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February 28, 2013

via Federal Express

Mr. Jeff Robinson
Chief, Air Permits Section
U.S. EPA Region 6, 6PD
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

RECEIVED
13 MAR -4 PM 1:27
AIR PERMITS SECTION
6PD-R

RE: Application for a Prevention of Significant Deterioration Air Quality Permit for Greenhouse Gas Emissions
M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation
Corpus Christi, TX

Mr. Robinson:

On behalf of M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation (M&G), Zephyr Environmental Corporation (Zephyr) is hereby submitting this application for a Prevention of Significant Deterioration (PSD) air quality permit for greenhouse gas emissions to authorize a greenfield plastic resin manufacturing plant at its site located in Corpus Christi, Nueces County, Texas. The state/PSD application for non-greenhouse gas emissions was previously submitted to the Texas Commission on Environmental Quality (TCEQ).

"Project Jumbo" will consist of a polyethylene terephthalate (PET) unit and a terephthalic acid (PTA) unit, which will be owned and operated by M&G, and a new combined heat and power utility plant (Utility Plant), which will be owned and operated by NRG Texas Power LLC (NRG). Project Jumbo will be constructed in Nueces County, which is designated as attainment/unclassifiable for all criteria pollutants. A separate permit application is being submitted to the EPA to authorize GHG emissions from the NRG Utility Plant.

General information for the application is provided on the TCEQ Form PI-1 - General Application for Air Preconstruction Permit and Amendments. The U.S. Environmental Protection Agency's (EPA) document entitled *"PSD and Title V Permitting Guidance For Greenhouse Gases", dated November 2010 and March 2011*, was utilized as a guide for preparation of the attached application.

M&G is committed to working closely with EPA Region 6 to get the application review completed as expeditiously as possible. We will be contacting your staff soon after submittal of this application to arrange a meeting to review the application and answer any questions that your team may have developed after initially reading our application.

If you have any questions regarding this registration, please contact me, at 512-879-6632 or tsullivan@zephyrenv.com, or Allana Whitney, of Chemtex, at (910) 509-4451 or Allana.Whitney@chemtex.com. Please note that Chemtex is a wholly owned subsidiary of M&G and serves as the engineering arm of M&G for Project Jumbo.

Sincerely,
Zephyr Environmental Corporation

Thomas Sullivan, P.E.
Principal

Enclosures

cc: Allana Whitney, Chemtex
Michele Chiarelli, Chemtex
Davide Milanese, Chemtex
Mauro Fenoglio, M&G
Flavio Assis, M&G
Mr. Mike Wilson, P.E., Director, Air Permits Division, TCEQ, Austin, w/enclosures
(via USPS Certified Mail 7012 3050 0001 4138 2638)

GREENHOUSE GAS PERMIT APPLICATION PREVENTION OF SIGNIFICANT DETERIORATION: PROJECT JUMBO: PET PLANT CORPUS CHRISTI, TEXAS

SUBMITTED TO:

ENVIRONMENTAL PROTECTION AGENCY
REGION VI
MULTIMEDIA PLANNING AND PERMITTING DIVISION
FOUNTAIN PLACE 12TH FLOOR, SUITE 1200
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

SUBMITTED BY:

M&G RESINS USA, LLC
A WHOLLY OWNED SUBSIDIARY OF M&G USA CORPORATION
450 GEARS ROAD, SUITE 240
HOUSTON, TEXAS 77067

PREPARED BY:

ZEPHYR ENVIRONMENTAL CORPORATION
TEXAS REGISTERED ENGINEERING FIRM F-102
2600 VIA FORTUNA, SUITE 450
AUSTIN, TEXAS 78746

FEBRUARY 2013

STATE OF TEXAS
THOMAS I. SULLIVAN
98196
LICENSED
PROFESSIONAL ENGINEER
02/28/2013

zephyr

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APPENDICES

1.0 INTRODUCTION

M&G Resins USA, LLC (M&G) is proposing to construct a new plastic resin manufacturing plant at its site located in Corpus Christi, Nueces County, Texas. "Project Jumbo" will consist of a PET Plant (a new polyethylene terephthalate (PET) unit and a new terephthalic acid (PTA) unit) owned and operated by M&G, and a new heat and power utility plant (Utility Plant) that will be owned and operated by NRG Texas Power LLC (NRG).

On June 3, 2010, the EPA published final rules for permitting sources of Greenhouse Gases (GHGs) under the prevention of significant deterioration (PSD) and Title V air permitting programs, known as the GHG Tailoring Rule.[1] After July 1, 2011, new sources with GHG emission increases of more than 100,000 tons/yr on a carbon dioxide equivalent (CO_2e) basis are considered new major sources subject to GHG PSD review. On December 23, 2010, EPA issued a Federal Implementation Plan (FIP) authorizing EPA to issue PSD permits in Texas for GHG sources until Texas submits the required SIP revision for GHG permitting and it is approved by EPA.[2]

The M&G Project Jumbo (which includes the PET Plant and the Utility Plant) triggers PSD review for GHG pollutants because the GHG emissions from the project will be more than 100,000 tons/yr making the site a new major source. Therefore, the entire Project Jumbo is subject to PSD review for GHG pollutants. The applications for GHG PSD air permits for this project are being submitted to the EPA. The applications for criteria pollutant PSD permits are being submitted to the Texas Commission on Environmental Quality (TCEQ) with copies for the EPA.

M&G is hereby submitting this application for a GHG prevention of significant deterioration (PSD) air permit for the construction of a PET plant in Corpus Christi, Texas. The GHG emission unit descriptions, GHG emissions calculations and a GHG Best Available Control Technology (BACT) analysis are provided for those PET plant GHG emission sources owned

[1] 75 FR 31514 (June 3, 2010).
[2] 75 FR 81874 (Dec. 29, 2010).

and operated by M&G. A separate application by NRG will address the Utility Plant GHG emissions associated with this PSD project.

2.0 GENERAL APPLICATION INFORMATION

A completed TCEQ Form PI-1 is included in this application to provide all the general administrative and project information for this GHG application. In addition a plot plan for the PET plant and an area map are included in this section.

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment

Important Note: The agency requires that a Core Data Form be submitted on all incoming applications unless a Regulated Entity and Customer Reference Number have been issued and no core data information has changed. For more information regarding the Core Data Form, call (512) 239-5175 or go to www.tceq.texas.gov/permitting/central_registry/guidance.html.

I. **Applicant Information**		
A. Company or Other Legal Name: M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation		
Texas Secretary of State Charter/Registration Number (if applicable):		
B. Company Official Contact Name: Mauro Fenoglio		
Title: Global Manufacturing Director, PET Resin Division		
Mailing Address: 450 Gears Rd Ste 240		
City: Houston	State: TX	ZIP Code: 77067
Telephone No.: 281 874-8074	Fax No.: 281 716-4640	E-mail Address: Mauro.fenoglio@gruppomg.com
C. Technical Contact Name: Allana Whitney		
Title: Project Manager		
Company Name: Chemtex International, Inc.		
Mailing Address: 1979 Eastwood Rd		
City: Wilmington	State: NC	ZIP Code: 28403
Telephone No.: 910-509-4451	Fax No.: 910-509-4567	E-mail Address: Allana.Whitney@chemtex.com
D. Site Name: M&G PET Plant		
E. Area Name/Type of Facility: M&G PET Plant		☒ Permanent ☐ Portable
F. Principal Company Product or Business: Polyethylene Terephthalate (PET) Manufacture		
Principal Standard Industrial Classification Code (SIC): 2821		
Principal North American Industry Classification System (NAICS): 325211		
G. Projected Start of Construction Date: January 05, 2014		
Projected Start of Operation Date: August 01, 2014		
H. Facility and Site Location Information (If no street address, provide clear driving directions to the site in writing.):		
Street Address: In Corpus Christi heading East on I-37 South toward Exit 10, Take Exit 10 for Carbon Plant Road, go 0.2 mi, turn left onto Carbon Road/E. Navigation Blvd/Joe Fulton Int'l Trade Corridor, go 5 miles, turn right into plant entrance.		
City/Town: Corpus Christi	County: Nueces	ZIP Code: 78409
Latitude (nearest second): 27°50'7.8899"	Longitude (nearest second): -97°29'38.0256"	

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I.	**Applicant Information (continued)**	
I.	Account Identification Number (leave blank if new site or facility):	
J.	Core Data Form.	
Is the Core Data Form (Form 10400) attached? If No, provide customer reference number and regulated entity number (complete K and L).		☒ YES ☐ NO
K.	Customer Reference Number (CN):	
L.	Regulated Entity Number (RN):	
II.	**General Information**	
A.	Is confidential information submitted with this application? If Yes, mark each confidential page confidential in large red letters at the bottom of each page.	☐ YES ☒ NO
B.	Is this application in response to an investigation, notice of violation, or enforcement action? If Yes, attach a copy of any correspondence from the agency and provide the RN in section I.L. above.	☐ YES ☒ NO
C.	Number of New Jobs: 250	
D.	Provide the name of the State Senator and State Representative and district numbers for this facility site:	
State Senator: Juan Hinojosa		District No.: 20
State Representative: Blake Farenthold		District No.: 27
III.	**Type of Permit Action Requested**	
A.	Mark the appropriate box indicating what type of action is requested.	
☒ Initial ☐ Amendment ☐ Revision (30 TAC 116.116(e) ☐ Change of Location ☐ Relocation		
B.	Permit Number (if existing):	
C.	Permit Type: Mark the appropriate box indicating what type of permit is requested. *(check all that apply, skip for change of location)*	
☒ Construction ☐ Flexible ☐ Multiple Plant ☐ Nonattainment ☐ Plant-Wide Applicability Limit ☒ Prevention of Significant Deterioration ☐ Hazardous Air Pollutant Major Source ☐ Other:		
D.	Is a permit renewal application being submitted in conjunction with this amendment in accordance with 30 TAC 116.315(c).	☐ YES ☒ NO

Texas Commission on Environmental Quality
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III. Type of Permit Action Requested *(continued)*	
E. Is this application for a change of location of previously permitted facilities? If Yes, complete III.E.1 - III.E.4.0	☐ YES ☒ NO
1. Current Location of Facility (If no street address, provide clear driving directions to the site in writing.):	
Street Address:	
City: / County: / ZIP Code:	
2. Proposed Location of Facility (If no street address, provide clear driving directions to the site in writing.):	
Street Address:	
City: / County: / ZIP Code:	
3. Will the proposed facility, site, and plot plan meet all current technical requirements of the permit special conditions? If "NO", attach detailed information.	☐ YES ☐ NO
4. Is the site where the facility is moving considered a major source of criteria pollutants or HAPs?	☐ YES ☐ NO
F. Consolidation into this Permit: List any standard permits, exemptions or permits by rule to be consolidated into this permit including those for planned maintenance, startup, and shutdown.	
List: None	
G. Are you permitting planned maintenance, startup, and shutdown emissions? If Yes, attach information on any changes to emissions under this application as specified in VII and VIII.	☒ YES ☐ NO
H. Federal Operating Permit Requirements (30 TAC Chapter 122 Applicability) Is this facility located at a site required to obtain a federal operating permit? If Yes, list all associated permit number(s), attach pages as needed).	☐ YES ☐ NO ☒ To be determined
Associated Permit No (s.): None	
1. Identify the requirements of 30 TAC Chapter 122 that will be triggered if this application is approved.	
☐ FOP Significant Revision ☐ FOP Minor ☐ Application for an FOP Revision	
☐ Operational Flexibility/Off-Permit Notification ☐ Streamlined Revision for GOP	
☒ To be Determined ☐ None	

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III. Type of Permit Action Requested *(continued)*	
H. Federal Operating Permit Requirements (30 TAC Chapter 122 Applicability) *(continued)*	
2. Identify the type(s) of FOP(s) issued and/or FOP application(s) submitted/pending for the site. ***(check all that apply)***	
☐ GOP Issued	☐ GOP application/revision application submitted or under APD review
☐ SOP Issued	☐ SOP application/revision application submitted or under APD review

IV. Public Notice Applicability	
A. Is this a new permit application or a change of location application?	☒ YES ☐ NO
B. Is this application for a concrete batch plant? If Yes, complete V.C.1 – V.C.2.	☐ YES ☒ NO
C. Is this an application for a major modification of a PSD, nonattainment, FCAA 112(g) permit, or exceedance of a PAL permit?	☐ YES ☒ NO
D. Is this application for a PSD or major modification of a PSD located within 100 kilometers or less of an affected state or Class I Area?	☐ YES ☒ NO
If Yes, list the affected state(s) and/or Class I Area(s).	
List:	
E. Is this a state permit amendment application? If Yes, complete IV.E.1. – IV.E.3. ☐ YES ☒ NO	
1. Is there any change in character of emissions in this application?	☐ YES ☐ NO
2. Is there a new air contaminant in this application?	☐ YES ☐ NO
3. Do the facilities handle, load, unload, dry, manufacture, or process grain, seed, legumes, or vegetables fibers (agricultural facilities)?	☐ YES ☐ NO
List the total annual emission increases associated with the application ***(List all that apply and attach additional sheets as needed): SEE PERMIT APPLICATION***	
Volatile Organic Compounds (VOC):	
Sulfur Dioxide (SO_2):	
Carbon Monoxide (CO):	
Nitrogen Oxides (NO_x):	
Particulate Matter (PM):	
PM 10 microns or less (PM_{10}):	
PM 2.5 microns or less ($PM_{2.5}$):	
Lead (Pb):	
Hazardous Air Pollutants (HAPs):	
Other speciated air contaminants not listed above:	

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V. Public Notice Information *(complete if applicable)*		
A. Public Notice Contact Name: Allana Whitney		
Title: Project Manager		
Mailing Address: 1979 Eastwood Road		
City: Wilmington	State: NC	ZIP Code: 28403
B. Name of the Public Place: La Retama Central Library		
Physical Address *(No P.O. Boxes)*: 805 Comanche Street		
City: Corpus Christi	County: Nueces	ZIP Code: 78401
The public place has granted authorization to place the application for public viewing and copying.		☒ YES ☐ NO
The public place has internet access available for the public.		☒ YES ☐ NO
C. Concrete Batch Plants, PSD, and Nonattainment Permits		
1. County Judge Information (For Concrete Batch Plants and PSD and/or Nonattainment Permits) for this facility site.		
The Honorable: Samuel L. Neal, Jr.		
Mailing Address: 901 Leopard Street, Room 303		
City: Corpus Christi	State: TX	ZIP Code: 78401
2. Is the facility located in a municipality or an extraterritorial jurisdiction of a municipality? ***(For Concrete Batch Plants)***		☐ YES ☐ NO
Presiding Officers Name(s):		
Title:		
Mailing Address:		
City:	State:	ZIP Code:
3. Provide the name, mailing address of the chief executive and Indian Governing Body; and identify the Federal Land Manager(s) for the location where the facility is or will be located. Not Applicable		
Chief Executive:		
Mailing Address:		
City:	State:	ZIP Code:
Name of the Indian Governing Body:		
Mailing Address:		
City:	State:	ZIP Code:

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V. Public Notice Information *(complete if applicable) (continued)*		
C. Concrete Batch Plants, PSD, and Nonattainment Permits		
3. Provide the name, mailing address of the chief executive and Indian Governing Body; and identify the Federal Land Manager(s) for the location where the facility is or will be located. *(continued)*		
Name of the Federal Land Manager(s):		
D. Bilingual Notice		
Is a bilingual program required by the Texas Education Code in the School District?		☒ YES ☐ NO
Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district?		☒ YES ☐ NO
If Yes, list which languages are required by the bilingual program?	Spanish	
VI. Small Business Classification *(Required)*		
A. Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts?		☐ YES ☒ NO
B. Is the site a major stationary source for federal air quality permitting?		☒ YES ☐ NO
C. Are the site emissions of any regulated air pollutant greater than or equal to 50 tpy?		☒ YES ☐ NO
D. Are the site emissions of all regulated air pollutants combined less than 75 tpy?		☐ YES ☒ NO
VII. Technical Information		
A. The following information must be submitted with your Form PI-1 ***(this is just a checklist to make sure you have included everything)***		
1. ☒ Current Area Map		
2. ☒ Plot Plan		
3. ☒ Existing Authorizations - None		
4. ☒ Process Flow Diagram		
5. ☒ Process Description		
6. ☒ Maximum Emissions Data and Calculations		
7. ☒ Air Permit Application Tables		
a. ☒ Table 1(a) (Form 10153) entitled, Emission Point Summary		
b. ☒ Table 2 (Form 10155) entitled, Material Balance		
c. ☒ Other equipment, process or control device tables		
B. Are any schools located within 3,000 feet of this facility?		☐ YES ☒ NO

VII. Technical Information			
C. Maximum Operating Schedule:			
Hour(s):24	Day(s):7	Week(s):52	Year(s):8760 hrs/yr
Seasonal Operation? If Yes, please describe in the space provide below.			☐ YES ☒ NO
D. Have the planned MSS emissions been previously submitted as part of an emissions inventory?			☐ YES ☒ NO
Provide a list of each planned MSS facility or related activity and indicate which years the MSS activities have been included in the emissions inventories. Attach pages as needed.			
E. Does this application involve any air contaminants for which a disaster review is required?			☐ YES ☒ NO
F. Does this application include a pollutant of concern on the Air Pollutant Watch List (APWL)?			☐ YES ☒ NO

VIII. State Regulatory Requirements **Applicants must demonstrate compliance with all applicable state regulations to obtain a permit or amendment.** *The application must contain detailed attachments addressing applicability or non applicability; identify state regulations; show how requirements are met; and include compliance demonstrations.*	
A. Will the emissions from the proposed facility protect public health and welfare, and comply with all rules and regulations of the TCEQ?	☒ YES ☐ NO
B. Will emissions of significant air contaminants from the facility be measured?	☒ YES ☐ NO
C. Is the Best Available Control Technology (BACT) demonstration attached?	☒ YES ☐ NO
D. Will the proposed facilities achieve the performance represented in the permit application as demonstrated through recordkeeping, monitoring, stack testing, or other applicable methods?	☒ YES ☐ NO

IX. Federal Regulatory Requirements **Applicants must demonstrate compliance with all applicable federal regulations to obtain a permit or amendment.** *The application must contain detailed attachments addressing applicability or non applicability; identify federal regulation subparts; show how requirements are met; and include compliance demonstrations.*	
A. Does Title 40 Code of Federal Regulations Part 60, (40 CFR Part 60) New Source Performance Standard (NSPS) apply to a facility in this application?	☒ YES ☐ NO
B. Does 40 CFR Part 61, National Emissions Standard for Hazardous Air Pollutants (NESHAP) apply to a facility in this application?	☐ YES ☒ NO

Form PI-1 General Application for Air Preconstruction Permit and Amendment

IX.	**Federal Regulatory Requirements** **Applicants must demonstrate compliance with all applicable federal regulations to obtain a permit or amendment.** *The application must contain detailed attachments addressing applicability or non applicability; identify federal regulation subparts; show how requirements are met; and include compliance demonstrations.*	
C.	Does 40 CFR Part 63, Maximum Achievable Control Technology (MACT) standard apply to a facility in this application?	☒ YES ☐ NO
D.	Do nonattainment permitting requirements apply to this application?	☐ YES ☒ NO
E.	Do prevention of significant deterioration permitting requirements apply to this application?	☒ YES ☐ NO
F.	Do Hazardous Air Pollutant Major Source [FCAA 112(g)] requirements apply to this application?	☐ YES ☒ NO
G.	Is a Plant-wide Applicability Limit permit being requested?	☐ YES ☒ NO
X.	**Professional Engineer (P.E.) Seal**	
Is the estimated capital cost of the project greater than $2 million dollars?		☒ YES ☐ NO
If Yes, submit the application under the seal of a Texas licensed P.E.		
XI.	**Permit Fee Information**	
Check, Money Order, Transaction Number , ePay Voucher Number:		Fee Amount: $75,000
Paid online?		☐ YES ☒ NO
Company name on check: M & G Resins, LLC		
Is a copy of the check or money order attached to the original submittal of this application?		☒ YES ☐ NO ☐ N/A
Is a Table 30 (Form 10196) entitled, Estimated Capital Cost and Fee Verification, attached?		☒ YES ☐ NO ☐ N/A

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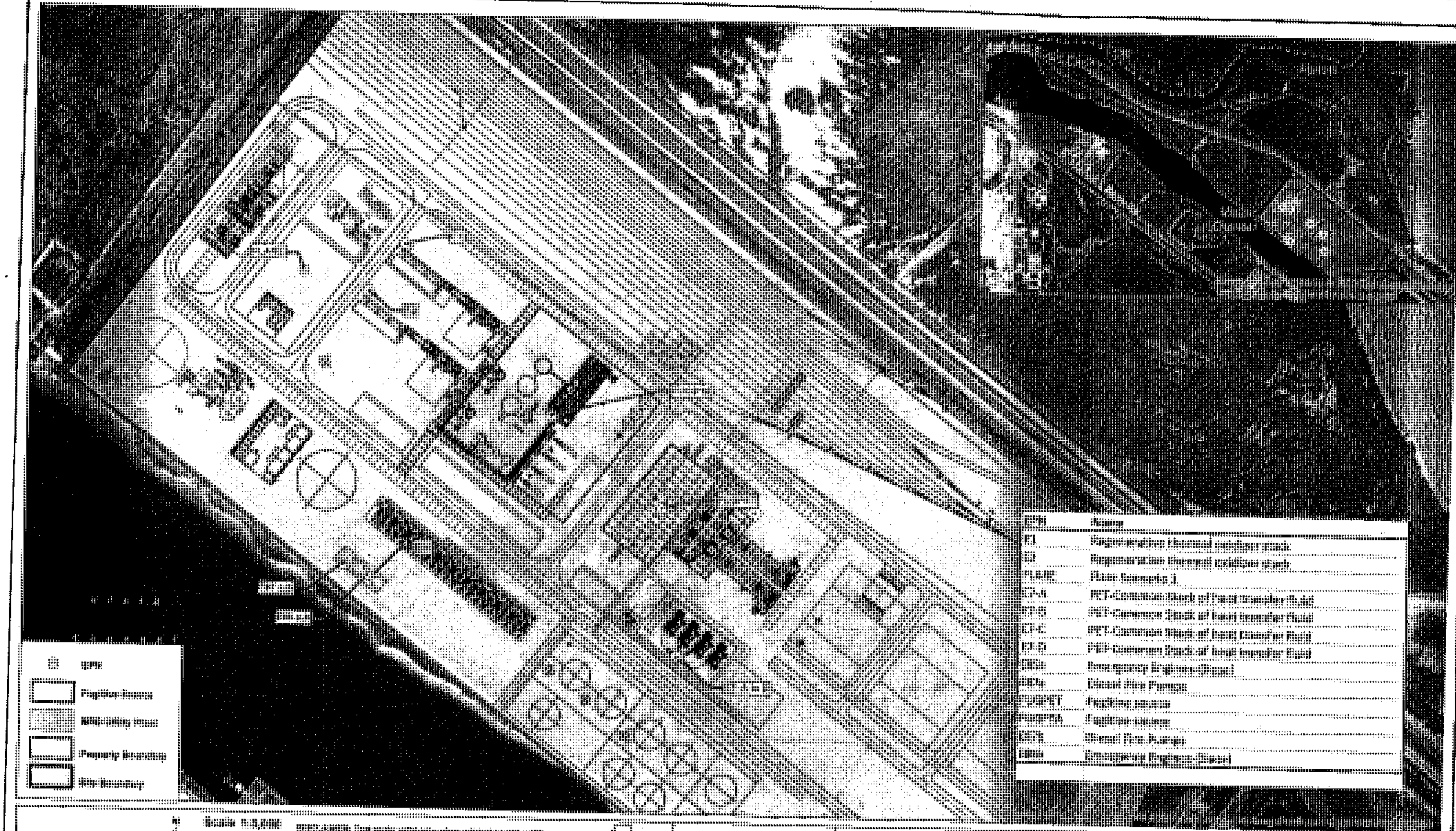
XII. Delinquent Fees and Penalties
This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ is paid in accordance with the Delinquent Fee and Penalty Protocol. For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: www.tceq.texas.gov/agency/delin/index.html.
XIII. Signature
The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7, Texas Clean Air Act (TCAA), as amended, or any of the air quality rules and regulations of the Texas Commission on Environmental Quality or any local governmental ordinance or resolution enacted pursuant to the TCAA I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. The signature further signifies awareness that intentionally or knowingly making or causing to be made false material statements or representations in the application is a criminal offense subject to criminal penalties.
Name: Mauro Fenoglio
Signature: *Original Signature Required*
Date: 02/21/2013



