, and shall be accurate to within 0.5 inch water gauge pressure or 0.5 percent of span.

Quality-assured (or valid) data must be generated when the baghouses listed on the table which follows this special condition are operating. Loss of valid data due to periods of monitor breakdown, out-of-control operation (producing inaccurate data), repair, maintenance, or calibration may be exempted provided it does not exceed 5 percent of the time (in hours) that these sources operated over the previous rolling 12-month period. The measurements missed shall be estimated using engineering judgment and the methods used recorded. **(07/12)**

Baghouse	Minimum differential pressure, inches of water*	Maximum differential pressure, inches of water
No. 1 Dryer Bag Filter	0.2	10
No. 2 Dryer Bag Filter	0.2	10
No. 3 Dryer Bag Filter	0.2	10
No. 4 Dryer Bag Filter	0.2	10
No. 1 Storage Bin Bag Filter(as measured by bin pressure, not differential pressure)	0.2	5.5
No. 2 Storage Bin Bag Filter (as measured by bin pressure, not differential pressure)	0.2	5.5
No. 1 Fluid Bed Cooler Bag Filter	0.2	10
No. 2 Fluid Bed Cooler Bag Filter	0.2	10

* While dryers venting to the baghouse are operating

The permit holder shall inspect the outer surface of each baghouse once per week to verify that there are no cracks, holes, tears, or other defects. Records of inspection shall be maintained on site. **(Date)**

17. The minimum liquid flow to the scrubber identified as the Fluid Bed Dryer Scrubber shall be 5,000 lbs/hr. The circulation rates shall be monitored and recorded at least once an hour.

    The flow monitoring device shall be calibrated at a frequency in accordance with the manufacturer's specifications, or at least annually, whichever is more frequent, and shall be accurate to within 2 percent of span or 5 percent of the design value.

    Quality-assured (or valid) data must be generated when the scrubber is operating. Loss of valid data due to periods of monitor breakdown, out-of-control operation (producing inaccurate data), repair, maintenance, or calibration may be exempted provided it does not exceed 5 percent of the time (in hours) that the scrubber operated over the previous rolling 12-month period. The measurements missed shall be estimated using engineering judgment and the methods used recorded. **(02/09)**

Loading Operations

18. All lines and connectors shall be visually inspected for any defects prior to hookup. Lines and connectors that are visibly damaged shall be removed from service. Audio, olfactory, and visual checks for liquid leaks shall be made during all loading operations. No liquid leaks shall be allowed in the piping, valves, flanges, or pumps. Loading operations shall be stopped immediately upon detection of a leaking component and shall not be resumed until the leak has been repaired. Spills shall be cleaned up immediately. **(02/09)**

19. The ADBA tank truck loading emissions shall be collected by the fume vent header which shall be routed to the Adipic Power House Boilers authorized under Permit Number 812, or an approved abatement device. **(02/09)**

20. Loading operations are limited to the materials and rates identified in Table 2 of the confidential letter dated July 19, 2016, additional loading activities that were included in the December 18, 2014 confidential permit application, and any permit by rule (PBR) approved by TCEQ. **(Date)**

Cooling Basin

21. The cooling basin (EPN: 06WA-091) is subject to the following requirements: **(Date)**

    A. The water entering the cooling basin shall be monitored monthly for VOC leakage from heat exchangers in accordance with the requirements of the TCEQ Sampling Procedures Manual, Appendix P (dated January 2003 or a later edition) or another air stripping method approved by the TCEQ Executive Director.

    B. Sampled VOC concentrations above 0.08 ppmw indicate faulty equipment. Equipment shall be maintained so as to minimize VOC emissions into the cooling water. Faulty equipment shall be repaired at the earliest opportunity but no later than the next scheduled shutdown of the process unit in which the leak occurs.

Emissions from the cooling basin are not authorized if the VOC concentration of the water entering the cooling basin exceeds 0.8 ppmw. The VOC concentrations above maximum acceptable VOC concentration 0.8 ppmw are not subject to extensions for delay of repair under this permit condition. The results of the monitoring and maintenance efforts shall be recorded.

In case a sampled concentration difference of greater than 0.08 ppmw methane equivalent and less than 0.8 ppmw methane equivalent is detected during monthly monitoring required under this paragraph, the permit holder may, as an alternative to repairing faulty equipment, repeat the monitoring specified in paragraph A on three consecutive days immediately following the day on which a leak was detected ("follow-up samples"), and verify that the average concentration difference for the three follow-up samples is less than 0.08 ppmw methane equivalent.

C. The permit holder must demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the conditions of the permit. Alternative methods shall be applied for in writing and must be reviewed and approved by the executive director prior to their use in fulfilling any requirements of the permit.

Analyzer Vents

22. All analyzers in OP1 and OP1A in VOC service installed after the date of this permit shall vent to a control device. The following existing analyzers are exempted from this requirement: **(Date)**

OP1 Analyzers	OP1A Analyzers
Condensate GC	Condensate GC

Recordkeeping

23. A monthly record of adipic acid production that includes the monthly and cumulative year-to-date production, calculated in pounds, shall be maintained at the plant site for a minimum of five years and shall be made available to the TCEQ Executive Director or his representative upon request. **(02/09)**

Maintenance, Start-Up, and Shutdown (MSS)

24. During planned MSS activities for which control is required, the minimum liquid flow to the scrubbers listed in this condition shall be that listed in the table which follows. The circulation rates shall be monitored and recorded at least once an hour. The flow monitoring device shall be calibrated at a frequency in accordance with the manufacturer's specifications, or at least annually, whichever is more frequent. **(Date)**

Emission Point Number	Emission Point Name	Minimum Liquid Flow
06VNT-001	OP 1 Low Pressure Scrubber Vent	8,000 lbs/hr
06VNT-002	OP 1 High Pressure Scrubber Vent	11,000 lbs/hr
06VNT-021	OP 1A Low Pressure Scrubber Vent	6,300 lbs/hr
06VNT-022	OP 1A High Pressure Scrubber Vent	11,000 lbs/hr

25. This permit authorizes the emissions for the planned MSS activities summarized in the MSS Activity Summary (Attachment C) attached to this permit. **(07/11)**

    Attachment A identifies the inherently low emitting MSS activities that may be performed at the plant. Emissions from activities identified in Attachment A shall be considered to be equal to the potential to emit represented in the permit application. The estimated emissions from the activities listed in Attachment A must be revalidated annually. This revalidation shall consist of the estimated emissions for each type of activity and the basis for that emission estimate.

26. Routine maintenance activities, as identified in Attachment B may be tracked through the work orders or equivalent. Emissions from activities identified in Attachment B shall be calculated using the number of work orders or equivalent that month and the emissions associated with that activity identified in the permit application.

27. This permit authorizes emissions from the following temporary facilities used to support planned MSS activities at permanent site facilities: frac tanks, containers, vacuum trucks, portable control devices identified in SC No. 36, and controlled recovery systems. Emissions from temporary facilities are authorized provided the temporary facility (a) does not remain on the plant site for more than 12 consecutive months, (b) is used solely to support planned MSS activities at the permanent site facilities listed in this Attachment, and (c) does not operate as a replacement for an existing authorized facility.

    The performance of each planned MSS activity not identified in Attachments A or B and the emissions associated with it shall be recorded and include at least the following information:

    A. The process unit at which emissions from the MSS activity occurred, including the emission point number and common name of the process unit;

    B. The type of planned MSS activity and the reason for the planned activity;

    C. The common name and the facility identification number, if applicable, of the facilities at which the MSS activity and emissions occurred;

    D. The date and time of the MSS activity and its duration;

    E. The estimated quantity of each air contaminant, or mixture of air contaminants, emitted with the data and methods used to determine it. The emissions shall be

estimated using the methods identified in the permit application, consistent with good engineering practice.

All MSS emissions shall be summed monthly and the rolling 12-month emissions shall be updated on a monthly basis.

28. Process units and facilities, with the exception of those identified in SC Nos. 26, 27, 29, and Attachment A shall be depressurized, emptied, degassed, and placed in service in accordance with the following requirements. **(07/11)**

A. The process equipment shall be depressurized to a control device or a controlled recovery system prior to venting to atmosphere, degassing, or draining liquid. Equipment that only contains material that is liquid with VOC partial pressure less than 0.50 psi at the normal process temperature and 95°F may be opened to atmosphere and drained in accordance with paragraph C of this special condition. The vapor pressure at 95°F may be used if the actual temperature of the liquid is verified to be less than 95°F and the temperature is recorded.

B. If mixed phase materials must be removed from process equipment, the cleared material shall be routed to a knockout drum or equivalent to allow for managed initial phase separation. If the VOC partial pressure is greater than 0.50 psi at either the normal process temperature or 95°F, any vents in the system must be routed to a control device or a controlled recovery system. The vapor pressure at 95°F may be used if the actual temperature of the liquid is verified to be less than 95°F and the temperature is recorded. Control must remain in place until degassing has been completed or the system is no longer vented to atmosphere.

C. All liquids from process equipment or storage vessels must be removed to the maximum extent practical prior to opening equipment to commence degassing and/or maintenance. Liquids must be drained into a closed vessel or closed liquid recovery system unless prevented by the physical configuration of the equipment. If it is necessary to drain liquid into an open pan or sump, the liquid must be covered or transferred to a covered vessel within one hour of being drained.

D. If the VOC partial pressure is greater than 0.50 psi at the normal process temperature or 95°F, facilities shall be degassed using good engineering practice to ensure air contaminants are removed from the system through the control device or controlled recovery system to the extent allowed by process equipment or storage vessel design. The vapor pressure at 95°F may be used if the actual temperature of the liquid is verified to be less than 95°F and the temperature is recorded. The facilities to be degassed shall not be vented directly to atmosphere, except as necessary to establish isolation of the work area or to monitor VOC concentration following controlled depressurization. The venting shall be minimized to the maximum extent practicable and actions taken recorded. The control device or recovery system utilized shall be recorded with the estimated emissions from controlled and uncontrolled degassing calculated using the methods that were used to determine allowable emissions for the permit application.

(1) For MSS activities identified in Attachment B, the following option may be used in lieu of (2) below. The facilities being prepared for maintenance shall not be vented directly to atmosphere until the VOC concentration has been verified to be less than 10 percent of the lower explosive limit (LEL) per the site safety procedures.

(2) The locations and/or identifiers where the purge gas or steam enters the process equipment or storage vessel and the exit points for the exhaust gases shall be recorded. If the process equipment is purged with a gas, two system volumes of purge gas must have passed through the control device or controlled recovery system before the vent stream may be sampled to verify acceptable VOC concentration prior to uncontrolled venting. The VOC sampling and analysis shall be performed using an instrument meeting the requirements of SC No. 29. The sampling point shall be upstream of the inlet to the control device or controlled recovery system. The sample ports and the collection system must be designed and operated such that there is no air leakage into the sample probe or the collection system downstream of the process equipment or vessel being purged. If there is not a connection (such as a sample, vent, or drain valve) available from which a representative sample may be obtained, a sample may be taken upon entry into the system after degassing has been completed. The sample shall be taken from inside the vessel so as to minimize any air or dilution from the entry point. The facilities shall be degassed to a control device or controlled recovery system until the VOC concentration is less than 10,000 ppmv or 10 percent of the LEL. Documented site procedures used to de-inventory equipment to a control device for safety purposes (i.e., hot work or vessel entry procedures) that achieve at least the same level of purging may be used in lieu of the above.

E. Gases and vapors with VOC partial pressure greater than 0.50 psi may be vented directly to atmosphere if all the following criteria are met:

(1) It is not technically practicable to depressurize or degas, as applicable, into the process.

(2) There is not an available connection to a plant control system (flare).

(3) There is no more than 50 lb of air contaminant to be vented to atmosphere during shutdown or startup, as applicable.

All instances of venting directly to atmosphere per E of this condition must be documented when occurring as part of any MSS activity. The emissions associated with venting without control must be included in the work order or equivalent for those planned MSS activities identified in Attachment B.

29. Air contaminant concentration shall be measured using an instrument/detector meeting one set of requirements specified below. **(07/11)**

A. VOC concentration shall be measured using an instrument meeting all the requirements specified in EPA Method 21 (40 CFR 60, Appendix A) with the following exceptions:

(1) The instrument shall be calibrated within 24 hours of use with a calibration gas such that the response factor (RF) of the VOC (or mixture of VOCs) to be monitored shall be less than 2.0. The calibration gas and the gas to be measured, and its approximate (RF) shall be recorded. If the RF of the VOC (or mixture of VOCs) to be monitored is greater than 2.0, the VOC concentration shall be determined as follows:

VOC Concentration = Concentration as read from the instrument*RF

In no case should a calibration gas be used such that the RF of the VOC (or mixture of VOCs) to be monitored is greater than 5.0.

