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February 22, 2013

Mr. Mike Wilson, P.E., Director
Air Permits Division, MC-163
Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, Texas 78753

via Hand Delivery

RE: NSR and PSD Permit Application
M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation
Corpus Christi, TX
Customer Number: Not Assigned
Registered Entity Number: Not Assigned

Dear Mr. Wilson:

On behalf of M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation (M&G), Zephyr Environmental Corporation (Zephyr) is submitting this New Source Review (NSR) and Prevention of Significant Deterioration (PSD) permit application for a greenfield plastic resin manufacturing plant at its site located in Corpus Christi, Nueces County, Texas. "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 concurrently being submitted to the TCEQ to authorize the NRG Utility Plant. The emissions for the combined Project Jumbo will trigger PSD review, as the facility will be a Major Stationary Source for CO, NO_x, VOC, PM, PM_{10}, and $PM_{2.5}$.

Enclosed is the permit application which includes a PI-1 Form, General Application for Air Preconstruction Permit and Amendments; supporting documentation; and a $75,000 permit application fee.

2600 Via Fortuna, Suite 450 ♦ Austin, Texas 78746 ♦ PH 512.329.5544 ♦ FAX 512.329.8253

www.ZephyrEnv.com ♦ www.HazMatAcademy.com

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
Ms. Susan Clewis, Regional Director, TCEQ Region 14, Corpus Christi, w/enclosures
(via USPS Certified Mail 7012 3050 0001 4138 2553)
Ms. Stephanie Kordzi, EPA Region 6 (electronic copy by email)

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APPLICATION FOR AN AIR QUALITY PERMIT
PROJECT JUMBO: PET PLANT
CORPUS CHRISTI, TEXAS

SUBMITTED TO:
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
OFFICE OF PERMITTING, REMEDIATION, AND REGISTRATION
AIR PERMITS DIVISION
P. O. BOX 13087
AUSTIN, TEXAS 78711-3087

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

STATE OF TEXAS
THOMAS I. SULLIVAN
98196
LICENSED
PROFESSIONAL ENGINEER
3/22/2013

FEBRUARY 2013

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TABLE OF CONTENTS

APPENDICES

INTRODUCTION

M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation (M&G) is hereby submitting this application for an air quality permit for the construction of a greenfield plastic resin manufacturing plant at its site located in Corpus Christi, Nueces County, Texas. "Project Jumbo" will consist of a PET Plant (a new PET (polyethylene terephthalate) unit and a new terephthalic acid (PTA) unit) owned and operated by M&G, and a new combined heat and power utility plant (Utility Plant) that will be owned and operated by NRG Development Company, Inc. (NRG). NRG will be filing a permit application under separate cover, to authorize the Utility Plant.

Nueces County is designated as attainment/unclassifiable for all criteria pollutants. As a Major Stationary Source, emissions from the proposed plant trigger Prevention of Significant Deterioration (PSD) review. In addition, two GHG applications for these proposed facilities are being submitted separately to the EPA by M&G and NRG.

The remainder of the application presents all information required for an air quality construction permit according to the TCEQ's Form PI-1, with information presented in the order that it is addressed on the PI-1 Form. The dispersion modeling component of this application, including evaluations required under PSD review, will be submitted after consultation with the TCEQ.

FORM PI-1 GENERAL APPLICATION, CORE DATA FORM & PERMIT FEE INFORMATION

A copy of the PI-1 and Core Data forms are included in this section.

As required by 30 TAC §116.141 for PSD permit reviews, M&G is remitting a fee of $75,000 for Project Jumbo. A Table 30 and copy of the permit fee check are also 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"	

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

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

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	

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

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 (SO2):		
Carbon Monoxide (CO):		
Nitrogen Oxides (NOx):		
Particulate Matter (PM):		
PM 10 microns or less (PM10):		
PM 2.5 microns or less (PM2.5):		
Lead (Pb):		
Hazardous Air Pollutants (HAPs):		
Other speciated air contaminants not listed above:		

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

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:	

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

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

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

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

TCEQ

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

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

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

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission *(If other is checked please describe in space provided)*

☒ New Permit, Registration or Authorization *(Core Data Form should be submitted with the program application)*

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Attachments — Describe Any Attachments: *(ex. Title V Application, Waste Transporter Application, etc.)*

☒ Yes ☐ No — NSR and PSD Application

3. Customer Reference Number *(if issued)*: CN

Follow this link to search for CN or RN numbers in Central Registry**

4. Regulated Entity Reference Number *(if issued)*: RN

SECTION II: Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy):

6. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check only one of the following:*

☐ Owner ☐ Operator ☒ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other: _____

7. General Customer Information

☒ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State) ☐ No Change**

If "No Change" and Section I is complete, skip to Section III – Regulated Entity Information.

8. Type of Customer:	☒ Corporation	☐ Individual	☐ Sole Proprietorship- D.B.A
☐ City Government	☐ County Government	☐ Federal Government	☐ State Government
☐ Other Government	☐ General Partnership	☐ Limited Partnership	☐ Other:

9. Customer Legal Name *(If an individual, print last name first: ex: Doe, John)*: M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation

If new Customer, enter previous Customer below — *End Date:*

10. Mailing Address: 450 Gears Rd Ste 240

City: Houston State: TX ZIP: 77067 ZIP + 4:

11. Country Mailing Information *(if outside USA)*:

12. E-Mail Address *(if applicable)*:

13. Telephone Number: (281) 873-5780

14. Extension or Code:

15. Fax Number *(if applicable)*: (281) 716-4640

16. Federal Tax ID *(9 digits)*: 26-158323

17. TX State Franchise Tax ID *(11 digits)*: 32047019669

18. DUNS Number *(if applicable)*:

19. TX SOS Filing Number *(if applicable)*: 0056740980

20. Number of Employees
☐ 0-20 ☐ 21-100 ☒ 101-250 ☐ 251-500 ☐ 501 and higher

21. Independently Owned and Operated?
☒ Yes ☐ No

SECTION III: Regulated Entity Information

22. General Regulated Entity Information *(If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information ☐ No Change** *(See below)*

**If "NO CHANGE" is checked and Section I is complete, skip to Section IV, Preparer Information.

23. Regulated Entity Name *(name of the site where the regulated action is taking place)*:

M&G PET Plant								
24. Street Address of the Regulated Entity: *(No P.O. Boxes)*								
	City	Corpus Christi	State	TX	ZIP	78409	ZIP + 4	
25. Mailing Address:	M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation							
	450 Gears Rd. St. 420							
	City	Houston	State	TX	ZIP	77067	ZIP + 4	4529
26. E-Mail Address:								

27. Telephone Number	28. Extension or Code	29. Fax Number *(if applicable)*
( ) -		( ) -

30. Primary SIC Code (4 digits)	31. Secondary SIC Code (4 digits)	32. Primary NAICS Code (5 or 6 digits)	33. Secondary NAICS Code (5 or 6 digits)
2821		325211	

34. What is the Primary Business of this entity? *(Please do not repeat the SIC or NAICS description.)*

Polyethylene Terephthalate (PET) Manufacture

Questions 34 – 37 address geographic location. Please refer to the instructions for applicability.

35. Description to Physical Location:	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.

36. Nearest City	County	State	Nearest ZIP Code
Corpus Christi	Nueces	TX	78409

37. Latitude (N) In Decimal:	27.835525		38. Longitude (W) In Decimal:	-97.493896	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
27	50	7.8899	-97	29	38.0256

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form or the updates may not be made. If your Program is not listed, check other and write it in. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Industrial Hazardous Waste	☐ Municipal Solid Waste
☒ New Source Review – Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS	☐ Sludge
☐ Stormwater	☒ Title V – Air	☐ Tires	☐ Used Oil	☐ Utilities
☐ Voluntary Cleanup	☒ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Brett Jay Davis, PE	41. Title:	Senior Project Engineer

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 879-6628		(512) 329-8253	bdavis@zephyrenv.ocm

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 9 and/or as required for the updates to the ID numbers identified in field 39.

(See the Core Data Form instructions for more information on who should sign this form.)

Company:	M&G Resins USA, LLC	Job Title:	Project Responsible: Global Manufacturing Dir., PET Resin Division
Name *(In Print)*:	Mauro Fenoglio	Phone:	(281) 874-8074

Signature:		Date:	02/21/2013

Texas Commission on Environmental Quality
Table 30
Estimated Capital Cost and Fee Verification

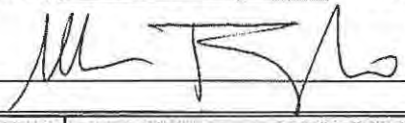
Include estimated cost of the equipment and services that would normally be capitalized according to standard and generally accepted corporate financing and accounting procedures. Tables, checklists, and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality, Air Permits Division Web site at **www.tceq.state.tx.us/nav/permits/air_permits.html**.

I. DIRECT COSTS [30 TAC § 116.141(c)(1)]	Estimated Capital Cost
A. A process and control equipment not previously owned by the applicant and not currently authorized under this chapter	$
B. Auxiliary equipment, including exhaust hoods, ducting, fans, pumps, piping, conveyors, stacks, storage tanks, waste disposal facilities, and air pollution control equipment specifically needed to meet permit and regulation requirements	$
C. Freight charges	$
D. Site preparation, including demolition, construction of fences, outdoor lighting, road and parking areas	$
E. Installation, including foundations, erection of supporting structures, enclosures or weather protection, insulation and painting, utilities and connections, process integration, and process control equipment	$
F. Auxiliary buildings, including materials storage, employee facilities, and changes to existing structures	$
G. Ambient air monitoring network	$
II. INDIRECT COSTS [30 TAC § 116.141(c)(2)]	**Estimated Capital Cost**
A. Final engineering design and supervision, and administrative overhead	$
B. Construction expense, including construction liaison, securing local building permits, insurance, temporary construction facilities, and construction clean-up	$
C. Contractor's fee and overhead	$
TOTAL ESTIMATED CAPITAL COST	**$ 7,500,000+**

I certify that the total estimated capital cost of the project as defined in 30 TAC § 116.141 is equal to or less than the above figure. I further state that I have read and understand Texas Water Code § 7.179, which defines CRIMINAL OFFENSES for certain violations, including intentionally or knowingly making, or causing to be made, false material statements or representations.

Company Name: **M&G Resins USA, LLC a wholly owned subsidiary of M&G USA Corporation**

Company Representative Name (please print): **Mauro Fenoglio** Title: **Project Responsible: Global Manufacturing Director, PET Resin Division**

Company Representative Signature: 

Estimated Capital Cost	Permit Application Fee	PSD/Nonattainment Application Fee
Less than $300,000	**$900 (minimum fee)**	**$3,000 (minimum fee)**
$300,000 to $25,000,000	**0.30% of capital cost**	
$300,000 to $7,500,000		**1.0% of capital cost**
Greater than $25,000,000	**$75,000 (maximum fee)**	
Greater than $7,500,000		**$75,000 (maximum fee)**

PERMIT APPLICATION FEE (from table above) = $ **75,000** Date: **February 21, 2013**

THIS WARNING BAR MUST HAVE A GRAY BACKGROUND WHICH FADES TEMPORARILY WHEN WARMED BY TOUCH OR FRICTION. ADDITIONAL SECURITY FEATURES ARE LISTED ON THE BACK.

JB 1521477

M & G RESINS, LLC
P.O. BOX 8
APPLE GROVE, WV 25502

001023

DATE 02/07/2013 11-24/1210

PAY TO THE ORDER OF Texas Commission on Environmental Quality $ 75,000.00

Seventy-Five Thousand ----- 00/100 DOLLARS

WELLS FARGO BANK, N.A.

TCEQ Air Permit application fee
MEMO ~~for M&G Resins Jumbo~~ Project

Diane E Mitchell

⑈001023⑈ ⑆121000248⑆ 4124801812⑈

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VII. TECHNICAL INFORMATION

A.1. Area Map and A.2. Plot Plans

An area map is provided with a USGS underlay that shows the surrounding land use, the location of the nearest residence, and a 3,000-foot radius around the site property line. The attached plot plans show the scale, a north arrow, two benchmarks, and emission points associated with the facility.