Map Sources:
ESRI Bing & Streets Basemaps;
M&G Resins USA, LLC
Datum: GCS NAD 1983

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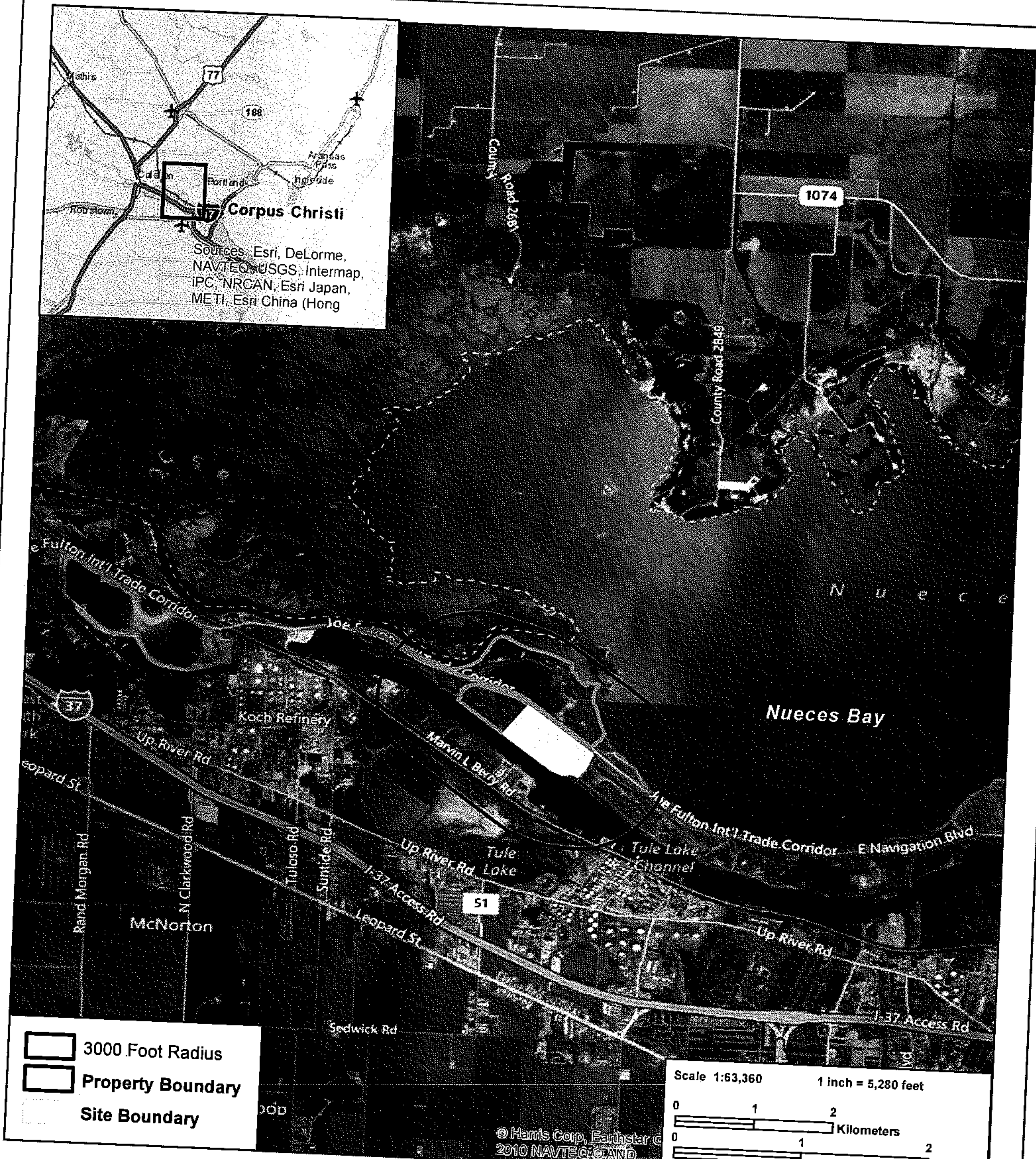
PLOT PLAN

M&G RESINS USA, LLC - Nueces County, Texas

File Location: \\Austin\Projects\Chemtex\Task 002 - Air NSR PSD Permit\Graphics\PLOT PLAN

Drafted By: J. Knowles	Reviewed By: T. Sullivan	Project No.: 012453.002	Date: 02.22.2013



Datum:
GCS NAD 1983
Map Sources:
ESRI-Bing Hybrid & Streets Basemaps; USA Named Streams, M&G Resins USA, LLC

SITE LOCATION

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AREA MAP

New Source Review Application

M&G RESINS USA, LLC

Corpus Christi, Texas

File location: H:\Chemtex\Task 002 - Air NSR PSD Permit\Graphics

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	T. Sullivan	012453.002	02.22.2013

3.0 PROCESS DESCRIPTION AND GHG EMISSION SOURCES

3.1 PROCESS DESCRIPTION

With this application, M&G is seeking authorization to construct the PET plant, which consists of a polyethylene terephthalate (PET) unit and a terephthalic acid (PTA) unit. The new PET plant will be located at M&G's site located in Corpus Christi, Nueces County, Texas. The emission points of GHG emissions associated with the PET plant are listed below:

- Two regenerative thermal oxidizers (RTOs)
- Four gas-fired process heaters
- Flare
- Two diesel fuel-fired emergency electrical generator engines
- Two diesel fuel-fired fire water pump engines
- Piping fugitives

The following process description discussion references streams shown on the process flow diagram, which is included at the end of this section. A detailed discussion of the GHG sources is included in Section 3.2.

The Utility Plant emissions will be addressed in the associated NRG application.

<u>PTA UNIT PROCESS DESCRIPTION</u>

The terephthalic acid (PTA) process uses para-xylene and air as major feedstock for producing PTA. PTA is a primary raw material used to produce PET (polyethylene terephthalate) in M&G's proposed downstream PET unit. The PTA production process is organized into the following process systems:

- Process Air and Offgas
- Crude PTA
- Digestion
- Crystallizer
- Flash Cooling
- Filtration and Drying

Process Air and Offgas

The process air and off-gas units can be broken down into air compression system, power recovery and regenerative thermal oxidation steps described below.

The main air compressor provides process air to the oxidizers and post-oxidizers based on the reaction requirements. The compressor will be fitted with a turbine (expander) to allow for startup using steam from outside battery limits (OSBL) and for energy recovery using waste steam from inside battery limits (ISBL) during normal operation.

After reacting in the oxidizer and post oxidizer, the exiting vapor stream is sent to the base of the water removal column where water is separated from the acetic acid. The hot vapor exiting the water removal column is superheated in offgas preheater and then routed to the expander for energy recovery. The expander, together with a steam turbine, drives the main air compressor and a power generator for the plant.

Following the expander, the decompressed vapor is partially condensed in a water removal column condenser. Discharge from the condenser passes to the water removal column reflux tank. The separated, uncondensed offgas stream is routed to the regenerative thermal oxidizer (RTO) preheater.

Discharge from the preheater enters the system of two RTOs where the organic volatile compounds and residual carbon monoxide (CO) in the waste gas stream are oxidized to carbon dioxide (CO_2). The main purpose of regenerative thermal oxidation is to destroy CO and hydrocarbons. In addition, an associated waste gas scrubber system is designed to convert residual bromine-containing species (methyl bromide) in the offgas (waste gas) before it is vented to the atmosphere (EPNs: E1, E2).

During normal operation, the heat release of the offgas is sufficient for the RTO to operate auto-thermally, i.e. supplementary heat input is not required. Should the offgas heat release periodically decrease, natural gas will be supplied to the RTOs to sustain proper firebox temperature.

Crude Terephthalic Acid Process (Crude PTA)

Oxidation

The PTA oxidizer serves as the primary reactor for converting p-xylene to PTA. Air from the main air compressor is injected to provide reaction oxygen and agitation, while p-xylene is fed to the reactor from one of the floating roof tanks located in the tank farm.

Water Removal Column (WRC)

The WRC is the primary means of water removal from the PTA process. The oxidation reactions in the oxidizer are exothermic and the heat of reaction vaporizes acetic acid, water and low boiling compounds. This vapor, along with nitrogen, unreacted oxygen and lesser amounts of carbon monoxide and carbon dioxide, is fed to the WRC.

The WRC overhead vapor is cooled down and condensed such that it can be pumped back to the top of the column as reflux. The WRC non-condensable overhead vapor is sent to the off-gas treatment unit (system of RTOs, described above). A portion of the water column underflow is pumped directly to the digestion process as the feed to the acetic acid vaporizer. The excess underflow is cooled in a train of heat exchangers and steam generators for energy recovery.

In addition to the primary feed from the oxidizers, the WRC will receive digester and crystallizer off gases (a high pressure vaporized mixture of acetic acid and water) used to increase the enthalpy input to the WRC, thereby increasing acetic acid/water fractionating capacity.

Digestion

The post oxidizer slurry underflow is pumped to the digester where the reactions of partially oxidized products of p-xylene (i.e., p-toluic acid and 4-carboxybenzaldehyde (4-CBA)) to terephthalic acid result in a higher overall conversion. Hot acetic acid vapor, from the acid vaporizer is injected to the digester to maintain the temperature and pressure. The acetic acid vapor is injected directly into the digester to raise the temperature of the slurry to promote dissolution and re-crystallization of the PTA.

Crystallizer

Following the post digester the slurry is crystallized at oxidation pressure in the crystallizer. The crystallizer is agitated to maintain a solids suspension. The offgas from the crystallizer is vented back to the respective WRCs.

Filtering and Drying

After crystallization, the product slurry is flash-cooled and sent to the PTA filters which separate the PTA from the acetic acid/catalyst liquid. The wet PTA cake is kicked off the filter into the respective PTA dryers, which are heated by steam. No air is introduced to this drying system.

The dried PTA powder falls from the drier discharge while vaporized acetic acid is removed through the (dryer) filter vent scrubber system. Overheads from the scrubbing system are routed to the RTOs (EPNs: E1, E2). A stream from the filtering and drying section containing solid wastes is sent to the wastewater treatment plant (WWTP).

From the dryer, solid PTA is pneumatically conveyed to silos and from there either to the PET plant or to the PTA silos located in the rail yard for further loading into railcars and carriage by rail. An off-spec silo located in the PTA unit process area is used to store off-spec material for further re-processing. All the pneumatic transport systems of the PTA unit are operated using nitrogen in a closed loop.

PET UNIT PROCESS DESCRIPTION

M&G's proposed process for the production of PET uses PTA and ethylene glycol (EG) as primary feedstocks and the following other additives: catalyst, diethylene glycol (DEG), inhibitor (phosphoric acid), FeP (iron phosphide), toner and isophthalic acid (IPA). The PET production process is organized in two main process units: a continuous polymerization (CP) unit and a solid state polymerization (SSP) unit. These two units consist of the following systems:

CP Unit

- Additive and feedstock preparation
- Esterification
- Prepolymerization

- Polymerization
- Filtration and cutting
- Scrap Recovery

SSP Unit

- Pre-crystallization
- Crystallization
- Solid state polymerization reaction
- Cooling
- GTU
- Heat transfer fluid distribution system

The following systems are common to both CP and SSP units:

- Heat Transfer Fluid (HTF) heaters and related distribution system
- Organic Stripping Column (OSC)
- Waste Water Treatment Plant (WWTP)

CP Unit

Feedstock and additive preparation

In this unit, the main feedstock materials, PTA and EG are mixed together to produce a slurry which is then fed to the following esterification unit. This system includes the equipment required for the additive preparation. Except for DEG, all additives need to be premixed with EG, which takes place in a series of independent preparation/mix vessels (one for each additive) and one or more feeding vessels.

Esterification

In the esterification unit, the PTA contained in the slurry coming from the feedstock preparation unit is preheated for the reaction with EG in the esterifier by increasing the temperature of the slurry in a heat exchanger using HTF (heat transfer fluid).

The reaction between PTA and EG yields an oligomer (short-chain polymer) and water as products of the reaction. Water is removed from the system in a tray column. The column bottoms are sent to the OSC and then onto the WWTP. The water-free oligomer is transferred to the prepolymerization unit described below. It should be noted that downstream of this point in the process, the process stream is divided into two parallel independent lines (CP lines 1 and 2, and SSP lines 1 and 2).

Following the esterification unit, each of the two CP lines is comprised of one prepolymerizer, one Polymerization reactor (Finisher) and one set of filtering and cutting machines.

Process vents from the column are collected, along with other process vents coming from the Vacuum Pump Unit described below, and bubble into a seal pot (esterifier seal pot) equipped with a scrubber. The vapor stream from the scrubber is directed to the HTF process heaters (EPN E7), as part of the combustion air, for thermal destruction of organics contained herein.

Prepolymerization

In the prepolymerization unit, the esterification reaction started in the previous unit is completed and the polymerization reaction starts to form the prepolymer (a precursor of the final desired polymer). The unit is comprised of a heat exchanger and a reactor equipped with special internals and heating jacket.

Before entering the prepolymerization unit, additives prepared in the feedstock and additive preparation unit are introduced with the oligomer stream (from the esterification unit). From the prepolymerization onward, all equipment is maintained under vacuum conditions which are required to promote the reaction and to remove the reaction side products.

Vacuum is maintained through a system of ethylene glycol vapor ejectors followed by a vacuum pump in common for all equipment of a CP line. In the prepolymerization unit, sealing against atmosphere of equipment working under vacuum is guaranteed through barometric legs terminating into a vessel (one per line), conventionally called “hot wells”. The hot wells contain ethylene glycol which is maintained under level control at ambient conditions.

Polymerization

In the polymerization unit, the polymerization reaction is completed in the reactor (Finisher) working under vacuum. Just as in the prepolymerization unit, in the polymerization unit, sealing against atmosphere of equipment working under vacuum is guaranteed through barometric legs terminating into a vessel (one per line) containing ethylene glycol. These vessels are conventionally called cold wells, however they operate at ambient conditions under level control.

Filtration and Chip Formation

Normally, molten polymer from the finisher is divided and pumped to a set of filters and chip making machines where chips of polymer are formed. During instances of generating off-spec material or during periods of SSP line outage, the molten polymer is routed to air coolers and thence to the off-spec silo. In the chip making machines, chips of amorphous PET (also called base resin) are formed by simultaneous cutting and quenching of molten polymer strands with water.

The chip making machine is also equipped with a centrifugal air dryer for the separation of the bulk of water used during the chip formation and final drying of chip.

From the dryer, chips are then fed to a classifier for the removal of oversized material and pneumatically conveyed to the intermediate storage (amorphous) silos. Amorphous PET chips stored in silos are the feedstock for the SSP unit.

Scrap Recovery

This unit is designed to recover scraps coming from the PET production plant (both from CP and SSP) and further recycling in the process.

Vacuum Unit

Vacuum conditions in each CP line are maintained through a system of ethylene glycol vapor jet ejectors with three inter-condensers and a liquid ring vacuum pump. Vapor streams from the liquid ring pump bubble into the esterifier seal pot as described above.

Ejectors will be operated with ethylene glycol vapor as motive fluid. There will be a total of 2 independent vacuum systems: one per CP line. Sealing against atmosphere of inter-condensers working under vacuum is guaranteed through barometric legs terminating into a vessel (one per line), called "glycol seal tank", containing ethylene glycol. The glycol seal tank is integrated in the ethylene glycol distribution system within the CP unit (as well as the hot and cold wells described above) and is under level control.

SSP Unit

In the Solid State Post-Poly-Condensation (SSP) unit the molecular weight of PET amorphous chips is increased and byproducts (mainly water, EG and acetaldehyde) are removed in order to make a final polymer mechanically and chemically suitable for the end user. The process is performed by precrystallization, crystallization and SSP reaction steps.

Byproduct organic compounds released during the crystallization and solid state polymerization are conveyed from reactors by nitrogen inert gas. Then, the inert gas goes to the Gas Treatment Unit (GTU) where byproducts are oxidized in the presence of a catalytic bed. The water vapors released during reactions and catalytic oxidation are subsequently condensed and absorbed in drying molecular sieved driers, while the clean gas is returned back to the process.

Pre-Crystallization and Crystallization

Amorphous PET chips at ambient temperature are conveyed from the intermediate PET Amorphous silos to the pre-crystallization unit which comprises of a fluid bed heater. In this unit, chips are heated using hot air as heating and fluidizing media. The air coming out from the bed passes through multi-cyclones and a filter for the removal of PET fines. The clean air is then circulated back (in closed loop) to the fluid bed heater while powders recovered from multi-cyclones and filter are recovered and re-processed.

Liquid HTF (Therminoll 66 or equivalent) is used to heat the fluidization air. A portion of the filtered air is continuously purged from the closed circulation loop and sent to HTF process heaters to avoid accumulation of undesired contaminants released during heat of amorphous PET chips.

The semi-crystallized product coming out of this bed enters then into another fluid bed: the crystallizer. In this second fluid bed, the partially crystallized product reaches a certain degree of crystallization and reaches the temperature required for the following solid state reaction in the SSP reactor.

The process gas for the crystallizer is nitrogen and not air anymore. The fluidizing nitrogen leaving the fluid bed passes through multi-cyclones and a filter. Then, it is heated and sent back to the crystallizer in closed loop. Part of this gas is continuously purged from the closed circulation loop and sent to the GTU (Gas Treatment Unit) for removal of by-products. This purge avoids the build-up of undesired contaminants released during the crystallization process and the following solid state polymerization.

After removal of by-products, the clean gas leaving the GTU is then heated up, sent to the SSP reaction unit, where it is used to remove by-products herein produced and finally sent back into the closed loop of the crystallizer. A continuous make-up of nitrogen from outside the unit is provided to compensate unavoidable nitrogen losses of the closed loops.

Chips leaving the crystallizer enter then the SSP reactor of the homonymous unit.

SSP Reaction Section

This section is comprised of a horizontal inclined rotating cylinder (SSP reactor) in which inert gas is flowing counter currently with respect to the chips flow direction. The main reaction taking place in the SSP reactor is the polycondensation of PET polymer chains, leading to increased PET molecular weight, up do the desired level. Some side reactions, similar to the ones occurring in the crystallization steps, take place in the SSP reactor. The removal of these volatile reaction by-products is accomplished with nitrogen inert gas coming from the GTU, as described in the previous section.

Cooling

After polycondensation in the SSP reactor, chips are cooled in a fluidized bed that is operated with air. The cooled chips are finally pneumatically conveyed with air to a pair of quality evaluation silos for each SSP line and from here to the SSP (product) silos located in the rail yard for further loading into railcars. On demand, a portion of chips can be also sent to a bagging unit equipped with a buffer storage and a bagging machine. In the bagging unit, chips are charged into bags, which are in turn loaded into trucks.

GTU: Gas Treatment Unit

In this section of the plant, a portion of nitrogen from the crystallizer loop is treated to remove the entrained hydrocarbons and moisture. The gas is heated and sent to a catalytic bed reactor, where oxidation of volatile organic compounds coming from the crystallization and SSP reaction units takes place.

The oxidation reaction water, along with the water coming from the crystallization and SSP reaction units is adsorbed on molecular sieve type driers. The adsorbent material is then regenerated by a flow of hot, dry inert gas and the water is separated from this gas by condensation. The unit is made of two molecular sieve fixed beds, operating in "sweep" mode: one under operation and one under regeneration.

After removal of by-products, the clean gas leaving the GTU is then heated up, sent to the SSP reaction unit, where it is used to remove by-products herein produced and finally sent back into the closed loop of the crystallizer. A continuous make-up of nitrogen from outside the unit is provided to compensate unavoidable nitrogen losses of the closed loops.

Process Heaters and Heat Transfer Fluid Distribution Systems

The heat input required by the CP and SSP units is provided through Dowtherm A (or equivalent) heat transfer fluid which is vaporized in four process heaters (EPN: E7). The heaters will fire natural gas as the primary fuel, as well as methane-rich biogas collected from the WWTP (described later in this section) during normal operations. In addition, the heaters will also combust vapors from the organic stripping column (OSC) as well as vapors from the esterification unit seal pot.

The HTF (Dowtherm A, or equivalent) is stored in an atmospheric vessel in the CP unit (EPN: E77). Users located in the CP unit utilize Dowtherm A directly, either as vapor or condensed hot liquid, which is distributed through a dedicated system. Non-condensables HTF distribution system are removed through a liquid ring vacuum pump.

In the SSP unit, whenever heat is required, this is given through another heat transfer fluid (Therminoll 66 or equivalent) in liquid phase. The Therminoll 66 circulating to/from SSP users is heated in a heat exchanger using condensing Dowtherm A at higher temperature and distributed to SSP unit users with a separate HTF system independent from the primary system operated with Dowtherm.

Before venting to atmosphere, the heat of the hot flue gases leaving the HTF heaters is recovered to generate low pressure steam used within the PET plant. Low pressure steam is used to remove part of the organics contained in the waste waters coming from the PET plant by stripping, in the OSC. Stripped organics are then sent back to HTF heaters for thermal destruction. The stripped waste water stream is sent to the WWTP.

Utilities

Wastewater Treatment Plant (WWTP)

Wastewater from PET and PTA units and other areas of the complex are collected and combined in a mixed equalization tank. Once equalized, the wastewater is pumped to an anaerobic system where the resident biomass will effectively remove the bulk of the organics and produce methane gas. The gas will be collected and recovered for use as fuel gas in the process heaters. During periods of heater maintenance or plant turnaround and when excess biogas is produced, biogas will be flared in a low pressure flare (EPN: FL1) located at the WWTP.

The wastewater will flow to an aerobic mixed bed biological reactor (MBBR) where the remaining organics are reduced by aerobic bacteria that exist as a fixed film on free-floating plastic media. The tank is aerated with medium bubble diffusers utilizing blower air. This air provides both the oxygen necessary for biological degradation as well as the energy for mixing.

Cooling Towers and Blowdown Treatment

The site will be equipped with a cooling tower comprised of 10 modules which will supply cooling water to both the PET plant and the Utility Plant. A continuous make-up with treated water coming from the treated water storage tank is used to compensate losses of the cooling tower system (drift and evaporation losses and brine reject from the cooling tower blow down treatment unit).

Conveying Air

As described above, PET chips are conveyed within the plant units and to/from the rail yard using a network of pneumatic conveying systems. For this purpose, ambient air is filtered and then pressurized at the desired value using oil-free, water cooled centrifugal compressors.

The sales product silos operate deduster systems in the loading lines below each silo to remove fines from the product during loading operations. Air is blown counter current to the falling product to mobilize fines (dust) and transport it to the deduster baghouses for control. The dedusters are part of normal loading operations to assure the product meets the low dust content specifications. The dedusting operation is not always needed for the off-spec silo loading operations.

Conveying Nitrogen

As described above, PTA and IPA powders are conveyed within the plant units and to/from rail yard using a network of pneumatic conveying systems operated with nitrogen. These systems resemble the ones used for the PET, however, unlike conveying air, nitrogen used for conveying is not vented to the atmosphere. For this reason, after conveying and separation of PTA/IPA dusts, nitrogen is filtered, cooled and recycled back to the compressors in closed loop.

Tank Farm

The tank farm will include the following tanks:

- 2 tanks for EG
- 5 tanks for p-xylene
- 1 DEG tank
- 1 acetic acid tank
- 1 caustic storage tank

The tank farm will be provided with a water scrubber for the treatment of gaseous emission from the tanks during normal operation. Similarly to all the other scrubbers of the plant, the liquid stream from the tank farm scrubber is sent to the wastewater plant for further treatment.