(2) Sampling shall be performed as directed by this permit in lieu of section 8.3 of Method 21. During sampling, data recording shall not begin until after two times the instrument response time. The date and time shall be recorded, and VOC concentration shall be monitored for at least 5 minutes, recording VOC concentration each minute. As an alternative the VOC concentration may be monitored over a five-minute period with an instrument designed to continuously measure concentration and record the highest concentration read. The highest measured VOC concentration shall be recorded and shall not exceed the specified VOC concentration limit prior to uncontrolled venting.

(3) If a TVA-1000 series FID analyzer calibrated with methane is used to determine the VOC concentration, a measured concentration of 34,000 ppmv may be considered equivalent to 10,000 ppmv as VOC.

B. Colorimetric gas detector tubes may be used to determine air contaminant concentrations if they are used in accordance with the following requirements.

(1) The air contaminant concentration measured as defined in (3) is less than 80 percent of the range of the tube and is at least 20 percent of the maximum range of the tube.

(2) The tube is used in accordance with the manufacturer's guidelines.

(3) At least 2 samples taken at least 5 minutes apart must satisfy the following prior to uncontrolled venting:

Measured contaminant concentration (ppmv) < release concentration.

Where the release concentration is:

10,000*mole fraction of the total air contaminants present that can be detected by the tube

The mole fraction may be estimated based on process knowledge. The release concentration and basis for its determination shall be recorded.

Records shall be maintained of the tube type, range, measured concentrations, and time the samples were taken.

C. Lower explosive limit measured with a lower explosive limit detector.

(1) The detector shall be calibrated monthly with a certified pentane gas standard at 25% of the lower explosive limit (LEL) for pentane. Records of the calibration date/time and calibration result (pass/fail) shall be maintained.

(2) A daily functionality test shall be performed on each detector using a certified gas standard at 25% of the LEL for pentane. The LEL monitor shall read no lower than 90% of the calibration gas certified value. Records, including the date/time and test results, shall be maintained.

(3) A certified methane gas standard equivalent to 25% of the LEL for pentane may be used for calibration and functionality tests provided that the LEL response is within 95% of that for pentane.

30. This condition applies only to piping and components subject to leak detection and repair monitoring requirements identified in other NSR permits. Each open-ended valve or line shall be equipped with an appropriately sized cap, blind flange, plug, or a second valve to seal the line. Except during sampling, both valves shall be closed. If the removal of a component for repair or replacement results in an open-ended line or valve, it is exempt from the requirement to install a cap, blind flange, plug, or second valve for 72 hours. If the repair or replacement is not completed within 72 hours, the permit holder must complete either of the following actions within that time period; **(07/11)**

A. A cap, blind flange, plug, or second valve must be installed on the line or valve; or

B. The open-ended valve or line shall be monitored once for leaks above background for a plant or unit turnaround lasting up to 45 days with an approved gas analyzer and the results recorded. For all other situations, the open-ended valve or line shall be monitored once at the end of the 72-hour period following the creation of the open ended line and monthly thereafter with an approved gas analyzer and the results recorded. For turnarounds and all other situations, leaks are indicated by readings 500 ppmv above background and must be repaired within 24 hours or a cap, blind flange, plug, or second valve must be installed on the line or valve.

31. This permit authorizes emissions from internal floating roof tanks No. 2 Cyane Storage Tank, No. 3 Cyane Storage Tank, and No. 4 Cyane Storage Tank, identified as EPNs 06TFL-014, 06TFL-015, and 06TFL-016, during planned floating roof landings. Tank roofs may only be landed for changes of tank service or tank inspection/maintenance as identified in the permit application. Emissions from change of service tank landings, for which the tank is not cleaned and degassed, shall not exceed 10 tons of VOC in any rolling 12-month period. Tank roof landings include all operations when the tank floating roof is on its supporting legs. These emissions are subject to the maximum allowable emission rates indicated on the MAERT. The following requirements apply to tank roof landings. **(07/11)**

A. The tank liquid level shall be continuously lowered after the tank floating roof initially lands on its supporting legs until the tank has been drained to the maximum extent practicable without entering the tank. Liquid level may be maintained steady for a period of up to two hours if necessary to allow for valve lineups and pump

changes necessary to drain the tank. This requirement does not apply where the vapor under a floating roof is routed to control or a controlled recovery system during this process.

B. If the VOC partial pressure of the liquid previously stored in the tank is greater than 0.50 psi at 95°F, tank refilling or degassing of the vapor space under the landed floating roof must begin within 24 hours after the tank has been drained unless the vapor under the floating roof is routed to control or a controlled recovery system during this period. The tank shall not be opened except as necessary to set up for degassing and cleaning, Floating roof tanks with liquid capacities less than 100,000 gallons may be degassed without control if the VOC partial pressure of the standing liquid in the tank has been reduced to less than 0.02 psia prior to ventilating the tank. Controlled degassing of the vapor space under landed roofs shall be completed as follows:

(1) Any gas or vapor removed from the vapor space under the floating roof must be routed to a control device or a controlled recovery system and controlled degassing must be maintained until the VOC concentration is less than 10,000 ppmv or 10 percent of the LEL. The locations and identifiers of vents other than permanent roof fittings and seals, control device or controlled recovery system, and controlled exhaust stream shall be recorded. There shall be no other gas/vapor flow out of the vapor space under the floating roof when degassing to the control device or controlled recovery system.

(2) The vapor space under the floating roof shall be vented using good engineering practice to ensure air contaminants are flushed out of the tank through the control device or controlled recovery system to the extent allowed by the storage tank design.

(3) A volume of purge gas equivalent to twice the volume of the vapor space under the floating roof must have passed through the control device or into a controlled recovery system, before the vent stream may be sampled to verify acceptable VOC concentration. The measurement of purge gas volume shall not include any make-up air introduced into the control device or recovery system. The VOC sampling and analysis shall be performed as specified in SC No. 29.

(4) The sampling point shall be upstream of the inlet to the control device or controlled recovery system. The sample ports and the collection system must be designed and operated such that there is no air leakage into the sample probe or the collection system downstream of the process equipment or vessel being purged.

(5) Degassing must be performed every 24 hours unless there is no standing liquid in the tank or the VOC partial pressure of the remaining liquid in the tank is less than 0.15 psia.

C. The tank shall not be opened or ventilated without control, until one of the criteria in part D of this condition is satisfied, except when minimizing air circulation in the tank vapor space as follows:

(1) One manway may be opened to allow access to the tank to remove or de-volatilize the remaining liquid. Other manways or access points may be opened as necessary to remove or de-volatilize the remaining liquid. Wind barriers shall be installed at all open manways and access points to minimize air flow through the tank.

(2) Access points shall be closed when not in use.

D. The tank may be opened without restriction and ventilated without control, after all standing liquid has been removed from the tank or the liquid remaining in the tank has a VOC partial pressure less than 0.02 psia. These criteria shall be demonstrated in any one of the following ways.

(1) Low VOC partial pressure liquid that is soluble with the liquid previously stored may be added to the tank to lower the VOC partial pressure of the liquid mixture remaining in the tank to less than 0.02 psia. This liquid shall be added during tank degassing if practicable. The estimated volume of liquid remaining in the drained tank and the volume and type of liquid added shall be recorded. The liquid VOC partial pressure may be estimated based on this information and engineering calculations.

(2) If water is added or sprayed into the tank to remove standing VOC, one of the following must be demonstrated:

(a) Take a representative sample of the liquid remaining in the tank and verify no visible sheen using the static sheen test from 40 CFR 435 Subpart A, Appendix 1.

(b) Take a representative sample of the liquid remaining in the tank and verify hexane soluble VOC concentration is less than 1000 ppmw using EPA method 1664 (may also use 8260B or 5030 with 8015 from SW-846).

(c) Stop ventilation and close the tank for at least 24 hours. When the tank manway is opened after this period, verify VOC concentration is less than 1000 ppmv through the procedure in SC No. 27.

(3) No standing liquid verified through visual inspection.

The permit holder shall maintain records to document the method used to release the tank.

E. Tanks shall be refilled as rapidly as practicable until the roof is off its legs with the following exceptions:

(1) Only one tank with a landed floating roof can be filled at any time at a rate not to exceed the values in the confidential letter dated April 26, 2011, or

(2) the vapor space below the tank roof is directed to a control device when the tank is refilled until the roof is floating on the liquid. The control device used and the method and locations used to connect the control device shall be recorded. All vents from the tank being filled must exit through the control device.

F. The occurrence of each roof landing and the associated emissions shall be recorded and the rolling 12-month tank roof landing emissions shall be updated on a monthly basis. These records shall include at least the following information:

(1) the identification of the tank and emission point number, and any control devices or recovery systems used to reduce emissions;

(2) the reason for the tank roof landing;

(3) for the purpose of estimating emissions, the date, time, and other information specified for each of the following events:

(a) the roof was initially landed,

(b) all liquid was pumped from the tank to the extent practical,

(c) start and completion of controlled degassing, and total volumetric flow,

(d) all standing liquid was removed from the tank or any transfers of low VOC partial pressure liquid to or from the tank including volumes and vapor pressures to reduce tank liquid VOC partial pressure to <0.02 psi,

(e) if there is liquid in the tank, VOC partial pressure of liquid, start and completion of uncontrolled degassing, and total volumetric flow,

(f) refilling commenced, liquid filling the tank, and the volume necessary to float the roof, and

(g) tank roof off supporting legs, floating on liquid;

(4) the estimated quantity of each air contaminant, or mixture of air contaminants, emitted between events c and g with the data and methods used to determine it. The emissions associated with roof landing activities shall be calculated using the methods described in Section 7.1.3.2 of AP-42 "Compilation of Air Pollution Emission Factors, Chapter 7 - Storage of Organic Liquids" dated November 2006 and the permit application.

32. Fixed-roof storage tanks are subject to the following requirements: **(07/12)**

A. Fixed-roof storage tanks are subject to the requirements of SC Nos. 31.C and 31.D. If the ventilation of the vapor space is controlled, the emission control system shall meet the requirements of SC Nos. 31.B(1) through 31.B(4). Records shall be maintained per SC Nos. 31.F(3)(c) through 31.F(3)(e), and 31.F(4).

B. Each fixed roof tank containing liquid with a VOC partial pressure which is less than 0.02 psia at the maximum stored liquid temperature may be opened without restriction and ventilated without control, and shall be subject to the following:

(1) Part A of this condition does not apply.

(2) The permit holder shall maintain a record which includes:

(a) tank identification number, name of the material stored, and VOC vapor pressure, in psia, at the maximum stored liquid temperature, and

(b) estimated quantity of each air contaminant, or mixture of air contaminants, emitted during MSS activities, with the data and methods used to determine it. The emissions shall be calculated using the methods described in Section 7.1.3.2 of AP-42 "Compilation of Air Pollution Emission Factors, Chapter 7 - Storage of Organic Liquids" dated November 2006 and the permit application.

C. In lieu of this SC, Tank 06TFX-387 may demonstrate compliance with SC 28.E. **(07/12)**

33. The following requirements apply to vacuum and air mover truck operations to support planned MSS activities at this site: **(07/11)**

A. Prior to initial use, identify any liquid in the truck. Record the liquid level and document the VOC partial pressure. After each liquid transfer, identify the liquid, the volume transferred, and its VOC partial pressure.

B. If vacuum pumps or blowers are operated when liquid is in or being transferred to the truck, the following requirements apply:

(1) If the VOC partial pressure of the liquid in or being transferred to the truck is greater than 0.50 psi at 95°F, the vacuum/blower exhaust shall be routed to a control device or a controlled recovery system.

(2) Equip fill line intake with a "duckbill" or equivalent attachment if the hose end cannot be submerged in the liquid being collected.

(3) A daily record containing the information identified below is required for each vacuum truck in operation at the site each day.

(a) For each liquid transfer made with the vacuum operating, record the duration of any periods when air may have been entrained with the liquid transfer. The reason for operating in this manner and whether a "duckbill" or equivalent was used shall be recorded. Short, incidental periods, such as those necessary to walk from the truck to the fill line intake, do not need to be documented.

(b) If the vacuum truck exhaust is controlled with a control device other than an engine or oxidizer, VOC exhaust concentration upon commencing each transfer, at the end of each transfer, and at least every hour during each transfer shall be recorded, measured using an instrument meeting the requirements of SC No. 29.A or 29.B.