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

zephyr

AREA MAP

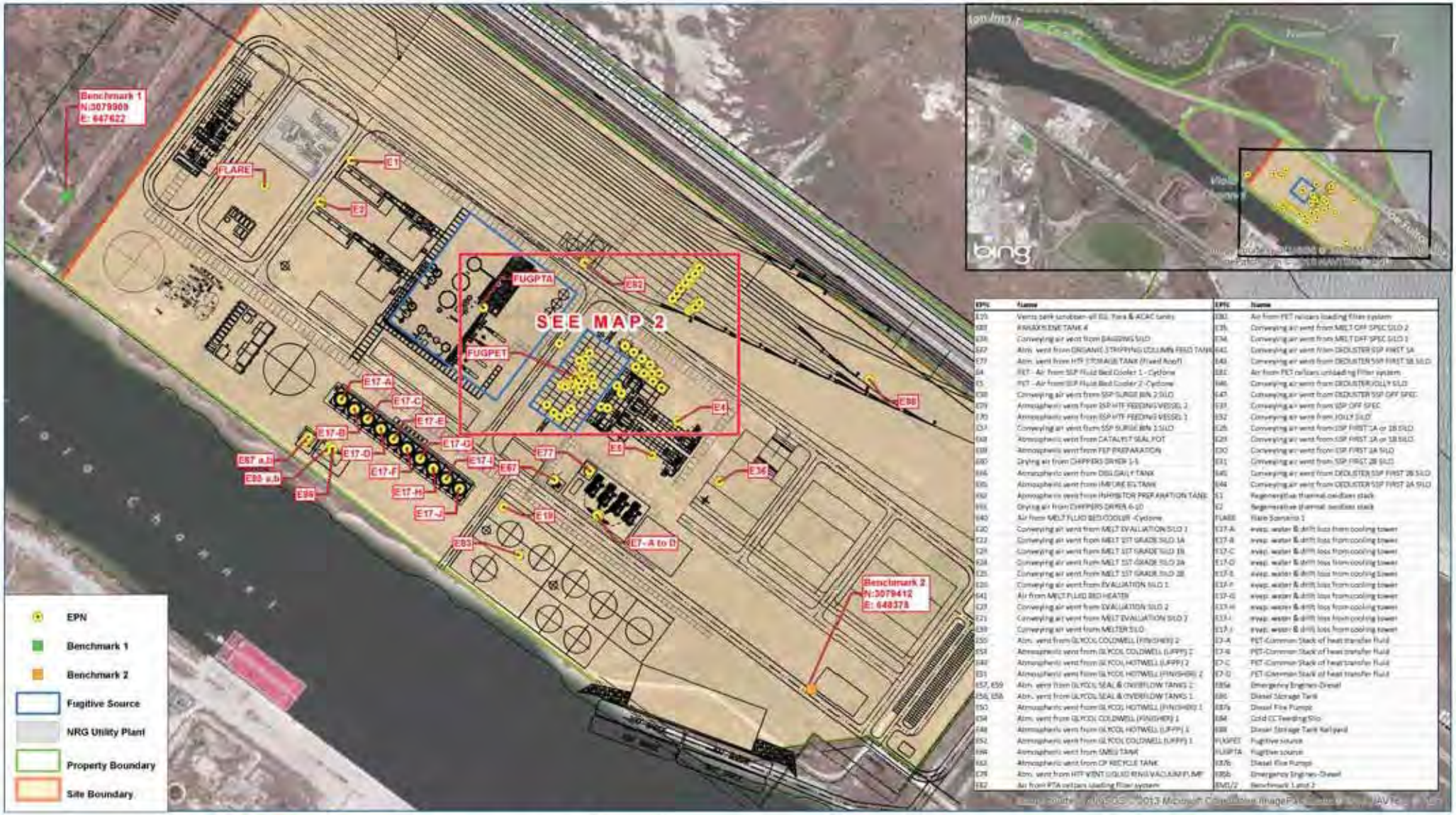
New Source Review Application

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



EPN	Name	EPN	Name
E70	Vents tank scrubber-all EG, Para & ACAC tanks	E80	Air from PET railcars loading filter system
E88	RAILCAR ETANE 4	E35	Conveying air vent from MELT OFF SPEC SILO 2
E36	Conveying air vent from BAGGING SILO	E54	Conveying air vent from MELT OFF SPEC SILO 1
E67	Atm. vent from ORGANIC STRIPPING COLUMN FEED TANK	E42	Conveying air vent from DEDUSTER SSP FIRST 1A
E77	Atm. vent from HTF STORAGE TANK (Fixed Roof)	E43	Conveying air vent from DEDUSTER SSP FIRST 1B SILO
E4	PET - Air from SSP Fluid Bed Cooler 1 - Cyclone	E81	Air from PET railcars unloading filter system
E5	PET - Air from SSP Fluid Bed Cooler 2 -Cyclone	E46	Conveying air vent from DEDUSTER/CLLY SILO
E30	Conveying air vent from SSP SURGE BIN 2 SILO	E47	Conveying air vent from DEDUSTER SSP OFF SPEC
E29	Atmospheric vent from SSP HTF FEEDING VESSEL 2	E31	Conveying air vent from SSP OFF SPEC
E30	Atmospheric vent from SSP HTF FEEDING VESSEL 1	E52	Conveying air vent from JOLLY SILO
E31	Conveying air vent from SSP SURGE BIN 1 SILO	E25	Conveying air vent from DSP FIRST 1A or 1B SILO
E48	Atmospheric vent from CATALYST SEAL POT	E28	Conveying air vent from DSP FIRST 1A or 1B SILO
E39	Atmospheric vent from FEP PREPARATION	E30	Conveying air vent from DSP FIRST 1A SILO
E40	Drying air from CHIPPERS DRYER 1-5	E31	Conveying air vent from DSP FIRST 2B SILO
E66	Atmospheric vent from DSLGAULY TANK	E45	Conveying air vent from DEDUSTER SSP FIRST 2B SILO
E65	Atmospheric vent from EMPURE EG TANK	E44	Conveying air vent from DEDUSTER SSP FIRST 2A SILO
E62	Atmospheric vent from INHIBITOR PREPARATION TANK	S1	Regenerative thermal oxidizer stack
E61	Drying air from CHIPPERS DRYER 6-10	S2	Regenerative thermal oxidizer stack
E40	Air from MELT FLUID BED COOLER -Cyclone	FLARE	Flare Scenario 1
E20	Conveying air vent from MELT EVALUATION SILO 1	E17-A	evap. water & drift loss from cooling tower
E22	Conveying air vent from MELT 1ST GRADE SILO 1A	E17-B	evap. water & drift loss from cooling tower
E24	Conveying air vent from MELT 1ST GRADE SILO 1B	E17-C	evap. water & drift loss from cooling tower
E26	Conveying air vent from MELT 1ST GRADE SILO 2A	E17-D	evap. water & drift loss from cooling tower
E25	Conveying air vent from MELT 1ST GRADE SILO 2B	E17-E	evap. water & drift loss from cooling tower
E20	Conveying air vent from EVALUATION SILO 1	E17-F	evap. water & drift loss from cooling tower
E41	Air from MELT FLUID BED HEATER	E17-G	evap. water & drift loss from cooling tower
E23	Conveying air vent from EVALUATION SILO 2	E17-H	evap. water & drift loss from cooling tower
E21	Conveying air vent from MELT EVALUATION SILO 2	E17-I	evap. water & drift loss from cooling tower
E39	Conveying air vent from MELTER SILO	E17-J	evap. water & drift loss from cooling tower
E50	Atm. vent from GLYCOL COLDWELL (FINISHER) 2	E7-A	PET-Common Stack of heat transfer Fluid
E53	Atmospheric vent from GLYCOL COLDWELL (UFPF) 2	E7-B	PET-Common Stack of heat transfer Fluid
E49	Atmospheric vent from GLYCOL HOTWELL (UFPF) 2	E7-C	PET-Common Stack of heat transfer Fluid
E51	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 2	E7-D	PET-Common Stack of heat transfer Fluid
E57, E59	Atm. vent from GLYCOL SEAL & OVERFLOW TANKS 2	E85a	Emergency Engines-Diesel
E56, E58	Atm. vent from GLYCOL SEAL & OVERFLOW TANKS 1	E86	Diesel Storage Tank
E52	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 1	E87a	Diesel Fire Pumps
E54	Atm. vent from GLYCOL COLDWELL (FINISHER) 1	E84	Cold CC Feeding Silo
E48	Atmospheric vent from GLYCOL HOTWELL (UFPF) 1	E88	Diesel Storage Tank Railyard
E52	Atmospheric vent from GLYCOL COLDWELL (UFPF) 1	FUGPET	Fugitive source
E66	Atmospheric vent from SMELI TANK	FUGPTA	Fugitive source
E63	Atmospheric vent from CP RECYCLE TANK	E87b	Diesel Fire Pumps
E78	Atm. vent from HTF VENT LIQUID RING VACUUM PUMP	E85b	Emergency Engines-Diesel
E82	Air from PTA railcars loading filter system	BM1/2	Benchmark 1 and 2

Scale 1:3,500 DISCLAIMER: Text scale valid only when printed on 11" x 17" paper

Meters: 0 150 300

Feet: 0 500 1,000

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

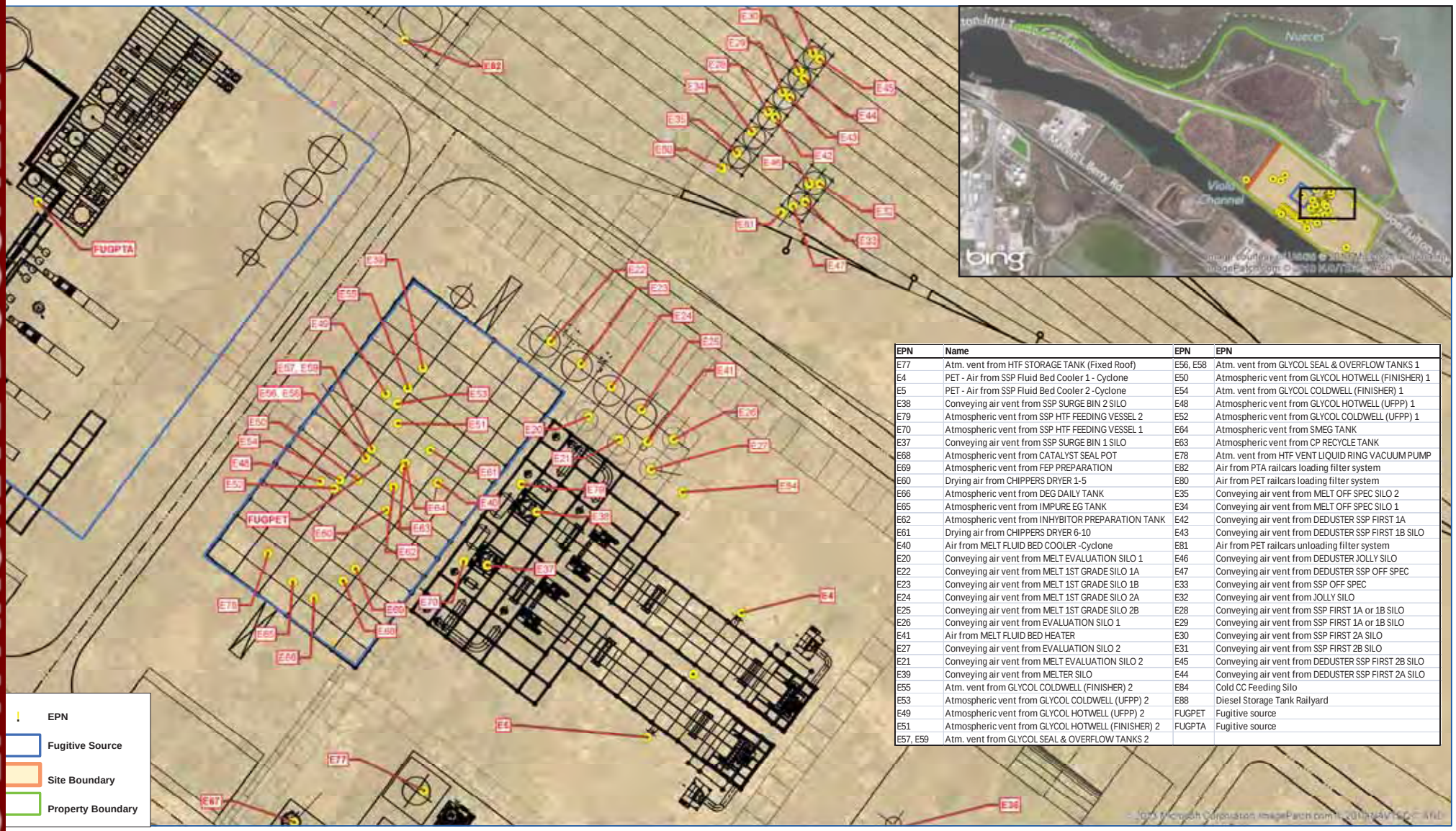
zephyr

PLOT PLAN - MAP 1 OF 2

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

File Location: I:\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



EPN	Name	EPN	EPN
E77	Atm. vent from HTF STORAGE TANK (Fixed Roof)	E56, E58	Atm. vent from GLYCOL SEAL & OVERFLOW TANKS 1
E4	PET - Air from SSP Fluid Bed Cooler 1 - Cyclone	E50	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 1
E5	PET - Air from SSP Fluid Bed Cooler 2 -Cyclone	E54	Atm. vent from GLYCOL COLDWELL (FINISHER) 1
E38	Conveying air vent from SSP SURGE BIN 2 SILO	E48	Atmospheric vent from GLYCOL HOTWELL (UFPP) 1
E79	Atmospheric vent from SSP HTF FEEDING VESSEL 2	E52	Atmospheric vent from GLYCOL COLDWELL (UFPP) 1
E70	Atmospheric vent from SSP HTF FEEDING VESSEL 1	E64	Atmospheric vent from SMEG TANK
E37	Conveying air vent from SSP SURGE BIN 1 SILO	E63	Atmospheric vent from CP RECYCLE TANK
E68	Atmospheric vent from CATALYST SEAL POT	E78	Atm. vent from HTF VENT LIQUID RING VACUUM PUMP
E69	Atmospheric vent from FEP PREPARATION	E82	Air from PTA railcars loading filter system
E60	Drying air from CHIPPERS DRYER 1-5	E80	Air from PET railcars loading filter system
E66	Atmospheric vent from DEG DAILY TANK	E35	Conveying air vent from MELT OFF SPEC SILO 2
E65	Atmospheric vent from IMPURE EG TANK	E34	Conveying air vent from MELT OFF SPEC SILO 1
E62	Atmospheric vent from INHYBITOR PREPARATION TANK	E42	Conveying air vent from DEDUSTER SSP FIRST 1A
E61	Drying air from CHIPPERS DRYER 6-10	E43	Conveying air vent from DEDUSTER SSP FIRST 1B SILO
E40	Air from MELT FLUID BED COOLER -Cyclone	E81	Air from PET railcars unloading filter system
E20	Conveying air vent from MELT EVALUATION SILO 1	E46	Conveying air vent from DEDUSTER JOLLY SILO
E22	Conveying air vent from MELT 1ST GRADE SILO 1A	E47	Conveying air vent from DEDUSTER SSP OFF SPEC
E23	Conveying air vent from MELT 1ST GRADE SILO 1B	E33	Conveying air vent from SSP OFF SPEC
E24	Conveying air vent from MELT 1ST GRADE SILO 2A	E32	Conveying air vent from JOLLY SILO
E25	Conveying air vent from MELT 1ST GRADE SILO 2B	E28	Conveying air vent from SSP FIRST 1A or 1B SILO
E26	Conveying air vent from EVALUATION SILO 1	E29	Conveying air vent from SSP FIRST 1A or 1B SILO
E41	Air from MELT FLUID BED HEATER	E30	Conveying air vent from SSP FIRST 2A SILO
E27	Conveying air vent from EVALUATION SILO 2	E31	Conveying air vent from SSP FIRST 2B SILO
E21	Conveying air vent from MELT EVALUATION SILO 2	E45	Conveying air vent from DEDUSTER SSP FIRST 2B SILO
E39	Conveying air vent from MELTER SILO	E44	Conveying air vent from DEDUSTER SSP FIRST 2A SILO
E55	Atm. vent from GLYCOL COLDWELL (FINISHER) 2	E84	Cold CC Feeding Silo
E53	Atmospheric vent from GLYCOL COLDWELL (UFPP) 2	E88	Diesel Storage Tank Railyard
E49	Atmospheric vent from GLYCOL HOTWELL (UFPP) 2	FUGPET	Fugitive source
E51	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 2	FUGPTA	Fugitive source
E57, E59	Atm. vent from GLYCOL SEAL & OVERFLOW TANKS 2		