Dock

The plant will be provided with a dock that will be also shared with the Port of Corpus Christi Authority (dock owner and operator). Current plans include receipt of raw material from the barges at the Dock. No loading of barges is planned.

Rail Yard

The rail yard serving M&G plants will be provided with:

- 3 unloading stations for PTA which will be used only in case of unavailability of PTA from the M&G PTA production plant. Unloading will be closed loop with nitrogen conveying.
- 1 unloading station for IPA. Unloading will be closed loop with nitrogen conveying.
- 2 unloading stations for internal PET handling operations (off specs, rework material),
- 2 shipping silos for PTA and a rail car loading air filter system.
- 5 shipping silos for PET and a rail car loading air filter system.
- 3 additional silos for internal PET handling operation (off specs, rework material).
- Unloading stations for liquid DEG, Acetic Acid and MEG.

Inbound and Outbound

Regarding the receipt of raw materials and chemicals at the site:

- p-xylene will be received by ship/barge.
- acetic acid arrives mainly by rail (a back-up truck unloading station is also provided).
- EG will be received by barge (a back-up rail car unloading station is also provided).
- IPA will be received by rail and from here pneumatically conveyed to the PET unit production process (a back-up container unloading station is also provided).
- DEG arrives mainly by rail (a back-up truck unloading station is also provided).
- Other raw materials will arrive at site by truck or container.

3.2 GHG EMISSION SOURCES

3.2.1 Overall Energy-Efficient Design Philosophy

In the interest of minimizing the production of GHG emissions, M&G is incorporating available design and equipment selection approaches in the PET plant design that contribute to reduced energy use and conservation of materials. This design strategy provides operating cost savings and has the benefit of minimizing emissions of GHGs throughout the plant and at upstream electric generation sources. Since the proposed energy efficiency design features represent an integrated energy efficiency strategy, it is difficult to identify and quantify the effect of each individual efficiency feature. However, some examples of the type of energy efficiency design features that are included in the PET plant design are described in this section below.

Process Design Selection

There are several technologies available for the manufacture of PET. M&G is proposing to select a PET process that features a single step esterification in the continuous process (CP unit). This technology eliminates a second esterification step found in traditional CP units in PET plants and reduces the total energy required during the esterification unit operation by reducing the number of heated vessels, which minimizes the quantity of ambient heat losses.

M&G is also proposing to construct a solid state process (SSP) unit that eliminates the pre-crystallization and crystallization steps found in traditional SSP units. By eliminating these unit operations at the front end of the SSP process, the overall SSP unit throughput can be increased by up to threefold (as compared to a traditional SSP unit) which corresponds to significant energy (heat and electricity) savings.

Waste Energy Recovery

The PTA unit is equipped with two turboexpanders that receive hot vapor from the water removal columns. The expanders drive each main PTA unit air compressor via steam turbine and feed power generators (electric motors) for the PTA unit.

Electrical Equipment Selection

The PET plant design specifies that all new, high-efficiency electrical equipment be installed for the efficient conversion of electrical energy into mechanical energy, thus minimizing the amount of electrical energy needed and associated emissions of GHGs at upstream generation sources (e.g., combined cycle gas turbine).

Energy-saving motors will be implemented on all applicable compressors. Capacity control will be installed to reduce electric energy consumption while running the compressor at a lower load. Variable speed controllers are selected as the design specification for blowers, compressors and pumps to optimize electricity consumption.

Biogas Recovery and Reuse

As described previously, M&G is designing the plant with specific GHG-minimization measures integrated into the plant design. Most notably, M&G is proposing to collect methane-rich biogas generated from the WWTP to be used as fuel in plant combustion equipment (heaters). This design approach not only minimizes potential GHG emissions associated with the continuous venting of biogas, it also reduces the amount of imported fuel (natural gas) supplied to the plant.

3.2.2 Regenerative Thermal Oxidizers (RTOs)

The RTOs are operated to abate VOC and CO emissions for various process streams in the PTA unit. The RTOs emit GHGs as a result of waste gas and fuel gas combustion (EPNs: E1, E2). The RTOs will achieve 98-99% VOC destruction and removal efficiency as described in the non-GHG State PSD permit application. The RTO exhaust stream includes GHG contributions from the reactor process and from the combustion of carbon containing species in the RTO. There is also a fraction of CO_2 that passes through the system as part of the process air. This fraction is not included in the facility GHG total.

It should be noted that the waste gas routed to the RTOs will not contain GHG species other than CO_2 (e.g., methane). GHGs are emitted as a result of the combustion process, not from residual (uncontrolled) waste gas.

The RTOs are designed for redundant operation where waste gas can be routed to either, or both RTOs. Both RTOs may combust natural gas ("fuel gas") simultaneously to keep the units at proper VOC destruction temperature.

3.2.3 Process Heaters

The heaters are fired primarily with natural gas, however the following process streams are fired as fuel gases in the heaters to recover residual heating value and decrease overall natural gas usage: biogas stream, Organic Stripping Column (OSC) stream, and the Esterification Column (EC) stream. These fuel gas streams can be routed to any one of the heaters at any time.

Combustion of natural gas and these fuel gases results in emissions of GHGs from the four heaters (EPN: E7a through E7d).

3.2.4 Flare

The wastewater treatment plant (WWTP) will feature biological treatment units that convert organic material present in plant wastewater streams into methane-rich gas (biogas). This gas will be collected and routed to the process heaters for beneficial reuse as fuel gas. However, the biogas may need to be flared periodically; for example, during certain operating scenarios such as heater maintenance or startup, or plant turnaround. The flare will be equipped with a natural gas pilot. Flaring of the biogas stream results in emissions of GHGs (EPN: Flare).

3.2.5 Emergency Generator Engines

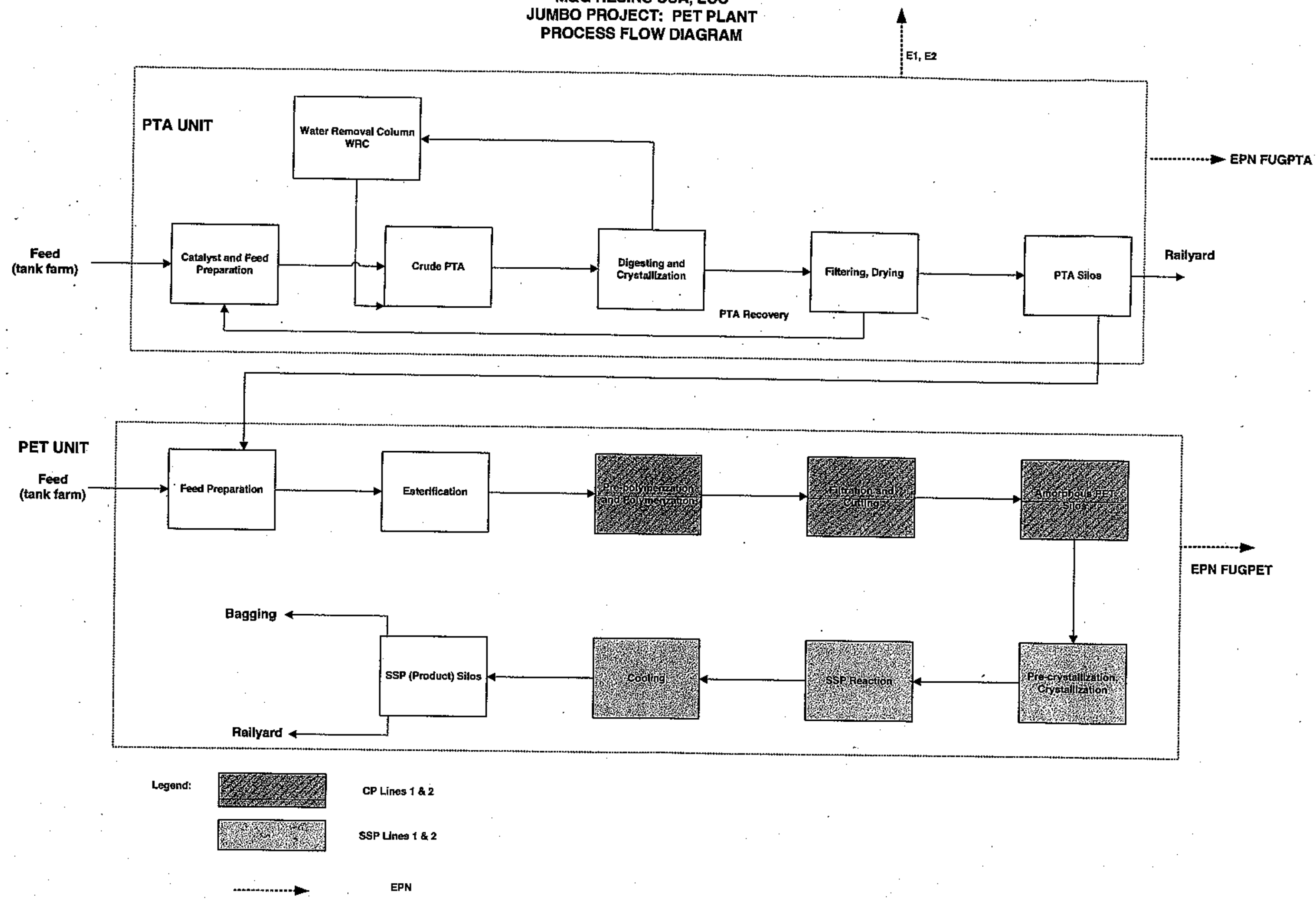
The emergency generator engines (EPNs: ENG-1, ENG-2) and the emergency firewater pump engines (EPNs: ENG-3, ENG-4) combust diesel fuel and are sources of GHG emissions. The emergency engines will be limited during non-emergency operating hours to testing and readiness checks as it is subject to NSPS Subpart IIII[3].

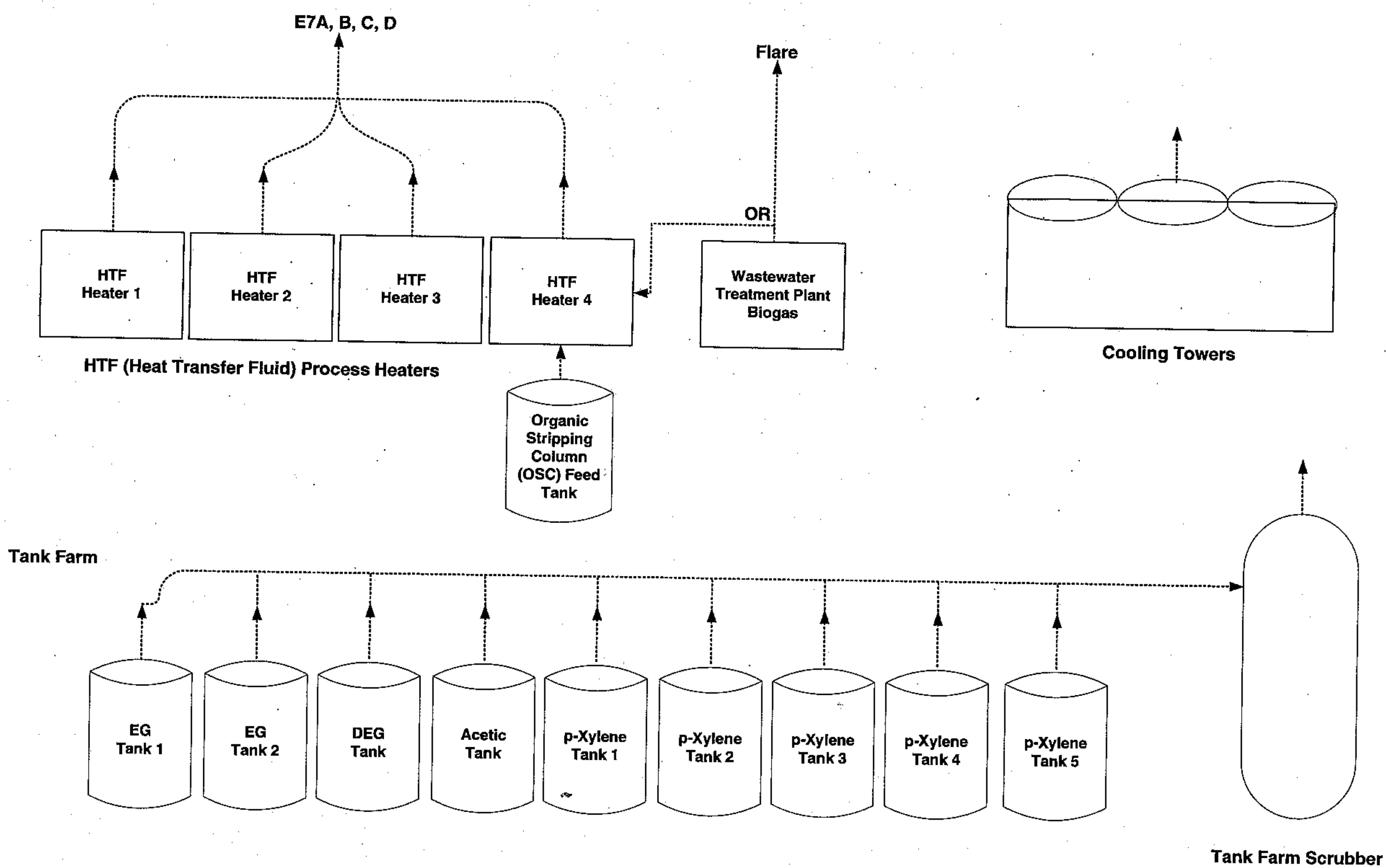
3.2.6 Piping Fugitives

Natural gas, biogas and other process streams contain GHGs and the associated piping system components are emissions. Natural gas is delivered to the site via pipeline and will be metered and piped to the RTOs and heaters. Biogas will be collected at the WWTP and routed to the heaters. Fugitive GHG emissions from the piping components will include emissions of methane (CH_4) and carbon dioxide (CO_2). Emissions from fugitive piping components are designated as EPN: FUG.

[3] 40 CFR 60, Subpart IIII

M&G RESINS USA, LCC
JUMBO PROJECT: PET PLANT
PROCESS FLOW DIAGRAM




E7A, B, C, D
Flare
OR
HTF Heater 1
HTF Heater 2
HTF Heater 3
HTF Heater 4
Wastewater Treatment Plant Biogas
Cooling Towers
HTF (Heat Transfer Fluid) Process Heaters
Organic Stripping Column (OSC) Feed Tank
Tank Farm
EG Tank 1
EG Tank 2
DEG Tank
Acetic Tank
p-Xylene Tank 1
p-Xylene Tank 2
p-Xylene Tank 3
p-Xylene Tank 4
p-Xylene Tank 5
Tank Farm Scrubber

4.0 GHG EMISSION CALCULATIONS

This section provides a description of the methods used to estimate GHG emissions from the proposed PET plant GHG emission units. GHG emissions were estimated using the most appropriate source-specific emission calculation methodologies available in EPA's GHG Mandatory Reporting Rule (GHG MRR), 40 CFR 98. For each source type, either the applicable methodology or most appropriate methodology (based on the source type) was selected from Subparts C, Y or W of the GHG MRR. The following provides an explanation of calculation methodologies by source type. A summary of GHG emissions, detailed emission calculations and supporting information can be found in Appendix A.

4.1 GHG EMISSIONS FROM NATURAL GAS COMBUSTION SOURCES

Natural gas is used as fuel in the heaters and RTOs and pilot gas in the flare. GHG emission calculations for the natural gas-fired combustion units are calculated in accordance with the equations and procedures in the Mandatory Greenhouse Reporting Rules, Subpart C – Stationary Fuel Combustion Sources.[4]

$$CO_2 = 1\,x\,10^{-3} x\ Fuel\ x\ HHV\ X\ EF \quad \text{(EQ. C-1)}$$

Where:

CO_2 = Annual CO_2 mass emissions for the specific fuel type, metric tons/yr

Fuel = Volume of fuel combusted per year, standard cubic feet/yr, based on the maximum rated equipment capacity and maximum hours of operation (8,760 hours/yr)

EF = Emission factor for natural gas from table C-1

HHV = default high heat value of fuel, from table C-1

0.001 = conversion from kg to metric tons

[4] 40 CFR 98, Subpart C – *General Stationary Fuel Combustion Sources*

Emissions of CH_4 and nitrous oxide (N_2O) are calculated using the emission factors (kg/MMBtu) for natural gas combustion from Table C-2 of the Mandatory Greenhouse Gas Reporting Rules.[5] The global warming potential factors used to calculate carbon dioxide equivalent (CO_2e) emissions are based on Table A-1 of Mandatory Greenhouse Gas Reporting Rules.

4.2 GHG EMISSIONS FROM FUEL GAS COMBUSTION

GHG emission calculations for combustion of fuel gas streams (biogas, OSC stream and EC stream) are calculated in accordance with the equations and procedures in the Mandatory Greenhouse Reporting Rules, Subpart C – Stationary Fuel Combustion Sources.[6]

$$CO_2 = \frac{44}{12} \times Fuel\ x\ CC\ X\ \frac{MW}{MVC} \times 0.001 \quad \text{(EQ. C-5)}$$

Where:

CO_2 = Annual CO_2 mass emissions for the specific fuel type, metric tons/yr

Fuel = Volume of gas combusted per year, standard cubic feet/yr, based on the maximum rated equipment capacity and maximum hours of operation (8,760 hours/yr)

CC = Annual average carbon content of the gas (kg C per scf), obtained from the estimated gas composition

MW = Annual average molecular weight of fuel (kg/kg-mol), obtained from the estimated gas composition

MVC = molar volume conversion factor = 849.5 scf/kg-mol @ std. conditions

0.001 = conversion from kg to metric tons

In accordance with the Tier 3 fuel calculation methodology in 40 CFR 98, Subpart C, emissions of CH_4 and nitrous oxide (N_2O) are calculated using the emission factors (kg/MMBtu) for natural

[5] *Default CH_4 and N_2O Emission Factors for Various Types of Fuel*, 40 CFR 98, Subpart C, Table C-2
[6] 40 CFR 98, Subpart C – *General Stationary Fuel Combustion Sources*

gas combustion from Table C-2 of the Mandatory Greenhouse Gas Reporting Rules[7] and annual heat release for fuel gas combustion. The global warming potential factors used to calculate carbon dioxide equivalent (CO_2e) emissions are based on Table A-1 of Mandatory Greenhouse Gas Reporting Rules.

4.3 GHG EMISSIONS FROM WASTE GAS COMBUSTION IN FLARE AND RTOS

GHG emissions from waste gas combustion in the RTOs and any biogas combustion in the flare are calculated in accordance with the procedures in the Mandatory Greenhouse Reporting Rules, Subpart Y – Petroleum Refineries[8], equation no. Y-1a.

$$CO_2 = 0.98 \times \frac{44}{12} \times Flare\ x\ CC\ X\ \frac{MW}{MVC} \times 0.001 \quad \text{(EQ. Y-1a)}$$

Where:

CO_2 = Annual CO_2 mass emissions, metric tons/yr

Flare = Volume of flare gas combusted per year, standard cubic feet/yr, from process design data

CC = Annual average carbon content of flare gas (kg C per scf), from engineering estimate of waste gas composition

MW = Annual average molecular weight of flare gas (kg/kg-mol) from engineering estimate of waste gas composition

MVC = molar volume conversion factor = 849.5 scf/kg-mol @ std. conditions

0.001 = conversion from kg to metric tons

0.98 = flare combustion efficiency

[7] *Default CH_4 and N_2O Emission Factors for Various Types of Fuel*, 40 CFR 98, Subpart C, Table C-2
[8] 40 CFR 98, Subpart Y – *Petroleum Refineries*

$$CH_4 = CO_2 \times (EF_{CH4} \div EF) + CO_2 \times (\frac{0.02}{0.98}) \times \frac{16}{44} \times f_{CH4} \quad \text{(EQ. Y-4)}$$

Where:

CH_4 = Annual CH_4 mass emissions, metric tons/yr

CO_2 = Annual CO_2 mass emissions, metric tons/yr

EF_{CH4} = CH_4 emission factor for Petroleum Products from Table C-2 of 40 CFR 98 Subpart C = 3.0E-03 (kg CH4/MMBtu)

EF = Default CO_2 emission factor for flare gas of 60 kg CO_2/MMBtu (HHV basis)

0.02/0.98 = Adjustment factor for flare combustion efficiency

16/44 = Correction factor for the ratio of the molecular weight of CH_4 to CO_2

f_{CH4} = Weight fraction of carbon in the flare gas that is contributed by methane (kg CH4/kg C); default is 0.4.

$$N_2O = CO_2 \times (EF_{N2O} \div EF) \quad \text{(EQ. Y-5)}$$

Where:

N_2O = Annual N_2O mass emissions, metric tons/yr

CO_2 = Annual CO_2 mass emissions, metric tons/yr

EF_{N2O} = N_2O emission factor for Petroleum Products from Table C-2 of 40 CFR 98 Subpart C = 6.0E-04 (kg CH4/MMBtu)

EF = Default CO_2 emission factor for flare gas of 60 kg CO_2/MMBtu (HHV basis)

4.4 GHG EMISSIONS FROM PIPING FUGITIVES

GHG emission calculations for piping component fugitive emissions are based on emission factors from Table W-1A of the Mandatory Greenhouse Gas Reporting Rules.[9] The concentrations of CH_4 and CO_2 in each stream type are based on the expected annual average composition of the stream. Although audio/visual/olfactory (AVO) inspections are being proposed as BACT for this source (see Section 6.9.5) no control efficiency credits were taken for AVO monitoring. The global warming potential factors used to calculate CO_2e emissions are based on Table A-1 of Mandatory Greenhouse Gas Reporting Rules.[10]

4.5 GHG EMISSIONS FROM FUEL OIL FIRED ENGINES

GHG emissions from the diesel-fired emergency engines were calculated using the engine's maximum rated horsepower, fuel consumption rate (Btu/hp-hr), maximum annual operation and the diesel fuel GHG emission factors from Tables C-1 and C-2 of 40 CFR 98 Subpart C listed below. The maximum annual operation is 100 hours per year per NSPS Subpart IIII[11].

Emission factor for Distillate Fuel Oil No. 2 from 40 CFR 98, Subpart C:

Default CO_2 emission factor (kg CO_2/mmBtu) = 73.96

[9] *Default Whole Gas Emission Factors for Onshore Petroleum and Natural Gas Production*, 2012 Technical Corrections to 40 CFR Part 98, Subpart W, Table. W-1A.

[10] *Global Warming Potentials*, 40 CFR Part 98, Subpart A, Table A-1.

[11] 40 CFR 60, Subpart IIII

5.0 PREVENTION OF SIGNIFICANT DETERIORATION APPLICABILITY

Because the combined CHP Plant and PET Plant project emissions increase of GHG is greater than 100,000 ton/yr of CO2e, PSD is triggered for GHG emissions. The emissions netting analysis is documented on the attached TCEQ PSD netting tables: Table 1F and Table 2F of Appendix B. Note that this is a new Greenfield site and, as such, there are no contemporaneous emission changes associated with the project.

Please note that, although separate permits are being requested and two separate permit applications have been submitted, the project increase shown here represents emissions from all Project Jumbo GHG emission sources.

6.0 BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

The PSD rules define BACT as:

> *Best available control technology* means an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under [the] Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.[12]

In the EPA guidance document titled *PSD and Title V Permitting Guidance for Greenhouse Gases*, EPA recommended the use of the Agency's five-step "top-down" BACT process to determine BACT for GHGs.[13] In brief, the top-down process calls for all available control technologies for a given pollutant to be identified and ranked in descending order of control effectiveness. The permit applicant should first examine the highest-ranked ("top") option. The top-ranked options should be established as BACT unless the permit applicant demonstrates to the satisfaction of the permitting authority that technical considerations, or energy,

[12] 40 CFR § 52.21(b)(12.)

[13] EPA, *PSD and Title V Permitting Guidance for Greenhouse Gases*, p. 18 (March 2011).

environmental, or economic impacts justify a conclusion that the top ranked technology is not "achievable" in that case. If the most effective control strategy is eliminated in this fashion, then the next most effective alternative should be evaluated, and so on, until an option is selected as BACT.