C. Record the volume in the vacuum truck at the end of the day, or the volume unloaded, as applicable.

D. The permit holder shall determine the vacuum truck emissions each month using the daily vacuum truck records and the calculation methods utilized in the permit application. If records of the volume of liquid transferred for each pick-up are not maintained, the emissions shall be determined using the physical properties of the

liquid vacuumed with the greatest potential emissions. Rolling 12-month vacuum truck emissions shall also be determined on a monthly basis.

E. If the VOC partial pressure of all the liquids vacuumed into the truck is less than 0.10 psia, this shall be recorded when the truck is unloaded or leaves the plant site and the emissions may be estimated as the maximum potential to emit for a truck in that service as documented in the permit application. The recordkeeping requirements in A through D of this SC do not apply.

34. The following requirements apply to frac, or temporary, tanks and vessels used in support of MSS activities. **(07/11)**

A. The exterior surfaces of these tanks/vessels that are exposed to the sun shall be white or aluminum effective May 1, 2013. This requirement does not apply to tanks/vessels that only vent to atmosphere when being filled, sampled, gauged, or when removing material.

B. These tanks/vessels must be covered and equipped with fill pipes that discharge within 6 inches of the tank/vessel bottom.

C. These requirements do not apply to vessels storing less than 450 gallons of liquid that are closed such that the vessel does not vent to atmosphere except when filling, sampling, gauging, or when removing material.

D. The permit holder shall maintain an emissions record which includes calculated emissions of VOC from all frac tanks during the previous calendar month and the past consecutive 12 month period. This record shall be updated with all data of a month by the last day of the following month. The record shall include tank identification number, dates put into and removed from service, control method used, tank capacity and volume of liquid stored in gallons, name of the material stored, VOC molecular weight, and VOC partial pressure at the estimated monthly average material temperature in psia. Filling emissions for tanks shall be calculated using the TCEQ publication titled "Technical Guidance Package for Chemical Sources - Loading Operations" and standing emissions determined using: the TCEQ publication titled "Technical Guidance Package for Chemical Sources - Storage Tanks."

35. Additional occurrences of MSS activities authorized by this permit may be authorized under permit by rule only if conducted in compliance with this permit's procedures, emission controls, monitoring, and recordkeeping requirements applicable to the activity. **(07/11)**

36. This Special Condition applies only to the control of emissions from planned MSS activities. Control devices required by this permit for emissions from planned MSS activities are limited to those types identified in this condition. Control devices shall be operated with no visible emissions except periods not to exceed a total of five minutes during any two consecutive hours. Each device used must meet all the requirements identified for that type of control device. **(07/11)**

Controlled recovery systems identified in this permit shall be directed to an operating plant process or to a collection system that is vented through a control device meeting the requirements of this permit condition.

A. Carbon Adsorption System (CAS).

(1) The CAS shall consist of two carbon canisters in series with adequate carbon supply for the emission control operation.

(2) The CAS shall be sampled downstream of the first can and the concentration recorded at least once every hour of CAS run time to determine breakthrough of the VOC. The sampling frequency may be extended using either of the following methods:

(a) It may be extended to up to 30 percent of the minimum potential saturation time for a new can of carbon. The permit holder shall maintain records including the calculations performed to determine the minimum saturation time.

(b) The carbon sampling frequency may be extended to longer periods based on previous experience with carbon control of a MSS waste gas stream. The past experience must be with the same VOC, type of facility, and MSS activity. The basis for the sampling frequency shall be recorded. If the VOC concentration on the initial sample downstream of the first carbon canister following a new polishing canister being put in place is greater than 100 ppmv above background, it shall be assumed that breakthrough occurred while that canister functioned as the final polishing canister and a permit deviation shall be recorded.

(3) The method of VOC sampling and analysis shall be by detector meeting the requirements of SC No. 29.

(4) Breakthrough is defined as the highest measured VOC concentration at or exceeding 100 ppmv above background. Sufficient new activated carbon canisters shall be maintained at the site to replace spent carbon canisters as specified in this paragraph. When the condition of breakthrough of VOC from the initial saturation canister occurs, the holder of this permit shall implement one of the following alternatives:

(a) the waste gas flow shall be switched to the second canister and a fresh canister shall be placed as the new final polishing canister within four hours; or,

(b) the MSS activity shall cease until a fresh canister replaces the spent first canister.

(5) Records of CAS monitoring shall include the following:

(a) Sample time and date;

(b) Monitoring results (ppmv); and

(c) Canister replacement log.

(6) Single canister systems are allowed if the time the carbon canister is in service is limited to no more than 30 percent of the minimum potential saturation time. The permit holder shall maintain records for these systems, including the calculations performed to determine the saturation time. The time limit on carbon canister service shall be recorded and the expiration date attached to the carbon can.

B. Thermal Oxidizer.

(1) The thermal oxidizer firebox exit temperature shall be maintained at not less than 1400°F and waste gas flows shall be limited to assure at least a 0.5 second residence time in the fire box while waste gas is being fed into the oxidizer.

(2) The thermal oxidizer exhaust temperature shall be continuously monitored and recorded when waste gas is directed to the oxidizer. The temperature measurements shall be made at intervals of six minutes or less and recorded at that frequency.

The temperature measurement device shall be installed, calibrated, and maintained according to accepted practice and the manufacturer's specifications. The device shall have an accuracy of the greater of ±0.75 percent of the temperature being measured expressed in degrees Celsius or ±2.5°C.

C. Internal Combustion Engine.

(1) The internal combustion engine shall have a VOC destruction efficiency of at least 99 percent.

(2) The engine must have been stack tested with butane or propane to confirm the required destruction efficiency within the period specified in part (3) below. VOC shall be measured in accordance with the applicable United States EPA Reference Method during the stack test and the exhaust flow rate may be determined from measured fuel flow rate and measured oxygen concentration. A copy of the stack test report shall be maintained with the engine. There shall also be documentation of acceptable VOC emissions following each occurrence of engine maintenance that may reasonably be expected to increase emissions including oxygen sensor replacement and catalyst cleaning or replacement. Stain tube indicators specifically designed to measure VOC concentration shall be acceptable for this documentation, provided a hot air probe or equivalent device is used to prevent error due to high stack temperature, and three sets of concentration measurements are made and averaged. Portable VOC analyzers meeting the requirements of SC No. 29 are also acceptable for this documentation.

(3) The engine shall be operated and monitored as specified below:

(a) If the engine is operated with an oxygen sensor-based air-to-fuel ratio (AFR) controller, documentation for each AFR controller that the manufacturer's or supplier's recommended maintenance has been performed, including replacement of the oxygen sensor as necessary for oxygen sensor-based controllers shall be maintained with the engine. The

oxygen sensor shall be replaced at least quarterly in the absence of a specific written recommendation. The engine must have been stack tested within the past 12 months in accordance with part (2) of this condition.

The test period may be extended to 24 months if the engine exhaust is sampled once an hour when waste gas is directed to the engine using a detector meeting the requirements of SC No. 29. The sample ports and the collection system must be designed and operated such that there is no air leakage into the sample probe or the collection system downstream of the engine. The concentrations shall be recorded and the MSS activity shall be stopped as soon as possible if the VOC concentration exceeds 100 ppmv above background.

(b) If an oxygen sensor-based AFR controller is not used, the engine exhaust to atmosphere shall be monitored continuously and the VOC concentration recorded at least once every 15 minutes when waste gas is directed to the engine. The sample ports and the collection system must be designed and operated such that there is no air leakage into the sample probe or the collection system downstream of the engine. The method of VOC sampling and analysis shall be by detector meeting the requirements of SC No. 29. An alarm shall be installed such that an operator is alerted when outlet VOC concentration exceeds 100 ppmv above background. The MSS activity shall be stopped as soon as possible if the VOC concentration exceeds 100 ppmv above background for more than one minute. The date and time of all alarms and the actions taken shall be recorded. The engine must have been stack tested within the past 24 months in accordance with part (2) of this condition.

37. Reserved **(Date)**

Compliance Assurance Monitoring (CAM)

38. The following requirements apply to capture systems for the following emission points: **(2/09)**

Emission Point Number	Source Name
06DRY-008	No. 1 Dryer Bag Filter
06DRY-009	No. 2 Dryer Bag Filter
06DRY-028	No. 3 Dryer Bag Filter
06DRY-029	No. 4 Dryer Bag Filter
06DRY-050	No. 1 Fluid Bed Dryer Scrubber
06CLR-017	No. 1 Fluid Bed Cooler
06CLR-037	No. 2 Fluid Bed Cooler

Emission Point Number	Source Name
06BIN-011	No. 1 Loading Bin
06BIN-031	No. 2 Loading Bin
06VNT-001	OP1 Low Pressure Scrubber Vent to Boilers
06VNT-002	OP1 High Pressure Scrubber Vent to Boilers
06VNT-021	OP1A Low Pressure Scrubber Vent to Boilers
06VNT-022	OP1A High Pressure Scrubber Vent to Boilers

A. If used for particulate control, complete either of the following at least once in every 12-month period:

(1) Inspect any fan and verify proper operation and inspect the capture system to verify there are no cracks, holes, tears, and other defects once a year; or

(2) Verify there are no fugitive emissions escaping from the capture system by performing a visible emissions observation for a period of at least six minutes in accordance with 40 CFR Part 60, Appendix A, Test Method 22.

B. If used to control pollutants other than particulate, either:

(1) Conduct a once a month visual, audible, and/or olfactory inspection of the capture system to verify there are no leaking components in the capture system; or

(2) At least once in every 12-month period, verify the capture system is leak-free by inspecting in accordance with 40 CFR Part 60, Appendix A, Test Method 21. Leaks shall be indicated by an instrument reading greater than or equal to 500 ppmv above background.

C. The following control devices shall not have a bypass:

Emission Point Number	Source Name
06DRY-008	No. 1 Dryer Bag Filter
06DRY-009	No. 2 Dryer Bag Filter
06DRY-028	No. 3 Dryer Bag Filter
06DRY-029	No. 4 Dryer Bag Filter
06DRY-050	No. 1 Fluid Bed Dryer Scrubber
06CLR-017	No. 1 Fluid Bed Cooler
06CLR-037	No. 2 Fluid Bed Cooler
06BIN-011	No. 1 Loading Bin
06BIN-031	No. 2 Loading Bin

D. The following control devices may have a bypass and shall comply with either of the requirements which follow:

Emission Point Number	Source Name
06VNT-001	OP1 Low Pressure Scrubber Vent
06VNT-002	OP1 High Pressure Scrubber Vent
06VNT-021	OP1A Low Pressure Scrubber Vent
06VNT-022	OP1A High Pressure Scrubber Vent

(1) Install a flow indicator that records and verifies zero flow at least once every 15 minutes immediately upstream or downstream of each valve that if opened would allow a vent stream to bypass the control device and be emitted, either directly or indirectly, to the atmosphere; or

(2) Once a month, inspect the valves, verifying the position of the valves and the condition of the car seals prevent flow out the bypass.

A deviation shall be reported if the monitoring or inspections indicate bypass of the control device at any time other than during an MSS activity authorized under the amendment application, PI-1 form dated February 27, 2006, approved February 2009.

E. If any of the above inspections is not satisfactory, the permit holder shall promptly take necessary corrective action.

Green House Gases Continuous Determination of Compliance

39. The permit holder shall at least once annually conduct the Source Emissions Performance Test for N2O in the cyclohexanone/cyclohexanol off-gas being treated in either the NOx reactor or the boilers #3 and #4. The off-gas shall be sampled using procedures specified in 40 CFR Part 98, Subpart E. Results of the test data shall be kept on site and shall include unabated ppm N2O, unabated pounds per hour (lbs/hr) of N2O as well as pounds N2O generated per ton of adipic acid manufactured. **(Date)**

40. The holder of this permit shall install, calibrate, maintain, and operate a continuous emission monitoring system (CEMS) to measure and record the concentrations of nitrous oxide (N2O) in the Catalytic Abater Stack (EPN 15 CAT-001). In addition, the holder of this permit shall comply with the following: **(Date)**

A. The CEMS shall meet the design and performance specifications, pass the field tests, and meet the installation requirements and the data analysis and reporting requirements specified in the applicable Performance Specification Nos. 1 through 9, Title 40 Code of Federal Regulation Part 60 (40 CFR Part 60), Appendix B. If there are no applicable performance specifications in 40 CFR Part 60, Appendix B, contact the TCEQ Office of Air, Air Permits Division for requirements to be met.

B. Section 1 below applies to sources subject to the quality-assurance requirements of 40 CFR Part 60, Appendix F; section 2 applies to all other sources:

(1) The permit holder shall assure that the CEMS meets the applicable quality-assurance requirements specified in 40 CFR Part 60, Appendix F, Procedure 1.