EPN
Fugitive Source
Site Boundary
Property Boundary

Scale 1:984

DISCLAIMER: Text scale valid only when printed on 11" x 17" page

Meters
0 25 50

Feet
0 100 200

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

zephyr

PLOT PLAN - MAP 2 OF 2

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

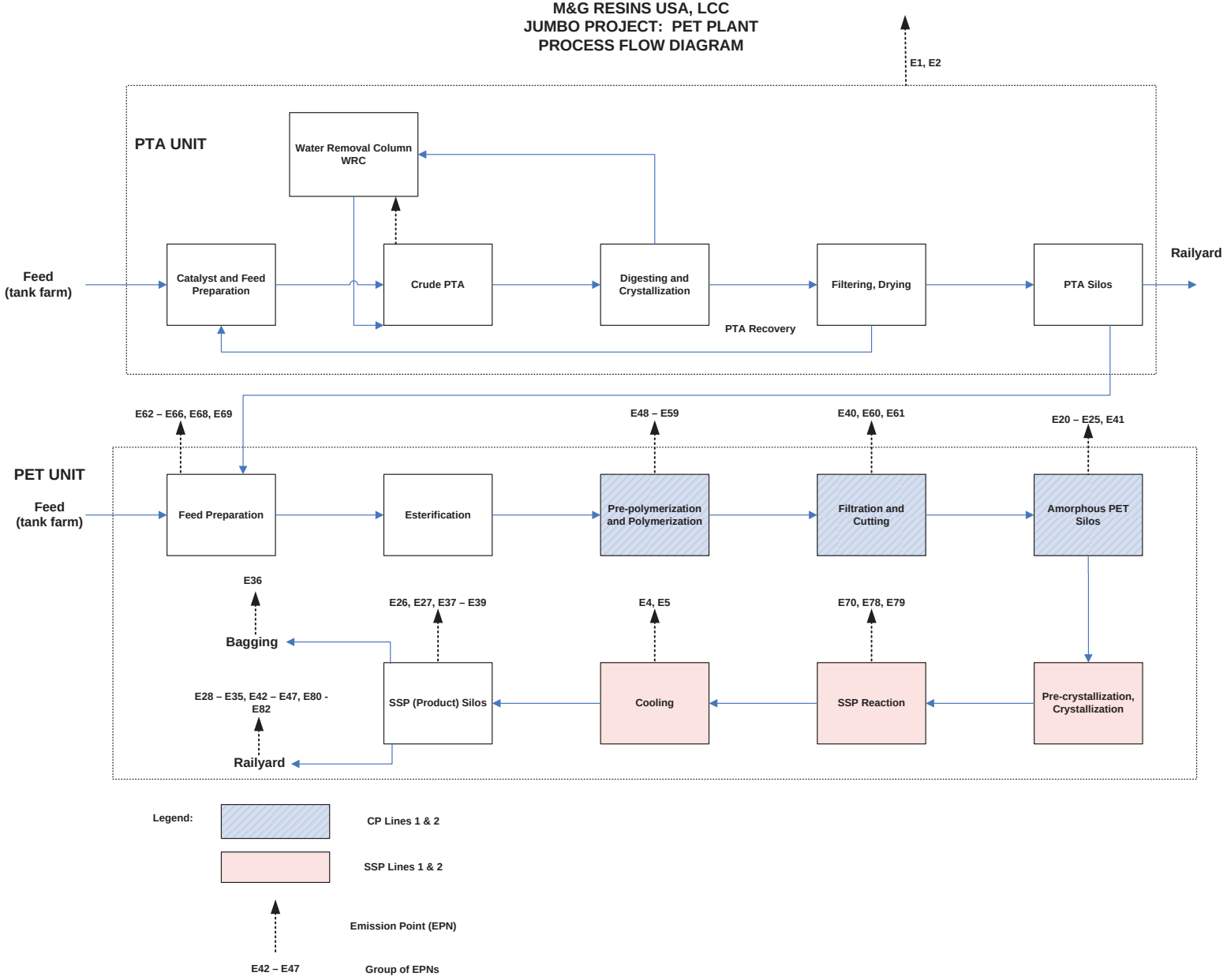
File Location: \\Austin\Projects\Chemtex\Task 002 - Air NSR PSD Permit\Graphics\PLOT PLAN

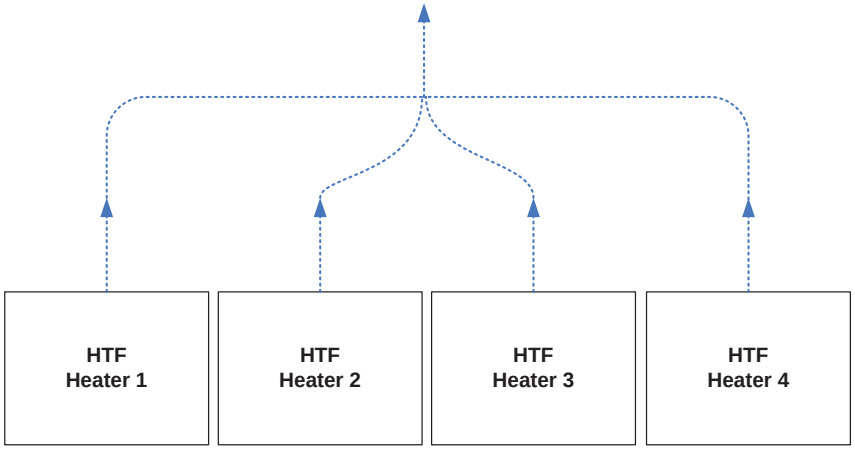
Drafted By: J. Knowles	Reviewed By: T. Sullivan	Project No.: 012453.002	Date: 02.22.2013

VII. A.3 EXISTING AUTHORIZATIONS

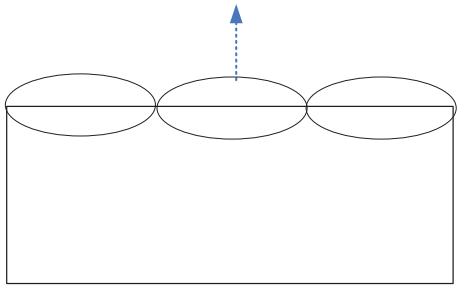
The PET plant will be located at M&G's Corpus Christi site which is a greenfield site; there are no existing air quality authorizations.

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

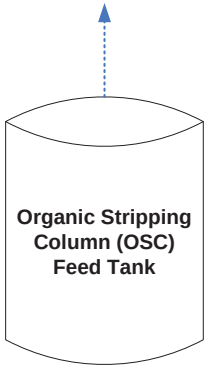


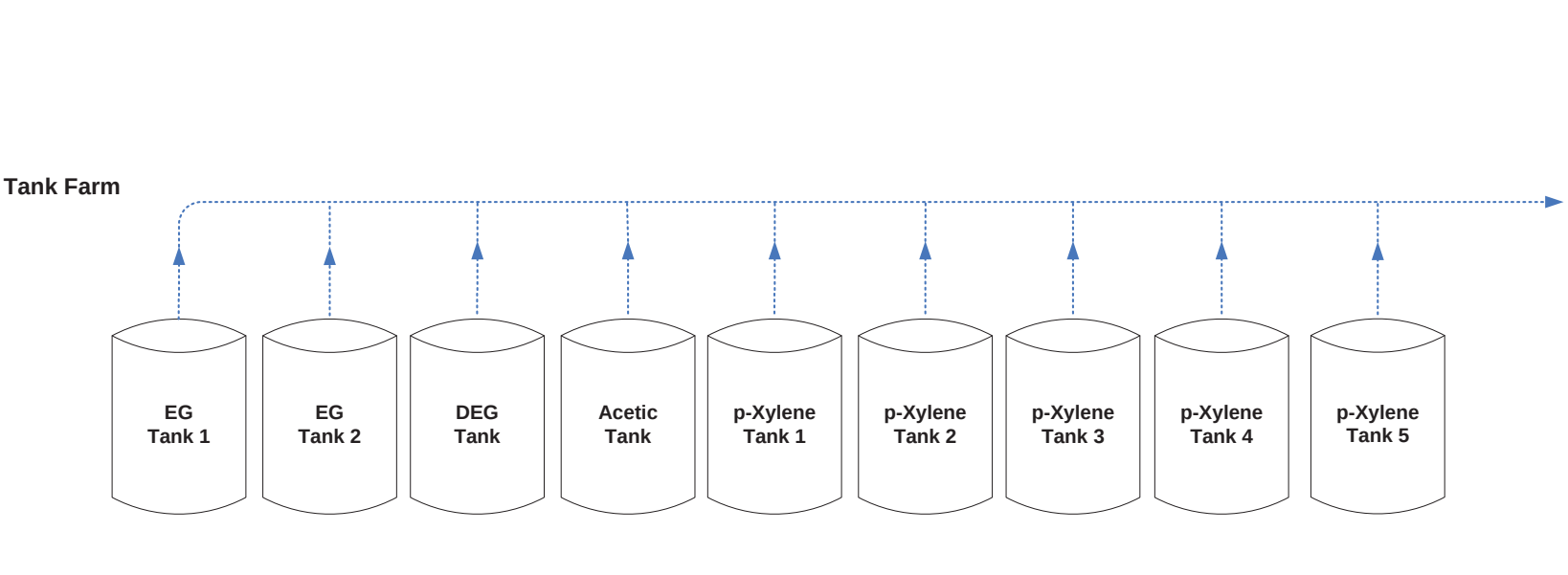


HTF (Heat Transfer Fluid) Process Heaters



Cooling Towers





Tank Farm Scrubber

VII.A.5 PROCESS DESCRIPTION

1.0 Introduction

With this application, M&G is seeking authorization to construct a new PET plant in Nueces County, Texas. The process equipment, as well as ancillary equipment that will be sources of air pollutant emissions at the site, are listed below:

- Four gas-fired process heaters
- Cooling tower
- Two regenerative thermal oxidizers (RTOs)
- Material handling system vents (includes silos, surge bins, product loading filters and conveyance systems)
- Dryer vents
- Flare
- Process piping and metering fugitive components
- Various glycol hot and cold well vents
- Vacuum system vent
- Raw material storage tanks
- Feed preparation vessels, including raw material day tanks
- Barge, truck and rail car unloading racks
- Two diesel fuel-fired emergency electrical generator engines
- Two diesel fuel-fired fire water pump engine
- Two diesel fuel storage tanks, one serving the emergency generators and one serving the rail yard mobile engine
- Organic stripping column (OSC)
- Esterification column
- Wastewater Treatment Plant (WWTP)

A process flow diagram is included as Figure VII.A.4 and a TCEQ Material Balance Table 2 is included in Section VII.A.7.

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

2.0 Process Description

PTA UNIT PROCESS DESCRIPTION

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 consists of two identical production lines that are 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 offgas units can be broken down into the air compression system, power recovery and regenerative thermal oxidation steps described below. This description applies to both PTA production lines.

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 an 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 RTO where the organic volatile compounds and residual carbon monoxide (CO) in the waste gas stream are oxidized. The main purpose of regenerative thermal oxidation is to destroy carbon monoxide 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 offgas 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.

In addition to the primary feed from the oxidizers, the WRC will receive feeds from a variety of sources. Specifically, digester and crystallizer off gases (a high pressure vaporized mixture of acetic acid and water) are 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.

Support equipment for digestion includes an acetic acid vaporizer which receives acid from the WRC underflow. 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 phosphorous), 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. These additive preparation vessels are vented to atmosphere (EPNs: E62 through E66, E68, E69).

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 top stream is 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 reactors 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 by-products (primarily ethylene glycol and water).

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. The hot wells actually operate at ambient temperature and vent to the atmosphere (EPNs: E48, E49, E52, E53, E58, E59).

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 and emit VOCs to the atmosphere (EPNs: E50, E51, E54, E55).

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. Cooling air from the polymer air coolers is vented to the atmosphere

after control by cyclone (EPN: E40) or bagfilter (EPN: E41). 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. The dryer exhausts are routed to the atmosphere and may contain PET dust (EPNs: E60, E61).

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 (EPNs: E20 through E25). 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. The scrap conveyance system is vented through a filter to the atmosphere (EPN: E39).

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 two 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 (EPNs: E56, E57). 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 by-products (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.

By-product 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 by-products 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 (primarily water) released during the heating 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 two production lines, each consisting 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 air leaving the bed is emitted to atmosphere after removal of dusts through a cyclone (EPNs: E4, E5).

The cooled chips are finally pneumatically conveyed with air to a pair of quality evaluation silos (one pair for each SSP line, EPNs: E26, E27, E37, E38) 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 silo (EPN: E36) 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-condensibles HTF distribution system are removed through a liquid ring vacuum pump; vapors separated from the liquid ring of the vacuum pump with small traces of Dowtherm A are vented to atmosphere (EPN: E78).

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 A which vent to the atmosphere (EPNs: E70, E79).

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 (combustion chamber) 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 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 (EPN: E17) 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.

After conveying and separation of PET pellets, air is vented to atmosphere via the intermediate product silo bagfilters (EPNs: E20 through E27) and final product silo bagfilters (EPNs: E28 through E32). Off-spec material is routed to off-spec silos and the associated conveying air is vented through bagfilters located on the off-spec silos (EPNs: E33 through E35). Conveying air is also vented through several process PET silos (EPNs: E37 through E39).

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 (EPNs: E42 through E47). 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 (fixed roof, routed to tank farm scrubber system EPN: E19)
- 5 tanks for p-xylene (internal floating roof, routed to tank farm scrubber system EPN: E19)
- 1 DEG tank (fixed roof, routed to tank farm scrubber system EPN: E19)
- 1 acetic acid tank (fixed roof, routed to tank farm scrubber system EPN: E19)
- 1 caustic storage tank (fixed roof, EPN:E83)

The tank farm will be provided with a water (5% caustic) scrubber for the treatment of gaseous emission from the tanks during normal operation (EPN: E19). 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 have access to a public dock that will be owned by 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), (EPNs: E33 through E35).
- 2 shipping silos for PTA and a rail car loading air filter system (EPN: E82).
- 5 shipping silos for PET (EPNs: E28 through E32) and a rail car loading air filter system (EPN: E80).
- 3 additional silos for internal PET handling operation (off specs, rework material), (EPNs: E33 through E35).
- 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 or pipeline.
- 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.

VII.A.6 EMISSIONS DATA AND CALCULATIONS

1.0 Introduction

This section presents the basis for and calculations of emissions to be authorized under the permit. Detailed calculations are provided in Appendix A. A TCEQ Table 1(a) (Emission Point Summary) is provided in Section VII.A.7. This table lists the maximum hourly emission rates and average annual emission rates for pollutants from each EPN and also shows emission point locations and exhaust parameters. Supporting emission calculations are found in Appendix A of this application. TCEQ equipment tables for the proposed equipment are presented in Section VII.A.7.

2.0 HTF Process Heaters

The four heat transfer fluid (HTF) process heaters are designed to combust both natural gas (as primary fuel) and WWTP biogas (primarily methane and CO_2). In addition, the heaters will combust two process streams: the organic stripping column (OSC) overheads and the esterification seal pot vent (EC vent). It should be noted that all four heaters have the capability of combusting all of these process streams, but typically these streams are combusted in just one heater at a time.