EPA has divided this analytical process into the following five steps:

Step 1: Identify all available control technologies.
Step 2: Eliminate technically infeasible options.
Step 3: Rank remaining control technologies.
Step 4: Evaluate most effective controls and document results.
Step 5: Select the BACT.

This evaluation is generally performed individually for each GHG emission source which are addressed in subsections 6.2 onward. One control technology, Carbon Capture and Sequestration (CCS), could be a potential control technology for multiple emissions sources associated with Project Jumbo. Therefore, before presenting the BACT evaluation for the individual PET plant GHG emission sources, the first subsection 6.1, will present the BACT evaluation for CCS as a potential control technology.

6.1 BACT FOR THE PROCESS HEATERS

6.1.1 Step 1: Identify All Available Control Technologies

The primary GHG control options available are selection of energy efficient design options to maximize thermal efficiency and implementation of select operation and maintenance procedures to ensure energy-efficient operation of the heaters on an ongoing basis.

The following discussion lists those design elements and operating and maintenance practices that have been considered and selected to maximize energy efficiency. These individual elements are not being individually considered as BACT control options, rather overall unit energy-efficient design and operation is considered the BACT option. The individual elements' effects on overall unit energy efficiency are reflected in the proposed holistic energy efficiency-based BACT limit in Step 5, which limits the maximum heater exhaust temperature: a metric of overall thermal efficiency.

6.1.1.1 Energy-Efficient Design Elements

The following section lists those specific energy-efficient design options that were considered and selected by M&G to maximize furnace energy efficiency.

- Economizer – Use of heat exchanger to recover heat from the exhaust gas to preheat incoming HTF will maximize thermal efficiency. This heat transfer rate will be monitored by measuring inlet and exhaust gas temperature.

By selecting an economizer design option (design option A), M&G's furnace is being designed with lower stack exit temperature, which indicates that the units are designed for maximal heat recovery. A numeric energy efficiency-based BACT limit and benchmarking against other sources is addressed in Step 5.

6.1.1.2 Operating and Maintenance Elements Relating to Energy Efficiency

The following operating and maintenance practices were considered and selected to maximize PET yield by improving heater efficiency.

- Oxygen trim control – Monitoring oxygen concentration in the flue gas adjustment of inlet air flow will assist in maximizing thermal efficiency. The heater will be equipped with oxygen analyzers in both the stack and the arch (between the radiant and convection sections). Typically, excess oxygen levels of 3 to 5 percent are optimal for a good combustion profile. The furnace combustion system features air adjustment dampers at the burners and an adjustment damper at the combustion air controller. Both damper systems are designed for both automatic and manual (operator) control capability.
- Periodic maintenance of the heat transfer surfaces to remove foulant formation will improve heat transfer through the tube walls and improves thermal efficiency.
- Periodic furnace tune-up – The heaters will receive periodic inspection and maintenance as needed to maintain optimal thermal efficiency.

6.1.1.3 Add On Controls

In addition to energy efficient design, operating, and maintenance options discussed above, it is appropriate to consider add-on technologies as possible ways to capture GHG emissions that are emitted from the Process Heaters, as well as GHG emissions from other emission sources associated with the Project Jumbo. GHG emissions that are emitted from Carbon Capture and Sequestration (CCS) candidate sources associated with Project Jumbo listed below (plant names in parenthesis):

- 4 heaters (PET plant)
- 2 regenerative thermal oxidizers (PET plant)
- 1 gas-fired turbine and duct burners (Utility Plant)
- 2 two gas-fired boilers (Utility Plant)

The emerging carbon capture and sequestration (CCS) technologies generally consist of processes that separate CO_2 from combustion or process flue gas (capture component), the compression and transport component, and then injection into geologic formations such as oil and gas reservoirs, unmineable coal seams, and underground saline formations (sequestration component). These three components of CCS are addressed separately below:

Carbon Capture:

Of the emerging CO_2 capture technologies that have been identified, only amine absorption is currently commercially used for state-of-the-art CO_2 separation processes. The U.S. Department of Energy's National Energy Technology Laboratory (DOE-NETL) provides the following brief description of state-of-the-art post-combustion CO_2 capture technology and related implementation challenges. Although the DOE-NETL discussions focus on CCS application at combustion units in electrical generation service, elements of this discussion are applicable when discussing the application of CCS to sources in the chemical manufacturing industry. The following excerpts from DOE-NETL Information Portal illustrate some of the many challenges, but not all, that are present in applying available CO_2 Capture technologies at combustion and process sources located at chemical manufacturing plants.

> *...In the future, emerging R&D will provide numerous cost-effective technologies for capturing CO_2 from power plants. At present, however, state-of-the-art technologies for*

existing power plants are essentially limited to amine absorbents. Such amines are used extensively in the petroleum refining and natural gas processing industries... Amine solvents are effective at absorbing CO_2 from power plant exhaust streams—about 90 percent removal—but the highly energy-intensive process of regenerating the solvents decreases plant electricity output...[14]

In its CCS information portal, the DOE-NETL adds:

...Separating CO_2 from flue gas streams is challenging for several reasons:

- *CO_2 is present at dilute concentrations (13-15 volume percent in coal-fired systems and 3-4 volume percent in gas-fired turbines) and at low pressure (15-25 pounds per square inch absolute [psia]), which dictates that a high volume of gas be treated.*
- *Trace impurities (particulate matter, sulfur dioxide, nitrogen oxides) in the flue gas can degrade sorbents and reduce the effectiveness of certain CO_2 capture processes.*

It should be noted that the majority of the candidate CCS source vent streams (previously listed in this section) are dilute in CO_2 concentration and contain impurities such as PM, NO_X and SO_2, thus increasing the challenge of CO_2 separation for Project Jumbo.

Compression and Transport:

The compression aspect of this component of CCS will represent a significant cost and additional environmental impact because of the energy required to provide the amount of compression needed. This is supported by DOE-NETL who states that:

[14] DOE-NETL, *Carbon Sequestration: FAQ Information Portal*, http://extsearch1.netl.doe.gov/search?q=cache:e0yvzjAh22cJ:www.netl.doe.gov/technologies/carbon_seq/FAQs/tech-status.html+emerging+R%26D&access=p&output=xml_no_dtd&ie=UTF-8&client=default_frontend&site=default_collection&proxystylesheet=default_frontend&oe=ISO-8859-1 (last visited July 26, 2012).

> *Compressing captured or separated CO_2 from atmospheric pressure to pipeline pressure (about 2,000 psia) represents a large auxiliary power load on the overall plant system...*[15]

If CO_2 capture and compression can be achieved at a process or combustion source, it would need to be routed to a geologic formation capable of long-term storage. The long-term storage potential for a formation is a function of the volumetric capacity of a geologic formation and CO_2 trapping mechanisms within the formation, including dissolution in brine, reactions with minerals to form solid carbonates, and/or adsorption in porous rock. The DOE-NETL describes the geologic formations that could potentially serve as CO_2 storage sites and their associated technical challenges as follows:

> *Geologic carbon dioxide (CO_2) storage involves the injection of supercritical CO_2 into deep geologic formations (injection zones) overlain by competent sealing formations and geologic traps that will prevent the CO_2 from escaping. Current research and field studies are focused on developing better understanding of 11 major types of geologic storage reservoir classes, each having their own unique opportunities and challenges. Understanding these different storage classes provides insight into how the systems influence fluids flow within these systems today, and how CO_2 in geologic storage would be anticipated to flow in the future. The different storage formation classes include: deltaic, coal/shale, fluvial, alluvial, strandplain, turbidite, eolian, lacustrine, clastic shelf, carbonate shallow shelf, and reef. Basaltic interflow zones are also being considered as potential reservoirs. These storage reservoirs contain fluids that may include natural gas, oil, or saline water; any of which may impact CO_2 storage differently...*[16]

Therefore, as can be seen from the DOE-NETL Information Portal, CCS as a whole cannot be considered a commercial available, technically feasible option for the combustion and process vent emissions sources under review in the M&G proposed project. M&G's Project Jumbo generates flue gas streams that contain CO_2 in dilute concentrations and the project is not located in an acceptable geological storage location. Even so, M&G provides even further and more detailed evaluation to address all 5 steps of the EPA BACT analysis.

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[15] *Id.*

[16] DOE-NETL, ***Carbon Sequestration:*** *Geologic Storage Focus Area,* http://www.netl.doe.gov/technologies/carbon_seq/corerd/storage.html (last visited July 26, 2012)

6.1.2 Step 2: Eliminate Technically Infeasible Options

M&G addresses, in more detail, the potential feasibility of implementing CCS technology as BACT for GHG emissions from the proposed project GHG emission sources. The feasibility issues are different for each component of CCS technology (i.e., capture; compression and transport; and storage). Therefore, technical feasibility of each component is addressed separately below.

6.1.1.1 CO_2 Capture

Though amine absorption technology for CO_2 capture has routinely been applied to processes in the petroleum refining and natural gas processing industries it has not been applied to process vents at chemical manufacturing plants.

The Obama Administration's Interagency Task Force on Carbon Capture and Storage, in its recently completed report on the current status of development of CCS systems for power plants, states that carbon capture could be used on combustion units. However, the following discussion on carbon capture technology availability for combustion unit shows that carbon capture is not commercially available for application.

Large commercial applications, such as the project sources, present even more difficult application of carbon capture, in part, due to the additional variability in flow volumes as typically experienced in chemical plants. Therefore, the discussion related to power plants also shows that of CO_2 capture for chemical process combustion streams are not commercially available.

> *Current technologies could be used to capture CO_2 from new and existing fossil energy power plants; however, they are not ready for widespread implementation primarily because they have not been demonstrated at the scale necessary to establish confidence for power plant application. Since the CO_2 capture capacities used in current industrial processes are generally much smaller than the capacity required for the purposes of GHG emissions*

mitigation at a typical power plant, there is considerable uncertainty associated with capacities at volumes necessary for commercial deployment.[17]

In its current CCS research program plans (which focus on power plant application), the DOE-NETL confirms that commercial CO_2 capture technology for large-scale combustion units (e.g., power plants) is not yet available and suggests that it may not be available until at least 2020:

> *The overall objective of the Carbon Sequestration Program is to develop and advance CCS technologies that will be ready for widespread commercial deployment by 2020. To accomplish widespread deployment, four program goals have been established:*
>
> *(1) Develop technologies that can separate, capture, transport, and store CO_2 using either direct or indirect systems that result in a less than 10 percent increase in the cost of energy by 2015;*
>
> *(2) Develop technologies that will support industries' ability to predict CO_2 storage capacity in geologic formations to within ±30 percent by 2015;*
>
> *(3) Develop technologies to demonstrate that 99 percent of injected CO_2 remains in the injection zones by 2015;*
>
> *(4) Complete Best Practices Manuals (BPMs) for site selection, characterization, site operations, and closure practices by 2020. Only by accomplishing these goals will CCS technologies be ready for safe, effective commercial deployment both domestically and abroad beginning in 2020 and through the next several decades.*[18A]

To corroborate that commercial availability of CO_2 capture technology for large-scale combustion (power plant) projects will not occur for several more years, Alstom, one of the major developers of commercial CO_2 capture technology using post-combustion amine absorption, post-combustion chilled ammonia absorption, and oxy-combustion, states on its web site that its CO_2 capture technology will become commercially available in 2015.[19] However, it should be noted that in committing to this timeframe, the company does not indicate whether

[17] *Report of the Interagency Task Force on Carbon Capture and Storage* at 50 (Aug. 2010).

[18] DOE-NETL, *Carbon Sequestration Program: Technical Program Plan,* at 10 (Feb. 2011).

[19] Alstom, *Alstom's Carbon Capture Technology Commercially "Ready to Go" by 2015*, Nov.30, 2010, http://www.alstom.com/australia/news-and-events/pr/ccs2015/ (last visited July.26, 2012).

such technology will be available for CO_2 emissions generated from chemical plant sources, like those included in Project Jumbo.

6.1.1.2 CO_2 Compression and Transport

Notwithstanding the fact that the above discussion demonstrates that the carbon capture component of CCS is not commercial available for chemical plant combustion and process vents, M&G provides the following discussion concerning technical feasibility. This discussion further supports that the compression and transport component of CCS may be technically feasible but, as explained later, the cost evaluation shows that it is not economically reasonable. Therefore, CCS is not BACT for Project Jumbo.

Even if it is assumed that CO_2 capture could feasibly be achieved for the proposed project, the high-volume CO_2 stream generated would need to be compressed and transported to a facility capable of storing it. Potential geologic storage sites in Texas, Louisiana, and Mississippi to which CO_2 could be transported if a pipeline was constructed are delineated on the map found at the end of this Appendix.[20] The hypothetical minimum length required for any such pipeline(s) is the distance to the closest site with recognized potential for some geological storage of CO_2, which is an enhanced oil recovery (EOR) reservoir site located within 30 miles of the proposed project. However, none of the South and Southeast Texas EOR reservoir or other geologic formation sites have yet been technically demonstrated for large-scale, long-term CO_2 storage.

In comparison, the closest site that is currently being field-tested to demonstrate its capacity for large-scale geological storage of CO_2 is the Southwest Regional Partnership (SWP) on Carbon Sequestration's Scurry Area Canyon Reef Operators (SACROC) test site, which is located in Scurry County, Texas approximately 385 miles away (see the map at the end of this Appendix for the test site location). Therefore, to access this potentially large-scale storage capacity site, assuming that it is eventually demonstrated to indefinitely store a substantial portion of the large volume of CO_2 generated by the proposed project, a very long and sizable pipeline would need

[20] Susan Hovorka, University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, *New Developments: Solved and Unsolved Questions Regarding Geologic Sequestration of CO_2 as a Greenhouse Gas Reduction Method* (GCCC Digital Publication #08-13) at slide 4 (Apr. 2008), available at: http://www.beg.utexas.edu/gccc/forum/codexdownloadpdf.php?ID=100(last visited July 26, 2012).

to be constructed to transport the large volume of high-pressure CO_2 from the plant to the storage facility, thereby rendering implementation of a CO_2 transport system infeasible.

The potential length of such a CO_2 transport pipeline is uncertain due to the uncertainty of identifying a site(s) that is suitable for large-scale, long-term CO_2 storage. The hypothetical minimum length required for any such pipeline(s) is estimated to be the lesser of the following:

- The distance to the closest site with established capability for some geological storage of CO_2, which is an enhanced oil recovery (EOR) reservoir site[21] located more than 620 kilometers from the proposed project; or
- The distance to a CO_2 pipeline that Denbury Green Pipeline-Texas is currently constructing approximately 280 kilometers (straight line distance) from the project site for the purpose of providing CO_2 to support various EOR operations in Southeast Texas beginning in late 2013.

6.1.1.3 CO_2 Sequestration

Even if it is assumed that CO_2 capture and compression could feasibly be achieved for the proposed project and that the CO_2 could be transported economically, the feasibility of CCS technology would still depend on the availability of a suitable pipeline or sequestration site as addressed in Step 4 of the BACT analysis. The suitability of potential storage sites is a function of volumetric capacity of their geologic formations, CO_2 trapping mechanisms within formations (including dissolution in brine, reactions with minerals to form solid carbonates, and/or adsorption in porous rock), and potential environmental impacts resulting from injection of CO_2 into the formations. Potential environmental impacts resulting from CO_2 injection that still require assessment before CCS technology can be considered feasible include:

- Uncertainty concerning the significance of dissolution of CO_2 into brine,
- Risks of brine displacement resulting from large-scale CO_2 injection, including a pressure leakage risk for brine into underground drinking water sources and/or surface water,

[21] None of the nearby South Texas EOR reservoirs or other geologic formation sites have been technically demonstrated for large-scale, long-term CO_2 storage.

- Risks to fresh water as a result of leakage of CO_2, including the possibility for damage to the biosphere, underground drinking water sources, and/or surface water,[22] and
- Potential effects on wildlife.

Potentially suitable storage sites, including EOR sites and saline formations, exist in Texas, Louisiana, and Mississippi. In fact, sites with such recognized potential for some geological storage of CO_2 are located within 30 miles of the proposed project, but such nearby sites have not yet been technically demonstrated with respect to all of the suitability factors described above. In comparison, the closest site that is currently being field-tested to demonstrate its capacity for geological storage of the volume of CO_2 that would be generated by the proposed power unit, i.e., SWP's SACROC test site, is located in Scurry County, Texas approximately 385 miles away. It should be noted that, based on the suitability factors described above, currently the suitability of the SACROC site or any other test site to store a substantial portion of the large volume of CO_2 generated by the proposed project has yet to be fully demonstrated. No BACT options are being eliminated in this step.

6.1.3 Step 3: Rank Remaining Control Technologies

As all of the energy efficiency related processes, practices, and designs discussed in Section 5.1.1.1 of this application are being proposed for this project, a ranking of the control technologies is not necessary for this application. As documented in Step 2 and 4, implementation of CCS technology is not technically or economically reasonable, leaving energy efficiency measures as the only feasible emission control options

6.1.4 Step 4: Evaluate Most Effective Controls and Document Results

In this section, M&G addresses the potential energy, environmental, and economic feasibility of implementing CCS technology as BACT for GHG emissions from the proposed Jumbo Project's emission sources. Each component of CCS technology (i.e., capture and compression, transport, and storage) is discussed separately.

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[22] *Id.*

6.1.1.4 Additional Environmental Impacts and Considerations

There are a number of other environmental and operational issues related to the installation and operation of CCS that must also be considered in this evaluation. First, operation of CCS capture and compression equipment would require substantial additional electric power. For example, operation of carbon capture equipment at a typical natural gas fired combined heat and power plant is estimated to reduce the net energy efficiency of the plant from approximately 50% (based on the fuel higher heating value (HHV)) to approximately 42.7% (based on fuel HHV).[23] To provide the amount of reliable electricity needed to power a capture system, M&G would need to significantly expand the scope of the Utility Plant proposed with this project to install one or more additional electric generating units, which are sources of conventional (non-GHG) and GHG air pollutants themselves. To put these additional power requirements in perspective, gas-fired electric generating units typically emit more than 100,000 tons CO_2e/yr and would themselves, require a PSD permit for GHGs in addition to non-GHG pollutants.

M&G would need to construct a pipeline that is estimated to be at least 175 miles in length to transport captured GHGs to the nearest potential purchaser (Denbury Green Pipeline). Constructing a pipeline of this magnitude would require procurement of right-of-ways which can be a lengthy and potentially difficult undertaking. Pipeline construction would also require extensive planning, environmental studies and possible mitigation of environmental impacts from pipeline construction. Therefore, the transportation of GHGs for this project would potentially result in negative impacts and disturbance to the environment in the pipeline right-of-way.

6.1.1.5 CCS Cost Evaluation

Based on the reasons provided above, M&G believes that CCS technology should be eliminated from further consideration as a potential feasible control technology for purposes of this BACT analysis.

[23] US Department of Energy, National Energy Technology Laboratory, "Costs and Performance Baseline For Fossil Energy Plants, Volume 1 - Bituminous Coal and Natural Gas to Energy", Revision 2, November 2010

For the cost evaluation, M&G considered all plants (PET plant and Utility Plant) associated with Project Jumbo GHG emission sources for which CCS is considered technically feasible, for purposes of this analysis, even though separate permits are requested for each plant. These GHG emissions sources include the following emission units (respective plant names/permit applications shown in parenthesis):

- 4 process heaters (PET plant)
- 2 RTOs (PET plant)
- 1 gas-fired turbine and duct burners (Utility Plant)
- 2 gas-fired boilers (Utility Plant)

M&G's cost estimation is conservatively low because it does not include additional costs for the following items that would be needed to implement CCS for Project Jumbo:

- additional gas conditioning and stream cleanup to meet specifications for final sale
- thousands of feet of gas gathering system piping to collect vent gas from sources located in different areas of the plant
- costs of additional electric generating units required to power the capture and compression system (including design, procurement, permitting, installation, operating and maintenance costs)
- cost of obtaining rights of way for construction of a pipeline

These items would require significantly more effort to estimate and, since the conservatively low cost estimate demonstrates that this technology is not economically reasonable, it was not necessary to expend the extra time and resources to gather this additional data for the cost analysis.

The CCS system cost estimate, excluding these additional capital expenditure items, is presented on Table 6-1 at the end of this section. The total CCS system cost is estimated at approximately $150 million dollars, which is about 15% of the total Jumbo Project capital cost (total estimated capital cost is 1 billion dollars). Increasing the capital cost of the project by this margin and increasing the ongoing operating and maintenance costs would render this project economically unviable. The margins of additional capital and operating costs are significantly greater if the aforementioned additional capital cost items, which were excluded, are taken into consideration.

As discussed above, CCS was determined to be not commercially available and not technically feasible; therefore, a detailed examination of the energy, environmental, and economic impacts of CCS is not required for this application. However, at the request of EPA Region 6, M&G included the estimated costs for implementation of CCS which are presented in Table 6-1. As discussed above these costs show that CCS is not commercially available, not technically feasible but also economically unreasonable. Therefore, it is not included as BACT for Project Jumbo.

6.1.5 Step 5: Select BACT

M&G proposes the selection of all available energy-efficient design options and operational/maintenance practices presented in Step 1 as BACT for the process heaters. Since the proposed energy efficiency design options, described in Step 1 above, are not independent features but are interdependent and represent an integrated energy efficiency strategy, M&G is proposing a BACT limit for each heater which takes into consideration the operation, variability and interaction of all features in combination. A holistic BACT limit which accounts for the ultimate performance of the entire unit was chosen, rather than individual independent subsystem performance. Otherwise, monitoring and maintaining energy efficiency would be un-necessarily complex because the interdependent nature of operating parameters means that one parameter cannot necessarily be controlled independently without affecting the other operating parameters.

M&G proposes a numerical energy efficiency-based BACT limit for maximum exhaust gas temperature, as this is a direct indicator of energy-efficiency. M&G proposes that, for purposes of an enforceable BACT limitation a numerical energy efficiency-based BACT limit for maximum exhaust gas temperature of 320 °F averaged on a 365-day rolling average basis. M&G will monitor the heaters' flue gas exhaust temperature in accordance with permit conditions.

M&G performed a search of the EPA's RACT/BACT/LAER Clearinghouse for gas-fired heaters and found two entries which address BACT for GHG emissions which are included in Appendix

C. The first entry is for a pair of 180 MMBtu/hr cracking furnaces at the Williams Olefins, LLC Geismar Ethylene Plant. This entry identifies BACT for GHGs as follows: "1) low-emitting feedstocks, 2) energy efficient equipment, 3) process design improvement, 4) low-emitting and low- carbon fuel (>25 vol% hydrogen, annual ave.)." Although M&G's proposed process heaters are functionally different than Williams' cracking furnaces, M&G's proposed combustion units will feature some of the same BACT for GHGs, including brand new equipment and selection of low-carbon fuel gas. Although the PET plant will not produce a hydrogen-rich fuel gas, M&G will limit natural gas usage by designing the heaters to fire fuel gas streams generated in the plant (biogas, OCS and EC streams). In addition to these design options, M&G is proposing a numeric energy efficiency-based BACT limit for the heaters. Therefore, the proposed BACT is consistent with this similar unit.

The second BACT entry identified in the RBLC search is for a 110 MMBtu/hr auxiliary boiler located at the City of Palmdale's Hybrid Power Project. GHG BACT was identified as selection of annual boiler tune ups. M&G is proposing routine heater maintenance as BACT in conjunction with energy efficiency design options and a numeric BACT limit. Therefore, the proposed BACT is consistent with this similar unit.

6.2 BACT FOR REGENERATIVE THERMAL OXIDIZERS

6.2.1 Step 1: Identify All Available Control Technologies

6.2.1.1 RTO Selection and Energy Efficient Design and Operation

Regenerative thermal oxidizers are inherently designed with energy efficiency in mind and provide superior energy efficiency compared to a standard (non-regenerative) thermal oxidizer unit. RTOs are specifically designed to minimize the amount of fuel required to maintain the minimum firebox temperature. Specifically, the RTO firebox is lined with ceramic fiber refractory material to provide superior heat retention. RTOs are designed for high (more than 90%) thermal efficiency. By selecting an RTO instead of a non-regenerative thermal oxidizer, M&G estimates as much as 90+% reduction in fuel gas (natural gas) combustion.