All CGA exceedances greater than ±15 percent accuracy and any unscheduled CEMS downtime lasting four hours or more shall be reported in written form to the TCEQ Regional Office within 24 hours of detection, and necessary corrective action shall be taken. Scheduled repair or replacement work on the CEMS resulting in downtime is exempt from this notification requirement. Supplemental stack concentration measurements may be required at the discretion of the TCEQ Regional Manager.

(2) The system shall be zeroed and spanned daily, and corrective action taken when the 24-hour span drift exceeds two times the amounts specified in the applicable Performance Specification Nos. 1 through 9, 40 CFR Part 60, Appendix B, or as specified by the TCEQ if not specified in Appendix B. Zero and span is not required on weekends and plant holidays if instrument technicians are not normally scheduled on those days.

Each monitor shall be quality-assured at least quarterly using Cylinder Gas Audits (CGA) in accordance with 40 CFR Part 60, Appendix F, Procedure 1, Section 5.1.2, with the following exception: a relative accuracy test audit (RATA) is not required once every four quarters (i.e., four successive quarterly CGA may be conducted). An equivalent quality-assurance method approved by the TCEQ may also be used. Successive quarterly audits shall occur no closer than two months.

All CGA exceedances of +15 percent accuracy indicate that the CEMS is out of control.

41. The Adipic Acid Unit off-gas shall be routed to the VNOx System (EPN 15CAT 001). The VNOx System, shall be equipped with a N2O abatement system (front-end unit) and a NOX abatement system (back-end unit), which shall have an overall N2O control efficiency of 95% for Adipic Acid unit off-gas. When the VNOx system is not operational, the boilers shall handle the off- gas and shall have an overall N2O control efficiency of 90%. **(Date)**

Date: DATE

Attachment 1

Permit Number 810, PSDTX 1448, GHGPSDTX 129

Exempted Relief Valves

Area	Equipment No.	Description
Op 1	60503821	Relief Valve High Press Separator
Op 1	60503510	Relief Valve HP Scrubber Exit Vapor Line
Op 1	60503548	Relief Valve KA Topper Vapor Line
Op 1	60503994	Relief Valve LPSOG Pilot Operated
Op 1	60503994	Relief Valve LPSOG Pilot Operated
Op 1	60503639	Relief Valve PDHCS Column E
Op 1	60503638	Relief Valve PDHCS Column W
Op 1	60503607	Relief Valve PDHCS Condenser
Op 1	60503776	Relief Valve PMD1 Column
Op 1	60503847	Relief Valve Recy Compressor KOP Drum
Op 1	60503914	Relief Valve Rich Oil Tank
Op 1	60504091	Relief Valve Steam Still Vapor To PDHCS Cal
Op 1	60504096	Relief Valve Steam Still Vapor To SDHCS Cal
Op 1	60503959	Relief Valve SDHCS Vapor Line
Op 1	60504066	Relief Valve Stm Still Condenser
Op 1	60504094	Relief Valve Stm Still Vapor Line E
Op 1	60504095	Relief Valve Stm Still Vapor Line W
Op 1	60504306	Relief Valve WHCS Vapor Line N
Op 1	60504305	Relief Valve WHCS Vapor Line S
Op 1	60504346	Relief Valve WOS Ex Vap Line 322270101010
Op 1	60504033	Rupture Disc LPSOG Compressor Oil Separator
Op 1	60503637	Rupture Disc PDHCS Column E
Op 1	60503636	Rupture Disc PDHCS Column W
Op 1	60503766	Rupture Disc PMD 1 Column
Op 1A	60501421	Rupture Disc CHHP Column 312110101.22
Op 1A	60501743	Relief Valve Kat Column
Op 1A	60501890	Rupture Disc PDHCS Column
Op 1A	60501891	Relief Valve PDHCS Column
Op 1A	60502015	Rupture Disc PMD1a Column
Op 1A	60502057	Rupture Disc Low Press Separator
Op 1A	60502059	Relief Valve Low Press Separator

Area	Equipment No.	Description
Op 1A	60502119	Relief Valve Recy Ch Sphere W
Op 1A	60502120	Relief Valve Recy Ch Sphere E
Op 1A	60502330	Rupture Disc LPSOG Oil Separator
Op 1A	60502418	Relief Valve Stm Still Decanter
Op 1A	60502490	Rupture Disc WHCS Column S
Op 1A	60502491	Rupture Disc WHCS Column N
Op 1A	60502492	Relief Valve WHCS Column S
Op 1A	60502493	Relief Valve WHCS Column N
Op 1A	60502640	Relief Valve Inert Flasher O/G Separator
Op 1A	60502640	Relief Valve Inert Flasher O/G Separator
Op 1A	66339278	Relief Valve Wash Oil Stripper Column
Op 1A	66339278	Relief Valve Wash Oil Stripper Column
Op 1A	66339279	Rupture Disc Wash Oil Stripper Column
Op 1A	60501215	Relief Valve Hp
Op 1A	60501623	Relief Valve HR1 Column 312810100101
Op 1A	60501698	Relief Valve Inert Flasher 312110200101
Op 1A	60502016	Relief Valve PMD1a Column
Op 1A	60502024	Relief Valve High Press Separator
Op 1A	60502146	Relief Valve Recy Compressor Knockout Pot
Op 1A	60501916	Relief Valve PDHCS Mk Holdup Tank
Op 1A	60502277	Relief Valve SDHCS Reboiler Seal Tank
Op 1A	60502536	Relief Valve WHCS Calandria Seal Pot
Op 1A	60502380	Relief Valve Stm Still Column
Op 1A	60501903	Relief Valve PDHCS Reboiler Seal Tank
Op 1A	60501555	Relief Valve High Press Scrubber
Op 1A	60502221	Relief Valve Rich Oil Tank
Op 1A	60502570	Relief Valve WOS Column
Op 1A	60502260	Relief Valve SDHCS Condenser Seal Tank Make Hut
Op 1A	60501422	Relief Valve CHHP Column 312110101.21
Op 1A	60502302	Relief Valve LPSOG Pilot Operated Relief
Op 1A	60502302	Relief Valve LPSOG Pilot Operated Relief
Op 1A	60502349	Relief Valve Stm Still Condenser
Op 1A	60502246	Relief Valve SDHCS Column N

Area	Equipment No.	Description
Op 1A	60501853	Relief Valve PDHCS Calandria Seal Tank
Op 1A	60501853	Relief Valve PDHCS Calandria Seal Tank
Op 1A	60501591	Relief Valve H_2 Compressor Suct Sep 3128101030
Op 1A	60501468	Relief Valve CWW Evap 317310201.21
Op 1A	60501468	Relief Valve CWW Evap 317310201.21
Op 1A	60502333	Relief Valve LPSOG Compressor Oil Separator
OP 2-3	323070100921A	No. 1 Absorber (A)
OP 2-3	323070100921B	No. 1 Absorber (B)
OP 2-3	322770160103	No. 1 Bleacher
OP 2-3	322770180121	No. 1 Dump Tank (New)
OP 2-3	313020300121	No. 2 Absorber
OP 2-3	32287110103	No. 2 Bleacher
OP 2-3	322871180121	No. 2 Dump Tank (New)
OP 2-3	312720201.2	No. 3 Bleacher
OP 2-3	312720251.2	No. 3 Dump Tank (No. 1 Valve)
OP 2-3	312720251.2	No. 3 Dump Tank (No. 2 Valve)
OP 2-3	323070100121A	Contact Cooler (A)
OP 2-3	323070100121B	Contact Cooler (B)
OP 2-3	60504748	No. 1 Bleacher Rupture Disk
OP 2-3	60504842	No. 2 Bleacher Rupture Disk
OP 2-3	60504931	No. 3 Bleacher Rupture Disk
OP 2-3	60505116	Contact Clr. To No. 1 Dump Rupture Disk
OP 2-3	60505117	Contact Clr. To No. 2 Dump Rupture Disk
OP 2-3	60505065	No. 1 Absorber To No. 1 Dump Rupture Disk
OP 2-3	60505066	No. 1 Absorber To No. 2 Dump Rupture Disk
OP 2-3	60505164	No. 2 Absorber Rupture Disk
OP 2-3	60504587	No. 1 Conc. Still Rupture Disk
OP 2-3	66316931	No. 2 Conc. Still Rupture Disk
OP 2-3	60504381	No. 3 Atmos. Conc. Still Rupture Disk
OP 2-3	60505375	No. 3 Vacuum Still Rupture Disk

Attachment A

Permit Number 810, PSDTX 1448, GHGPSDTX 129

Inherently Low Emitting Activities

Activity	Emissions				
	VOC	NO_x	CO	PM	H_2S/SO_2
Management of sludge from pits, ponds, sumps, and water conveyances	X				
Aerosol Cans	X				
Calibration of analytical equipment	X	X	X		X
Catalyst charging/handling				X	
Soap and other aqueous based cleaners	X				
OP1 air bank meter sparge	X				

Date: DATE

Attachment B

Permit Number 810, PSDTX 1448, GHGPSDTX 129

Routine Maintenance Activities

Pump repair/replacement

Fugitive component (valve, pipe, flange) repair/replacement

Clearing of KA loading line into barge for purposes of annual unloading line hydrotest

Liquid transfer for tank inspections

Vacuum Truck usage

Op1 Building Clear-Up (Includes tanks, columns, shells, exchangers, heaters, and sumps)

Op1A Building Clear-Up (Includes tanks, columns, shells, exchangers, heaters, spheres and sumps)

Fluid bed cooler clean-out of bag filter housing

Dryers clean-out of bag filter housing

Storage bin clean-out of bag filter housing

Filter change outs

OP1 and OP1A Scrubbers Compressors for Oil Change or compressor replacement

Relief Valve, Emergency Vent, Conservation Vent and/or Flame Arrestor Removal for Inspection

Rework RGA and LGA Hopper Car Compartments

Rework Lab Dumpster

Date: DATE

Attachment C

Permit Number 810, PSDTX 1448, GHGPSDTX 129

MSS Activity Summary

Facilities	Description	Emissions Activity	EPN
Cyane Storage Tanks	Degassing	Vent to Control and Atmosphere when conditions are satisfied	06TFL-014/06TFL-014C 06TFL-015/06TFL-15C 06TFL-016/06TFL-16C
Cyclohexane Oxidation Unit	Planned shutdown and start-up of cyclohexane oxidation unit.	emissions vent to OP1 low pressure scrubber	06VNT-001
Cyclohexane Oxidation Unit	Planned shutdown and start-up of cyclohexane oxidation unit.	emissions vent to OP1 high pressure scrubber	06VNT-002
Cyclohexane Oxidation Unit	Planned shutdown and start-up of cyclohexane oxidation unit.	emissions vent to OP1A low pressure scrubber	06VNT-021
Cyclohexane Oxidation Unit	Planned shutdown and start-up of cyclohexane oxidation unit.	emissions vent to OP1A high pressure scrubber	06VNT-022
see Attachment A	Inherently low emitting activities	vent to atmosphere	06LBA-084 06TFX-387 06TFX-013 06TFX-032 06TFX-033 06TFX-034 06TFX-038 06TFX-044 06TFX-046 06TFX-056
see Attachment B	Routine maintenance activities	vent to atmosphere	06MNT-OP1/OP1A 06LRC-111 06CLR-COMB 06DRY-COMB 06TFL-014 06TFL-015 06TFL-016 06LTR-MSS 06FUG-MSS

Date: DATE

Emission Sources - Maximum Allowable Emission Rates

Permit Number 810, PSDTX1448

This table lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities, sources, and related activities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

Air Contaminants Data

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
06HUT-003	No. 1 PAA Hold-Up Tank	NO_X	0.01	0.01
		PM	0.45	0.50
		PM_{10}	0.45	0.50
		$PM_{2.5}$	0.45	0.50
06FLT-004	No. 1 SR Filter	NO_X	0.20	0.50
		PM	0.45	1.10
		PM_{10}	0.45	1.10
		$PM_{2.5}$	0.45	1.10
06FLT-005	No. 2 SR Filter	NO_X	0.20	0.50
		PM	0.45	1.10
		PM_{10}	0.45	1.10
		$PM_{2.5}$	0.45	1.10
06CEN-006	No. 1 and No. 2 Refined Centrifuge	NO_X	0.10	0.10
		PM	0.28	0.67
		PM_{10}	0.28	0.67
		$PM_{2.5}$	0.28	0.67
06DRY-COMB	No. 1 - No. 4 Dryer Combined Emissions (Normal Operations)	PM	6.30	15.94
		PM_{10}	4.4	11.16
		$PM_{2.5}$	1.6	4.0
	No. 1 - No. 4 Dryer Combined Emissions (Maintenance, Start-Up and Shutdown [MSS] Operations)	PM	9.4	0.02
		PM_{10}	6.6	0.01
		$PM_{2.5}$	2.4	0.01
06BIN-COMB	No. 1 and No. 2 Loading Bins Combined Emissions (Normal Operations)	PM	1.10	3.54
		PM_{10}	0.7	2.48
		$PM_{2.5}$	0.3	0.9
	No. 1 and No. 2 Loading Bins Combined Emissions	PM	12.0	0.01