Heater emission rates were calculated using equipment design heat input rates and emission factors for both natural gas and biogas, which were obtained from the biogas heating values and the expected biogas composition. The heaters also function as end of pipe control for the OSC waste gas streams (WGS) and the EC vent. The OSC WGS and EC vent streams are routed to the burner assembly as supplemental fuel and combustion air, respectively. As a result, the VOCs present in the process vent streams achieve 99% (by weight) DRE.

When process vent streams (OCS WGS and EC vent) are routed to a heater, the heater which is receiving these streams may be fed fuel gases (biogas and/or natural gas) to achieve the heater's maximum firing rate (128 MMBtu/hr). The remaining three heaters could simultaneously combust fuel gases at their maximum firing rates (128 MMBtu/hr).

Emission factors used for heater emission calculations were developed as follows:

- Particulate Matter (PM_{10}, and $PM_{2.5}$) emission factors were calculated using emission factors obtained from AP-42, Table 1.4-2, *Natural Gas Combustion*.

- Sulfur Dioxide (SO_2) emission factors were calculated using emission factors from AP-42. For biogas combustion, a mass balance of sulfur in the biogas was used.

- Volatile Organic Compounds (VOC) emission factors were calculated from the biogas and process stream (OCS WGS, EC vent) compositions and the expected VOC DRE. For natural gas combustion, the emission factors were taken from AP-42 Section 1.4, *Natural Gas Combustion*

- Nitrogen Oxide (NO_x) annual emission rates were calculated based on the maximum annual firing rates (based on heater design capacity) and the proposed BACT emission factor of 0.010 lb NO_X/MMBtu from combustion using low-NO_x burners. The maximum hourly emission rates were calculated using design maximum heat input rates and a maximum hourly NO_x emission factor of 0.010 lb/MMBtu for the low-NO_x burners.

- Carbon Monoxide (CO) emissions were calculated using TCEQ's published Tier I BACT limit of 50 ppmv corrected to 3% O_2 (equivalent to 0.035 lb/MMBtu).

It should be noted that when developing worst-case hourly and annual emission rate scenarios for the system of heaters, that when any (one) heater is combusting process stream waste gases, the remaining three heaters are capable of combusting fuel gases (biogas or natural gas) at maximum firing rates.

3.0 Regenerative Thermal Oxidizer (RTO) Emissions

The RTOs combust process waste gases generated in the PTA unit as well as fuel gas (natural gas). These process waste gases contain VOCs, CO and HAPs; and, as a result, the RTOs are sources of VOC, CO and HAP emissions from combustion of process waste gas as well as products of combustion emissions (from both waste gas and fuel gas combustion). The RTOs are equipped with water scrubbers on the outlet to control emissions of bromine (from methyl bromide or hydrogen bromide).

Operating Scenario 1 - Waste Gas and Natural Combustion

During this scenario, both RTOs are combusting both waste gas and natural gas. For waste gas combustion, NO_x emissions factors are from TCEQ's *Technical Guidance Document for Flares and Vapor Oxidizers* (October 2000) and PM factors are from AP-42, Chapter 1.4. For PM, a control efficiency in the scrubber of 50% was taken. For natural gas combustion, the CO, PM and SO_2 emission factors for these calculations are from AP-42 Chapter 1.4 and the CO and NO_x emission factors are from TCEQ's *Technical Guidance Document for Flares and Vapor Oxidizers* (October 2000).

Process VOC emissions, from the waste gas combustion, were calculated based on the estimated RTO waste gas volumetric flow rate and estimated concentration of chemical species in the RTO waste gas. Using this flow rate and composition information along with the ideal gas law, the mass rate of each species routed to the RTOs was calculated. The VOC emission rate from waste gas was calculated using the VOC destruction efficiency, as specified by RTO manufacturer.

Process CO emissions, from the waste gas combustion, were calculated based on the expected mass flow rate of CO routed to the RTOs (mass flow rate calculated using the methodology described in the previous paragraph) and an expected CO destruction efficiency specified by the RTO manufacturer. Note that compliance will be demonstrated by demonstrating that the

RTOs' exhaust CO concentration is less than 100 ppmv (corrected to 3% oxygen), as described in Section VIII.C.

Process emissions of methyl bromide were calculated using the calculated mass flow rate of methyl bromide routed to the RTOs and a water scrubber design DRE of 99% (by weight).

Operating Scenario 2 – Waste Gas Only (Normal Operation)
During this scenario, both RTOs are combusting waste gas only. For waste gas combustion, NO_x emissions factors are from TCEQ's *Technical Guidance Document for Flares and Vapor Oxidizers* (October 2000) and PM factors are from AP-42, Chapter 1.4. For PM, a control efficiency, in the scrubber, of 50% was taken.

Process VOC emissions, from the waste gas combustion, were calculated based on the estimated RTO waste gas volumetric flow rate and estimated concentration of chemical species in the RTO waste gas. Using this flow rate and composition information along with the ideal gas law, the mass rate of each species routed to the RTOs was calculated. The VOC emission rate from waste gas was calculated using the VOC destruction efficiency, as specified by RTO manufacturer.

Process CO emissions, from the waste gas combustion, were calculated based on the expected mass flow rate of CO routed to the RTOs (mass flow rate calculated using the methodology described in the previous paragraph) and an expected CO destruction efficiency specified by the RTO manufacturer. Note that compliance will be demonstrated by demonstrating that the RTOs' exhaust CO concentration is less than 100 ppmv (corrected to 3% oxygen), as described in Section VIII.C.

Process emissions of methyl bromide were calculated using the calculated mass flow rate of methyl bromide routed to the RTOs and a water scrubber design DRE of 99% (by weight).

Summary of RTO Operating Scenarios
Maximum hourly emissions from the RTOs were calculated by determining the maximum hourly emission rate of each pollutant in any of the following operating scenarios:

- Scenario 1 – Both RTOs in natural gas assist mode, firing both waste gas and natural gas
- Scenario 2 – Both RTOs in normal operation, firing waste gas

These maximum hourly emission rate scenarios are reflected on both the RTO emission summary worksheet and in the Table 1a. For each pollutant, the annual emission rate from the system of RTOs (EPNs: E.1 and E.2) was calculated based on the following methodology:

1. Select the operating scenario with the highest maximum hourly emission rate

2. If Scenario 1 or 2 was selected, the maximum hourly emission rate (lb/hr) was multiplied by the maximum hours of annual operation (8,760) for these scenarios to obtain the annual rate for a pollutant.

4.0 Cooling Tower Emissions

One series of mechanical draft cooling towers will serve the entire PET plant and the Utility Plant. Emissions from the cooling tower were calculated based on the amount of water that may be entrained into the air stream and carried away from the tower as drift. While the larger drift particles will settle very close to the cooling towers, PM_{10} emissions will be generated when the drift droplets evaporate and leave behind fine particulate matter formed by crystallization of total dissolved solids (TDS).

PM emissions from the cooling tower are based on a total dissolved solids concentration of 6,000 parts per million by weight (ppmw). A drift rate of 0.001 percent was used in the calculation based on the design of the cooling tower mist eliminators.

The PM_{10} and $PM_{2.5}$ fractions of the emissions were calculated using a methodology published by Reisman and Frisbie. Emissions of hypochlorous acid from use of chlorine gas as biocide were calculated based on the maximum annual average chlorine residual rates, cooling tower circulation rates and drift specifications. Detailed sample calculations are presented on the emission calculation worksheet.

5.0 Material Handling Systems and Dryer Vent

Each material handling system, silo vent and deduster system vents to the atmosphere through a bagfilter or cyclone. As such, these vents are sources of particulate matter (PM). PM emission rates from bagfilter and cyclone vents were calculated based on the design volumetric exhaust flow rate and the particulate grain outlet loading BACT value (0.01 gr/scf). To estimate emissions of PM_{10} and $PM_{2.5}$, particle size distribution data from existing PET plants was applied to the calculated PM emission rate.

The dryer vent will be routed to a cyclone for particulate control. Emissions from the dryer vent were calculated using the same methodology as the material handling system vents.

Based on M&G's experience and test data for existing PET plants, the silos, material handling system and dryer vents are not expected to emit residual VOC. However, in order to be conservative, emissions of 1 ppm acetaldehyde were estimated as being released from these sources.

6.0 Flare Emissions

This application includes emissions from the WWTP plant's flare, which will be used to combust any excess, unrecovered biogas (primarily methane) generated at the WWTP. This flaring is

only expected to occur during HTF process heater downtime and is expected to be less than 1000 hours per year. As a conservative estimate of total annual emissions, 8,760 hours of flare operations on natural gas are requested in this permit application, in addition to the 1000 hours on biogas.

Actual tip velocity was calculated to verify that it did not exceed the maximum allowable tip velocity established for unassisted flares in 40 CFR 60.18 (c)(4)(i). The net heating value was calculated for the waste gas stream (bio gas) for the flare to ensure that the calculated LHV was greater than the minimum LHV value established 40 CFR 60.18(c)(3)(ii).

Biogas combustion emissions (CO and NO_X) have been calculated using the heating value of the biogas and emission factors from the TCEQ document, *Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers*. Note that M&G selected the highest emission factors for unassisted flares from either low-BTU (<1,000 BTU/scf) or high-BTU waste gas streams in order to estimate worst-case NO_X and CO emission rates, regardless of the waste gas stream's actual heating value (e.g., a conservative worst case).

To calculate emissions from the flare pilot gas (natural gas) combustion, emission factors were taken from AP-42, Tables 1.4-1 and 1.4-2, *Natural Gas Combustion* and used in conjunction with the design pilot flame duty (MMBtu/hr). Total NO_X and CO emission rates for the flare were calculated by summing emission rates from biogas combustion and emissions from the flare pilot gas usage.

VOC emission rates from uncombusted waste gas were calculated by multiplying the volumetric flow rate and the molecular weight of each compound in the waste gas and applying the appropriate (compound-specific) VOC DRE.

7.0 Fugitive Component Emissions

Fugitive emission were calculated by estimating the number of piping components of various types, like flanges, pumps, and valves, and multiplying these counts by the specific emission (leak) factors based on the component type. M&G used the Synthetic Organic Chemical Manufacturing Industry (SOCMI) with ethylene, SOCMI average, and SOCMI without ethylene emission factors found in the TCEQ document *Uncontrolled SOCMI Fugitive Emission Factors* depending on the designated service for each component. Uncontrolled pollutant emission rates of chlorine and VOC were calculated by multiplying the component leak rate by the estimated content (weight fraction) of VOC or chlorine in the associated process streams.

To calculate controlled emission rates, control efficiencies were applied based on the leak detection program selected. M&G is proposing to apply a 28VHP LDAR program to components in VOC service. One hundred percent control efficiency is claimed for the following types of sources: dual seal pumps with barrier fluid at higher pressure than process pressure or tandem or labyrinth seals vented to a control device, compressors equipped with dual seals with barrier fluid at higher pressure than process pressure or tandem or labyrinth seals vented to a

control device, relief valves vented to a control device (flare), open ended lines capped or blinded, and the closed loop sampling system.

8.0 Vacuum System Vent

HTF vacuum pump exhaust and VOC content were estimated based upon M&G process knowledge and design data.

9.0 Fixed and Floating Roof Storage Tanks

Annual standing storage and working losses from fixed roof and floating storage tanks were calculated using equations taken from AP-42, Section 7.1, *Liquid Storage Tanks.* Annual emission rate calculations for each tank are presented in the tank calculation worksheet with the date column listed as "365". Short-term emissions from fixed roof tanks were calculated as recommended in the TCEQ document, *Technical Guidance Package for Chemical Sources: Storage Tanks*. Hourly emission rate calculations for each tank are presented in the tank calculation worksheet with the date column listed as "7/1/2012", which corresponds to the hottest month of the year from the Corpus Christi meteorological data set.

10.0 Glycol Hot and Cold Well Vents

The glycol hot and cold wells were calculated using the same methodology as the fixed roof storage tanks with a few distinct exceptions. First, the hot and cold wells are expected to operate at constant level so an annual turnover of 10 was conservatively selected to account for fluctuations in liquid level. Second, since the hot and cold wells operate at near-constant temperature (versus ambient temperature), the daily maximum and minimum temperatures were manually set to the design operating temperature of the hot and cold wells. Third, for hourly maximum emission estimates, a maximum hourly fill rate was conservatively estimated based on one foot of level change. Actual hourly loading displacement is expected to be much less due to level control.

11.0 Diesel Fuel-Fired Equipment

Two diesel fuel-fired emergency generators will be installed to operate only for emergency situations. In addition, a pair of diesel fuel-fired firewater pumps will be installed at the site. Testing of the two engines will be limited to 100 hours per year, each. The exhaust emissions from the diesel-fired equipment were calculated based on manufacturer's specifications, except for SO_2 emissions which are based on low sulfur diesel with a maximum sulfur content of 15 ppmw.

12.0 Diesel Fuel Storage Tanks

The site will include a 40,000-gallon vertical storage tank for the storage of diesel fuel for the emergency generators and firewater pumps. Maximum annual turnovers are not expected to

exceed 5 for this tank. A separate 5000 gallon vertical diesel storage tank will be located in the rail yard to service the on-site pusher engine.

Maximum hourly and annual emission rates from these tanks were calculated based on the maximum filling rates and maximum annual throughputs using the TCEQ's February 2001 "Technical Guidance Package for Storage Tanks".