The RTOs are designed to allow the RTOs to maintain its combustion temperature without use of additional natural gas. The natural gas burner may be switched off while process gas is injected. This design feature results in the consumption of up to 95+% less natural gas.

The RTOs will also be designed to minimize the electrical power used to drive the combustion blower by installation of a variable speed blower and corresponding instrumentation and control systems.

6.2.1.2 Fuel Selection

Natural gas has the lowest carbon intensity of any available fuel gas, thus selection of natural gas as the RTO fuel will minimize emissions of GHGs from RTO fuel combustion.

6.2.2 Step 2: Eliminate Technically Infeasible Options

No technically infeasible options are being eliminated in this step.

6.2.3 Step 3: Rank Remaining Control Technologies

No BACT options are being eliminated in this step.

6.2.4 Step 4: Evaluate Most Effective Controls and Document Results

No BACT options are being eliminated in this step.

6.2.5 Step 5: Select BACT

M&G will use natural gas as the RTO fuel gas and utilize energy efficient design and operation of the RTO, as described in Step 1 (above), to limit the amount of fuel gas required to maintain the minimum firebox temperature and achieve 98.5+% destruction of VOCs and CO (the primary function of the RTO). Since the proposed energy efficiency design options, described in Step 1 above, are not independent features but are interdependent and represent an integrated energy efficiency strategy, M&G is proposing a BACT limit for each RTO which takes into consideration the operation, variability and interaction of all these energy efficient features in combination. A holistic BACT limit considers the ultimate performance of the entire unit, rather than individual independent subsystem performance which would be un-necessarily complex because the interdependent nature of operating parameters means that one parameter cannot necessarily be controlled independently without affecting the other operating parameters.

M&G proposes a numeric energy efficiency-based BACT limit for RTO fuel gas (natural gas) of 16 MMBTU/hr (per RTO, LHV bases), based on a twelve month rolling average. To demonstrate compliance with this limit, M&G proposes to use fuel gas flow monitoring in conjunction with natural gas heating values to calculate the twelve month rolling average fuel gas heat input to the RTOs. This numeric BACT limit will provide ongoing demonstration that the RTOs achieve the represented energy efficiency by limiting heat input (fuel use) via operation of the natural gas conservation systems.

M&G performed a search of the EPA's RACT/BACT/LAER Clearinghouse for RTOs and found no entries which address BACT for GHG emissions for RTOs. In addition, M&G searched pending permit applications and issued GHG permits in other states and EPA regions for any proposed RTOs at chemical plants and found nothing. Although not listed in the RACT/BACT/LAER Clearinghouse, a review was completed of the GHG BACT analysis in other GHG permit applications submitted to EPA Region 6 that included an RTO. A discussion of M&G's proposed BACT as compared to those projects is provided below.

ExxonMobil Chemical – Mont Belvieu Plastics Plant

On May 21, 2012 ExxonMobil Chemical submitted a permit application to EPA Region 6 authorizing the construction of a new low-pressure polyethylene unit. The permit application included an RTO and proposed the following for BACT: natural gas as assist gas, good operating and maintenance practices and energy efficient design. The permit application also included a low-profile flare as a backup control device during periods of RTO outage.

M&G is proposing to construct a PET plant, which features different equipment and operating parameters as compared to ExxonMobil's process. Although these two process types differ significantly, M&G is including a comparison of the proposed GHG BACT for the RTOs to ExxonMobil's in this section.

ExxonMobil is proposing to use one RTO as a control device with a low-profile flare as backup during RTO outages. In contrast, M&G is proposing to use two (redundant) RTOs for emission control. In doing so, 99% destruction of VOCs will be achieved (versus 98% in a flare) at all times.

M&G is proposing specific energy efficient RTO design options and a holistic, numeric energy efficiency-based BACT limit and monitoring methods as BACT for the RTOs. In addition, by selecting redundant RTOs (two), versus a combination of control device types (e.g., RTO and flare), the VOC destruction efficiency will be maximized for the waste streams routed to the RTOs.

Targa Gas Processing LLC – Longhorn Gas Plant

On February 17, 2012 Targa submitted a GHG permit application to EPA Region 6 requesting authorization of a new natural gas processing plant. This permit application included one RTO for which the applicant proposed the following BACT: use of natural gas as fuel gas, and proper RTO design, operation and maintenance. Targa also proposed a numeric BACT limit for total annual GHG emissions (12-month rolling average) and proposed monitoring fuel gas flow rate to demonstrate compliance.

M&G is also proposing fuel gas monitoring but is additionally proposing an energy efficiency-based numeric BACT limit which limits the fuel gas fired in the RTOs. In addition, by selecting redundant RTOs (two), the control device on-stream time and thus the overall VOC destruction efficiency will be maximized for the waste streams routed to the RTOs.

6.3 BACT FOR FLARE

6.3.1 Step 1: Identify All Available Control Technologies

Other than CCS, addressed in Section 6.1, the primary GHG control options available are selection of energy efficient and GHG-minimizing design options and implementation of select operation and maintenance procedures to ensure proper operation of the flares on an ongoing basis.

The following discussion lists those design elements and operating and maintenance practices that have been considered and selected to minimize GHG emissions. These individual elements are not being individually considered as BACT control options, rather overall unit design and operation to minimize GHG emissions is considered the BACT option. The individual elements' effects on overall flare efficiency are reflected in the proposed holistic energy efficiency-based BACT limit in Step 5, which limits the quantity of GHG emissions from each flare.

6.3.1.1 Design and Operating Elements that Minimize GHG Emissions

Minimization of Waste Gas to Flare

M&G is designing the PET plant with a biogas system which will provide beneficial reuse of biogas that would otherwise be routed to a flare for control. By incorporating a biogas fuel delivery system into the inherent process function, M&G's selected design will minimize the amount of process waste gas that could potentially be flared. The flare will simply serve as a backup for operating scenarios during which the biogas cannot be combusted as fuel gas in the heaters.

Flare Design and Operation

Good flare design ensures that the design hydrocarbon destruction and removal efficiency (DRE) is achieved under real world operating conditions. Specifically, the flare tip is being designed to accommodate maximum design waste gas flow rates and achieve optimal combustion profile at the flare tip (e.g., optimal air and waste gas mixing) to ensure at least 98% destruction (weight percent) of VOCs and 99% destruction of methane.

As addressed in the TCEQ permit application, the flare is being designed in accordance with the design requirements of 40 CFR 60.18. The flare is being designed so the maximum tip allowable velocity is not exceeded under normal operating conditions. Finally, the flare will be equipped with monitors to ensure that there is a pilot at all times that waste gas may be directed to the flare and it will also be equipped with a waste gas flow rate monitor.

6.3.2 Step 2: Eliminate Technically Infeasible Options

No BACT options are being eliminated in this step.

6.3.3 Step 3: Rank Remaining Control Technologies

No BACT options are being eliminated in this step.

6.3.4 Step 4: Evaluate Most Effective Controls and Document Results

No BACT options are being eliminated in this step.

6.3.5 Step 5: Select BACT

M&G proposes the selection of all available design and operational elements that minimize GHG emissions presented in Step 1 as BACT for the flare. Since the proposed design and operating elements, described in Step 1 above, are not independent features but are interdependent and represent an integrated energy efficiency strategy, M&G is proposing a BACT limit for the flare which takes into consideration the operation, variability and interaction of all these features in combination. A holistic BACT limit which accounts for the ultimate performance of the entire unit was chosen, rather than individual independent subsystem performance. Otherwise, monitoring and maintaining energy efficiency would be un-necessarily complex because the interdependent nature of operating parameters means that one parameter cannot necessarily be controlled independently without affecting the other operating parameters.

M&G proposes that the flare's annual GHG emission limit (tpy CO_2e), as presented in Appendix A, serve as the numerical BACT limit on a rolling 12-month basis.

M&G performed a search of the EPA's RACT/BACT/LAER Clearinghouse for flaring and found two entries which address BACT for GHG emissions from flares. The first entry is for a marine flare at the Sabine Pass LNG Terminal (see Appendix C). This entry lists BACT for GHGs as "proper plant operations and maintain the presence of the flame when the gas is routed to the flare." The second entry is for four wet/dry gas flares at the same facility. These units have an entry that identifies GHG BACT that is identical to the marine flare. Therefore, the proposed BACT for M&G's flare is consistent with these similar units.

A GHG BACT analysis was performed by other GHG permit applications submitted to EPA Region 6. A discussion of M&G's proposed BACT as compared to those projects is provided below.

Equistar La Porte – Olefins Expansion

The Equistar permit application proposes good flare design and operation (meeting 40 CFR 60.18), natural gas pilots and appropriate instrumentation as BACT. M&G is proposing BACT that is similar to, or the same as the one proposed by Equistar for its flares. As described in Step 5, M&G is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from the flares.

Chevron Phillips Chemical Company LP – Cedar Bayou Plant, New Ethylene Unit

The Chevron Phillips application proposes low carbon fuel gas (natural gas) for the flare pilot and supplemental gas and good combustion practices (in accordance with flare manufacturer) as BACT. M&G is proposing BACT that is similar to, or the same as the one proposed by Chevron Phillips. As described in Step 5, M&G is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from the flares.

ExxonMobil Baytown Olefins Plant

The ExxonMobil permit application proposes proper flare design and operation to maintain required waste gas heating value and tip velocity and selection of staged flaring with natural gas assist as BACT. M&G is proposing BACT that is similar to the one proposed by ExxonMobil; however, M&G is not proposing a staged flaring scheme. M&G is, instead, proposing to select design and operating elements described in Step 1 that minimize GHG emissions and is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from the flares.

ExxonMobil Mont Belvieu Plastics Plant

On May 21, 2012 ExxonMobil Chemical Company submitted a permit application to EPA Region 6 for the construction of a new polyethylene unit. The ExxonMobil permit application requests authorization of a new low profile flare and proposes proper flare operation and natural gas assist as BACT. M&G is proposing BACT that is similar to the one proposed by ExxonMobil. As described in Step 1, M&G is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from the flares.

Celanese Chemicals Clear Lake Plant Methanol Unit

The Celanese permit application proposed construction of a new flare for MSS activity and emergency use. Celanese Chemicals proposes good flare design with appropriate instrumentation and control as BACT for the flare. M&G is proposing BACT that is similar to the one proposed by Celanese Chemicals. As described in Step 1, M&G is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from the flares.

6.4 BACT FOR NATURAL GAS AND BIOGAS PIPING FUGITIVES

6.4.1 Step 1: Identify All Available Control Technologies

The following available control technologies for fugitive piping components emitting GHGs (primarily those in natural gas and biogas service) were identified:

- Installation of leakless technology components to eliminate fugitive emission sources.
- Implementing leak detection and repair (LDAR) programs (those used for VOC components) in accordance with applicable state and federal air regulations.
- Implement alternative monitoring using a remote sensing technology such as infrared camera monitoring.
- Implementing an audio/visual/olfactory (AVO) monitoring program typically used for non-VOC compounds.

6.4.2 Step 2: Eliminate Technically Infeasible Options

All the available options are considered technically feasible and have been used in industry as described below.

Leakless valves are primarily used where highly toxic or otherwise hazardous materials are present. Leakless valves are expensive in comparison to a standard (non-leakless) valve. These technologies are generally considered cost prohibitive except for specialized service.

LDAR programs are typically implemented for control of VOC emissions from materials in VOC service (at least 5 wt% VOC or HAP), however instrument monitoring may also be technically feasible for components in methane service, including the biogas and natural gas piping fugitives.

Remote sensing technologies have been proven effective in leak detection and repair, especially on larger pipeline-sized lines. The use of sensitive infrared camera technology has become widely accepted as a cost-effective means for identifying leaks of hydrocarbons depending on the number of sources.

AVO monitoring methods are also capable of detecting leaks from piping components as leaks can be detected by sound (audio) and sight. AVO programs are commonly used in industry and technically feasible for the GHG fugitives.

6.4.3 Step 3: Rank Remaining Control Technologies

AVO monitoring is as effective in detecting significant leaks as Method 21 instrument or remote sensing monitoring if AVO inspections are performed frequently enough. AVO detections can be performed very frequently, at lower cost and with less additional manpower and equipment than Method 21 instrument or remote sensing monitoring because it does not require a specialized piece of monitoring equipment. Therefore, for components in methane (natural gas or biogas) service AVO is considered the most preferred technically feasible alternative.

Remote sensing using infrared imaging has been accepted by EPA as an acceptable alternative to Method 21 instrument monitoring and leak detection effectiveness is expected to comparable. Although less manpower may be required for remote sensing compared to Method 21 depending on the number of sources, the frequency of monitoring is more limited than AVO because the number of simultaneous measurements will be limited by the availability of the remote sensing equipment.

Method 21 Instrument monitoring has historically been used to identify leaks in need of repair. However, instrument monitoring requires significant allocation of manpower as compared to AVO monitoring, while AVO is expected to be equally effective at identifying significant leaks.

Leakless technologies are effective in eliminating fugitive emissions from the locations where installed. However, because of their high cost, these specialty components are, in practice, selectively applied only as absolutely necessary to toxic or hazardous components.

6.4.4 Step 4: Evaluate Most Effective Controls and Document Results

The AVO monitoring option is expected to be effective in finding leaks, can be implemented at the greatest frequency and lower cost due to being incorporated into routine operations.

The use of Method 21 instrument leak detection is technically feasible, however the leak effectiveness, in comparison to AVO monitoring, is likely similar or less for components in methane service. However, Method 21 instrument monitoring is much more costly and requires much more manpower than AVO monitoring. In addition AVO monitoring can be done at a much greater frequency thus allowing detection of leaks more quickly.

Remote sensing monitoring has lower cost than Method 21 instrument monitoring but still much more costly than AVO. Typically, remote sensing is more applicable to larger potential emission sources that contain critical fugitive components with the potential for high volume leaks. In addition, remote sensing can be performed on a limited frequency because it requires specialized equipment. Remote sensing is not practicable for small fugitive sources

Leakless technologies have not been universally adopted as BACT for emission from fugitive piping components, even for hazardous services. Therefore, M&G believes that these technologies are not practical for control of GHG emissions from methane piping components.

6.4.5 Step 5: Select BACT

Please note the total GHG fugitive emissions are expected to be less than 0.01% of the total GHG emissions from the proposed PET plant. M&G proposes to perform weekly AVO monitoring of piping components that are in GHG service (natural gas and biogas service).

M&G performed a search of the EPA's RACT/BACT/LAER Clearinghouse for piping fugitive GHG emissions and found one entry which addresses BACT for GHG emissions from piping fugitives (see Appendix C). The Phillips 66 Company Alliance Refinery Hydrogen Plant Fugitives list BACT for GHGs as implementation of the Louisiana Refinery MACT LDAR program for total hydrocarbon. As discussed in the BACT comparison below for other Region 6 GHG applications, M&G's proposed weekly AVO monitoring is equally as effective and can be performed at greater frequency as instrument monitoring. Therefore, M&G's proposed BACT for fugitive components is as effective as BACT proposed in other applications.

A GHG BACT analysis was also performed by other GHG permit applications submitted to EPA Region 6. A discussion of M&G's proposed BACT as compared to those projects is provided below.

- **Equistar Channelview – Olefins I&II Expansions**
  - The Equistar applications request authorization of GHG emissions from piping components. These applications propose remote sensing of "pipeline sized" components that are not otherwise subject to Method 21 monitoring.

- **Equistar La Porte – Olefins Expansion**
  - The Equistar permit application proposes to employ TCEQ's 28 LAER fugitive leak detection and repair program for components "in CH4 service" as BACT, however "in CH4 service" is not defined in the application.

- **Chevron Phillips Chemical Company LP – Cedar Bayou Plant, New Ethylene Unit**
  - The Chevron Phillips application proposes as-observed AVO (audio/visual/olfactory) monitoring for natural gas and fuel gas piping components as BACT.

- **ExxonMobil Baytown Olefins Plant**
  - The ExxonMobil application proposes as-observed AVO (audio/visual/olfactory) monitoring for natural gas piping components and applicable TCEQ LDAR programs for components in VOC service as BACT.

- **ExxonMobil Mont Belvieu Plastics Plant**
  - ExxonMobil application proposes as-observed AVO (audio/visual/olfactory) monitoring for natural gas piping components and applicable TCEQ LDAR programs for components in VOC service as BACT.

- **INEOS USA LLC – Olefins Expansion**
  - The INEOS permit requires TCEQ's 28VHP LDAR program for fugitive piping components in methane service.

- **BASF FINA - NAFTA Region Olefins Complex**
  - The permit stipulates the use of TCEQ's 28LAER LDAR program for all fugitive emissions of methane.

M&G's proposed weekly AVO monitoring is equally as effective and can be performed at greater frequency as instrument monitoring. Therefore, M&G's proposed BACT for fugitive components is as effective as BACT proposed in other applications.

6.5 BACT FOR EMERGENCY ENGINES

The proposed project will include installation of a new, high efficiency emergency generators and firewater pumps. Use of these engines for purpose of maintenance checks and readiness testing will be limited to 100 hours per year each per the applicable New Source Performance

Standard for Stationary Compression Ignition Internal Combustion Engines.[24] As such, the engines will be required to meet specific emission standards based on engine size, model year, and end use.

The use of engines with a low annual capacity factor and performance of annual routine maintenance (as prescribed by the NSPS) is BACT for GHG emissions.

[24] *See* 40 CFR Part 60, Subpart IIII.

Table 6-1
Range of Approximate Annual Costs for Installation and Operation of Capture, Transport, and Storage Systems for Control of CO_2 Emissions from the Jumbo Project

Carbon Capture and Storage (CCS) Component System	Factors for Approximate Costs for CCS Systems	Annual System CO_2 Throughput (tons of CO_2 captured, transported, and stored) [1]	Pipeline Length for CO_2 Transport System (km CO_2 transported) [4]	Approximate Annualized Costs for CCS System ($)
Post-Combustion CO_2 Capture and Compression System	$103.00 / ton of CO_2 avoided [2]	820,242		$84,484,949
CO_2 Transport System	$ 1.81 / ton of CO_2 transported per 100 km [3]	820,242	285	$4,241,434
CO_2 Storage System	$ 9.33 / ton of CO_2 stored [3]	820,242		$7,649,463
Total Annualized Cost for CO_2 Capture, Transport, and Storage Systems				**$96,375,846**
Estimated Construction Cost of CCS System [5] (Does not include pipeline costs)				**Approximate Construction Costs for CCS System ($)** **$156,737,415**

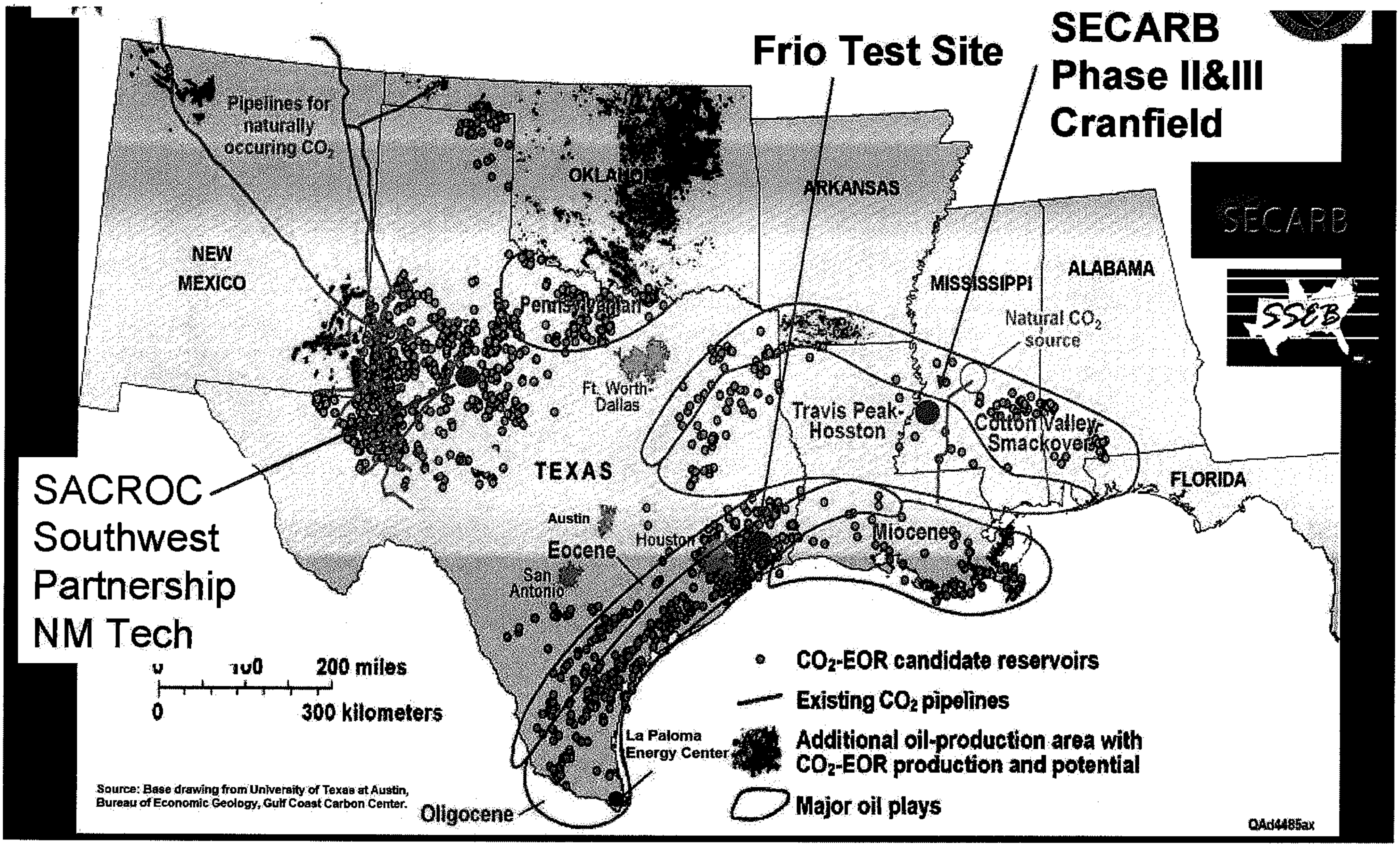
[1] Assumes the maximum possible annual CO_2 emissions scenario and assumes that a capture system would be able to capture 90% of the total CO_2 emissions generated by the PET Plant and the CHP Plant process stacks.

[2] These cost factors are from *Report of the Interagency Task Force on Carbon Captura and Storage*, pp.33, 34 (Aug. 2010) (http://www.fe.doe.gov/programs/sequestration/ccstf/CCSTaskForceReport2010.pdf). Reported costs in $/tonne of CO_2 avoided was converted to $/ton.

[3] These are cost factors are from *Report of the Interagency Task Force on Carbon Capture and Storage*, pp. 37 and 44 (Aug. 2010) (http://www.fe.doe.gov/programs/sequestration/ccstf/CCSTaskForceReport2010.pdf). The average cost factors were calculated as the arithmetic mean of the minimum and maximum factors provided in the document. Reported costs in $/tonne of CO_2 avoided were converted to $/ton. Cost estimates [for geologic storage of CO_2] are limited to capital and operational costs, and do not include potential costs associated with long-term liability (from p. 44).

[4] The length of the pipeline was assumad to ba the distance to the closest potential geologic storage site, as identified by the University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, available at: http://www.beg.utexas.edu/gccc/graphics/Basemap_state_lands_fp_lg.jpg (last visited Feb. 27, 2012).

[5] Construction cost estimate for CCS system from Cost and Performance Baseline for Fossil Energy Plants Volume 1: Bituminous Coal and Natural Gas to Electricity Revision 2, November 2010, DOE/NETL-2010/1397, pp. 474, 497, and 499).