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
	(Maintenance, Start-Up and Shutdown [MSS] Operations)	PM_{10}	8.4	0.01
		$PM_{2.5}$	3.0	0.01
06TFX-012	OP1 Catalyst Mix Tank	VOC	3.23	0.04
06TFX-013	No. 3 TWKA Tank	VOC	9.09	0.59
		H_2O_2	0.05	0.01
	No. 3 TWKA Tank (MSS Operations)	VOC	1.52	0.01
		H_2O_2	0.01	0.01
06TFL-014	No. 2 Cyane Storage Tank (Normal Operations)	VOC	1.16	1.32
06TFL-014C	Thermal Oxidizer or Engine (MSS Operations)	NOx	1.96	0.01
		CO	1.65	0.01
		SO_2	0.29	0.01
		PM	0.15	0.01
		PM_{10}	0.15	0.01
		$PM_{2.5}$	0.15	0.01
		VOC	1.12	1.01
06TFL-015	No. 3 Cyane Storage Tank (Normal Operations)	VOC	1.05	1.10
06TFL-015C	Thermal Oxidizer or Engine (MSS Operations)	NO_X	1.96	0.01
		CO	1.65	0.01
		SO_2	0.29	0.01
		PM	0.15	0.01
		PM_{10}	0.15	0.01
		$PM_{2.5}$	0.15	0.01
		VOC	1.12	1.01
06TFL-016	No. 4 Cyane Storage Tank (Normal Operations)	VOC	0.97	2.62
06TFL-016C	Thermal Oxidizer or Engine (MSS Operations)	NO_X	1.96	0.04
		CO	1.65	0.03
		SO_2	0.29	0.01
		PM	0.15	0.01
		PM_{10}	0.15	0.01
		$PM_{2.5}$	0.15	0.01

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
		VOC	5.80	1.05
06CLR-COMB	No. 1 and No. 2 Fluid Bed Cooler Combined Emissions (Normal Operations)	PM	2.50	6.40
		PM_{10}	1.76	4.45
		$PM_{2.5}$	0.63	1.59
	No. 1 and No. 2 Fluid Bed Cooler Combined Emissions (MSS Operations)	PM	1.70	0.01
		PM_{10}	1.19	0.01
		$PM_{2.5}$	0.43	0.01
06LTR-019	ADBA Truck Loading	VOC	0.01	0.01
		NO_X	0.18	0.08
06FLT-024	No. 3 Crude Filter	NO_X	1.00	2.50
		PM	0.23	0.56
		PM_{10}	0.23	0.56
		$PM_{2.5}$	0.23	0.56
06FLT-025	No. 4 Crude Filter	NO_X	1.00	2.20
		PM	0.23	0.56
		PM_{10}	0.23	0.56
		$PM_{2.5}$	0.23	0.56
06CEN-026	No. 3 and No. 4 Refined Centrifuge	NO_X	0.10	0.20
		PM	0.30	0.67
		PM_{10}	0.30	0.67
		$PM_{2.5}$	0.30	0.67
06FLT-027	Purge Filter	NO_X	1.30	2.80
06TFX-032	OP1 PMD Cobalt Metering Tank	VOC	3.53	0.02
	OP1 PMD Cobalt Metering Tank (MSS Operations)	VOC	0.01	0.01
06TFX-033	OP1 Lean Oil Tank	VOC	2.73	0.01
	OP1 Lean Oil Tank (MSS Operations)	VOC	0.01	0.01
06TFX-034	OP1 EDTA Tank	VOC	0.05	0.01
06TFX-035	Antifoam Tank	VOC	0.86	0.01
06TFX-041	No. 2 PAA Storage Tank	NO_X	0.01	0.01
		VOC	0.01	0.01

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
06TFX-044	OP1A Crude KA Tank	VOC	7.54	0.60
	OP1A Crude KA Tank (MSS Operations)	VOC	0.01	0.01
06TFX-038	No. 2 South TWKA Storage Tank	VOC	18.57	3.33
		H_2O_2	0.11	0.02
	No. 2 South TWKA Storage Tank (MSS Operations)	VOC	1.71	0.01
		H_2O_2	0.01	0.01
06TFX-045	NVR Tank	VOC	0.15	0.16
06TFX-046	OP1A Lean Oil Tank	VOC	3.95	0.03
	OP1A Lean Oil Tank (MSS Operations)	VOC	0.01	0.01
06LBA-047	Cyane Barge Unloading	VOC	5.50	3.00
06TFX-048	DEHPA Storage Tank	VOC	1.38	0.01
06DRY-050	No. 1 Fluid Bed Dryer	PM	1.29	5.06
		PM_{10}	0.90	3.54
		$PM_{2.5}$	0.32	1.26
06TFX-051	OP1A EDTA Tank	VOC	0.05	0.01
06TFX-054	OP1 Crude KA Tank	VOC	2.28	0.20
06TFX-054	OP1 Crude KA Tank (MSS Operations)	VOC	0.10	0.01
06LDR-055	Cyane Drum Loading	VOC	2.90	0.02
06TFX-056	No. 1 TWKA Storage Tank	VOC	18.57	3.35
		H_2O_2	0.11	0.02
	No. 1 TWKA Storage Tank (MSS Operations)	VOC	1.70	0.01
		H_2O_2	0.01	0.01
06TFX-060	PMD Cobalt Metering Tank	VOC	3.57	0.01
06TFX-061	PMD North DEHPA Metering Tank	VOC	0.46	0.01
06CEN-062	No. 5 and No. 6 Crude Centrifuge	NO_X	1.00	2.40
		PM	0.19	0.45
		PM_{10}	0.19	0.45
		$PM_{2.5}$	0.19	0.45
06TFX-063	PMD South DEHPA Metering Tank	VOC	0.46	0.01
06TFX-065	No. 1 PAA Storage Tank	VOC	0.01	0.01

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
		NO_X	0.01	0.01
06CRY-066	No. 1 SR Crystallizer Jet Seal Tank	NO_X	1.10	2.20
06CRY-067	No. 1 Refined Crystallizer Jet Seal Tank	NO_X	0.01	0.01
06CRY-068	No. 2 SR Crystallizer Jet Seal Tank	NO_X	1.10	2.20
06CRY-069	No. 2 Refined Crystallizer Jet Seal Tank	NO_X	0.01	0.01
06HUT-071	No. 2 PAA HUT	NO_X	0.01	0.01
		PM	0.19	0.50
		PM_{10}	0.19	0.50
		$PM_{2.5}$	0.19	0.50
06LTR-074	KA/NVR/COP Acid Truck Spot	VOC	4.87	1.04
		CO	4.15	3.73
06LDR-075	COP Acid Drum Loading	VOC	0.06	0.01
		CO	0.59	0.01
06LBA-084	KA Barge Loading and Unloading (Normal Operations)	VOC	7.42	0.72
		H_2O_2	0.03	0.01
	KA Barge Loading and Unloading (MSS Operations)	VOC	0.01	0.01
06CTL-090	Cooling Towers	VOC	0.92	3.16
		PM	0.35	0.99
		PM_{10}	0.32	0.15
		$PM_{2.5}$	0.27	0.09
		Inorganic Acid	0.44	1.52
06-DDDA	Feed System for Transloading	PM	0.02	0.09
		PM_{10}	0.02	0.09
		$PM_{2.5}$	0.02	0.09
06WA-091	Cooling Water Basin	VOC	5.04	19.87
06LRC-094	CWW Railcar Loading	VOC	0.46	0.46
		CO	4.48	4.48
06LRC-086	Adipic Acid Rework Area	$PM/PM_{10}/PM_{2.5}$	1.10	0.05
06VNT-092A	OP1 East Analyzer Vent	VOC	0.01	0.01

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
06VNT-092B	OP1 West Analyzer Vent	VOC	0.01	0.01
		CO	0.01	0.01
06VNT-093A	OP1A North Analyzer Vent	VOC	0.01	0.01
		CO	0.01	0.01
06VNT-093B	OP1A South Analyzer Vent	VOC	0.01	0.01
06LRC-111	Dust Collection System Maintenance (MSS Operations)	$PM/PM_{10}/PM_{2.5}$	0.30	0.01
06LRC-112	Adipic Acid Transloading	$PM/PM_{10}/PM_{2.5}$	0.05	0.20
06LRC-113A	Sack-Hopper Car Interface	$PM/PM_{10}/PM_{2.5}$	0.08	0.01
06LRC-113B	Hopper Car Dome Filter	$PM/PM_{10}/PM_{2.5}$	0.01	0.01
06LTR-116	Lean Oil Loading	VOC	0.75	0.01
06TFX-288	Stormwater Tank	VOC	0.01	0.01
06FUG	Fugitives (5)	VOC	17.64	77.30
		CO	0.11	0.44
		HNO_3	0.15	0.59
06VNT-001	OP1 Low Pressure Scrubber Vent (MSS Operations)	CO	545.00	31.79
		VOC	124.91	7.31
06VNT-002	OP1 High Pressure Scrubber Vent (MSS Operations)	CO	630.00	16.92
		VOC	245.00	8.00
06VNT-021	OP1A Low Pressure Scrubber Vent (MSS Operations)	CO	576.67	15.40
		VOC	125.50	4.07
06VNT-022	OP1A High Pressure Scrubber Vent (MSS Operations)	CO	930.00	26.01
		VOC	200.00	5.90
06TFX-387	Recycle Cyane Tank (MSS Operations)	VOC	1.39	0.01
06MNT-OP1	OP1 Area Clear-up Emissions (MSS Operations)	VOC	59.44	0.36
	Blowing of the Air Sparger Meter during Startup	VOC	0.96	0.01
06MNT-OP1A	OP1A Area Clear-up Emissions (MSS Operations)	VOC	106.51	0.59
	Recycle Cyane Sphere(MSS Operations)	VOC	120.30	0.40
06LTR-MSS	MSS Loading Fugitives(MSS Operations)	VOC	2.51	0.06
06BOX-116	DDDA Feed Box Loading	$PM/PM_{10}/PM_{2.5}$	0.02	0.08
06TFX-057	#4 TWKA Storage Tank	H_2O_2	0.06	0.03

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
		VOC	10.73	4.95
	#4 TWKA Storage Tank (MSS Operations)	VOC	12.05	0.01
06FUG-MSS	MSS Fugitive Emissions (MSS Operations)	Cl_2	0.10	0.01
		CO	0.02	0.01
		HCN	0.01	0.01
		HNO_3	0.24	0.01
		NH_3	0.01	0.01
		NO_X	1.00	0.92
		PM	2.70	1.16
		PM_{10}	2.03	0.81
		$PM_{2.5}$	1.02	0.29
		VOC	20.65	2.15

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources, use area name or fugitive source name.
(3) Cl2 - chlorine
CO - carbon monoxide
HCl - hydrogen chloride
HNO_3 - nitric acid
NH_3 - ammonia
NO_X - total oxides of nitrogen
PM - total particulate matter, suspended in the atmosphere, including PM10 and PM2.5, as represented
PM_{10} - total particulate matter equal to or less than 10 microns in diameter, including PM2.5, as represented
$PM_{2.5}$ - particulate matter equal to or less than 2.5 microns in diameter
SO_2 - sulfur dioxide
VOC - volatile organic compounds as defined in Title 30 Texas Administrative Code § 101.1
(4) Compliance with annual emission limits (tons per year) is based on a 12 month rolling period.
(5) Emission rate is an estimate and is enforceable through compliance with the applicable special condition(s) and permit application representations.

Date: August XX , 2016

Preliminary Determination Summary

INVISTA S.a r.l.
Permit Numbers 810, PSDTX1448, and GHGPSDTX129

I. Applicant

Invista Sarl
PO Box 2626
Victoria, Texas 77902-2626

II. Project Location

Adipic Acid Unit
2695 Old Bloomington Rd N
Victoria County
Victoria, Texas 77905

III. Project Description

The Victoria Plant is located in Victoria County, which is currently classified as an attainment area for all criteria pollutants. The Victoria Plant is a major source with respect to the Prevention of Significant Deterioration (PSD) and the federal operating (Title V) permit programs.