VII.A.7 TCEQ TABLE 1A AND TABLE 2

A TCEQ Table 1(a) (Emission Point Summary) and Table 2 (Material Balance) are included in this section. Other TCEQ equipment and control device tables are included in Appendix C.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E1 and E2	PTA, E1 and E2	RTO1 and RTO2	VOC	37.8355	165.7195	14	648239.40	3079681.50		40.00	7.00	44.75	136.40			
			NOx	3.3997	14.8680											
			CO	44.6855	195.7223											
			PM10	0.1267	0.5539		647878.80	3079903.50		40.00	7.00	44.75	136.40			
			PM 2.5	0.1267	0.5539											
			SO2	0.0941	0.4122											
			HAPs	2.3607	10.3229											
E4	E4	PET - Air from SSP Fluid Bed Cooler 1 - Cyclone	VOC	0	0	14	648,239.40	3,079,681.50		50.00	3.00	75.00	212.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.3752	1.6432											
			PM 2.5	0.3752	1.6432											
			SO2	0	0											
			HAPs	0.2523	1.1049											
E5	E5	PET - Air from SSP Fluid Bed Cooler 2 - Cyclone	VOC	0	0	14	648,213.20	3,079,646.60		50.00	3.00	75.00	212.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.3752	1.6432											
			PM 2.5	0.3752	1.6432											
			SO2	0	0											
			HAPs	0.2523	1.1049											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E7-A	E7-A	HTF (Heat Transfer Fluid) Heater 1	VOC	0.6902	3.0231	14	648,159.00	3,079,588.50		175.00	1.00	48.00	320.00			
			NOx	1.2800	5.6064											
			CO	10.5412	46.1704											
			PM10	0.9537	4.1773											
			PM 2.5	0.9537	4.1773											
			SO2	0.3765	1.6489											
			HAPs	0	0											
E7-B	E7-B	HTF (Heat Transfer Fluid) Heater 2	VOC	0.6902	3.0231	14	648,160.50	3,079,587.30		175.00	1.00	48.00	320.00			
			NOx	1.2800	5.6064											
			CO	10.5412	46.1704											
			PM10	0.9537	4.1773											
			PM 2.5	0.9537	4.1773											
			SO2	0.3765	1.6489											
			HAPs	0	0											
E7-C	E7-C	HTF (Heat Transfer Fluid) Heater 3	VOC	0.6902	3.0231	14	648,159.40	3,079,585.80		175.00	1.00	48.00	320.00			
			NOx	1.2800	5.6064											
			CO	10.5412	46.1704											
			PM10	0.9537	4.1773											
			PM 2.5	0.9537	4.1773											
			SO2	0.3765	1.6489											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E7-D	E7-D, PET, WWTP	HTF (Heat Transfer Fluid) Heater 4	VOC	19.0367	83.3808	14	648,157.80	3,079,586.90		175.00	1.00	48.00	320.00			
			NOx	1.2800	5.6064											
			CO	10.5412	46.1704											
			PM10	0.9537	4.1773											
			PM 2.5	0.9537	4.1773											
			SO2	3.7711	16.5175											
			HAPs	10.7002	46.8668											
E17	E17	Cooling Tower	VOC	5.9486	26.0550	14	647,900.00	3,079,703.50		65.60	24.33	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0071	0.0313											
			PM 2.5	0.0065	0.0284											
			SO2	0	0											
			HAPs	0	0											
E19	E71	EG Tank 1	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0273	0.0029											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E7-D	E7-D, PET, WWTP	HTF (Heat Transfer Fluid) Heater 4	VOC	19.0367	83.3808	14	648,157.80	3,079,586.90		175.00	1.00	48.00	320.00			
			NOx	1.2800	5.6064											
			CO	10.5412	46.1704											
			PM10	0.9537	4.1773											
			PM 2.5	0.9537	4.1773											
			SO2	3.7711	16.5175											
			HAPs	10.7002	46.8668											
E17	E17	Cooling Tower	VOC	5.9486	26.0550	14	647,900.00	3,079,703.50		65.60	24.33	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0071	0.0313											
			PM 2.5	0.0065	0.0284											
			SO2	0	0											
			HAPs	0	0											
E19	E71	EG Tank 1	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0273	0.0029											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	E72	EG Tank 2	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0273	0.0029											
E19	F6	EG Tank 3	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E19	E73	DEG Tank	VOC	0.0006	<0.0001	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0006	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	E74	Acetic Acid Tank Farm	VOC	0.4454	0.1356	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E19	E75	Paraxylene Tank 1	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											
E19	E76	Paraxylene Tank 2	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	E83	Caustic Storage Tank	VOC	0	0	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E19	F3	Paraxylene Tank 3	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											
E19	F4	Paraxylene Tank 4	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	F5	Paraxylene Tank 5	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											
E20	E20	Conveying air vent from MELT EVALUATION SILO 1	VOC	0	0	14	648,196.90	3,079,736.30		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0196											
			PM 2.5	0.0045	0.0196											
			SO2	0	0											
			HAPs	0.0088	0.0386											
E21	E21	Conveying air vent from MELT EVALUATION SILO 2	VOC	0	0	14	648,205.30	3,079,730.00		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0196											
			PM 2.5	0.0045	0.0196											
			SO2	0	0											
			HAPs	0.0088	0.0386											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E22	E22	Conveying air vent from MELT 1ST GRADE SILO 1A	VOC	0	0	14	648,186.40	3,079,757.40		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											
E23	E23	Conveying air vent from MELT 1ST GRADE SILO 1B	VOC	0	0	14	648,194.80	3,079,751.10		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											
E24	E24	Conveying air vent from MELT 1ST GRADE SILO 2A	VOC	0	0	14	648,203.20	3,079,744.70		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E25	E25	Conveying air vent from MELT 1ST GRADE SILO 2B	VOC	0	0	14	648,211.60	3,079,738.40		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											
E26	E26	Conveying air vent from EVALUATION SILO 1	VOC	0	0	14	648,220.70	3,079,730.10		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0029	0.0128											
			PM 2.5	0.0029	0.0128											
			SO2	0	0											
			HAPs	0.0058	0.0253											
E27	E27	Conveying air vent from EVALUATION SILO 2	VOC	0	0	14	648,214.30	3,079,721.70		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0029	0.0128											
			PM 2.5	0.0029	0.0128											
			SO2	0	0											
			HAPs	0.0058	0.0253											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E28 or E29	E28 or E29	Conveying air vent from SSP FIRST 1A or 1B SILO	VOC	0	0	14	648246.90	3079821.40		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0226											
			PM 2.5	0.0052	0.0226											
			SO2	0	0											
			HAPs	0.0102	0.0446											
E30	E30	Conveying air vent from SSP FIRST 2A SILO	VOC	0	0	14	648,255.60	3,079,832.90		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0113											
			PM 2.5	0.0052	0.0113											
			SO2	0	0											
			HAPs	0.0102	0.0223											
E31	E31	Conveying air vent from SSP FIRST 2B SILO	VOC	0	0	14	648,259.50	3,079,837.80		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0113											
			PM 2.5	0.0052	0.0113											
			SO2	0	0											
			HAPs	0.0102	0.0223											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E32	E32	Conveying air vent from JOLLY SILO	VOC	0	0	14	648,261.30	3,079,801.30		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0011											
			PM 2.5	0.0052	0.0011											
			SO2	0	0											
			HAPs	0.0102	0.0022											
E33	E33	Conveying air vent from SSP OFF SPEC	VOC	0	0	14	648,257.30	3,079,796.30		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0005											
			PM 2.5	0.0052	0.0005											
			SO2	0	0											
			HAPs	0.0102	0.0009											
E34	E34	Conveying air vent from MELT OFF SPEC SILO 1	VOC	0	0	14	648,242.40	3,079,815.90		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0004											
			PM 2.5	0.0045	0.0004											
			SO2	0	0											
			HAPs	0.0088	0.0008											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E35	E35	Conveying air vent from MELT OFF SPEC SILO 2	VOC	0	0	14	648,238.20	3,079,810.00		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0004											
			PM 2.5	0.0045	0.0004											
			SO2	0	0											
			HAPs	0.0088	0.0008											
E36	E36	Conveying air vent from BAGGING SILO	VOC	0	0	14	648,281.60	3,079,621.10		126.21	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0008											
			PM 2.5	0.0036	0.0008											
			SO2	0	0											
			HAPs	0.0072	0.0016											
E37	E37	Conveying air vent from SSP SURGE BIN 1 SILO	VOC	0	0	14	648,168.60	3,079,695.00		210.58	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0041	0.0177											
			PM 2.5	0.0041	0.0177											
			SO2	0	0											
			HAPs	0.0080	0.0350											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E38	E38	Conveying air vent from SSP SURGE BIN 2 SILO	VOC	0	0	14	648,182.30	3,079,709.70		210.58	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0041	0.0177											
			PM 2.5	0.0041	0.0177											
			SO2	0	0											
			HAPs	0.0080	0.0350											
E39	E39	Conveying air vent from MELTER SILO	VOC	0	0	14	648,150.50	3,079,749.90		181.06	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0064	0.0280											
			PM 2.5	0.0064	0.0280											
			SO2	0	0											
			HAPs	0.0126	0.0553											
E40	E40	Air from MELT FLUID BED COOLER - Cyclone	VOC	0	0	14	648,154.80	3,079,717.80		75.00	3.00	75.00	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.1936	0.0426											
			PM 2.5	0.1936	0.0426											
			SO2	0	0											
			HAPs	0.1301	0.0286											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E41	E41	Air from MELT FLUID BED HEATER	VOC	0	0	14	648,213.40	3,079,729.40		42.64	1.00	40.00	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0025	0.0006											
			PM 2.5	0.0025	0.0006											
			SO2	0	0											
			HAPs	0.0050	0.0011											
E42	E42	Conveying air vent from DEDUSTER SSP FIRST 1A	VOC	0	0	14	648,249.00	3,079,820.00		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											
E43	E43	Conveying air vent from DEDUSTER SSP FIRST 1B SILO	VOC	0	0	14	648,253.10	3,079,825.50		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source						8. Fugitives		
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data						
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E44	E44	Conveying air vent from DEDUSTER SSP FIRST 2A SILO	VOC	0	0	14	648,257.00	3,079,830.70		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											
E45	E45	Conveying air vent from DEDUSTER SSP FIRST 2B SILO	VOC	0	0	14	648,261.40	3,079,836.30		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											
E46	E46	Conveying air vent from DEDUSTER JOLLY SILO	VOC	0	0	14	648,258.50	3,079,801.40		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0038											
			PM 2.5	0.0087	0.0038											
			SO2	0	0											
			HAPs	0.0172	0.0076											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E47	E47	Conveying air vent from DEDUSTER SSP OFF SPEC	VOC	0	0	14	648,254.00	3,079,794.90		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0019											
			PM 2.5	0.0087	0.0019											
			SO2	0	0											
			HAPs	0.0172	0.0038											
E48	E48	Atmospheric vent from GLYCOL HOTWELL (UFPP) 1	VOC	0.0055	0.0001	14	648,121.90	3,079,718.10		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											
E49	E49	Atmospheric vent from GLYCOL HOTWELL (UFPP) 2	VOC	0.0055	0.0001	14	648,140.20	3,079,742.70		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E50	E50	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 1	VOC	0.0055	0.0001	14	648,132.50	3,079,718.60		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											
E51	E51	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 2	VOC	0.0055	0.0001	14	648,143.60	3,079,734.30		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											
E52	E52	Atmospheric vent from GLYCOL COLDWELL (UFPP) 1	VOC	0.0014	<0.0001	14	648,125.80	3,079,716.20		34.77	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0014	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E53	E53	Atmospheric vent from GLYCOL COLDWELL (UFPP) 2	VOC	0.0014	<0.0001	14	648,143.40	3,079,739.90		34.77	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0014	<0.0001											
E54	E54	Atmospheric vent from GLYCOL COLDWELL (FINISHER) 1	VOC	0.0005	<0.0001	14	648,127.40	3,079,718.60		30.50	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0005	<0.0001											
E55	E55	Atmospheric vent from GLYCOL COLDWELL (FINISHER) 2	VOC	0.0005	<0.0001	14	648,146.40	3,079,744.30		30.18	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0005	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E56	E56	Atmospheric vent from GLYCOL SEAL TANK 1	VOC	0.0042	0.0001	14	648,134.60	3,079,724.50		30.83	0.67	0.00	149.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0042	0.0001											
E57	E57	Atmospheric vent from GLYCOL SEAL TANK 2	VOC	0.0042	0.0001	14	648,136.20	3,079,727.30		30.83	0.67	0.00	149.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0042	0.0001											
E58	E58	Atmospheric vent from GLYCOL OVERFLOW TANK 1	VOC	0.0016	<0.0001	14	648,134.60	3,079,724.50		4.26	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0016	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E59	E59	Atmospheric vent from GLYCOL OVERFLOW TANK 2	VOC	0.0016	<0.0001	14	648,136.20	3,079,727.30		4.26	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0016	<0.0001											
E60	E60	Drying air from CHIPPERS DRYER 1-5	VOC	0	0	14	648,140.30	3,079,710.20		147.60	1.00	62.30	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0066	0.0289											
			PM 2.5	0.0066	0.0289											
			SO2	0	0											
			HAPs	0.0130	0.0570											
E61	E61	Drying air from CHIPPERS DRYER 6-10	VOC	0	0	14	648,152.60	3,079,726.80		147.60	1.00	62.30	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0066	0.0289											
			PM 2.5	0.0066	0.0289											
			SO2	0	0											
			HAPs	0.0130	0.0570											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E62	E62	Atmospheric vent from INHYBITOR PREPARATION TANK	VOC	0.0344	0.0029	14	648,142.30	3,079,716.60		15.74	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0344	0.0029											
E63	E63	Atmospheric vent from CP RECYCLE TANK	VOC	0.0243	0.0015	14	648,145.40	3,079,721.80		24.93	0.67	0.00	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0243	0.0015											
E64	E64	Atmospheric vent from SMEG TANK	VOC	0.0011	<0.0001	14	648,145.70	3,079,723.20		49.20	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0011	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E65	E65	Atmospheric vent from IMPURE EG TANK	VOC	0.0237	0.0020	14	648,114.20	3,079,690.00		36.08	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0237	0.0020											
E66	E66	Atmospheric vent from DEG DAILY TANK	VOC	0.0038	0.0018	14	648,120.10	3,079,685.60		26.57	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0038	0.0018											
E67	E67	Atmospheric vent from ORGANIC STRIPPING COLUMN FEED TANK	VOC	0.0319	0.0021	14	648,114.50	3,079,623.10		19.68	0.67	0.00	122.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0319	0.0021											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E68	E68	Atmospheric vent from CATALYST SEAL POT	VOC	0.0009	<0.0001	14	648,128.30	3,079,690.40		45.92	0.67	0.00	104.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0009	<0.0001											
E69	E69	Atmospheric vent from FEP PREPARATION	VOC	0.0244	0.0021	14	648,131.70	3,079,693.90		62.32	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0244	0.0021											
E70	E70	Atmospheric vent from SSP HTF FEEDING VESSEL 1	VOC	0.0056	<0.0001	14	648,161.90	3,079,695.90		14.43	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E77	E77	Atmospheric vent from HTF STORAGE TANK (Fixed Roof)	VOC	0.0968	0.0048	14	648,150.80	3,079,631.90		41.00	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0998	0.0050											
E78	E78	Atmospheric vent from HTF VENT LIQUID RING VACUUM PUMP	VOC	0.3307	1.4484	14	648,107.30	3,079,698.00		27.88	0.67	1.15	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.3241	1.4195											
E79	E79	Atmospheric vent from SSP HTF FEEDING VESSEL 2	VOC	0.0056	<0.0001	14	648,178.00	3,079,717.30		14.43	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E80	E80	Air from PET railcars loading filter system	VOC	0	0	14	648,234.00	3,079,805.60		51.17	1.00	36.84	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0039	0.0171											
			PM 2.5	0.0039	0.0171											
			SO2	0	0											
			HAPs	0.0077	0.0337											
E81	E81	Air from PET railcars unloading filter system	VOC	0	0	14	648,250.50	3,079,793.40		51.17	1.00	24.55	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0026	0.0006											
			PM 2.5	0.0026	0.0006											
			SO2	0	0											
			HAPs	0.0051	0.0011											
E82	E82	Air from PTA railcars loading filter system	VOC	0	0	14	648,145.50	3,079,841.40		54.12	1.00	12.29	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0013	0.0057											
			PM 2.5	0.0013	0.0057											
			SO2	0	0											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E84	E84	Cold CC Feeding Silo	VOC	0	0	14	648,223.20	3,079,715.10		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0035	0.0008											
			PM 2.5	0.0035	0.0008											
			SO2	0	0											
			HAPs	0.0069	0.0015											
E85-A	E85-A	Emergency Diesel Generator 1	VOC	8.5540	0.4277	14	647,890.40	3,079,650.90		30.00	2.00	187.08	723.20			
			NOx	47.8847	2.3942											
			CO	30.8649	1.5432											
			PM10	1.7637	0.0882											
			PM 2.5	1.7637	0.0882											
			SO2	0.0572	0.0029											
			HAPs	0	0											
E85-B	E85-B	Emergency Diesel Generator 2	VOC	8.5540	0.4277	14	647,886.00	3,079,646.70		30.00	2.00	187.08	723.20			
			NOx	47.8847	2.3942											
			CO	30.8649	1.5432											
			PM10	1.7637	0.0882											
			PM 2.5	1.7637	0.0882											
			SO2	0.0572	0.0029											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E86	E86	Diesel Storage Tank	VOC	0.3981	0.0014	14	647,895.60	3,079,647.30		24.00	16.80	0.00	0.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E87-A	E87-A	Fire Water Pump Diesel Engine 1	VOC	0.1482	0.0074	14	647,861.70	3,079,655.40		14.00	0.70	194.88	900.00			
			NOx	3.5566	0.1778											
			CO	0.6908	0.0345											
			PM10	0.0843	0.0042											
			PM 2.5	0.0843	0.0042											
			SO2	0.0042	0.0002											
			HAPs	0	0											
E87-B	E87-B	Fire Water Pump Diesel Engine 2	VOC	0.1482	0.0074	14	647,865.60	3,079,659.10		14.00	0.70	194.88	900.00			
			NOx	3.5566	0.1778											
			CO	0.6908	0.0345											
			PM10	0.0843	0.0042											
			PM 2.5	0.0843	0.0042											
			SO2	0.0042	0.0002											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E88	E88	Diesel Storage Tank Railyard	VOC	0.2488	0.0004	14	648,423.60	3,079,721.20		24.00	5.95	0.00	0.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
FLARE	FLARE, WWTP	Biogas Flare	VOC	0.0007	0.0016	14	647,822.40	3,079,919.20		30.00	2.44	65.62	1831.73			
			NOx	1.1999	0.6327											
			CO	4.7788	2.5199											
			PM10	0.0648	0.0342											
			PM 2.5	0.0648	0.0342											
			SO2	3.4582	1.7298											
			HAPs	0	0											
FUGPTA and FUGPET	FUGPTA and FUGPET	Combined Plant Fugitives	VOC	3.6898	16.1613	14	648,041.11	3,079,787.79						450.00	440.00	53.70
			NOx	0	0											
			CO	0.0004	0.0016											
			PM10	0	0		648,142.41	3,079,723.44						350.00	170.00	53.70
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	3.0824	13.5011											