SECARB
Phase II&III
Cranfield
Frio Test Site
SACROC
Southwest
Partnership
NM Tech
SECARB
SSEB
NEW MEXICO
OKLAHOMA
ARKANSAS
MISSISSIPPI
ALABAMA
FLORIDA
TEXAS
Pipelines for naturally occuring CO_2
Pennsylvanian
Ft. Worth-Dallas
Travis Peak-Hosston
Natural CO_2 source
Cotton Valley-Smackover
Austin
Houston
San Antonio
Eocene
Miocene
Oligocene
La Paloma Energy Center
0 100 200 miles
0 300 kilometers
CO_2-EOR candidate reservoirs
Existing CO_2 pipelines
Additional oil-production area with CO_2-EOR production and potential
Major oil plays
Source: Base drawing from University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center.
QAd4485ax

7.0 OTHER PSD REQUIREMENTS

7.1 IMPACTS ANALYSIS

An impacts analysis is not being provided with this application in accordance with EPA's recommendations:

> *Since there are no NAAQS or PSD increments for GHGs, the requirements in sections 52.21(k) and 51.166(k) of EPA's regulations to demonstrate that a source does not cause or contribute to a violation of the NAAQS are not applicable to GHGs. Therefore, there is no requirement to conduct dispersion modeling or ambient monitoring for CO_2 or GHGs.*[25]

An impacts analysis for non-GHG emissions is being submitted with the State/PSD/Non-attainment application submitted to the TCEQ.

7.2 GHG PRECONSTRUCTION MONITORING

A pre-construction monitoring analysis for GHG is not being provided with this application in accordance with EPA's recommendations:

> *EPA does not consider it necessary for applicants to gather monitoring data to assess ambient air quality for GHGs under section 52.21(m)(1)(ii), section 51.166(m)(1)(ii), or similar provisions that may be contained in state rules based on EPA's rules. GHGs do not affect "ambient air quality" in the sense that EPA intended when these parts of EPA's rules were initially drafted. Considering the nature of GHG emissions and their global impacts, EPA does not believe it is practical or appropriate to expect permitting authorities to collect monitoring data for purpose of assessing ambient air impacts of GHGs.*[26]

A pre-construction monitoring analysis for non-GHG emissions is being submitted with the State/PSD/Nonattainment application submitted to the TCEQ.

[25] EPA, *PSD and Title V Permitting Guidance For Greenhouse Gases* at 48-49.
[26] *Id.* at 49.

7.3 ADDITIONAL IMPACTS ANALYSIS

A PSD additional impacts analysis is not being provided with this application in accordance with EPA's recommendations:

> *Furthermore, consistent with EPA's statement in the Tailoring Rule, EPA believes it is not necessary for applicants or permitting authorities to assess impacts from GHGs in the context of the additional impacts analysis or Class I area provisions of the PSD regulations for the following policy reasons. Although it is clear that GHG emissions contribute to global warming and other climate changes that result in impacts on the environment, including impacts on Class I areas and soils and vegetation due to the global scope of the problem, climate change modeling and evaluations of risks and impacts of GHG emissions is typically conducted for changes in emissions 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 with current climate change modeling. Given these considerations, GHG emissions would serve as the more appropriate and credible proxy for assessing the impact of a given facility. Thus, EPA believes that the most practical way to address the considerations reflected in the Class I area and additional impacts analysis is to focus on reducing GHG emissions to the maximum extent. In light of these analytical challenges, compliance with the BACT analysis is the best technique that can be employed at present to satisfy the additional impacts analysis and Class I area requirements of the rules related to GHGs.*[27]

A PSD additional impacts analysis for non-GHG emissions is being submitted with the State/PSD/Nonattainment application submitted to the TCEQ.

[27] *Id.*

APPENDIX A

GHG EMISSION CALCULATIONS

Table A-1
Plantwide GHG Emission Summary
M&G Resins USA, LLC
PET Plant
February 2013

Name	EPN	Fuel	GHG Mass Emissions ton/yr	CO_2e ton/yr
HTF (Heat Transfer Fluid) Heater 1	E7-A	Natural Gas	65,545	65,608
HTF (Heat Transfer Fluid) Heater 2	E7-B	Natural Gas	65,545	65,608
HTF (Heat Transfer Fluid) Heater 3	E7-C	Natural Gas	65,545	65,608
HTF (Heat Transfer Fluid) Heater 4	E7-D	Natural Gas	65,545	65,608
HTF Heaters 1 through 4	E7-A through E7-D	Bio Gas [1]	6,762	6,766
		OSC Stream [1]	548	554
		EC Stream [1]	0.61	0.62
Biogas Flare	FLARE	Natural Gas	31.2	31.3
		Bio Gas [2]	6,704	6,929
RTO1	E1	Natural Gas	8,193	8,201
RTO1	E1	Waste Gas [3]	43,895	45,363
RTO2	E2	Natural Gas	8,193	8,201
RTO2	E2	Waste Gas [3]	43,895	45,363
Emergency Diesel Generator 1	E85-A	Diesel	2,577	2,585
Emergency Diesel Generator 2	E85-B	Diesel	2,577	2,585
Fire Water Pump Diesel Engine 1	E87-A	Diesel	248	249
Fire Water Pump Diesel Engine 2	E87-B	Diesel	248	249
Combined Plant Fugitives	FUGPTA and FUGPET	NA	387	427
		total =	***379,737***	***383,008***

Notes:
[1] The following fuel gas streams may be routed to any of the four process heaters: biogas, OSC stream, EC stream.
[2] Biogas is used as fuel gas in the heaters but may be flared during heater downtime. *Emissions from biogas flaring do not contribute to the total plant GHG emissions.* Rather, the total (sum) GHG emissions only includes GHG emissions from biogas combustion in the heaters. The GHG emissions shown are for the flare pilot.
[3] Waste gas from the PTA unit may be routed to either or both RTOs for combustion.

Table A-2
GHG Emission Calculations - Natural Gas Combustion
M&G Resins USA, LLC
PET Plant
February 2013

GHG Emissions Contribution From Natural Gas Fired Combustion Sources (EPNs E7-A to D, E1 and E2 and Flare):

Source Type	Average Heat Input/Unit (MMBtu/hr)	Annual Operation (hrs/yr)	Annual Avg Heat Input, Each Unit (MMBtu/yr)	Pollutant	Emission Factor (kg/MMBtu)[1]	Emissions per Unit: GHG Mass Emissions[2] (metric ton/yr)	Emissions per Unit: GHG Mass Emissions (ton/yr)	Emissions per Unit: Global Warming Potential[3]	Emissions per Unit: CO_2e (metric ton/yr)	Emissions per Unit: CO_2e (tpy)
HTF Heaters 1 through 4 (each)	128	8,760	1,121,280	CO_2	53.02	59,450	65,544	1	59,450	65,544
				CH_4	1.0E-03	1.12	1.24	21	23.55	25.96
				N_2O	1.0E-04	0.11	0.12	310	34.76	38.32
					Totals	**59,451**	**65,545**		**59,509**	**65,608**
RTO1 or RTO2 (each)	16	8,760	140,160	CO_2	53.02	7,431	8,193	1	7,431	8,193
				CH_4	1.0E-03	0.14	0.15	21	2.94	3.25
				N_2O	1.0E-04	0.01	0.02	310	4.34	4.79
					Totals	**7,431**	**8,193**		**7,439**	**8,201**
Biogas Flare	0.06	8,760	534	CO_2	53.02	28	31	1	28	31
				CH_4	1.0E-03	5.34E-04	5.89E-04	21	0.011	0.012
				N_2O	1.0E-04	5.34E-05	5.89E-05	310	0.017	0.018
					Totals	**28.3**	**31.2**		**28.4**	**31.3**

Notes:

1. CO2 GHG factor from Table C-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting (GHG MRR).
CH4 and N2O GHG factors based on Table C-2 of GHG MRR.
2. CO_2 emissions based on 40 CFR Part 98, Subpart C, Equation C-1.
CH_4 and N_2O emissions based on 40 CFR Part 98, Subpart C, Equation C-8.
3. Global Warming Potential factors based on Table A-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.

Sample Calculation: Pyrolysis Furnaces - CO_2:

GHG Mass Emissions (metric ton/yr) = 0.001 x 1121280 (MMBtu/yr) x 53.02 kg/MMBtu = 59450
CO2e (metric ton/yr) = 59450 (metric ton/yr) x 1 = 59450.3

Table A-3
GHG Emission Calculations - Fuel Gas Combustion in Heaters (EPNs E7-A through E7-D)
M&G Resins USA, LLC
PET Plant
February 2013

Fuel Gas Stream Data:

Variable	Value, by Stream: Bio Gas	Organic Stripping Column (OSC) Stream	Esterification Column (EC) Stream	Units	Reference
HHV	617	153	0.27	Btu/scf	design specification
Carbon Content (Annual Avg)	0.471	8.00E-03	9.50E-06	kg C/kg	design specification
Molecular Weight (Annual Avg)	24.59	20.58	32.0	kg/kg-mol	design specification

GHG Emissions Contribution From Fuel Gas Fired Combustion in Heaters (EPNs E7-A through E7-D):

Fuel Gas Type	Average Heat Input/Unit (MMBtu/hr)	Annual Average BioGas Usage/Unit[1] (MMscf/hr)	Annual Operation (hrs/yr)	Annual Average Fuel Use, Each Unit (scf/yr)	Annual Average Heat Input, Each Unit (MMBtu/yr)	Pollutant	Emission Factor (kg/MMBtu)[2]	Emissions per Fuel Gas Stream: GHG Mass Emissions[3] (metric ton/yr)	GHG Mass Emissions (ton/yr)	Global Warming Potential[4]	CO_2e (metric ton/yr)	CO_2e (tpy)
Bio Gas	8.63	0.014	8,760	1.23E+08	7.56E+04	CO_2		6133.2	6761.9	1	6133.2	6761.9
						CH_4	1.0E-03	0.076	0.083	21	1.59	1.75
						N_2O	1.0E-04	0.008	0.008	310	2.34	2.58
							Totals	**6133.3**	**6761.9**		**6137.1**	**6766.2**
OSC Stream	12.22	0.080	8,760	7.00E+08	1.07E+05	CO_2		497.1	548.1	1	497.1	548.1
						CH_4	1.0E-03	0.107	0.118	21	2.25	2.48
						N_2O	1.0E-04	0.011	0.012	310	3.32	3.66
							Totals	**497.2**	**548.2**		**502.7**	**554.2**
EC Stream	0.013	0.048	8,760	4.22E+08	1.14E+02	CO_2		0.55	0.61	1	0.55	0.61
						CH_4	1.0E-03	0.00011	0.00013	21	0.0024	0.0026
						N_2O	1.0E-04	0.00001	0.00001	310	0.0035	0.0039
							Totals	**0.55**	**0.61**		**0.56**	**0.62**
Total, All Fuel Gas Combustion								***6,631.1***	***7,310.7***		***6,640.4***	***7321.0***

Notes:

1. Fuel use calculated as: MMscf/hr = Firing rate (MMBtu/hr) / HHV (Btu/scf)

2. CH_4 and N_2O GHG factors based on Table C-2 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.
CH_4 and N_2O emissions based on 40 CFR Part 98, Subpart C, Equation C-8.
*CH_4 / N_2O = 1E-03 * Fuel * HHV * EF*

3. CO_2 emissions based on 40 CFR Part 98, Subpart C, Equation C-5.
*CO_2 = 44/12 * Fuel * CC* MW / MVC *0.001*
CO_2 = CO_2 emitted from fuel combustion, metric tons/yr
Fuel = volume of fuel, scf/yr
CC = Annual average carbon content of fuel (kg C per kg)
MW = annual average molecular weight of fuel (kg/kg-mole)
MVC = molar volume conversion factor = 849.5 scf/kg-mole @ std cond.
0.001 = conversion factor from kg to metric tons

4. Global Warming Potential factors based on Table A-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.

Sample Calculation: Heaters - CO_2:

GHG Mass Emissions (metric ton/yr) = (44/12) x 1.23E+08 (scf/yr) x 0.4714 kg C/kg x 24.59 kg/kg-mol / 849.5 scf/kg-mole @ std cond. x 0.001 = 6.13E+03
CO2e (metric ton/yr) = 6.13E+03 (metric ton/yr) x 1 = 6.13E+03

Table A-4

GHG Emission Calculations - RTO Waste Gas Combustion

M&G Resins USA, LLC

PET Plant

February 2013

RTO Waste Gas Data:

Variable	Value	Units	Reference
Carbon content (annual avg)	0.0061	kg C/kg	design data for RTO inlet stream
Molecular Weight (annual avg)	26.8	kg/kmol	

GHG Emissions from Waste Gas Combustion from RTOs (EPNs E1 and E2):

Source Type	Annual Avg Waste gas flow rate (scf/yr)	Pollutant	GHG Mass Emissions[2] (metric ton/yr)	GHG Mass Emissions[2] (ton/yr)	Global Warming Potential[3]	CO_2e (metric ton/yr)	CO_2e (tpy)
RTO1 or RTO2 (each)	5.66E+10	CO_2	39,754	43,828	1	39,754	43,828
		CH_4	60	67	21	1,268	1,398
		N_2O	0.40	0.44	310	123	136
		Totals	**39,814**	**43,895**		**41,145**	**45,363**

Notes:

1. *CH_4 and $N_2\dot{O}$ GHG factors based on Table C-2 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.*
2. *CO_2 emissions based on 40 CFR Part 98, Subpart Y Equation Y-1a*

*CO_2 = 0.99 * 0.001 * 44/12 * RTOGas * CC* MW / MVC*

where:

CO_2 = CO_2 emitted from RTO waste gas combustion, metric tons/yr

RTOGas = volume of RTO waste gas combusted, scf/yr

CC = Annual average carbon content of waste gas (kg C per kg)

MW = annual average molecular weight of waste gas (kg/kg-mole)

MVC = molar volume conversion factor = 849.5 scf/kg-mole @ std cond.

0.001 = conversion factor from kg to metric tons

0.99 = RTO VOC destruction efficiency

Table A-4
GHG Emission Calculations - RTO Waste Gas Combustion
M&G Resins USA, LLC
PET Plant

CH_4 emissions based on 40 CFR Part 98, Subpart Y Equation Y-4

$CH_4 = (CO_2 * EF_{CH4}/EF) + CO_2 * (0.01/0.99) * (16/44) * f_{CH4}$

where:

CH_4 = CH_4 emitted from RTO waste gas combustion, metric tons/yr

EF_{CH4} = CH_4 emission factor for "Petroleum Products", Table C–2 of Subpart C = 3.0E-03 *kg CH_4/MMBtu*

EF = Default CO_2 emission factor for waste gas of 60 kg CO_2/MMBtu (HHV basis).

CO_2 = Emission rate of CO_2 from waste gas (metric tons/yr)

0.01/0.99 = Correction factor for RTO VOC destruction efficiency.

16/44 = Correction factor ratio of the molecular weight of CH_4 to CO_2.

f_{CH4} = Weight frac. of carbon in the waste gas that is contributed by methane (kg CH_4/kg C); default is 0.4

N_2O emissions based on 40 CFR Part 98, Subpart Y Equation Y-5

$N_2O = (CO_2 * EF_{N2O}/EF)$

where:

N_2O = N_2O emitted from RTO waste gas combustion, metric tons/yr

EF_{N2O} = N_2O emission factor for "Petroleum Products", Table C–2 of Subpart C = 6.0E-04 *kg N_2O/MMBtu*

EF = Default CO_2 emission factor for waste gas of 60 kg CO_2/MMBtu (HHV basis).

CO_2 = Emission rate of CO_2 from RTO waste gas (metric tons/yr)

3. Global Warming Potential factors based on Table A-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.

<u>Sample Calculations, CO_2:</u>

GHG Mass Emissions = 44/12 x 5.66E+10 (scf/yr) x 0.00614 (kg C/kg) x (26.8 (kg/mol) / 849.5 scf/kg-mole @ std cond.) x 0.001 x 0.98

= 3.98E+04 (metric ton/yr)

CO2e Emissions (from CO2) = 3.98E+04 (metric ton/yr) x 1 = 3.98E+04 (metric ton/yr)

Table A-5
GHG Emission Calculations - Bio Gas Combustion in Flare
M&G Resins USA, LLC
PET Plant
February 2013

Bio Gas Data:

Variable	Value	Units	Reference
Carbon content (annual avg)	0.4714	kg C/kg	design data
Molecular Weight (annual avg)	24.6	kg/kmol	design data

GHG Emissions from Bio Gas Combustion in Flare (EPN Flare):

Source Type	Annual Avg Waste gas flow rate (scf/yr)	Pollutant	GHG Mass Emissions[2] (metric ton/yr)	GHG Mass Emissions (ton/yr)	Global Warming Potential[3]	CO_2e (metric ton/yr)	CO_2e (tpy)
Biogas Flare	1.23E+08	CO_2	6072	6694	1	6072	6694
		CH_4	9.2	10.2	21	193.7	213.6
		N_2O	0.061	0.067	310	18.823	20.752
		Totals	**6081**	**6704**		**6284**	**6929**

Notes:

1. *CH_4 and N_2O GHG factors based on Table C-2 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.*
2. *CO_2 emissions based on 40 CFR Part 98, Subpart Y Equation Y-1a*

CH_4 emissions based on 40 CFR Part 98, Subpart Y Equation Y-4

$CH_4 = (CO_2 * EF_{CH4}/EF) + CO_2 * (0.01/0.99) * (16/44) * f_{CH4}$

where:

CH_4 = CH_4 emitted from RTO waste gas combustion, metric tons/yr

EF_{CH4} = CH_4 emission factor for "Petroleum Products", Table C–2 of Subpart C = 3.0E-03 *kg CH_4/MMBtu*

EF = Default CO_2 emission factor for waste gas of 60 *kg CO_2/MMBtu (HHV basis).*

CO_2 = Emission rate of CO_2 from waste gas (metric tons/yr)

0.01/0.99 = Correction factor for RTO VOC destruction efficiency.

Table A-5
GHG Emission Calculations - Bio Gas Combustion in Flare
M&G Resins USA, LLC
PET Plant

16/44 = Correction factor ratio of the molecular weight of CH_4 to CO_2.

f_{CH4} = Weight frac. of carbon in the waste gas that is contributed by methane (kg CH_4/kg C); default is 0.4

N_2O emissions based on 40 CFR Part 98, Subpart Y Equation Y-5

$N_2O = (CO_2 * EF_{N2O}/EF)$

where:

N_2O = N_2O emitted from RTO waste gas combustion, metric tons/yr

EF_{N2O} = N_2O emission factor for "Petroleum Products", Table C–2 of Subpart C = 6.0E-04 *kg N_2O/MMBtu*

EF = Default CO_2 emission factor for waste gas of 60 *kg CO_2/MMBtu (HHV basis)*

CO_2 = Emission rate of CO_2 from RTO waste gas (metric tons/yr)

3. Global Warming Potential factors based on Table A-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.

<u>Sample Calculations, CO_2:</u>

GHG Mass Emissions = 44/12 x 1.23E+08 (scf/yr) x 0.4714 (kg C/kg) x (24.6 (kg/mol) /
(849.5 scf/kg-mole @ std cond.) x 0.001 x 0.98
= 6.07E+03 (metric ton/yr)

CO2e Emissions (from CO2) = 6.07E+03 (metric ton/yr) x 1 = 6.07E+03 (metric ton/yr)

Table A-6
GHG Emission Calculations - Emergency Engines
M&G Resins USA, LLC
PET Plant
February 2013

Diesel Emergency Engine Specifications:

Variable	Value, by Engine:				Units	Reference
	Engine 1	Engine 2	Engine 3	Engine 4		
Annual Operating Schedule	100	100	100	100	hours/year	NSPS IIII Limitation
Power Rating	5,361	5,361	420	420	hp	Design Specs
Brake Specific Fuel Consumption	5,894	5,894	7,254	7,254	Btu/hp-hr	Design Specs

GHG Emissions Contribution From Diesel Combustion in Engines (EPN E85-A and B and 87-A and B):

Source	Heat Input (MMBtu/hr)	Pollutant	Emission Factor (kg/MMBtu)[1]	GHG Mass Emissions[3] (metric ton/yr)	GHG Mass Emissions (ton/yr)	Global Warming Potential[2]	CO_2e (metric ton/yr)	CO_2e (tpy)
Emergency Diesel Generator 1	316.0	CO_2	73.96	2,337	2,577	1	2,337	2,577
		CH_4	3.0E-03	0.095	0.10	21	1.99	2.19
		N_2O	6.0E-04	0.019	0.02	310	5.88	6.48
Emergency Diesel Generator 2	316.0	CO_2	73.96	2,337	2,577	1	2,337	2,577
		CH_4	3.0E-03	0.095	0.10	21	1.99	2.19
		N_2O	6.0E-04	0.019	0.02	310	5.88	6.48
Fire Water Pump Diesel Engine 1	30.5	CO_2	73.96	225	248	1	225	248
		CH_4	3.0E-03	0.0091	0.010	21	0.19	0.21
		N_2O	6.0E-04	0.0018	0.0020	310	0.57	0.62
Fire Water Pump Diesel Engine 2	30.5	CO_2	73.96	225	248	1	225	248
		CH_4	3.0E-03	0.009	0.010	21	0.19	0.21
		N_2O	6.0E-04	0.0018	0.0020	310	0.57	0.62
Total, Emergency Engines			**Totals**	***5,125***	***5,650***		***5,142***	***5,669***

Notes:

1. *GHG factors based on Tables C-1 and C-2 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.*
2. *Global Warming Potential factors based on Table A-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.*
3. *Annual Emission Rate = Heat Input x Emission Factor x 0.001 metric ton/kg x hours/year*

Sample Calculation: Diesel Combustion - CO_2:

GHG Mass Emissions (metric ton/yr) = 316 (MMBtu/hr) x 73.96 kg/MMBtu x 0.001 x 100 hours/year = 2337
CO2e (metric ton/yr) = 2337 (metric ton/yr) x 1 = 2337

Table A-7
GHG Emission Calculations - Process Fugitives
M&G Resins USA, LLC
PET Plant
February 2013

GHG emissions from process piping and components for fugitives (EPNs PTAFUG and PETFUG).