INVISTA is submitting this amendment application to authorize the following:

- Improvement of the distributed control system (DCS) and implementation of advanced process controls (APC) for the Adipic Acid Unit;
- Equipment replacement, reliability, and improvement projects;
- Update the Maintenance, Startup, and shutdown (MSS) representations in existing permit;
- Incorporate Permit by Rule (PBR) Registrations into TCEQ Permit No. 810; and,
- Request changes to TCEQ Permit No. 810 Special Conditions.

The Victoria Plant is an existing major PSD source, thus the emission increases from the project must be compared to the PSD Significant Emission Rates (SER) to determine if PSD permitting is required. Based on emissions estimates the proposed project is a major modification for nitrogen oxides (NOx) and volatile organic compounds (VOCs). In addition, emissions of greenhouse gases (GHGs) will exceed the de minimis level of 75,000 tons/yr and therefore GHG permitting is required. Emission increases for all other pollutants associated with the proposed project are below their respective SER; therefore, they are not subject to PSD permitting.

IV. Emissions

Air Contaminant	Proposed Allowable Emission Rates (tpy)
VOC	156.1
NO_x	15.8
SO_2	0.03
CO	98.9
PM	33.72
PM_{10}	29.2
$PM_{2.5}$	14.75
CO2	34,100.33
CH4	7.06
N2O	1,081.12
GHG mass basis	35,189.31
CO2 Equivalents (CO2e)	356,450.59

CO2e - carbon dioxide equivalents based on global warming potentials of CH4 = 25, N2O = 298, SF6=22,800.

V. Federal Applicability

The following chart illustrates the annual project emissions for each pollutant and whether this pollutant triggers PSD or Nonattainment (NA) review.

Pollutant	Project Emissions (tpy)	Major Mod Trigger (tpy)	PSD Triggered Y/N
VOC	46.03	40 for PSD	Yes
NO_x	95.52	40 for PSD	Yes
SO_2	1.90	100	No

Pollutant	Project Emissions (tpy)	Major Mod Trigger (tpy)	PSD Triggered Y/N
CO	58.36	100	No
PM	17.74	25	No
PM_{10}	13.47	15	No
$PM_{2.5}$	7.78	10	No

The proposed project triggers PSD review for non-GHG NSR regulated pollutants. As shown in the table below, because the project increase is more than 75,000 tpy of CO2e, PSD review is triggered for GHG emissions.

Pollutant	Project Emissions (tpy)	Major Source or Major Mod Trigger Level (tpy)	PSD Triggered Y/N
CO2e	356,450.59	75,000	Yes

For PSD and NNSR

The Victoria Adipic Acid Unit is a major source. There is a VOC increase of 46.03 TPY and a NOx increase of 95.52 TPY, which is greater than the VOC major modification threshold of 40 tpy and greater than the NOx major modification threshold of 40 tpy. Both the project increases and net increases are greater than 40 tpy.

Because the Adipic Acid Unit is already major for the PSD program and is considered a "PSD anyway" source, Green House Gas (GHG) emissions were evaluated and the project triggered a PSDGHG permitting. The GHG emissions increases from the modified and affected units are expressed as carbon dioxide equivalents (CO2e), the projected emissions are 356,450.59 TPY, which greater than 75,000 tons trigger level for PSDGHG as described in EPA's Greenhouse Gas Tailoring Rule and subsequent case law (See UARG v. EPA, 189 L.Ed. 2d 372 (2014)).

Invista evaluated the project emissions from affected upstream and downstream units and included all projects related emission in determining projected actual emission. The permit reviewer conducted an engineering analysis to verify that all project-related emissions were included.

A summary of the PSD applicability analysis is provided in Table below.

PEI	Units	NO_X (tpy)	CO (tpy)	VOC (tpy)	Total PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	CO_2e (tpy)
Modified Adipic Units	Adipic Acid Unit	6.72	42.45	41.53	14.63	10.36	4.77	--	--
Non-Modified Affected Units	AOP	16.60	11.83	1.66	--	--	--	0.13	160,377
Non-Modified Support Facilities	Boilers 1-4	38.99	1.24	0.44	3.04	3.04	3.04	1.77	33,937
	Catalytic Abater	33.22	2.84	2.39	0.07	0.07	0.07	--	155,836
Totals:		95.52	58.36	46.03	17.74	13.47	7.87	1.90	356,450
PSD Significant Emission Rate:		40	100	40	25	15	10	40	75,000
PSD Review Required?		YES	NO	YES	NO	NO	NO	NO	YES

VI. Control Technology Review

A Federal BACT review (30 TAC §116.160(c)(1)(A), 40 CFR §52.21(b)(12)) was performed for new and modified sources of NO_X, while state minor NSR BACT review (30 TAC §116.10(1)) was performed for new and modified sources of air contaminants other than NOx. Unmodified facilities which experience emissions increases as a result of the project ("affected facilities") are not subject to state or federal BACT requirements.

The BACT evaluation for the modified sources related to the proposed project was conducted in accordance with TCEQ and EPA regulations as well as U.S. EPA guidance documents. INVISTA also reviewed and/or relied on a number of other resources. Some of those resources form much of the basis for this BACT analysis. The resources included, but not limited to, the following:

- NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, 1990
- EPA's RACT/BACT/LAER Clearinghouse (RBLC) database
- TCEQ Tier I BACT
- New Source Performance Standards (NSPS)

Federal BACT Top-Down Method

Emissions increases for NO_X and VOC from the proposed project are projected to be greater than their respective Significant Emission Rates (SER) and therefore trigger PSD permitting obligations. Pursuant to U.S. EPA and Texas regulations, the project is subject to PSD and the required BACT review has been conducted for all pollutants that exceed the respective SERs; in this case NO_X, VOC and GHGs. Invista has elected to use the federal top down method for the federal PSD BACT review for NO_X. EPA has also approved TCEQ's Three-Tier Analysis for PSD BACT review. Since the end result from either method should be the same, TCEQ guidance allows the permittee to choose either the BACT Top-Down Method or the TCEQ BACT Three-Tier Analysis. Invista has elected to use the TCEQ Three-Tier Analysis for BACT review for VOCs. Therefore the BACT analysis contained in this application satisfies both TCEQ and EPA BACT requirements.

The first step in the top-down analysis is to identify all available control technologies that are potentially suitable for the modified sources. EPA RBLC search was used to obtain potential control technologies. The most recent 10-year period was used to identify applicable control technologies. This search did not identify any results for similar Adipic Acid Unit sources.

In the Adipic Acid Unit, NO_X is formed during various process reactions. As such, NO_X is emitted from the following facilities that are going to be modified as part of this project:

- No. 1 Crude Adipic Acid Tank, No. 2 Crude Adipic Acid Tank, No. 3 Crude Adipic Acid Tank, NML Storage Tank, OP.3A PML Jet Condenser, OP3A PNML Jet Condenser, No. 3 Crude Crystallizer Primary Jet, and No. 3 Crude Crystallizer Secondary Jet. All of these units are routed to EPN 15CAT 001 which is a Selective Catalytic Reduction (SCR) unit (referred to as the catalytic abater).
- EPN 06CRY-066: No. 1 Crystallizer Jet Seal Tank,
- EPN 06CRY-067: No. 2 Refined Crystallizer Jet Seal Tank
- EPN 06CRY-068: No. 2 SR Crystallizer Jet Seal Tank
- EPN 06CRY-069: No. 2 Refined Crystallizer Jet Seal Tank
- EPN 06FLT-024: No. 3 Crude Filter
- EPN 06FLT-025: No. 4 Crude Filter

This project includes various existing process vents and storage tanks. Potential control technologies for these process vents and tanks are being evaluated in the table below:

Control Technology	Description
Selective Catalytic Reduction (SCR)	SCR systems inject ammonia in a flue gas or vent gas, to reduce NO_X emissions in the presence of a catalyst. The catalyst allows the SCR system to achieve relatively high NO_X emission rates at lower flue gas temperatures.
Wet Scrubber	Wet scrubbers use extended absorption to remove NO_X from a flue gas or vent stream.
Selective Non-Catalytic Reduction (SNCR)	SNCR systems inject ammonia or urea into a flue gas or vent gas, ideally within a specific temperature zone.
Ultra low-NO_X burners (ULNBs)	ULNBs represent a further advancement of the LNB technology. ULNBs alter the air to fuel ratio in the combustion zone by internal flue gas or vent gas recirculation and by staging the introduction of air to promote a "lean-premixed" flame. This technology results in lower combustion temperatures and reduced NO_X formation.
Low NO_X Burners (LNB)	LNBs achieve NO_X reduction through staging of combustion; this staging reduces thermal NO_X by delaying combustion to a point when the flame temperature is lower.
Flue Gas Recirculation (FGR)	Recirculation of cooled flue gas reduces temperature by diluting the oxygen content of combustion air and by causing heat to be diluted in a greater mass of flue gas. Heat in the flue gas can be recovered by a heat exchanger. This reduction of temperature lowers the NO_X concentration that is generated.
Water or Steam Injection	Atomized water or steam is injected onto the flame zone. The presence of water tends to reduce flame temperature and quench NO_X-forming reactions. This control option requires high volumes of de-ionized water, distribution plumbing, and water/steam flow controllers.
Work Practice Standards	Work practice standards involve proper operation and maintenance of the process vents and storage tanks.

While SCRs, Wet Scrubbers, SNCRs, and Work Practice Standards are all technically feasible control options, the remaining technologies are not applicable technologies, and thus not technically feasible, for this source.

Ultra-Low NO_X burners, Low NO_X burners, Flue Gas Recirculation, and Water or Steam Injection. As described above, these controls use various combustion process technologies to reduce NO_X emissions, such as air to fuel ratios in combustion zones, staged combustion, combustion air oxygen content dilution, and water/steam injection into flame zones. As such, these technologies are not applicable to non-combustion NO_X emission sources. Since the NO_X from the process vents and storage tanks in the Adipic Acid Unit is formed via process reactions only, this technology is deemed technically infeasible for this application.

Rank Remaining Control Technologies

Control Technology	Efficiency	Rank
Selective Catalytic Reduction (SCR)	98%	1
Wet Scrubber	90%	2
Selective Non-Catalytic Reduction (SNCR)	45%	3
Work Practice Standards	N/A	4

Selective Catalytic Reduction
Process vents and storage tanks in the Adipic Acid Unit are controlled by an SCR (a.k.a., catalytic abater, EPN 15CAT-001) to reduce NO_X emissions. The SCR is the most effective and proven control technology for NO_X reduction.

Wet Scrubber
A wet scrubber is less effective (90% efficiency) for reducing NO_X emissions than the SCR (98% efficiency). The process vents and storage tanks in the Adipic Acid Unit are controlled by an SCR (catalytic abater, EPN 15CAT-001); therefore, the wet scrubber is not considered further in this BACT analysis.

Selective Non-Catalytic Reduction
SNCR is less effective (45% efficiency) for reducing NO_X emissions than the SCR (98% efficiency). The process vents and storage tanks in the Adipic Acid Unit are controlled by an SCR (catalytic abater, EPN 15CAT-001) equipped with an SCR unit. During MSS of the catalytic abater or Adipic Acid Unit, the process vents and storage tanks from the Adipic Acid Unit are routed to the West Powerhouse boilers (EPNs 15STK-005 and 15-STK-006), which are equipped with SNCR.

The proposed NO_X BACT for the process vents and storage tanks will consists of:

- Selective catalytic reduction (98% NOX control)
- Selective non-catalytic reduction (45% NOX control) during MSS of the catalytic abater or Adipic Acid Unit

NO_X BACT Analysis for EPNs 06CRY-066, 06CRY-067, 06CRY-068, 06CRY 069, 06FLT-0024 and 06FLT-0025 where also evaluated for the ranked remaining controls above. The total emissions from these sources were less than 10 tpy and demonstrated that no additional controls were needed.

VOC
As stated above the VOC emissions were evaluated under TCEQ BACT Three-Tier Analysis. Invista still provide a summary of VOC RBLC search below and a detail evaluation is under the state review.

Fugitive components – The RBLC search confirms that LDAR monitoring programs have been established as BACT.

Loading – All VOC loading activities associated with the application load materials with a vapor pressure less than 0.5 psia. A review of the RBLC results indicates that submerged fill has been established as BACT for materials with a vapor pressure less than 0.5 psia. In one instance, controls were required for materials with a vapor pressure greater than 0.1 psia. However, this application triggered NNSR and the entry in the RBLC is a LAER determination, rather than BACT.