EPN = Emission Point Number
FIN = Facility Identification Number

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E7-D	E7-D, PET, WWTP	HTF (Heat Transfer Fluid) Heater	VOC	19.0367	83.3808	14	648,157.80	3,079,586.90		175.00	1.00	48.00	320.00			
			NOx	1.2800	5.6064											
			CO	10.5412	46.1704											
			PM10	0.9537	4.1773											
			PM 2.5	0.9537	4.1773											
			SO2	3.7711	16.5175											
			HAPs	10.7002	46.8668											
E17	E17	Cooling Tower	VOC	5.9486	26.0550	14	647,900.00	3,079,703.50		65.60	24.33	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0071	0.0313											
			PM 2.5	0.0065	0.0284											
			SO2	0	0											
			HAPs	0	0											
E19	E71	EG Tank 1	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0273	0.0029											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	E72	EG Tank 2	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0273	0.0029											
E19	F6	EG Tank 3	VOC	0.0273	0.0029	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E19	E73	DEG Tank	VOC	0.0006	<0.0001	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0006	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	E74	Acetic Acid Tank Farm	VOC	0.4454	0.1356	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E19	E75	Paraxylene Tank 1	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											
E19	E76	Paraxylene Tank 2	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	E83	Caustic Storage Tank	VOC	0	0	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E19	F3	Paraxylene Tank 3	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											
E19	F4	Paraxylene Tank 4	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source						8. Fugitives		
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data						
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E19	F5	Paraxylene Tank 5	VOC	0.0305	0.0144	14	648,063.80	3,079,595.20		20.01	1.00	20.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0305	0.0144											
E20	E20	Conveying air vent from MELT EVALUATION SILO 1	VOC	0	0	14	648,196.90	3,079,736.30		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0196											
			PM 2.5	0.0045	0.0196											
			SO2	0	0											
			HAPs	0.0088	0.0386											
E21	E21	Conveying air vent from MELT EVALUATION SILO 2	VOC	0	0	14	648,205.30	3,079,730.00		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0196											
			PM 2.5	0.0045	0.0196											
			SO2	0	0											
			HAPs	0.0088	0.0386											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E22	E22	Conveying air vent from MELT 1ST GRADE SILO 1A	VOC	0	0	14	648,186.40	3,079,757.40		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											
E23	E23	Conveying air vent from MELT 1ST GRADE SILO 1B	VOC	0	0	14	648,194.80	3,079,751.10		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											
E24	E24	Conveying air vent from MELT 1ST GRADE SILO 2A	VOC	0	0	14	648,203.20	3,079,744.70		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E25	E25	Conveying air vent from MELT 1ST GRADE SILO 2B	VOC	0	0	14	648,211.60	3,079,738.40		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0080											
			PM 2.5	0.0036	0.0080											
			SO2	0	0											
			HAPs	0.0072	0.0157											
E26	E26	Conveying air vent from EVALUATION SILO 1	VOC	0	0	14	648,220.70	3,079,730.10		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0029	0.0128											
			PM 2.5	0.0029	0.0128											
			SO2	0	0											
			HAPs	0.0058	0.0253											
E27	E27	Conveying air vent from EVALUATION SILO 2	VOC	0	0	14	648,214.30	3,079,721.70		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0029	0.0128											
			PM 2.5	0.0029	0.0128											
			SO2	0	0											
			HAPs	0.0058	0.0253											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E28 or E29	E28 or E29	Conveying air vent from SSP FIRST 1A or 1B SILO	VOC	0	0	14	648246.90	3079821.40		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0226											
			PM 2.5	0.0052	0.0226											
			SO2	0	0											
			HAPs	0.0102	0.0446											
E30	E30	Conveying air vent from SSP FIRST 2A SILO	VOC	0	0	14	648,255.60	3,079,832.90		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0113											
			PM 2.5	0.0052	0.0113											
			SO2	0	0											
			HAPs	0.0102	0.0223											
E31	E31	Conveying air vent from SSP FIRST 2B SILO	VOC	0	0	14	648,259.50	3,079,837.80		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0113											
			PM 2.5	0.0052	0.0113											
			SO2	0	0											
			HAPs	0.0102	0.0223											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E32	E32	Conveying air vent from JOLLY SILO	VOC	0	0	14	648,261.30	3,079,801.30		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0011											
			PM 2.5	0.0052	0.0011											
			SO2	0	0											
			HAPs	0.0102	0.0022											
E33	E33	Conveying air vent from SSP OFF SPEC	VOC	0	0	14	648,257.30	3,079,796.30		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0052	0.0005											
			PM 2.5	0.0052	0.0005											
			SO2	0	0											
			HAPs	0.0102	0.0009											
E34	E34	Conveying air vent from MELT OFF SPEC SILO 1	VOC	0	0	14	648,242.40	3,079,815.90		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0004											
			PM 2.5	0.0045	0.0004											
			SO2	0	0											
			HAPs	0.0088	0.0008											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E35	E35	Conveying air vent from MELT OFF SPEC SILO 2	VOC	0	0	14	648,238.20	3,079,810.00		183.68	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0045	0.0004											
			PM 2.5	0.0045	0.0004											
			SO2	0	0											
			HAPs	0.0088	0.0008											
E36	E36	Conveying air vent from BAGGING SILO	VOC	0	0	14	648,281.60	3,079,621.10		126.21	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0036	0.0008											
			PM 2.5	0.0036	0.0008											
			SO2	0	0											
			HAPs	0.0072	0.0016											
E37	E37	Conveying air vent from SSP SURGE BIN 1 SILO	VOC	0	0	14	648,168.60	3,079,695.00		210.58	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0041	0.0177											
			PM 2.5	0.0041	0.0177											
			SO2	0	0											
			HAPs	0.0080	0.0350											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source						8. Fugitives		
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data						
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E38	E38	Conveying air vent from SSP SURGE BIN 2 SILO	VOC	0	0	14	648,182.30	3,079,709.70		210.58	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0041	0.0177											
			PM 2.5	0.0041	0.0177											
			SO2	0	0											
			HAPs	0.0080	0.0350											
E39	E39	Conveying air vent from MELTER SILO	VOC	0	0	14	648,150.50	3,079,749.90		181.06	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0064	0.0280											
			PM 2.5	0.0064	0.0280											
			SO2	0	0											
			HAPs	0.0126	0.0553											
E40	E40	Air from MELT FLUID BED COOLER - Cyclone	VOC	0	0	14	648,154.80	3,079,717.80		75.00	3.00	75.00	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.1936	0.0426											
			PM 2.5	0.1936	0.0426											
			SO2	0	0											
			HAPs	0.1301	0.0286											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E41	E41	Air from MELT FLUID BED HEATER	VOC	0	0	14	648,213.40	3,079,729.40		42.64	1.00	40.00	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0025	0.0006											
			PM 2.5	0.0025	0.0006											
			SO2	0	0											
			HAPs	0.0050	0.0011											
E42	E42	Conveying air vent from DEDUSTER SSP FIRST 1A	VOC	0	0	14	648,249.00	3,079,820.00		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											
E43	E43	Conveying air vent from DEDUSTER SSP FIRST 1B SILO	VOC	0	0	14	648,253.10	3,079,825.50		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E44	E44	Conveying air vent from DEDUSTER SSP FIRST 2A SILO	VOC	0	0	14	648,257.00	3,079,830.70		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											
E45	E45	Conveying air vent from DEDUSTER SSP FIRST 2B SILO	VOC	0	0	14	648,261.40	3,079,836.30		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0291											
			PM 2.5	0.0087	0.0291											
			SO2	0	0											
			HAPs	0.0172	0.0573											
E46	E46	Conveying air vent from DEDUSTER JOLLY SILO	VOC	0	0	14	648,258.50	3,079,801.40		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0038											
			PM 2.5	0.0087	0.0038											
			SO2	0	0											
			HAPs	0.0172	0.0076											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E47	E47	Conveying air vent from DEDUSTER SSP OFF SPEC	VOC	0	0	14	648,254.00	3,079,794.90		68.88	1.00	40.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0087	0.0019											
			PM 2.5	0.0087	0.0019											
			SO2	0	0											
			HAPs	0.0172	0.0038											
E48	E48	Atmospheric vent from GLYCOL HOTWELL (UFPP) 1	VOC	0.0055	0.0001	14	648,121.90	3,079,718.10		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											
E49	E49	Atmospheric vent from GLYCOL HOTWELL (UFPP) 2	VOC	0.0055	0.0001	14	648,140.20	3,079,742.70		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E50	E50	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 1	VOC	0.0055	0.0001	14	648,132.50	3,079,718.60		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											
E51	E51	Atmospheric vent from GLYCOL HOTWELL (FINISHER) 2	VOC	0.0055	0.0001	14	648,143.60	3,079,734.30		12.46	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0055	0.0001											
E52	E52	Atmospheric vent from GLYCOL COLDWELL (UFPP) 1	VOC	0.0014	<0.0001	14	648,125.80	3,079,716.20		34.77	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0014	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E53	E53	Atmospheric vent from GLYCOL COLDWELL (UFPP) 2	VOC	0.0014	<0.0001	14	648,143.40	3,079,739.90		34.77	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0014	<0.0001											
E54	E54	Atmospheric vent from GLYCOL COLDWELL (FINISHER) 1	VOC	0.0005	<0.0001	14	648,127.40	3,079,718.60		30.50	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0005	<0.0001											
E55	E55	Atmospheric vent from GLYCOL COLDWELL (FINISHER) 2	VOC	0.0005	<0.0001	14	648,146.40	3,079,744.30		30.18	0.67	0.00	86.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0005	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E56	E56	Atmospheric vent from GLYCOL SEAL TANK 1	VOC	0.0042	0.0001	14	648,134.60	3,079,724.50		30.83	0.67	0.00	149.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0042	0.0001											
E57	E57	Atmospheric vent from GLYCOL SEAL TANK 2	VOC	0.0042	0.0001	14	648,136.20	3,079,727.30		30.83	0.67	0.00	149.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0042	0.0001											
E58	E58	Atmospheric vent from GLYCOL OVERFLOW TANK 1	VOC	0.0016	<0.0001	14	648,134.60	3,079,724.50		4.26	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0016	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E59	E59	Atmospheric vent from GLYCOL OVERFLOW TANK 2	VOC	0.0016	<0.0001	14	648,136.20	3,079,727.30		4.26	0.67	0.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0016	<0.0001											
E60	E60	Drying air from CHIPPERS DRYER 1-5	VOC	0	0	14	648,140.30	3,079,710.20		147.60	1.00	62.30	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0066	0.0289											
			PM 2.5	0.0066	0.0289											
			SO2	0	0											
			HAPs	0.0130	0.0570											
E61	E61	Drying air from CHIPPERS DRYER 6-10	VOC	0	0	14	648,152.60	3,079,726.80		147.60	1.00	62.30	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0066	0.0289											
			PM 2.5	0.0066	0.0289											
			SO2	0	0											
			HAPs	0.0130	0.0570											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source						8. Fugitives		
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data						
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E62	E62	Atmospheric vent from INHYBITOR PREPARATION TANK	VOC	0.0344	0.0029	14	648,142.30	3,079,716.60		15.74	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0344	0.0029											
E63	E63	Atmospheric vent from CP RECYCLE TANK	VOC	0.0243	0.0015	14	648,145.40	3,079,721.80		24.93	0.67	0.00	302.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0243	0.0015											
E64	E64	Atmospheric vent from SMEG TANK	VOC	0.0011	<0.0001	14	648,145.70	3,079,723.20		49.20	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0011	<0.0001											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E65	E65	Atmospheric vent from IMPURE EG TANK	VOC	0.0237	0.0020	14	648,114.20	3,079,690.00		36.08	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0237	0.0020											
E66	E66	Atmospheric vent from DEG DAILY TANK	VOC	0.0038	0.0018	14	648,120.10	3,079,685.60		26.57	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0038	0.0018											
E67	E67	Atmospheric vent from ORGANIC STRIPPING COLUMN FEED TANK	VOC	0.0319	0.0021	14	648,114.50	3,079,623.10		19.68	0.67	0.00	122.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0319	0.0021											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E68	E68	Atmospheric vent from CATALYST SEAL POT	VOC	0.0009	<0.0001	14	648,128.30	3,079,690.40		45.92	0.67	0.00	104.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0009	<0.0001											
E69	E69	Atmospheric vent from FEP PREPARATION	VOC	0.0244	0.0021	14	648,131.70	3,079,693.90		62.32	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0244	0.0021											
E70	E70	Atmospheric vent from SSP HTF FEEDING VESSEL 1	VOC	0.0056	<0.0001	14	648,161.90	3,079,695.90		14.43	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E77	E77	Atmospheric vent from HTF STORAGE TANK (Fixed Roof)	VOC	0.0968	0.0048	14	648,150.80	3,079,631.90		41.00	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.0998	0.0050											
E78	E78	Atmospheric vent from HTF VENT LIQUID RING VACUUM PUMP	VOC	0.3307	1.4484	14	648,107.30	3,079,698.00		27.88	0.67	1.15	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0.3241	1.4195											
E79	E79	Atmospheric vent from SSP HTF FEEDING VESSEL 2	VOC	0.0056	<0.0001	14	648,178.00	3,079,717.30		14.43	0.67	0.00	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E80	E80	Air from PET railcars loading filter system	VOC	0	0	14	648,234.00	3,079,805.60		51.17	1.00	36.84	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0039	0.0171											
			PM 2.5	0.0039	0.0171											
			SO2	0	0											
			HAPs	0.0077	0.0337											
E81	E81	Air from PET railcars unloading filter system	VOC	0	0	14	648,250.50	3,079,793.40		51.17	1.00	24.55	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0026	0.0006											
			PM 2.5	0.0026	0.0006											
			SO2	0	0											
			HAPs	0.0051	0.0011											
E82	E82	Air from PTA railcars loading filter system	VOC	0	0	14	648,145.50	3,079,841.40		54.12	1.00	12.29	amb			
			NOx	0	0											
			CO	0	0											
			PM10	0.0013	0.0057											
			PM 2.5	0.0013	0.0057											
			SO2	0	0											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E84	E84	Cold CC Feeding Silo	VOC	0	0	14	648,223.20	3,079,715.10		127.92	1.00	40.00	140.00			
			NOx	0	0											
			CO	0	0											
			PM10	0.0035	0.0008											
			PM 2.5	0.0035	0.0008											
			SO2	0	0											
			HAPs	0.0069	0.0015											
E85-A	E85-A	Emergency Diesel Generator 1	VOC	8.5540	0.4277	14	647,890.40	3,079,650.90		30.00	2.00	187.08	723.20			
			NOx	47.8847	2.3942											
			CO	30.8649	1.5432											
			PM10	1.7637	0.0882											
			PM 2.5	1.7637	0.0882											
			SO2	0.0572	0.0029											
			HAPs	0	0											
E85-B	E85-B	Emergency Diesel Generator 2	VOC	8.5540	0.4277	14	647,886.00	3,079,646.70		30.00	2.00	187.08	723.20			
			NOx	47.8847	2.3942											
			CO	30.8649	1.5432											
			PM10	1.7637	0.0882											
			PM 2.5	1.7637	0.0882											
			SO2	0.0572	0.0029											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate		4. UTM Coordinates of Emission Point			Source								
									5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E86	E86	Diesel Storage Tank	VOC	0.3981	0.0014	14	647,895.60	3,079,647.30		24.00	16.80	0.00	0.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
E87-A	E87-A	Fire Water Pump Diesel Engine 1	VOC	0.1482	0.0074	14	647,861.70	3,079,655.40		14.00	0.70	194.88	900.00			
			NOx	3.5566	0.1778											
			CO	0.6908	0.0345											
			PM10	0.0843	0.0042											
			PM 2.5	0.0843	0.0042											
			SO2	0.0042	0.0002											
			HAPs	0	0											
E87-B	E87-B	Fire Water Pump Diesel Engine 2	VOC	0.1482	0.0074	14	647,865.60	3,079,659.10		14.00	0.70	194.88	900.00			
			NOx	3.5566	0.1778											
			CO	0.6908	0.0345											
			PM10	0.0843	0.0042											
			PM 2.5	0.0843	0.0042											
			SO2	0.0042	0.0002											
			HAPs	0	0											