Components in service with streams with vp ≥ 0.147 psia

Component Type	Material type	# Components [1]	SOCMI without Ethylene Emission Factor (lb/hr/component)	Control Method [2]	28VHP Control Efficiency (%)	CO2 Emissions	
						CO_2 Mass Fraction	(tpy)
Valves	Gas/Vapor	730	0.0089	-	97	5.44E-03	4.65E-03
	Light Liquid	899	0.0035	-	97	5.20E-06	2.15E-06
	Heavy Liquid	2629	0.0007	-	0	0.00E+00	0.00E+00
Flanges	Gas/Vapor	613	0.0029	A	97	2.27E-03	5.30E-04
	Light Liquid	987	0.0005	A	97	3.65E-06	2.37E-07
	Heavy Liquid	4739	0.00007	A	97	0.00E+00	0.00E+00
Pumps	Light Liquid	86	0.0386	-	85	1.70E-04	3.71E-04
	Heavy Liquid	73	0.0161	-	0	0.00E+00	0.00E+00
Compressors	Gas/Vapor	0	0.5027	-	85	0.00E+00	0.00E+00
Relief Valves	All	130	0.2293	-	97	5.79E-04	2.27E-03
Open Ended Lines	All	0	0.004	B	100	0.00E+00	0.00E+00
Sampling Connections	All	0	0.033	-	97	0.00E+00	0.00E+00
TOTAL							**7.82E-03**
GHG Mass-Based Emissions							7.82E-03
Global Warming Potential							1
CO_2e Emissions							7.82E-03

Components in service with streams with 0.0147 psia ≤ vp < 0.147 psia

Component Type	Material type	# Components [1]	SOCMI Non-Leaker	Control Method [2]	Control Efficiency (%)	CO2 Emissions	
						CO_2 Mass Fraction	(tpy)
Valves	Gas/Vapor	330	0.00029	-	0	1.91E-03	7.99E-04
	Light Liquid	0	0.00036	-	0	0.00E+00	0.00E+00
	Heavy Liquid	46	0.0005	-	0	0.00E+00	0.00E+00
Flanges	Gas/Vapor	1016	0.00018	-	0	1.82E-03	1.46E-03
	Light Liquid	0	0.00018	-	0	0.00E+00	0.00E+00
	Heavy Liquid	140	0.00018	-	0	0.00E+00	0.00E+00
Pumps	Light Liquid	0	0.0041	-	0	0.00E+00	0.00E+00
	Heavy Liquid	18	0.0046	-	0	1.44E-03	5.24E-04
Compressors	Gas/Vapor	0	0.1971	-	0	0.00E+00	0.00E+00
Relief Valves	All	27	0.0986	-	0	2.31E-03	2.69E-02
Open Ended Lines	All	0	0.0033	B	100	0.00E+00	0.00E+00
Sampling Connections	All	0	0.033	-	0	0.00E+00	0.00E+00
TOTAL							**2.97E-02**
GHG Mass-Based Emissions							2.97E-02
Global Warming Potential							1
CO_2e Emissions							2.97E-02

Components in service with streams with vp < 0.0147 psia

Component Type	Material type	# Components [1]	SOCMI without Ethylene Emission Factor (lb/hr/component)	Control Method [2]	AVO Control Efficiency (%)	CO2 Emissions	
						CO_2 Mass Fraction	(tpy)
Valves	Gas/Vapor	132	0.0089	-	97	6.06E-03	9.36E-04
	Light Liquid	0	0.0035	-	97	0.00E+00	0.00E+00
	Heavy Liquid	1244	0.0007	-	97	3.47E-07	3.97E-08
Flanges	Gas/Vapor	257	0.0029	-	97	6.06E-03	5.93E-04
	Light Liquid	0	0.0005	-	97	0.00E+00	0.00E+00
	Heavy Liquid	1735	0.00007	-	97	8.91E-08	1.42E-09
Pumps	Light Liquid	0	0.0386	-	93	0.00E+00	0.00E+00
	Heavy Liquid	85	0.0161	-	93	1.25E-03	5.25E-04
Compressors	Gas/Vapor	2	0.5027	-	95	5.85E-03	1.29E-03
Relief Valves	All	51	0.2293	-	97	2.97E-03	4.56E-03
Open Ended Lines	All	0	0.004	B	100	0.00E+00	0.00E+00
Sampling Connections	All	0	0.033	-	97	0.00E+00	0.00E+00
TOTAL							**7.90E-03**
GHG Mass-Based Emissions							7.90E-03
Global Warming Potential							1
CO_2e Emissions							7.90E-03

Notes:
[1] Estimated quantity of fugitive components based on preliminary design information and used for emission calculation purposes only.
[2] Control methods are either the 28 VHP leak detection and repair program.

Table A-8

GHG Emissions Calculations - Natural Gas Piping Fugitives
M&G Resins USA, LLC
PET Plant
February 2013

GHG emissions from natural gas piping and components for fugitives (EPNs PTAFUG and PETFUG).

EPNs	Source Type	Fluid State	Count	Emission Factor[1] scf/hr/comp	CO_2[2] (tpy)	Methane[3] (tpy)	Total (tpy)
FUGPTA and FUGPET	Valves	Gas/Vapor	600	0.121	0.45	12.74	
	Flanges	Gas/Vapor	2400	0.017	0.26	7.16	
	Relief Valves	Gas/Vapor	5	0.193	0.006	0.17	
	Sampling Connections	Gas/Vapor	10	0.031	0.0019	0.054	
	Compressors	Gas/Vapor	3	0.30	0.005631	0.1579	
GHG Mass-Based Emissions					0.72	20.27	***21.0***
Global Warming Potential[4]					1	21	
CO_2e Emissions					0.72	425.8	***426.5***

Notes

1. Emission factors from Table W-1A of 40 CFR 98 Mandatory Greenhouse Gas Reporting included in the August 3, 2012 Technical Corrections
2. CO_2 emissions based on vol% of CO_2 in natural gas 1.25%
3. CH_4 emissions based on vol% of CH_4 in natural gas 96.13%
4. Global Warming Potential factors based on Table A-1 of 40 CFR 98 Mandatory Greenhouse Gas Reporting.

Example Calculation

600 valves	0.123 scf gas	0.0125 scf CO2	lbmole	44 lb CO_2	8760 hr	ton
	hr * valve	scf gas	385 scf	lbmole	yr	2000 lb

= 0.45 ton/yr

APPENDIX B

PSD NETTING TABLES

TCEQ

TABLE 1F
AIR QUALITY APPLICATION SUPPLEMENT

Permit No.:	TBD	Application Submittal Date:	02/28/2013
Company	M&G Resins USA, LLC		
RN:	TBD	Facility Location:	
City	Corpus Christi	County:	Nueces
Permit Unit I.D.:	TBD ☑ New Major Source ☐ Modification	Permit Name:	TBD
Permit Activity:			
Project or Process Description:	PET Plant		

Complete for all pollutants with a project emission increase.	POLLUTANTS						
	Ozone		CO	SO_2	PM	GHG	CO_2e
	NOx	VOC					
Nonattainment? (yes or no)						No	No
Existing site PTE (tpy)	This form for GHG only					>100,000	>100,000
Proposed project increases (tpy from 2F)						379,737	383,008
Is the existing site a major source? If not, is the project a major source by itself? (yes or no)	Yes						
If site is major, is project increase significant? (yes or no)						Yes	Yes
If netting required, estimated start of construction:		3/1/14					
5 years prior to start of construction:		NA	Contemporaneous				
estimated start of operation:		NA	Period				
Net contemporaneous change, including proposed project, from Table 3F (tpy)						379,737	383,008
FNSR applicable? (yes or no)						Yes	Yes

2. Nonattainment major source is defined in Table 1 in 30 TAC 116.12(11) by pollutant and county. PSD thresholds are found in 40 CFR §51.166(b)(1).
3. Sum of proposed emissions minus baseline emissions, increases only.
4. Since there are no contemporaneous decreases which would potentially affect PSD applicability and an impacts analysis is not required for GHG emissions, contemporaneous emission changes are not included on this table.

The presentations made above and on the accompanying tables are true and correct to the best of my knowledge.

Signature | Title | Date

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	GHG Mass Emissions					**Permit:** TBD				
Baseline Period:			N/A	to		N/A				
					A	**B**				
	Affected or Modified Facilities[2] FIN	EPN	**Permit No.**	**Actual Emissions[3]**	**Baseline Emissions[4]**	**Proposed Emissions[5]**	**Projected Actual Emissions**	**Difference (B - A)[6]**	**Correction[7]**	**Project Increase[8]**
1		E7-A through E7-D		0.00	0.00	269,492		269,492		269,492
2		Flare - Normal		0.00	0.00	31.2		31.2		31.2
3		Flare - Biogas		0.00	0.00	6,704.5		6,704.5		6,704.5
4		E1		0.00	0.00	52,089		52,089		52,089
5		E2		0.00	0.00	52,089		52,089		52,089
6		E85-A		0.00	0.00	2,577		2,577		2,577
7		E85-B		0.00	0.00	2,577		2,577		2,577
8		E87-A		0.00	0.00	248		248		248
9		E87-B		0.00	0.00	248		248		248
10		FUGPTA and FUGPET		0.00	0.00	386.87		386.87		386.87
Note:							**Total [1] =**			**379,737**

[1] Line 3 is not included in the total emission summation. These are potential emissions for biogas combustion in the flare, as backup to uatural gas combustion in the heaters. The summation includes GHG emissions from biogas combustion in the heaters (as a fuel gas).

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant(1):	CO2e				Permit:	TBD			
Baseline Period:			N/A	to	N/A				
				A	B				
Affected or Modified Facilities(2) FIN	EPN	Permit No.	Actual Emissions(3)	Baseline Emissions(4)	Proposed Emissions(5)	Projected Actual Emissions	Difference (B - A)(6)	Correction(7)	Project Increase(8)
1	E7-A through E7-D		0.00	0.00	269,754		269,754		269,754
2	Flare - Normal		0.00	0.00	31.3		31.3		31.3
3	Flare - Biogas		0.00	0.00	6,928.6		6,928.6		6,928.6
4	E1		0.00	0.00	53,564		53,564		53,564
5	E2		0.00	0.00	53,564		53,564		53,564
6	E85-A		0.00	0.00	2,585		2,585		2,585
7	E85-B		0.00	0.00	2,585		2,585		2,585
8	E87-A		0.00	0.00	249		249		249
9	E87-B		0.00	0.00	249		249		249
10	FUGPTA and FUGPET		0.00	0.00	426.52		426.52		426.52
	Summary of Contemporaneous Changes					Total [1] =			**383,008**

Note:

[1] Line 3 is not included in the total emission summation. These are potential emissions for biogas combustion in the flare, as backup to natural gas combustion in the heaters. The summation includes GHG emissions from biogas combustion in the heaters (as a fuel gas).

APPENDIX C

RBLC SEARCH RESULTS

Previous Page

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.
Required fields are denoted by "+".

Facility Information: SABINE PASS LNG TERMINAL

RBLC ID:	LA-0257
+Corporate/Company Name:	SABINE PASS LNG, LP & SABINE PASS LIQUEFACTION, LL
+Facility Name:	SABINE PASS LNG TERMINAL
Facility County:	CAMERON
Facility State:	LA
Facility ZIP Code:	70631
Facility Country:	USA
Facility Contact Name:	PATRICIA OUTTRIM
Facility Contact Phone:	713-375-5212
Facility Contact Email:	PAT.OUTTRIM@CHENIERE.COM
EPA Region:	6
Agency Code:	LA001
Agency Name:	LOUISIANA DEPARTMENT OF ENV QUALITY
Agency Contact:	MR. BRYAN D. JOHNSTON
Agency Phone:	(225)219-3450
Agency Email:	BRYAN.JOHNSTON@LA.GOV
Other Agency Contact Info:	Permit writer: Dan Nguyen
+Permit Number:	PSD-LA-703(M3)
+SIC Code:	4925
NAICS Code:	221210
Facility Registry System Number:	110030770351
Application Accepted Received Date:	12/22/2010 ACT
Permit Issuance Date:	12/06/2011 ACT
Date determination entered in RBLC:	01/23/2012
Date determination last updated:	05/11/2012
Permit Type:	B: Add new process to existing facility
Permit URL:	
Facility Description:	A liquefaction section of the terminal which will include 24 compressor turbines, two generator turbines, two generator engines, flares, acid gas vents, and fugitives
Permit Notes:	

Affected Boundaries: SABINE PASS LNG TERMINAL

Facility-wide Emissions: SABINE PASS LNG TERMINAL

+Pollutant Name:	None
Facility-wide Emissions Increase:	

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Generator Engines (2)
+Process Type:	17.130
Primary Fuel:	Natural Gas
Throughput:	2012.00
Throughput Unit:	hp
Process Notes:	

Pollutant Information: SABINE PASS LNG TERMINAL - Generator Engines (2)

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	EPA/OAR Mthd 5 and 202
+Control Method Code:	P
+Control Method Description:	fueled by natural gas
Emission Limit 1:	0.7500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.1700
Emission Limit 2 Unit:	TONS/YEAR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	also for PM10 and PM2.5

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 7E
+Control Method Code:	P
+Control Method Description:	Comply with 40 CFR 60 Subpart JJJJ
Emission Limit 1:	9.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	2.2200
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	2.0000
Standard Emission Limit Unit:	GRAM/B-HP-H
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	

Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	P
+Control Method Description:	Comply with 40 CFR 60 Subpart JJJJ
Emission Limit 1:	19.5100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	4.4300
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	4.0000
Standard Emission Limit Unit:	LB/B-HP-H
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Volatile Organic Compounds (VOC)

Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	EPA/OAR Mthd 25A
+Control Method Code:	P
+Control Method Description:	Comply with 40 CFR 60 Subpart JJJJ
Emission Limit 1:	4.4300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	1.1100
Emission Limit 2 Unit:	TONS/YEAR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	1.0000
Standard Emission Limit Unit:	GRAM/B-HP-H
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	Fueled by natural gas, good combustion/operating practices
Emission Limit 1:	412.0000
Emission Limit 1 Unit:	TONS/YR

Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Simple Cycle Refrigeration Compressor Turbines (16)
+Process Type:	15.110
Primary Fuel:	Natural Gas
Throughput:	286.00
Throughput Unit:	MMBTU/H
Process Notes:	GE LM2500+G4

Pollutant Information: SABINE PASS LNG TERMINAL - Simple Cycle Refrigeration Compressor Turbines (16)

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	EPA/OAR Mthd 5 and 202
+Control Method Code:	P

+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	2.0800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	also for PM10 and PM2.5

+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	EPA/OAR Mthd 25A
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	0.6600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 20
+Control Method Code:	P
+Control Method Description:	water injection
Emission Limit 1:	22.9400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	20.0000
Standard Emission Limit Unit:	PPMV
Standard Limit Avg. Time/Condition:	AT 15% O2

+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	43.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	58.4000
Standard Emission Limit Unit:	PPMV
Standard Limit Avg. Time/Condition:	AT 15% OXYGEN
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	
+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	Good combustion/operating practices and fueled by natural gas - use GE LM2500+G4 turbines
Emission Limit 1:	4872107.0000
Emission Limit 1 Unit:	TONS/YR
Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM FROM THE FACILITYWIDE
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	CO2(e)

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Combined Cycle Refrigeration Compressor Turbines (8)
+Process Type:	15.210
Primary Fuel:	natural gas
Throughput:	286.00
Throughput Unit:	MMBTU/H
Process Notes:	GE LM2500+G4

Pollutant Information: SABINE PASS LNG TERMINAL - Combined Cycle Refrigeration Compressor Turbines (8)

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	EPA/OAR Mthd 5 and 202
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	2.0800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No

Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	also for PM10 and PM2.5
+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	EPA/OAR Mthd 25A
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	0.6600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	
+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102

Test Method:	EPA/OAR Mthd 20
+Control Method Code:	P
+Control Method Description:	water injection
Emission Limit 1:	22.9400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	20.0000
Standard Emission Limit Unit:	PPMV
Standard Limit Avg. Time/Condition:	AT 15% O2
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	43.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0

Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	58.4000
Standard Emission Limit Unit:	PPMV
Standard Limit Avg. Time/Condition:	AT 15% O2
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	Good combustion/operating practices and fueled by natural gas - use GE LM2500+G4 turbines
Emission Limit 1:	4872107.0000
Emission Limit 1 Unit:	TONS/YEAR
Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM FROM THE FACILITYWIDE
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	

+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	co2(e)

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Simple Cycle Generation Turbines (2)
+Process Type:	15.110
Primary Fuel:	Natural Gas
Throughput:	286.00
Throughput Unit:	MMBTU/H
Process Notes:	GE LM2500+G4

Pollutant Information: SABINE PASS LNG TERMINAL - Simple Cycle Generation Turbines (2)

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	EPA/OAR Mthd 5 and 202
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	2.0800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	also for PM10 and PM2.5

+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	EPA/OAR Mthd 25A
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	0.6600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 20
+Control Method Code:	P
+Control Method Description:	water injection
Emission Limit 1:	28.6800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	25.0000
Standard Emission Limit Unit:	PPMV
Standard Limit Avg. Time/Condition:	AT 15% O2
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	

Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	P
+Control Method Description:	Good combustion practices and fueled by natural gas
Emission Limit 1:	17.4600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	25.0000
Standard Emission Limit Unit:	PPMV
Standard Limit Avg. Time/Condition:	AT 15% O2
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)

Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	Good combustion/operating practices and fueled by natural gas - use GE LM2500+G4 turbines
Emission Limit 1:	4872107.0000
Emission Limit 1 Unit:	TONS/YR
Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM FROM THE FACILITYWIDE
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	CO2(e)

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Acid Gas Vents (4)
+Process Type:	50.999
Primary Fuel:	
Throughput:	0
Throughput Unit:	
Process Notes:	

Pollutant Information: SABINE PASS LNG TERMINAL - Acid Gas Vents (4)

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	39.2900
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	172.0900
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	CO2(e)

+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	Unspecified
+Control Method Code:	N

+Control Method Description:	No additional control
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.0300
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Marine Flare
+Process Type:	19.390
Primary Fuel:	natural gas
Throughput:	1590.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: SABINE PASS LNG TERMINAL - Marine Flare

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+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))

+CAS Number:	PM
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	14.9700
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.1700
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	Also for PM10 and PM2.5

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	185.1600
Emission Limit 1 Unit:	LB/H

Emission Limit 1 Avg. Time/Condition: HOURLY MAXIMUM
Emission Limit 2: 2.1300
Emission Limit 2 Unit: TONS/YR
Emission Limit 2 Avg. Time/Condition: ANNUAL MAXIMUM
Standard Emission Limit: 0
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

+Pollutant Name Carbon Monoxide
Pollutant Group(s): (InOrganic Compounds)
+CAS Number: 630-08-0
Test Method: Unspecified
+Control Method Code: P
+Control Method Description: proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1: 705.4900
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: HOURLY MAXIMUM
Emission Limit 2: 8.1200
Emission Limit 2 Unit: TONS/YR
Emission Limit 2 Avg. Time/Condition: ANNUAL MAXIMUM
Standard Emission Limit: 0

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	10.8300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.1200
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	2909.0000
Emission Limit 1 Unit:	TONS/YR
Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	CO2(e)

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Wet/Dry Gas Flares (4)
+Process Type:	19.390
Primary Fuel:	natural gas
Throughput:	0.26
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: SABINE PASS LNG TERMINAL - Wet/Dry Gas Flares (4)

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	also for PM10 and PM2.5

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	0.0300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.1100
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	0.1100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.4200
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	0.0100

Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	TONS/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	proper plant operations and maintain the presence of the flame when the gas is routed to the flare
Emission Limit 1:	133.0000
Emission Limit 1 Unit:	TONS/YR
Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	CO2(e)

Process Information: SABINE PASS LNG TERMINAL

+Process Name:	Fugitive Emissions
+Process Type:	50.999
Primary Fuel:	
Throughput:	0
Throughput Unit:	
Process Notes:	

Pollutant Information: SABINE PASS LNG TERMINAL - Fugitive Emissions

+Pollutant Name	Volatile Organic Compounds (VOC)
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
+CAS Number:	VOC
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	Mechanical seals or equivalent for pumps and compressors that serve VOC with vapor pressure of 1.5 psia and above
Emission Limit 1:	5.0300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	17.2100
Emission Limit 2 Unit:	TONS/YEAR

Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	conduct a leak detection and repair (LDAR) program
Emission Limit 1:	89629.0000
Emission Limit 1 Unit:	TONS/YR
Emission Limit 1 Avg. Time/Condition:	ANNUAL MAXIMUM
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	$CO_2(e)$

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NOTE: Draft determinations are marked with a " * " beside the RBLC ID.
Required fields are denoted by "+".

Report Date: 02/13/2013 Control Technology Determinations (Freeform)

Facility Information: ALLIANCE REFINERY

RBLC ID:	LA-0263
+Corporate/Company Name:	PHILLIPS 66 COMPANY
+Facility Name:	ALLIANCE REFINERY
Facility County:	PLAQUEMINES
Facility State:	LA
Facility ZIP Code:	70037
Facility Country:	USA
Facility Contact Name:	LARRY POCHE
Facility Contact Phone:	(504) 656-7711
Facility Contact Email:	LARRY.R.POCHE@CONOCOPHILLIPS.COM
EPA Region:	6
Agency Code:	LA001
Agency Name:	LOUISIANA DEPARTMENT OF ENV QUALITY
Agency Contact:	MR. BRYAN D. JOHNSTON
Agency Phone:	(225)219-3450
Agency Email:	BRYAN.JOHNSTON@LA.GOV
Other Agency Contact Info:	PERMIT WRITER: MR. CORBET MATHIS, 225.219.3417
+Permit Number:	PSD-LA-760
+SIC Code:	2911
NAICS Code:	324110
Facility Registry System Number:	110000744473
Application Accepted Received Date:	12/19/2011 ACT
Permit Issuance Date:	07/25/2012 ACT
Date determination entered in RBLC:	08/20/2012
Date determination last updated:	10/16/2012
Permit Type:	B: Add new process to existing facility
Permit URL:	
Facility Description:	PETROLEUM REFINERY. THE PROJECT ENTAILS CONSTRUCTION OF A NEW 20 MM SCF/DAY STEAM METHANE REFORMER TO MAKE HYDROGEN NEEDED TO PRODUCE ULTRA LOW SULFUR DIESEL.
Permit Notes:	

Affected Boundaries: ALLIANCE REFINERY

Facility-wide Emissions: ALLIANCE REFINERY

+Pollutant Name: Facility-wide Emissions Increase:	None

Process Information: ALLIANCE REFINERY

+Process Name:	STEAM METHANE REFORMER (2291-SMR, EQT 0196)
+Process Type:	12.390
Primary Fuel:	REFINERY FUEL GAS
Throughput:	216.00
Throughput Unit:	MMBTU/H
Process Notes:	AVERAGE HEAT INPUT: 180 MM BTU/HR NATURAL GAS IS ALSO USED AS A FUEL.

Pollutant Information: ALLIANCE REFINERY - STEAM METHANE REFORMER (2291-SMR, EQT 0196)

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	SELECTION OF MOST EFFICIENT H2 PURIFICATION PROCESS - PRESSURE SWING ADSORPTION, HEAT RECOVERY AIR PREHEATER (UNLESS HEAT FROM SMR STACK IS RECOVERED ELSEWHERE), ADIABATIC PRE-REFORMER, MAINTENANCE AND FOULING CONTROL, COMBUSTION AIR AND FEED/STEAM PREHEAT, COMBUSTION AIR CONTROLS (LIMITING EXCESS AIR), PROCESS INTEGRATION, FURNACE CONTROLS (GOOD COMBUSTION PRACTICES), NEW BURNER DESIGNS
Emission Limit 1:	183784.0000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	12-MONTH ROLLING AVERAGE
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0500

Standard Emission Limit Unit:	LB/SCF H2 PRODUCTION
Standard Limit Avg. Time/Condition:	12-MONTH ROLLING AVERAGE
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: ALLIANCE REFINERY

+Process Name:	HYDROGEN PLANT FUGITIVES (2291-FF, FUG 0026)
+Process Type:	99.999
Primary Fuel:	
Throughput:	0
Throughput Unit:	
Process Notes:	

Pollutant Information: ALLIANCE REFINERY - HYDROGEN PLANT FUGITIVES (2291-FF, FUG 0026)

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	IMPLEMENTATION OF THE LOUISIANA REFINERY MACT LEAK DETECTION AND REPAIR PROGRAM; MONITORING FOR TOTAL HYDROCARBON CONTENT INSTEAD OF VOC
Emission Limit 1:	0
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0

Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

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NOTE: Draft determinations are marked with a " * " beside the RBLC ID.
Required fields are denoted by "+".