Storage Tanks – All storage tanks affected by the project that vent to the atmosphere have a vapor pressure less than 0.5 psia. Therefore the RBLC results are divided by tanks with less than and greater than 0.5 psia vapor pressure. For tanks with a vapor pressure greater than 0.5 psia, the RBLC results indicated that a floating roof or venting to a control device is BACT. For tanks with a vapor pressure less than 0.5 psia, the RBLC results indicate that tanks that are painted white and utilize a submerged fill are considered BACT.

Process Vents – The process vents that are affected by this project are routed to a boiler for control (99% DRE). The RBLC results indicate that this meets BACT.

Cooling Basin – There were no entries for cooling basins in the RBLC. As the emission factor for cooling towers was used to estimate emissions from the cooling basin, an RBLC review was conducted for cooling towers. The RBLC search confirms that monthly monitoring of the water for VOCs and a repair program if leaks are detected meets BACT.

MSS – The RBLC results for opening equipment to the atmosphere confirms that limiting equipment openings until the VOC concentration is below 10,000 ppmv is BACT.

Green House Gases

Invista has chosen to use the federal BACT analysis, which satisfies both TCEQ and EPA BACT requirements.

The GHG BACT evaluation for the modified sources related to the proposed project was conducted in accordance with TCEQ and EPA regulations as well as U.S. EPA guidance documents. Invista also reviewed and/or relied on a number of other resources. Some of those resources form much of the basis for this BACT analysis. The resources included, but not limited to, the following:

- PSD and Title V Permitting Guidance For Greenhouse Gases

- Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Industrial, Commercial, and Institutional Boiler
-

To complete the GHG BACT evaluation, Invista also reviewed and/or relied on a number of other resources. Some of those resources form much of the basis for this BACT analysis. Examples of the variety of those resources which were consulted are listed below:

- NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, 1990
- EPA's Reasonably Available Control Technology (RACT)/Best Available Control Technology (BACT)/Lowest Achievable Emission Reduction (LAER) Clearinghouse (RBLC) database

The first step in the top-down analysis is to identify all available control technologies that are potentially suitable for the modified sources. EPA RBLC search was used to obtain potential control technologies. The most recent 10-year period was used to identify applicable control technologies. This search did not identify any results for similar Adipic Acid Unit sources.

The following information below discusses the GHG BACT Analysis.

Process Vents (PDHCS Column and Reboiler and SDHCS Column and Reboiler) GHG BACT (EPN 15STK-006) contains CH4 and CO2 and are routed to the West Powerhouse Boilers for conversion of CH4 to CO2.

The global warming potential (GWP) of CH4 is 25 times the GWP of CO2. Therefore, one ton of atmospheric CH4 emissions have the same predicted global warming effect as 25 tons of CO2e emissions. On the other hand, combusting one ton of CH4 releases 2.7 tons of CO2e emissions. Since the combustion of CH4 decreases GHG emissions by approximately 87 percent on a CO2e basis, combustion of CH4 is preferential to direct emission of CH4.

The proposed boiler combustion for the control of process vent off-gases meets BACT.

Off-gases from the Adipic Acid Unit, which contain N_2O, are emitted from the No. 1 Crude Adipic Acid Tank, No. 2 Crude Adipic Acid Tank, No. 3 Crude Adipic Acid Tank, the NAFM Tank, and the NML Storage Tank.

The Adipic Acid Unit off-gas is routed to the VNOx System (EPN 15CAT 001). The VNOx System, which is equipped with a N_2O abatement system (front-end unit) and a NO_X abatement system (back-end unit), has an overall N_2O control efficiency of 95% for Adipic Acid unit off-gas.

The proposed VNOx System for the control of Adipic Acid Unit off-gases meets BACT.

TCEQ BACT Three-Tier Analysis

TCEQ air permitting rules define BACT as follows: "An air pollution control method for a new or modified facility that through experience and research, has proven to be operational, obtainable, and capable of reducing or eliminating emissions from the facility, and is considered technically practical and economically reasonable for the facility. The emissions reduction can be achieved through technology such as the use of add-on control equipment or by enforceable changes in production processes, systems, methods, or work practice." [30 TAC 116.10(1)] The TCEQ has adopted the following three-tiered review process, as indicated in the TCEQ guidance document entitled, "Air Permit Reviewer Reference Guide, APDG 6110, Air Pollution Control: How to Conduct a Pollution Control Evaluation," dated 01/2011.

Tier I BACT review involves consideration of emission reduction performance levels accepted as BACT in recent permit reviews for the same process and/or industry which are approvable as BACT in the current review as long as there have been no subsequent developments that would justify more stringent requirements based on economical reasonableness and technical feasibility. These Tier I BACT emission reduction options have already been demonstrated as technically feasible and economically reasonable for the same process and/or industry. As a result, the Tier I review process can be relatively straightforward. Additionally, TCEQ has established Tier I BACT requirements for a number of industry types, which can be accessed at TCEQ's website. Should a proposed facility's performance be greater than or equal to the accepted Tier I BACT level then no further analysis or demonstration of BACT is needed. Otherwise a Tier II BACT analysis is required.

Tier II BACT review involves consideration of control levels achieved and accepted by the TCEQ in recent permits for similar streams but in a different process or industry type. Tier II BACT review may require additional research to review across industries, but an in-depth economic analysis is not required since it has already been demonstrated by use.

Tier III BACT review requires a detailed technical and economic analysis of alternative emission reduction options available for the facility being reviewed. Technical feasibility is evaluated by considering the demonstrated success of a control technology option based on its previous use, and/or by performing an engineering evaluation of the availability and reliability of a proposed control system. Economic reasonableness is determined by the cost effectiveness of

controlling emissions and does not take into account the effect of control cost on the permit applicant's corporate economics. It is evaluated on a dollar-per-ton basis considering both incremental and total tons controlled, although the focus is primarily on the dollar-per-total-ton number. Tier III BACT review is not routinely necessary because technical feasibility and economic reasonableness have usually been firmly established by industry practice as identified in the first two tiers.

State New Source Review (NSR) regulations are applicable to the proposed project. State permitting requirements provide that modified facilities must utilize BACT for all pollutants emitted by the facilities, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the equipment. This section provides a discussion of the State BACT identified for the equipment affected by this permitting action.

Since the uncontrolled VOC emissions from fugitive emissions in Adipic Acid Unit are greater than 25 tpy, 28VHP under LDAR program is required. Therefore, fugitive emissions control meets the applicable State Tier I BACT guidelines.

INVISTA will roll-in loading activities associated with the Lean Oil Loading (EPN 06LTR-117). The vapor pressure of the lean oil loaded into trucks is below 0.5 psia. INVISTA will conduct submerge or bottom loading on trucks at the Adipic Acid Unit. This constitutes BACT Tier I for the lean oil truck loading.

INVISTA will roll-in loading activities associated with the Acid Water Cyclohexane, Oxidized, Aqueous Extraction (COP) acid and non-volatile residue (NVR) truck loading as well as increasing the COP acid and NVR loading rates as part of this project (EPN 06LTR 074). The vapor pressure of COP acid and NVR loaded into trucks is below 0.5 psia. INVISTA conducts submerged or bottom loading on trucks at the Adipic Acid Unit. This constitutes BACT (Tier I) for the lean oil truck loading.

Additionally, INVISTA will update the loading and unloading of ketone alcohol (KA) from barges (EPN 06LBA 084) based on updated tank composition. The loading and unloading of KA has a VOC vp < 0.5 psia. INVISTA conducts submerged or bottom loading on barges with VOC vp < 0.5 psia at the Adipic Acid Unit. This constitutes BACT Tier I for the KA barge loading and unloading.

With this project, INVISTA will install conveyors and a loading emission capturing system for loading Large Grain Adipic (LGA) Adipic acid into trucks, boxes, or railcars from the No. 3 and No. 4 Dryers and the No.1 Fluid Bed Dryer (FIN 06DRY028 and FIN 06DRY-029/EPN 06DRY-COMB, EPN 06DRY-050). Dust generated from the loading of LGA will be captured by the loading emission

capturing system and returned back to the dryers at reduced throughput rates resulting in no increased emissions from the LGA loading operation. Therefore, this constitutes BACT for the LGA adipic acid loading.

INVISTA will roll-in loading activities associated with the Adipic Acid (AA) transloading activities (EPNs 06LRC-112, 06LRC-114, 06LRC-115) and Dodecanedioic Acid (DDDA) feed box loading (EPNs 06BOX-116, 06BOX-117, and 06BOX-118) represented under PBR Registrations Nos. 95372, 97945, and 121599 which result in PM emissions. Current TCEQ BACT guidelines in NSR Guidance for Drum Filling is for VOCs. PM emissions will be generated during transloading of AA and DDDA. AA transloading activities (EPNs 06LRC-112, 06LRC 114, and 06LRC-115) are routed to baghouse filters with a maximum outlet grain loading of 0.01 grains per dry standard cubic feet (gr/dscf). The transfer points for transloading of DDDA feed boxes (EPNs 06BOX-116, 06BOX-117, and 06BOX-118) are partially shielded from wind on all sides by an enclosure and only the top of the enclosure is open during DDDA loading. The PM emissions from transloading of DDDA feed boxes (EPNs 06BOX-116, 06BOX-117, and 06BOX-118) are minimal (<0.01 tpy). Controls to abate the PM emissions associated with these transloading of DDDA feed boxes is not economically reasonable. INVISTA will implement good housekeeping practices when performing transloading of DDDA feed boxes to insure minimum emissions.

INVISTA will implement improvement on the No. 4 TWKA Tank, OP1 EDTA Storage Tank, OP1 PMD Cobalt Metering Storage Tank, OP1 Lean Oil Tank, No. 1 PAA Storage Tank, No. 2 PAA Storage Tank, OP1A Lean Oil Tank, No. 1 Crude AA Tank, No. 2 Crude AA Tank, No. 3 Crude AA Tank, NML Storage Tank, and Recycle Cyane Sphere. Additionally, INVISTA includes an updated representation from the PBRs being rolled into the permit for the OP1A Lean Oil Tank, No. 2 Cyane Storage Tank, No. 3 Cyane Storage Tank, and No. 4 Cyane Storage Tank. All other tanks at the Adipic Acid Unit are not being modified as part of this permit action; therefore, they are not subject to BACT review. The updated implements and representations meet current BACT.

INVISTA will modify the Primary Dry Hydrocarbon Stripper (PDHCS) Column (FIN 06DIS1-01, EPN 15STK-006) and Secondary Dry Hydrocarbon Stripper (SDHCS) Column (FIN 06DIS1-0, EPN 15STK-006). All other columns and associated equipment at the Adipic Acid Unit are not being modified as part of this permit action; therefore, they are not subject to BACT review.

The vents from the PDHCS Column (FIN 06DIS1-01, EPN 15STK-006) and SDHCS Column (FIN 06DIS1-0, EPN 15STK-006) emit non halogenated VOCs and are routed to a lean oil scrubber and then to a boiler (EPN 15STK-006) with a minimum control efficiency of 99% for VOC. Therefore, this represents Tier I BACT for these process vents during normal operation.

A new scrubber associated with the No. 4 Crude Filter (EPN 06FLT 025) will be installed as part of this project. Current BACT (Tier I) for particulate scrubbers is a maximum outlet grain loading of 0.01 gr/dscf. The particulate scrubber will meet this outlet grain loading; thus, the particulate scrubber meets Tier I BACT for PM.

The No. 1 Fluid Bed Dryer (EPN 06DRY-050) will be modified as part of this project. INVISTA will install the associated conveyors and loading emission capturing system for loading LGA from EPN 06DRY-050. The No. 1 Fluid Bed Dryer and associated equipment are routed to a scrubber with a maximum outlet grain loading of 0.01 gr/dscf. BACT for particulate scrubbers is a maximum outlet grain loading of 0.01 gr/dscf. Therefore, the existing scrubber meets Tier I BACT for PM.

Baghouse filters associated with the dryer system (EPNs 06DRY-COMB, 06CLR-COMB, and 06BIN COMB) will be modified as a result of this project. Current BACT (Tier I) for baghouse filters is a maximum outlet grain loading of 0.01 gr/dscf. The baghouse filters will meet the maximum outlet grain loading; thus, the baghouse filters meet Tier I BACT for PM.