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	2/22/2013	**Permit No.:**	TBD	**Regulated Entity No.:**	TBD
Area Name:	M&G Resins PET Plant			**Customer Reference No.:**	TBD

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA						EMISSION POINT DISCHARGE PARAMETERS											
						4. UTM Coordinates of Emission Point			Source								
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate					5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives			
(A) EPN	(B) FIN	(C) NAME		(A) LB/HOUR	(B) TPY	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees from North ©
E88	E88	Diesel Storage Tank Railyard	VOC	0.2488	0.0004	14	648,423.60	3,079,721.20		24.00	5.95	0.00	0.00			
			NOx	0	0											
			CO	0	0											
			PM10	0	0											
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	0	0											
FLARE	FLARE, WWTP	Biogas Flare	VOC	0.0007	0.0016	14	647,822.40	3,079,919.20		30.00	2.44	65.62	1831.73			
			NOx	1.1999	0.6327											
			CO	4.7788	2.5199											
			PM10	0.0648	0.0342											
			PM 2.5	0.0648	0.0342											
			SO2	3.4582	1.7298											
			HAPs	0	0											
FUGPTA and FUGPET	FUGPTA and FUGPET	Combined Plant Fugitives	VOC	3.6898	16.1613	14	648,041.11	3,079,787.79						450.00	440.00	53.70
			NOx	0	0											
			CO	0.0004	0.0016											
			PM10	0	0		648,142.41	3,079,723.44						350.00	170.00	53.70
			PM 2.5	0	0											
			SO2	0	0											
			HAPs	3.0824	13.5011											

EPN = Emission Point Number
FIN = Facility Identification Number

Table 2
Material Balance

This material balance table is used to quantify possible emissions of air contaminants and special emphasis should be placed on potential air contaminants, for example: If feed contains sulfur, show distribution to all products. Please relate each material (or group of materials) listed to its respective location in the process flow diagram by assigned point numbers (taken from the flow diagram) to each material.

LIST EVERY MATERIAL INVOLVED IN EACH OF THE FOLLOWING GROUPS	Point No. from Flow Diagram	Process Rate (lbs/hr or scfm) at standard conditions: 70°F, 14.7 psia. Check appropriate column at right for each process.	Measurement	Estimation	Calculation
1. Raw Materials - Input					
p-xylene (PX)		255,000 lb/hr		x	
air		See calculations		x	
acetic acid		14,286 lb/hr		x	
Co-Mn/HBr catalyst		430 lb/hr		x	
monoethylene glycol (MEG)		105,192 lb/hr		x	
diethylene glycol (DEG)		1,890 lb/hr		x	
sodium bisulfate		833 lb/hr		x	
caustic		104 lb/hr		x	
azeotrope entr.		24 lb/hr		x	
isophthalic acid (IPA)		6,299 lb/hr		x	
2. Fuels - Input					
natural gas		5,297 scfm		x	
biogas		See calculations		x	
3. Products & By-Products - Output					
terephthalic acid (PTA)		383,604 lb/hr		x	
polyethylene terephthalate (PET)		314,946 lb/hr		x	
4. Solid Wastes - Output					
5. Liquid Wastes - Output					
water		TBD		x	
6. Airborne Waste (Solid) - Output					
PET		See calculations		x	
PTA		See calculations		x	
7. Airborne Waste (Gaseous) - Output					
CO		See calculations			x
VOC		See calculations			x
SO_2		See calculations			x
NOx		See calculations			x
H_2SO_4		See calculations			x
$PM/PM_{10}/PM_{2.5}$		See calculations			x

VII.E. DISASTER REVIEW

M&G will store hydrobromic acid for use in the process and it will be received at the site as hydrobromic acid. Although storage of hydrogen bromide (gas) would trigger the requirement for a disaster review under TCEQ regulations and would also trigger OSHA Process Safety Management (PSM) program requirements in storage quantities of 5,000 lbs. and greater, the storage of the hydrobromic acid (liquid) does not trigger these requirements. Additionally, the EPA Risk Management Plan requirements (40 CFR 68), encompasses a list of chemicals that if released could adversely impact the community / public around a facility. Neither hydrogen bromide nor hydrobromic acid are identified on that list. The TCEQ Disaster Review requirements cover situations where there is a potential for a catastrophic release of any air contaminant and the list of chemicals of concern includes toxic gases. Therefore, although hydrobromic acid presents some safety risks due to its corrosivity, there is no requirement to perform a disaster review.

VIII. STATE REGULATORY REQUIREMENTS
VIII.A. COMPLIANCE WITH TCEQ RULES AND REGULATIONS

M&G will comply with all the rules and regulations of the TCEQ and the intent of the Texas Clean Air Act (TCAA), including protection of the health and physical property of the public. No schools are located within 3,000 feet of the site. Applicable rules and regulations of the Commission are discussed below.

30 TAC Chapter 101, Subchapter A - General Rules

§101.2 Multiple Air Contaminant Sources or Properties – M&G will demonstrate through air dispersion modeling that the sources to be permitted will not cause or contribute to violations of any TCEQ standards.

§101.3 Circumvention – M&G will not use any plan, activity, device, or contrivance that will, without resulting in an actual reduction of air contaminants, conceal or appear to minimize the effects of emissions which would otherwise constitute a violation of the TCAA or TCEQ regulations.

§101.4 Nuisance – M&G will demonstrate through air dispersion modeling that discharges to the atmosphere from the Plant will not be in such concentration and of such duration that they will or may tend to be injurious to or adversely affect human health or welfare, animal life, vegetation, or property, or interfere with the normal use and enjoyment of animal life, vegetation, or property.

§101.5 Traffic Hazard – No discharge of air contaminants, uncombined water or other materials from the Plant will cause or have a tendency to cause a traffic hazard or an interference with normal road use.

§101.8 Sampling – All stack testing and sampling will meet requirements imposed by §101.8, and data will be reported and maintained as required.

§101.9 Sampling Ports – M&G will comply with TCEQ requests for location of sampling ports in accordance with §101.9.

§101.10 Emissions Inventory Requirements – M&G will submit emissions inventories as required by §101.10.

§101.20 Compliance with Environmental Protection Agency Standards – As described in the sections which follow, M&G will comply with applicable requirements of New Source Performance Standards (40 CFR 60) and National Emission Standards for Hazardous Air Pollutants for Source Categories under 40 CFR 63.

The PET Plant is not subject to National Emissions Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR 61. The project is not located in a designated nonattainment area and is not subject to federal Nonattainment New Source Review (NNSR). However, the project will be a Major Stationary Source, as defined at 30 TAC §116.160, and will be subject to and will comply with Prevention of Significant Deterioration (PSD) requirements.

§101.24-27 Fees – M&G will comply with all applicable requirements identified in this section and will pay the required fees and surcharges as specified.

30 TAC Chapter 101, Subchapter F – Emissions Events and Scheduled Maintenance, Start-up, and Shutdown Activities

§101.201 Emissions Event Reporting and Recordkeeping Requirements – M&G will follow the notification requirements in §101.201, should a reportable emissions event, as defined in §101.1, occur.

§101.211 Scheduled Maintenance, Start-up and Shutdown Reporting, and Recordkeeping Requirements – M&G will comply with the provisions of §101.211 to the extent that they apply to the operation of the facilities described in this application.

§101.221-§101.224 Operational Requirements, Demonstrations, and Excessive Emissions Events – M&G will comply with these provisions to the extent that they apply to the facilities described in this application. In particular, M&G will maintain in good working order and properly operate all pollution emission capture and abatement equipment.

30 TAC Chapter 101, Subchapter H – Emissions Banking and Trading

Nueces County is not subject to the Emissions Cap and Trade Program in Chapter 101, Subchapter H, Divisions 3 (MECT) and 6 (HRVOC).

30 TAC Chapter 111 – Control of Air Pollution from Visible Emissions and Particulate Matter

§111.111(a) (1) Requirements for Specified Sources: Stationary Vents – Emissions from the plant's stationary vents will meet the requirement of §111.111(a) (1) (C) specifying an opacity limitation of 15 percent averaged over a six-minute period. Initial stack testing will be performed using EPA Method 9. Emissions from other vents at the site are not expected to exceed the six-minute opacity limit of 20 percent in §111.111(a)(1)(B).

§111.111(a) (7) (A) Requirements for Specified Sources: Structures – Emissions from buildings, enclosed facilities and structures at the site will meet the opacity limitation of 30 percent averaged over a six-minute period.

§111.151. Allowable Emissions Limits – Emissions of total suspended particulates from all sources with specific stack flow rates will be within the limits specified in §111.151(a), Table 1, based on calculated emission rates.

30 TAC Chapter 112 - Control of Air Pollution from Sulfur Compounds

§112.2. Compliance, Reporting, and Recordkeeping – M&G will maintain on site and submit all records requested by the TCEQ to demonstrate compliance with Chapter 112 SO_2 limits.

§112.3. Net Ground Level Concentrations – The only sources of SO_2 at the PET Plant will be the combustion of natural gas and biogas in the process heaters, RTOs and flare and the combustion of low sulfur diesel fuel in the emergency generator and firewater pump. Therefore, M&G will not cause the net ground level property line standard for SO_2 to be exceeded.

§112.41. Sulfuric Acid Emission Limits – The only source of H_2SO_4 at the PET Plant will be the combustion of natural gas and biogas in the process heaters, flare and RTOs and the combustion of low sulfur diesel fuel in the emergency generator and firewater pump. Therefore, M&G will not cause the net ground level property line standard for H_2SO_4 to be exceeded. Note that the NRG contributions from the Utility Plant are included in the impacts review.