Report Date: 02/13/2013 Control Technology Determinations (Freeform)

Facility Information: GEISMAR ETHYLENE PLANT

RBLC ID:	LA-0260
+Corporate/Company Name:	WILLIAMS OLEFINS, LLC
+Facility Name:	GEISMAR ETHYLENE PLANT
Facility County:	ASCENSION
Facility State:	LA
Facility ZIP Code:	70734
Facility Country:	USA
Facility Contact Name:	DOUG BADON
Facility Contact Phone:	225-642-2114
Facility Contact Email:	DOUG.BADON@WILLIAMS.COM
EPA Region:	6
Agency Code:	LA001
Agency Name:	LOUISIANA DEPARTMENT OF ENV QUALITY
Agency Contact:	MR. BRYAN D. JOHNSTON
Agency Phone:	(225)219-3450
Agency Email:	BRYAN.JOHNSTON@LA.GOV
Other Agency Contact Info:	dan nguyen (225-219-3181)
+Permit Number:	PSD-LA-759
+SIC Code:	2869
NAICS Code:	325110
Facility Registry System Number:	110000746337
Application Accepted Received Date:	12/13/2011 ACT
Permit Issuance Date:	04/11/2012 ACT
Date determination entered in RBLC:	05/08/2012
Date determination last updated:	10/16/2012
Permit Type:	B: Add new process to existing facility
Permit URL:	
Facility Description:	Project to install 2 cracking furnaces at the Ethylene Plant to increase production from 1.4 to 1.95 billion lbs/yr
Permit Notes:	Complete application date = Administrative Complete date

Affected Boundaries: GEISMAR ETHYLENE PLANT

Facility-wide Emissions: GEISMAR ETHYLENE PLANT

+Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	73.5300 (Tons/Year)
+Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	23.0900 (Tons/Year)
+Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	8.6400 (Tons/Year)
+Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	33.4800 (Tons/Year)
+Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	23.9700 (Tons/Year)

Process Information: GEISMAR ETHYLENE PLANT

+Process Name:	Cracking Furnaces 95 and 96
+Process Type:	12.310
Primary Fuel:	natural gas
Throughput:	180.00
Throughput Unit:	MMBTU/H
Process Notes:	(each)

Pollutant Information: GEISMAR ETHYLENE PLANT - Cracking Furnaces 95 and 96

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	1) low-emitting feedstocks, 2) energy efficient equipment, 3) process design improvement, 4) lew-emitting and low- carbon fuel (>25 vol% hydrogen, annual ave.)
Emission Limit 1:	0
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

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NOTE: Draft determinations are marked with a " * " beside the RBLC ID.
Required fields are denoted by "+".

Facility Information: PALMDALE HYBRID POWER PROJECT

RBLC ID:	*CA-1212
+Corporate/Company Name:	CITY OF PALMDALE
+Facility Name:	PALMDALE HYBRID POWER PROJECT
Facility County:	LOS ANGELES
Facility State:	CA
Facility ZIP Code:	93535
Facility Country:	USA
Facility Contact Name:	STEVE WILLIAMS
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	9
Agency Code:	OT010
Agency Name:	EPA REGION IX
Agency Contact:	MR. GERARDO RIOS
Agency Phone:	(415)972-3974

Agency Email:	rios.gerardo@epa.gov
Other Agency Contact Info:	
+Permit Number:	SE 09-01
+SIC Code:	4911
NAICS Code:	221112
Facility Registry System Number:	
Application Accepted Received Date:	08/19/2011 ACT
Permit Issuance Date:	10/18/2011 ACT
Date determination entered in RBLC:	11/11/2012
Date determination last updated:	01/17/2013
Permit Type:	A: New/Greenfield Facility
Permit URL:	http://www.epa.gov/region9/air/permit/r9-permits-issued.html
Facility Description:	570 MW NATURAL GAS FIRED COMBINED CYCLE POWER PLANT WITH AN INTEGRATED 50 MW SOLAR THERMAL PLANT
Permit Notes:	

Affected Boundaries: PALMDALE HYBRID POWER PROJECT

+Boundary (Class 1 Area or US Border Name):	Cucamonga
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	< 100 km
Class 1 Area State:	CA
+Boundary (Class 1 Area or US Border Name):	San Gabriel
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	< 100 km
Class 1 Area State:	CA

Facility-wide Emissions: PALMDALE HYBRID POWER PROJECT

+Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	250.2000 (Tons/Year)
+Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	114.9000 (Tons/Year)
+Pollutant Name:	Particulate Matter (PM)

Facility-wide Emissions Increase:	79.1000 (Tons/Year)
+Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	8.9000 (Tons/Year)

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	COMBUSTION TURBINE GENERATOR
+Process Type:	15.210
Primary Fuel:	NATURAL GAS
Throughput:	154.00
Throughput Unit:	MW
Process Notes:	CTG EQUIPPED WITH A 1,736 MMBTU/HR (HHV) DUCT BURNER AND HRSG

Pollutant Information: PALMDALE HYBRID POWER PROJECT - COMBUSTION TURBINE GENERATOR

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	Other
Other Test Method:	EPA METHOD 7E, OR METHOD 7E & 19
+Control Method Code:	B
+Control Method Description:	DRY LOW NOX (DLN) COMBUSTORS, SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1:	2.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@15% O2, 1-HR AVG
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	A
+Control Method Description:	OXIDATION CATALYST SYSTEM
Emission Limit 1:	1.5000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@15% O2, 1-HR AVG (NO DUCT BURNING)
Emission Limit 2:	2.0000
Emission Limit 2 Unit:	PPMVD
Emission Limit 2 Avg. Time/Condition:	@15% O2, 1-HR AVG (W/ DUCT BURNING)
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: 2.0 PPMVD @15% O2, 1-HR AVG (NO DUCT BURNING) APPLIES DURING 3-YEAR DEMONSTRATION PERIOD

+Pollutant Name: Particulate matter, total (TPM)
Pollutant Group(s): (Particulate Matter (PM))
+CAS Number: PM
Test Method: Other
Other Test Method: EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code: P
+Control Method Description: USE PUC QUALITY NATURAL GAS
Emission Limit 1: 0.0048
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 9-HR AVG (NO DUCT BURNING)
Emission Limit 2: 0.0049
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition: 9-HR AVG (W/ DUCT BURNING)
Standard Emission Limit: 0
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

+Pollutant Name: Particulate matter, total < 10 μ (TPM10)
Pollutant Group(s): (Particulate Matter (PM))

+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY NATURAL GAS
Emission Limit 1:	0.0048
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	9-HR AVG (NO DUCT BURNING)
Emission Limit 2:	0.0049
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	9-HR AVG (W/ DUCT BURNING)
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 2.5 µ (TPM2.5)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY NATURAL GAS
Emission Limit 1:	0.0048
Emission Limit 1 Unit:	LB/MMBTU

Emission Limit 1 Avg.
Time/Condition: 9-HR AVG (NO DUCT BURNING)
Emission Limit 2: 0.0049
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg.
Time/Condition: 9-HR AVG (W/ DUCT BURNING)
Standard Emission
Limit: 0
Standard Emission
Limit Unit:
Standard Limit Avg.
Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable
Requirements:
Did factors, other then
air pollution technology
considerations influence
the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost
Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In
Cost Estimates:
Pollutants/Compliance
Notes:

+Pollutant Name Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s): (Greenhouse Gasses (GHG))
+CAS Number: CO2e
Test Method: Other
Other Test Method: EPA METHOD 3B
+Control Method Code: N
+Control Method
Description:
Emission Limit 1: 774.0000
Emission Limit 1 Unit: LB/MW-HR
Emission Limit 1 Avg.
Time/Condition: 365-DAY ROLLING AVG (FACILITYWIDE)
Emission Limit 2: 7319.0000
Emission Limit 2 Unit: BTU/KW-HR
Emission Limit 2 Avg.
Time/Condition: 365-DAY ROLLING AVG (FACILITYWIDE)
Standard Emission
Limit: 0

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	USE EPA METHOD 3B FOR CO2 EMISSIONS.

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	Other
Other Test Method:	EPA METHOD 7E, OR METHODS 7E & 19
+Control Method Code:	B
+Control Method Description:	DRY LOW NOX (DLN) COMBUSTORS, SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1:	96.0000
Emission Limit 1 Unit:	LB/EVENT
Emission Limit 1 Avg. Time/Condition:	COLD STARTUP PERIODS
Emission Limit 2:	40.0000
Emission Limit 2 Unit:	LB/EVENT
Emission Limit 2 Avg. Time/Condition:	WARM & HOT STARTUP PERIODS
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?: U

+Percent Efficiency:

Compliance Verified: Unknown

Cost Effectiveness:

Incremental Cost Effectiveness:

Cost Verified (Y/N)?: No

Dollar Year Used In Cost Estimates:

Pollutants/Compliance Notes: 1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF NOX FROM BOTH CTGS COMBINED SHALL NOT EXCEED 130 LB/HR; 2) DURATION OF COLD STARTUP NOT TO EXCEED 110 MIN; 3) DURATION OF WARM & HOT STARTUP NOT TO EXCEED 80 MIN;

+Pollutant Name: Carbon Monoxide

Pollutant Group(s): (InOrganic Compounds)

+CAS Number: 630-08-0

Test Method: Unspecified

+Control Method Code: A

+Control Method Description: OXIDATION CATALYST SYSTEM

Emission Limit 1: 410.0000

Emission Limit 1 Unit: LB/EVENT

Emission Limit 1 Avg. Time/Condition: COLD STARTUP

Emission Limit 2: 329.0000

Emission Limit 2 Unit: LB/EVENT

Emission Limit 2 Avg. Time/Condition: WARM & HOT STARTUP

Standard Emission Limit: 0

Standard Emission Limit Unit:

Standard Limit Avg. Time/Condition:

+Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Did factors, other then air pollution technology considerations influence the BACT decisions?: U

+Percent Efficiency:

Compliance Verified: Unknown

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF CO FROM BOTH CTGS COMBINED SHALL NOT EXCEED 790 LB/HR; 2) DURATION OF COLD STARTUP NOT TO EXCEED 110 MIN; 3) DURATION OF WARM & HOT STARTUP NOT TO EXCEED 80 MIN;

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	Unspecified
+Control Method Code:	A
+Control Method Description:	OXIDATION CATALYST SYSTEM
Emission Limit 1:	337.0000
Emission Limit 1 Unit:	LB/EVENT
Emission Limit 1 Avg. Time/Condition:	SHUTDOWN PERIODS
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes: 1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF CO FROM BOTH CTGS COMBINED SHALL NOT EXCEED 790 LB/HR; 2) SHUTDOWN NOT TO EXCEED 30 MIN

+Pollutant Name: Nitrogen Oxides (NOx)
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number: 10102
Test Method: Unspecified
+Control Method Code: B
+Control Method Description: DRY LOW NOX (DLN) COMBUSTORS, SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1: 57.0000
Emission Limit 1 Unit: LB/EVENT
Emission Limit 1 Avg. Time/Condition: SHUTDOWN PERIODS
Emission Limit 2: 0
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: 1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF NOX FROM BOTH CTGS COMBINED SHALL NOT EXCEED 130 LB/HR; 2) SHUTDOWN NOT TO EXCEED 30 MIN

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	COMBUSTION TURBINE GENERATOR
+Process Type:	15.210
Primary Fuel:	NATURAL GAS
Throughput:	154.00
Throughput Unit:	MW
Process Notes:	CTG EQUIPPED WITH A 1,736 MMBTU/HR (HHV) DUCT BURNER AND HRSG

Pollutant Information: PALMDALE HYBRID POWER PROJECT - COMBUSTION TURBINE GENERATOR

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	Other
Other Test Method:	EPA METHOD 7E, OR METHODS 7E & 19
+Control Method Code:	B
+Control Method Description:	DRY LOW NOX (DLN) COMBUSTORS, SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1:	2.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@15% O2, 1-HR AVG
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No

Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	
+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	A
+Control Method Description:	CATALYST OXIDATION SYSTEM
Emission Limit 1:	1.5000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@15% O2, 1-HR AVG (NO DUCT BURNING)
Emission Limit 2:	2.0000
Emission Limit 2 Unit:	PPMVD
Emission Limit 2 Avg. Time/Condition:	@15% O2, 1-HR AVG (W/ DUCT BURNING)
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	2.0 PPMVD @15% O2, 1-HR AVG (NO DUCT BURNING) APPLIES DURING 3-YEAR DEMONSTRATION PERIOD
+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other

Other Test Method: EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code: P
+Control Method
Description: USE PUC QUALITY NATURAL GAS
Emission Limit 1: 0.0048
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg.
Time/Condition: 9-HR AVG (NO DUCT BURNING)
Emission Limit 2: 0
Emission Limit 2 Unit:
Emission Limit 2 Avg.
Time/Condition:
Standard Emission
Limit: 0
Standard Emission
Limit Unit:
Standard Limit Avg.
Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable
Requirements:
Did factors, other then
air pollution technology
considerations influence
the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost
Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In
Cost Estimates:
Pollutants/Compliance
Notes:

+Pollutant Name Particulate matter, total < 10 μ (TPM10)
Pollutant Group(s): (Particulate Matter (PM))
+CAS Number: PM
Test Method: Other
Other Test Method: EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code: P
+Control Method
Description: USE PUC QUALITY NATURAL GAS
Emission Limit 1: 0.0048
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg.
Time/Condition: 9-HR AVG (NO DUCT BURNING)

Emission Limit 2:	0.0049
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	9-HR AVG (W/ DUCT BURNING)
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 2.5 μ (TPM2.5)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY NATURAL GAS
Emission Limit 1:	0.0048
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	9-HR AVG (NO DUCT BURNING)
Emission Limit 2:	0.0049
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	9-HR AVG (W/ DUCT BURNING)
Standard Emission Limit:	0
Standard Emission Limit Unit:	

Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Other
Other Test Method:	EPA METHOD 3B
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	774.0000
Emission Limit 1 Unit:	LB/MW-HR
Emission Limit 1 Avg. Time/Condition:	365-DAY ROLLING AVG (FACILITYWIDE)
Emission Limit 2:	7319.0000
Emission Limit 2 Unit:	BTU/KW-HR
Emission Limit 2 Avg. Time/Condition:	365-DAY ROLLING AVG (FACILITYWIDE)
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: USE EPA METHOD 3B FOR CO2 EMISSIONS.

+Pollutant Name Carbon Monoxide
Pollutant Group(s): (InOrganic Compounds)
+CAS Number: 630-08-0
Test Method: Unspecified
+Control Method Code: A
+Control Method Description: CATALYST OXIDATION SYSTEM
Emission Limit 1: 410.0000
Emission Limit 1 Unit: LB/EVENT
Emission Limit 1 Avg. Time/Condition: COLD STARTUP PERIODS
Emission Limit 2: 329.0000
Emission Limit 2 Unit: LB/EVENT
Emission Limit 2 Avg. Time/Condition: WARM & HOT STARTUP PERIODS
Standard Emission Limit: 0
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF CO FROM BOTH CTGS COMBINED SHALL NOT EXCEED 790 LB/HR; 2) DURATION OF COLD STARTUP NOT TO EXCEED 110 MIN; 3) DURATION OF WARM & HOT STARTUP NOT TO EXCEED 80 MIN;

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	Unspecified
+Control Method Code:	N
+Control Method Description:	DRY LOW NOX (DLN) COMBUSTORS, SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1:	96.0000
Emission Limit 1 Unit:	LB/EVENT
Emission Limit 1 Avg. Time/Condition:	COLD STARTUP PERIODS
Emission Limit 2:	40.0000
Emission Limit 2 Unit:	LB/EVENT
Emission Limit 2 Avg. Time/Condition:	WARM & HOT STARTUP PERIODS
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:	1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF NOX FROM BOTH CTGS COMBINED SHALL NOT EXCEED 130 LB/HR; 2) DURATION OF COLD STARTUP NOT TO EXCEED 110 MIN; 3) DURATION OF WARM & HOT STARTUP NOT TO EXCEED 80 MIN;

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	Unspecified
+Control Method Code:	A
+Control Method Description:	CATALYTIC OXIDATION SYSTEM
Emission Limit 1:	337.0000
Emission Limit 1 Unit:	LB/EVENT
Emission Limit 1 Avg. Time/Condition:	SHUTDOWN PERIODS
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF CO FROM BOTH CTGS COMBINED SHALL NOT EXCEED 790 LB/HR; 2) SHUTDOWN NOT TO EXCEED 30 MIN

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

+CAS Number:	10102
Test Method:	Unspecified
+Control Method Code:	A
+Control Method Description:	OXIDATION CATALYST SYSTEM
Emission Limit 1:	57.0000
Emission Limit 1 Unit:	LB/EVENT
Emission Limit 1 Avg. Time/Condition:	SHUTDOWN PERIODS
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	1) DURING STARTUP OR SHUTDOWN, EMISSIONS OF NOX FROM BOTH CTGS COMBINED SHALL NOT EXCEED 130 LB/HR; 2) SHUTDOWN NOT TO EXCEED 30 MIN

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	AUXILIARY BOILER
+Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	110.00
Throughput Unit:	MMBTU/HR
Process Notes:	

Pollutant Information: PALMDALE HYBRID POWER PROJECT - AUXILIARY BOILER

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 7E
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	9.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@3% O2, 3-HR AVG
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	N

+Control Method Description:	
Emission Limit 1:	50.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@3% O2, 3-HR AVG
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY NATURAL GAS
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 10 µ (TPM10)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY NATURAL GAS
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	

+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

+Pollutant Name Particulate matter, total < 2.5 µ (TPM2.5)
Pollutant Group(s): (Particulate Matter (PM))
+CAS Number: PM
Test Method: Other
Other Test Method: EPA METHODS 5 & 202, OR METHODS 201A & 202
+Control Method Code: P
+Control Method Description: USE PUC QUALITY NATURAL GAS
Emission Limit 1: 0.8000
Emission Limit 1 Unit: LB/HR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:

Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	ANNUAL BOILER TUNE-UPS
Emission Limit 1:	0
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	EMERGENCY IC ENGINE
+Process Type:	17.110
Primary Fuel:	DIESEL
Throughput:	2683.00
Throughput Unit:	HP
Process Notes:	UNIT IS 2000 KW.

Pollutant Information: PALMDALE HYBRID POWER PROJECT - EMERGENCY IC ENGINE

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 7E
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	6.4000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	3-HR AVG
Emission Limit 2:	4.8000
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	3-HR AVG
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No

Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	3.5000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.6000
Emission Limit 2 Unit:	G/HR-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other

Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE ULTRA LOW SULFUR FUEL
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1500
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 10 µ (TPM10)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE ULTRA LOW SULFUR FUEL
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:	0.1500
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 2.5 µ (TPM2.5)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE ULTRA LOW SULFUR FUEL
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1500
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	

Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	EMERGENCY IC ENGINE
+Process Type:	17.210
Primary Fuel:	DIESEL
Throughput:	182.00
Throughput Unit:	HP
Process Notes:	UNIT IS 135 KW.

Pollutant Information: PALMDALE HYBRID POWER PROJECT - EMERGENCY IC ENGINE

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 7E
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	4.0000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	3-HR AVG
Emission Limit 2:	3.0000
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	3-HR AVG

Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	3.5000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.6000
Emission Limit 2 Unit:	G-HP-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE ULTRA LOW SULFUR FUEL
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1500
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	

Incremental Cost
Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In
Cost Estimates:
Pollutants/Compliance
Notes:

+Pollutant Name Particulate matter, total < 10 μ (TPM10)
Pollutant Group(s): (Particulate Matter (PM))
+CAS Number: PM
Test Method: Other
Other Test Method: EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code: P
+Control Method
Description: USE ULTRA LOW SULFUR FUEL
Emission Limit 1: 0.2000
Emission Limit 1 Unit: G/KW-HR
Emission Limit 1 Avg.
Time/Condition:
Emission Limit 2: 0.1500
Emission Limit 2 Unit: G/HP-HR
Emission Limit 2 Avg.
Time/Condition:
Standard Emission
Limit: 0
Standard Emission
Limit Unit:
Standard Limit Avg.
Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable
Requirements:
Did factors, other then
air pollution technology
considerations influence
the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost
Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In
Cost Estimates:
Pollutants/Compliance
Notes:

+Pollutant Name	Particulate matter, total < 2.5 µ (TPM2.5)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE ULTRA LOW SULFUR FUEL
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	G/KW-HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1500
Emission Limit 2 Unit:	G/HP-HR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	AUXILIARY HEATER
+Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	40.00
Throughput Unit:	MMBTU/HR

Process Notes:

Pollutant Information: PALMDALE HYBRID POWER PROJECT - AUXILIARY HEATER

+Pollutant Name	Nitrogen Oxides (NOx)
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
+CAS Number:	10102
Test Method:	EPA/OAR Mthd 7E
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	9.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@3% O2, 3-HR AVG
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Monoxide
Pollutant Group(s):	(InOrganic Compounds)
+CAS Number:	630-08-0

Test Method:	EPA/OAR Mthd 10
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	50.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	@3% O2, 3-HR AVG
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY PIPELINE NATURAL GAS
Emission Limit 1:	0.3000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2: 0
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
+Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
+Percent Efficiency:
Compliance Verified: Unknown
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

+Pollutant Name Particulate matter, total < 2.5 µ (TPM2.5)
Pollutant Group(s): (Particulate Matter (PM))
+CAS Number: PM
Test Method: Other
Other Test Method: EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code: P
+Control Method Description: USE PUC QUALITY PIPELINE NATURAL GAS
Emission Limit 1: 0.3000
Emission Limit 1 Unit: LB/HR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0
Standard Emission Limit Unit:

Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 10 μ (TPM10)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	EPA METHODS 5 & 202, OR 201A & 202
+Control Method Code:	P
+Control Method Description:	USE PUC QUALITY PIPELINE NATURAL GAS
Emission Limit 1:	0.3000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Unspecified
+Control Method Code:	N
+Control Method Description:	ANNUAL BOILER TUNEUPS
Emission Limit 1:	0
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	NO EMISSION LIMITS

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	COOLING TOWER
+Process Type:	99.999
Primary Fuel:	
Throughput:	130000.00
Throughput Unit:	GAL/MIN CIRCULATION RATE
Process Notes:	

Pollutant Information: PALMDALE HYBRID POWER PROJECT - COOLING TOWER

+Pollutant Name	Particulate matter, total (TPM)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	MODIFIED METHOD 306 OR COOLING TOWER INSTITUTE TEST METHOD
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0005
Emission Limit 2 Unit:	% DRIFT
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5000.0000
Standard Emission Limit Unit:	PPM TDS
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U

+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

+Pollutant Name	Particulate matter, total < 10 μ (TPM10)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	MODIFIED METHOD 306 OR COOLING TOWER INSTITUTE TEST METHOD
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0005
Emission Limit 2 Unit:	% DRIFT
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5000.0000
Standard Emission Limit Unit:	5000 PPM TDS
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

+Pollutant Name	Particulate matter, total < 2.5 µ (TPM2.5)
Pollutant Group(s):	(Particulate Matter (PM))
+CAS Number:	PM
Test Method:	Other
Other Test Method:	MODIFIED METHOD 306 OR COOLING TOWER INSTITUTE TEST METHOD
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/HR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0005
Emission Limit 2 Unit:	% DRIFT
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5000.0000
Standard Emission Limit Unit:	PPM TDS
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	ENCLOSED PRESSURE SF6 CIRCUIT BREAKERS
+Process Type:	99.999
Primary Fuel:	
Throughput:	0
Throughput Unit:	
Process Notes:	0.5% BY WT ANNUAL LEAKAGE RATE 10% BY WT LEAK DETECTION SYSTEM

Pollutant Information: PALMDALE HYBRID POWER PROJECT - ENCLOSED PRESSURE SF6 CIRCUIT BREAKERS

+Pollutant Name	Carbon Dioxide Equivalent (CO2e)
Pollutant Group(s):	(Greenhouse Gasses (GHG))
+CAS Number:	CO2e
Test Method:	Other
Other Test Method:	EPA METHOD 3B FOR CO2
+Control Method Code:	N
+Control Method Description:	
Emission Limit 1:	9.5600
Emission Limit 1 Unit:	TPY
Emission Limit 1 Avg. Time/Condition:	12-MONTH ROLLING TOTAL
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information: PALMDALE HYBRID POWER PROJECT

+Process Name:	MAINTENANCE VEHICLES
+Process Type:	99.190
Primary Fuel:	
Throughput:	0
Throughput Unit:	
Process Notes:	MAINTENANCE VEHICLES GENERATING FUGITIVE ROAD DUST WHEN TRAVELING ON PAVED AND UNPAVED ROADWAYS IN THE SOLAR FIELD FOR THE PROJECT

Pollutant Information: PALMDALE HYBRID POWER PROJECT - MAINTENANCE VEHICLES

+Pollutant Name	Particulate matter, fugitive
Pollutant Group(s):	
+CAS Number:	PM
Test Method:	Unspecified
+Control Method Code:	P
+Control Method Description:	FUGITIVE DUST CONTROL PLAN
Emission Limit 1:	0
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
+Case-by-Case Basis:	
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U

+Percent Efficiency:	
Compliance Verified:	Unknown
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

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