Although the existing cooling tower at the Adipic Acid Unit (EPN 06CTL-090) will not be modified as part of this project, INVISTA will include PM and chlorine emissions from the cooling tower. Current BACT (Tier I) for cooling towers includes drift eliminators and a drift of equal or less than 0.001%. The cooling tower is equipped with drift eliminators with a drift of equal or less than 0.001%. Therefore, the cooling tower at the Adipic Acid Unit meets Tier I BACT for PM. Since chlorine emissions are limited by drift, this also represents BACT for chlorine.

The cooling basin (EPN 06WA-091) at the Adipic Acid Unit emits VOC. TCEQ has not established a minimum required state BACT for cooling basins. However, BACT for VOCs for the cooling tower is a work practice standard of periodic monitoring for leaking exchangers, combined with requirements to repair any leaks found. INVISTA will implement monthly sampling and repair requirements for the return water to the cooling basin; therefore, this represents BACT.

All maintenance, startup, and shutdown activities will meet current BACT requirements.

VII. Air Quality Analysis

The air quality analysis (AQA) is acceptable for all review types and pollutants. The results are summarized below.

A. De Minimis Analysis

A De Minimis analysis was initially conducted to determine if a full impacts analysis would be required. The De Minimis analysis modeling results for NO_2 indicate that the project is below the respective de minimis concentrations and no further analysis is required.

The justification for selecting the EPA's interim 1-hr NO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr NO_2 De Minimis level. As explained in EPA guidance memoranda[1], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr NO_2 NAAQS.

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter (µg/m³)

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
NO_2	1-hr	3.5	7.5
NO_2	Annual	0.2	1

The 1-hr NO_2 GLCmax is the highest five-year average of the maximum predicted 1-hr concentrations determined for each receptor.

The annual NO_2 GLCmax is the maximum predicted concentration associated with five years of meteorological data.

B. Air Quality Monitoring

The De Minimis analysis modeling results indicate that annual NO_2 is below the monitoring significance level.

Table 2. Modeling Results for PSD Monitoring Significance Levels

Pollutant	Averaging Time	GLCmax (µg/m³)	Significance (µg/m³)
NO_2	Annual	0.2	14

The annual NO_2 GLCmax is the maximum predicted concentration associated with five years of meteorological data.

[1] www.epa.gov/nsr/documents/20100629no2guidance.pdf

C. National Ambient Air Quality Standards (NAAQS) Analysis

The De Minimis analysis modeling results indicate that NO_2 is less than the respective de minimis concentrations and no further analysis is required.

As stated in 40 CFR 52.21 (i)(5)(i)(f), no de minimis air quality level has been established for ozone. Any net emissions increase of 100 tons per year (tpy) or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis for ozone, including the gathering of ambient air quality data. The emission increases for the proposed VOC and NO_x emissions are less than 100 tpy and an ozone ambient impact analysis is not required.

D. Increment Analysis

The De Minimis analysis modeling results indicate that annual NO_2 is less than the de minimis concentration and no further analysis is required.

E. Additional Impacts Analysis

The applicant performed an Additional Impacts Analysis as part of the PSD AQA. The applicant conducted a growth analysis and determined that population will not significantly increase as a result of the proposed project. The applicant conducted a soils and vegetation analysis and determined that all evaluated criteria pollutant concentrations are below their respective primary and secondary NAAQS. The applicant meets the Class II visibility analysis requirement by complying with 30 TAC 111. The Additional Impacts Analyses are reasonable and possible adverse impacts from this project are not expected.

The ADMT evaluated predicted concentrations from the project site to determine if proposed emissions could adversely affect a Class I area. The nearest Class I area, Big Bend National Park, is located approximately 580 kilometers (km) from the project site towards the west.

The predicted concentrations of PM_{10}, $PM_{2.5}$, and NO_2 for all averaging times, are all less than de minimis levels at the fence/property line. As noted above, the Big Bend National Park Class I area is approximately 580 km from the project site. Therefore, emissions from the proposed project are not expected to adversely affect the Big Bend National Park Class I area.

F. Minor Source NSR and Air Toxics Review

Table 3. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
PM_{10}	24-hr	2.4	5
$PM_{2.5}$	24-hr	0.8	1.2
$PM_{2.5}$	Annual	0.02	0.3
CO	1-hr	1619	2000
CO	8-hr	259	500

The 24-hr $PM_{2.5}$ GLCmax is the highest five-year average of the maximum predicted 24-hr concentrations determined for each receptor. The annual $PM_{2.5}$ GLCmax is the maximum predicted concentration associated with five years of meteorological data.

For all other pollutants, the GLCmax are the maximum predicted concentrations associated with one year of meteorological data.

Table 4. Minor NSR Production Project-Related Modeling Results for Health Effects

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	10% ESL (µg/m³)
benzene 71-43-2	1-hr	1.3	17
benzene 71-43-2	Annual	0.001	0.45
nitric acid 7697-37-2	1-hr	4.3	5
styrene 100-42-5	1-hr	8.8	11
cyclohexanone 108-94-1	Annual	1.2	8
cyclohexanol 108-93-0	Annual	0.5	20
dicyclohexyl hydroperoxide not found	Annual	0.0001	0.2
petroleum ether 8032-32-4	Annual	0.0001	35

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	10% ESL (µg/m³)
paraffin oil 8012-95-1	Annual	0.001	10

Table 5. Minor NSR Site-wide Modeling Results for Health Effects

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	GLCni (µg/m³)	ESL (µg/m³)
acetic acid 64-19-7	1-hr	124	< 124	250
cyclohexane 110-82-7	1-hr	2526	< 2526	3400
cyclohexanone 108-94-1	1-hr	1428	351	800
cyclohexanol 108-93-0	1-hr	1955	777	630
paraffinic mineral oil 64742-62-7	1-hr	818	< 818	1000
hydrogen peroxide 7722-84-1	1-hr	12.5	< 12.5	14
valeraldehyde 110-62-3	1-hr	80.3	< 80.3	98

Table 6. Minor NSR Hours of Exceedance for Health Effects

Pollutant	Averaging Time	1 X ESL GLCni	2 X ESL GLCmax
cyclohexanol	1-hr	1	2

The GLCmax are located along the property line. The GLCni for cyclohexanone, according to the applicant, is located along the southern property line. The GLCni for cyclohexanol, according to the applicant, is located approximately 1694 meters from the property line towards the southeast.

In conclusion, TCEQ does not anticipate any short- or long-term adverse health effects to occur among the general public as a result of exposure to the proposed emissions from this facility.

G. Greenhouse Gases

EPA has stated that unlike the criteria pollutants for which EPA has historically issued PSD permits, there is no National Ambient Air Quality

Standard (NAAQS) for GHGs, including no PSD increment. The global climate-change inducing effects of GHG emissions, according to the "Endangerment and Cause or Contribute Finding", are far-reaching and multi-dimensional (75 FR 66497). Climate change modeling and evaluations of risks and impacts are typically conducted for changes in emissions that are orders of magnitude larger than the emissions from individual projects that might be analyzed in PSD permit reviews. Quantifying the exact impacts attributable to a specific GHG source obtaining a permit in specific places and points would not be possible [EPA's PSD and Title V Permitting Guidance for GHGs at 48]. Thus, EPA has concluded in other GHG PSD permitting actions it would not be meaningful to evaluate impacts of GHG emissions on a local community in the context of a single permit.

The TCEQ has determined that an air quality analysis would provide no meaningful data and has not required the applicant to perform one. As stated in the preamble to TCEQ's adoption of the GHG PSD program, the impacts review for individual air contaminants will continue to be addressed, as applicable, in the state's traditional minor and major NSR permits program per 30 TAC Chapter 116.

VIII. Conclusion

The applicant has demonstrated that the project meets all applicable rules, regulations and requirements of the Texas and Federal Clean Air Acts. This permit is recommended for issuance.

Emission Sources - Maximum Allowable Emission Rates

Permit Number GHGPSDTX129

This table lists the maximum allowable emission rates of greenhouse gas (GHG) emissions, as defined in Title 30 Texas Administrative Code § 101.1, for all sources of GHG air contaminants on the applicant's property that are authorized by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities, sources, and related activities. Any proposed increase in emission rates may require an application for a modification of the facilities authorized by this permit.

Air Contaminants Data

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates
			TPY (4)
06HUT-003	No. 1 PAA Hold-Up Tank	N_2O (5)	0.01
		CO_2e	0.01
06FLT-004	No. 1 SR Filter	N_2O (5)	0.59
		CO_2e	174.57
06FLT-005	No. 2 SR Filter	N_2O (5)	0.59
		CO_2e	174.57
06CEN-006	No. 1 and No. 2 Refined Centrifuge	N_2O (5)	0.59
		CO_2e	174.57
06TFL-014C	Thermal Oxidizer or Engine (MSS Operations)	N_2O (5)	0.01
		CO_2e	14.20
		CO_2 (5)	14.12
		CH_4 (5)	0.01
06TFL-015C	Thermal Oxidizer or Engine (MSS Operations)	N_2O (5)	0.01
		CO_2e	14.20
		CO_2 (5)	14.12
		CH_4 (5)	0.01
06TFL-016C	Thermal Oxidizer or Engine (MSS Operations)	N_2O (5)	0.01
		CO_2e	42.61
		CO2 (5)	42.35
		CH4 (5)	0.01

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates
			TPY (4)
06LTR-019	ADBA Truck Loading	N_2O (5)	0.99
		CO_2e	294.96
06FLT-024	No. 3 Crude Filter	N_2O (5)	2.71
		CO_2e	806.84
06FLT-025	No. 4 Crude Filter	N_2O (5)	2.71
		CO_2e	806.84
06CEN-026	No. 3 and No. 4 Refined Centrifuge	N_2O (5)	0.59
		CO_2e	174.57
06FLT-027	Purge Filter	N_2O (5)	2.78
		CO_2e	828.13
06TFX-041	No. 2 PAA Storage Tank	N_2O (5)	0.01
		CO_2e	0.01
06CEN-062	No. 5 and No. 6 Crude Centrifuge	N_2O (5)	2.61
		CO_2e	777.47
06TFX-065	No. 1 PAA Storage Tank	N_2O (5)	0.01
		CO_2e	0.01
06CRY-066	No. 1 SR Crystallizer Jet Seal Tank	N_2O (5)	2.40
		CO_2e	714.42
06CRY-067	No. 1 Refined Crystallizer Jet Seal Tank	N_2O (5)	0.01
		CO_2e	2.41
06CRY-068	No. 2 SR Crystallizer Jet Seal Tank	N_2O (5)	2.40
		CO_2e	714.42
06CRY-069	No. 2 Refined Crystallizer Jet Seal Tank	N_2O (5)	0.01
		CO_2e	2.41

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates
			TPY (4)
06HUT-071	No. 2 PAA HUT	N_2O (5)	0.01
		CO_2e	3.20
06VNT-092A	OP1 East Analyzer Vent	CO_2e	0.01
		CO_2 (5)	0.01
06VNT-092B	OP1 West Analyzer Vent	CO_2e	0.01
		CO_2 (5)	0.01
		CH_4 (5)	0.01
06VNT-093A	OP1A North Analyzer Vent	CO_2e	0.01
		CO_2 (5)	0.01
		CH_4 (5)	0.01
06VNT-093B	OP1A South Analyzer Vent	CO_2e	0.01
		CO_2 (5)	0.01
06VNT-001	OP1 Low Pressure Scrubber Vent (MSS Operations)	CO_2e	29.04
		CO_2 (5)	25.68
		CH_4 (5)	0.13
06VNT-002	OP1 High Pressure Scrubber Vent (MSS Operations)	CO_2e	15.86
		CO_2 (5)	14.61
		CH_4 (5)	0.05
06VNT-021	OP1A Low Pressure Scrubber Vent (MSS Operations)	CO_2e	175.31
		CO_2 (5)	21.03
		CH_4 (5)	6.17
06VNT-022	OP1A High Pressure Scrubber Vent (MSS Operations)	CO_2e	48.92
		CO_2 (5)	31.41
		CH_4 (5)	0.70

Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates
			TPY (4)
		N_2O (5)	0.98
06FUG-MSS	MSS Fugitive Emissions (MSS Operations)	CO_2e	294.50

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources, use area name or fugitive source name.
(3) CO_2 - carbon dioxide
N_2O - nitrous oxide
CH_4 - methane
CO_2e - carbon dioxide equivalents based on the following Global Warming Potentials (1/2015): CO_2 (1), N_2O (298), CH_4(25), SF_6 (22,800), HFC (various), PFC (various)
(4) Compliance with annual emission limits (tons per year) is based on a 12-month rolling period. These rates include emissions from maintenance, startup, and shutdown.
(5) Emission rate is given for informational purposes only and does not constitute enforceable limit.

Date: August XX, 2016