No other paragraphs in Chapter 112 apply to the Plant. In particular, M&G will not operate a sulfuric acid plant, sulfur recovery plant, nonferrous smelter, Kraft pulp mill, or a non-emergency liquid fuel-fired source in association at the PET Plant.

30 TAC Chapter 113, Control of Air Pollution from Toxic Materials

Chapter 113 incorporates by reference National Emission Standards for Hazardous Air Pollutants for Source Categories (40 CFR Part 63). MACT Subpart JJJ, National Emission Standards for Hazardous Air Pollutants for Group IV Polymers and Resins will apply to portions of the PET plant and the HON (Subparts F, G and H) is applicable to the PTA unit (including the RTOs). The emergency engines will be subject to the RICE MACT (Subpart ZZZZ) and the process heaters will be subject to the boiler MACT (Subpart DDDDD).

30 TAC Chapter 114, Control of Air Pollution from Motor Vehicles

M&G will comply with all applicable requirements of this regulation regarding inspection, maintenance and operation of air pollution control systems/devices for motor vehicles operated at the proposed facility.

30 TAC Chapter 115, Control of Air Pollution from Volatile Organic Compounds

Nueces County is a named county in Subchapter B, Divisions 1 through 3 of Chapter 115. The provisions of Division 1 do not apply to the storage tanks proposed in this permit application, as

they will not store crude, condensate or VOCs with a true vapor pressure equal to or greater than 1.5 psia.

The control requirements of Division 2 do not apply as M&G is not proposing process vent emissions containing listed classes of VOC compounds (115.121(b)(3)) in a concentration greater than 30,000 ppmv (115.127(b)(2)(B)).

The control requirements of Division 3 do not apply as M&G is not proposing to construct a VOC water separator as described in 115.132(a).

30 TAC Chapter 116, Subchapter B. Control of Air Pollution by Permits for New Construction or Modification

§116.111(a)(1) – PI-1 Form, General Application – This application provides complete information required by the TCEQ's Form PI-1, General Application Form. As such, the completed form, signed by an authorized M&G representative, is included. All additional support information specified on the form is provided as part of this application or will be provided in the air dispersion modeling report, which will be submitted at a later date and after consultation with the TCEQ permit reviewer.

§116.111(a)(2)(A) – Protection of Public Health and Welfare – As described in this application and in the air dispersion modeling report to be submitted, emissions from the PET Plant will comply with all the rules and regulations of the Commission and the intent of the TCAA, including protection of the health and physical property of the public. There are no schools located within 3,000 feet of the Plant.

§116.111(a)(2)(B) – Measurement of Emissions – In addition to compliance with applicable NSPS and MACT requirements, M&G will measure emissions as described in Section VIII.B. of this application and install sampling ports in accordance with guidelines in the "Texas Commission on Environmental Quality (TCEQ) Sampling Procedures Manual."

§116.111(a)(2)(C) – Best Available Control Technology (BACT) – As demonstrated in this application, best available control technology will be used to control emissions from the proposed facilities.

§116.111(a)(2)(D) – Federal New Source Performance Standards (NSPS) – Portions of the PET unit are subject to the applicable provisions of NSPS Subpart DDD, Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry. The PTA unit reactor vents are subject to NSPS Subpart RRR, Standards of Performance for VOC Emissions from SOCMI Reactor Processes. The process heaters will be subject to NSPS Subpart Db, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. The emergency generator and fire pump engine will be subject to NSPS Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The flare will be subject to the design requirements of NSPS Subpart A. M&G will

comply with all applicable emissions limits, monitoring, recordkeeping and reporting requirements of this subpart, as discussed in detail in Section IX.A of this application.

§116.111(a)(2)(E) – National Emission Standards for Hazardous Air Pollutants (NESHAP) – The Plant is not expected to be subject to any of the provisions of 40 CFR Part 61.

§116.111(a)(2)(F) – NESHAP for Source Categories, MACT Standards, 40 CFR Part 63 – The PET Plant will be subject to the applicable provisions and control requirements of 40 CFR Part 63 Subpart JJJ, National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins, the HON (Subparts F, G and H) for the PTA unit (including the RTOs), for the emergency engines Subpart ZZZZ, National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines and the boiler MACT (Subpart DDDDD) for the process heaters.

§116.111(a)(2)(G) – Performance Demonstration – The PET Plant will achieve the performance specified in the representations in this application and required by the permit. M&G will submit any additional information as may be required by the TCEQ to demonstrate that the represented performance will be achieved.

§116.111(a)(2)(H) – Nonattainment Review – Nueces County is not located in a designated nonattainment area. Therefore, Nonattainment New Source Review (NNSR) will not apply to the proposed facilities.

§116.111(a)(2)(I) – Prevention of Significant Deterioration (PSD) Review – Project Jumbo will be a major modification under 30 TAC §116.160. Therefore, a PSD permit is required for the PSD-regulated contaminants for which there will be a significant net emissions increase. Compliance with PSD permitting requirements is described in Section IX.E and the air dispersion modeling report to be submitted. BACT is discussed in Section VIII.C. of this application

§116.111(a)(2)(J) – Air Dispersion Modeling – M&G will perform an air dispersion modeling study to demonstrate compliance with applicable standards. This study will be completed upon acceptance of emissions calculations and proposed BACT by the TCEQ permit reviewer.

§116.111(a)(2)(K) – Hazardous Air Pollutants – The proposed facilities will be subject to applicable MACT regulations, therefore, the case-by-case MACT requirements do not apply.

§116.111(a)(2)(L) – Mass Cap and Trade Allowances – Nueces County is not subject to the Emissions Cap and Trade Program in Chapter 101, Subchapter H, Division 3.

30 TAC Chapter 117, Control of Air Pollution from Nitrogen Compounds

Nueces County is not subject to the requirements of Chapter 117 because it is not located in an affected county in East or Central Texas.

30 TAC Chapter 118, Control of Air Pollution Episodes

The PET Plant will be operated in compliance with orders of the Commission relating to generalized and localized air pollution episodes.

30 TAC Chapter 122, Federal Operating Permits

M&G will apply for a Title V Federal Operating Permit.

VIII.B. MEASUREMENT OF EMISSIONS

M&G will measure emissions of regulated air contaminants through emissions performance testing, continuous emissions monitoring, and/or parameter monitoring. Emissions measurement and testing primarily will be those associated with the following standards:

- New Source Performance Standard (40 CFR 60, Subpart Db), applicable to the process heaters.
- National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins (40 CFR 63, Subpart JJJ)
- National Emission Standards for Hazardous Air Pollutant Emissions: Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry (40 CFR 63, Subparts F, G, H)
- National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters (40 CFR 63, Subpart DDDDD)

In addition, as discussed in Section VIII.C. of this application, M&G will employ procedures to continuously demonstrate compliance with the requirements of the permit for those pollutants/sources not subject to these regulations.

VIII.C. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

1.0 Introduction

The TCAA and 30 TAC §116.111(a)(2)(C) require that facilities use BACT, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facilities. M&G prepared this BACT analysis consistent with the TCEQ's 3-tier approach and its guidance provided in the TCEQ's April 2001 document, *Evaluating Best Available Control Technology (BACT) in Air Permit Applications* (Draft RG-383). As such, the BACT analysis process involved answering the following questions:

- Has the proposal been demonstrated to work in actual operation?
- Can the proposal reasonably be expected to work based on technical analysis?
- Is the project cost reasonable to achieve the emission reduction?

According to TCEQ guidance, the process begins at the first tier (i.e., emission performance levels accepted as BACT in recent permit reviews for the same process and/or industry) and continues sequentially through the second and third tiers only if BACT cannot be established through a Tier-1 analysis.

As stated in the TCEQ's RG-383 BACT guidance, "Tier I of the BACT evaluation involves a comparison of the applicant's BACT proposal to emission reduction performance levels accepted as BACT in recent permit reviews". RG-383 further indicates that the BACT review is complete if the Air Permits Division has not identified emission reduction options with better performance that should be evaluated. As will be presented in the following sections, BACT for the facilities at the Plant is established at the Tier 1 level.

2.0 BACT for HTF Process Heaters

The BACT determination for the operation of gas-fired HTF process heaters is based on the latest information available from the TCEQ concerning the evaluation of BACT in permit applications and concerning Tier I BACT in particular for process heaters. The full set of relevant documentation that provided technical background information for the BACT assessment of the proposed M&G units included the following:

- *Evaluating Best Available Control Technology (BACT) in Air Permit Applications*;
- *TCEQ Combustion Sources – Current Best Available Control Technology (BACT) Guidelines*; and
- U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC) listings for the process type(s) representative of the type of emission source being proposed by M&G.

The *TCEQ Combustion Sources – Current Best Available Control Technology (BACT) Guideline* document is provided in Appendix B of this application. A summary of RBLC listings for gas-fired industrial-size boilers (Process Type Nos. 11.300 and 11.900) of similar size to the

proposed units (i.e., heat input in the range of 50 MMBtu/hr to 175 MMBtu/hr) are provided in Appendix B of this application.

As discussed in the Process Description section of this application, M&G is proposing to install four process heaters, each with a heat input capacity of 128 MMBtu/hr. Each heater will be fired with natural gas and supplemental methane-rich biogas as fuel gases and will also combust two process waste gas streams. The BACT analysis presented in this section demonstrates that the emission rates proposed for the heaters are BACT.

***NO_x Emissions* – Process Heaters**

Emissions of NO_x from heaters are generated through the oxidation of nitrogen in the high-temperature combustion zones. A review of recently-issued permits for process heaters similar in size to those proposed by M&G and that are listed in the RBLC is provided in Appendix B. Two of the entries indicate use of low or ultra-low NOx burners as BACT, two entries indicate good combustion practices, one indicates low-NOx burners in conjunction with SCR and the remaining three entries do not specify a control method. The following entry is related to units that were permitted in an ozone nonattainment area, thus the search results represent LAER which is more stringent than BACT - the Shintech Plaquamine Plant 2. The remaining BACT-related entries in the RBLC search results indicate that low-NO_x burners (LNBs) are BACT for NO_X emissions from heaters of this size.

A LNB is considered a combustion control as it is designed to minimize combustion temperatures by providing a lean pre-mixed air/fuel mixture, where air and fuel are mixed before entering the combustor. This design minimizes fuel-rich pockets and allows the excess air to act as a heat sink, with the lower temperatures inhibiting NO_x formation.

The TCEQ's current combustion source BACT guidelines for NO_x emissions from gas-fired heaters is 0.01 lb/MMBtu (rolling 12-month average, normal operation); however this is not specified for smaller units (less than 300 MMBtu/hr), such as the process heaters M&G is proposing with this application. Rather, the BACT guidance document indicates that BACT for smaller units is determined case-by-case. M&G's proposed NO_x emission rate of 0.010 lb NO_X/MMBtu (annual average) for normal operation is consistent with TCEQ's BACT guidelines for process heaters less than 300 MMBtu/hr. Therefore, the proposed NO_X emission rate satisfies TCEQ's Tier 1 BACT for the process heaters.

M&G will demonstrate that BACT for NO_x is achieved through the initial stack testing and through the continuous monitoring of NO_x emission levels in the stack exhaust.

***CO Emissions* - Heaters**

Combustion is a thermal oxidation process in which carbon and hydrogen in the fuel combine with oxygen to primarily form carbon dioxide (CO_2) and water vapor. Emissions of CO are the result of incomplete combustion of the carbon in a fuel in the boilers. Similar to the generation of NO_x emissions, the primary factors influencing the generation of CO emissions are temperature and residence time within the combustion zone.

M&G will minimize CO emissions through both hardware design and operating procedures directed at the most efficient levels of operation (i.e., good combustion practices). Specifically, measures such as controlled fuel/air mixing and sufficient temperature and gas residence time will be established and implemented to minimize CO formation. Other than times of malfunction of equipment, good combustion practices will be applied during all hours of boiler operation.

A summary of the permitted CO emission limits for gas-fired heaters of similar size (heat input of approximately 75 MMBtu/hr to 175 MMBtu/hr) to the proposed units that are listed in the RBLC is provided in Appendix B. These emission limits range from 0.0194 lb/MMBtu to 0.08 lb/MMBtu for units permitted within the last ten years. The lowest permitted emission limit – 0.0194 lb/MMBtu for Iowa Fertilizer Company – was permitted in late 2012 and has not yet been constructed; therefore, this low emission limit has not been demonstrated in practice and should not be considered for BACT. The next lowest permitted emission limit for a continuous operating source is 0.046 lb/MMBtu for Shintech Plaquemine Plant 2, achieved by good combustion practices.

M&G is proposing good combustion practices as BACT for CO emissions from the heaters. Because good combustion practices (i.e., combustion controls) are not add-on abatement equipment, the performance of such controls cannot be described in terms of control efficiency, but are better described in terms of the resulting emission level. With application of good combustion practices, and balancing the need to simultaneously control NO_x emissions, a CO emission rate of 0.035 lb/MMBtu (or 50 ppmvd @ 3% O_2) is proposed for the heaters except during periods of startup and shutdown. M&G's proposed CO emission rate is consistent with TCEQ's BACT guidelines; therefore, the proposed emission rate satisfies TCEQ's Tier 1 BACT.

M&G will demonstrate that BACT for CO is achieved through the initial stack testing.

***VOC Emissions* - Heaters**

Similar to CO emissions generation, VOC emissions will result from the incomplete combustion of the gaseous fuel in the boilers. The level of VOC emissions is a factor of the temperature and residence time within the combustion zone.

M&G will minimize VOC emissions through both equipment design and operating procedures directed at the most efficient fuel usage operation (i.e., good combustion practices). Specifically, measures such as controlled fuel/air mixing and sufficient temperature and gas residence time will be employed to minimize uncombusted fuel and VOC emissions.

M&G is proposing good combustion practices as BACT for VOC emissions. Because good combustion practices (i.e., combustion controls) are not add-on abatement equipment, the performance of such controls cannot be described in terms of control efficiency, but are better described in terms of the resulting emission level. The proposed VOC emission rate for the heaters is 0.0054 lb/MMBtu for fuel gas (natural gas and biogas) firing only, based on gaseous fuel characteristics and efficient operation of the fuel combustion equipment specific to this

project, as well as the need to balance VOC emissions with the need to simultaneously minimize NO_x emissions. Additional VOC emissions will be emitted from the combustion of process waste gas streams. These streams will meet the equivalent Tier I DRE for vapor combustors of 99% DRE (by weight).

M&G will demonstrate that BACT for VOCs is achieved through compliance with the CO limit which reflects good combustion efficiency and practices. As discussed earlier, initial CO stack testing will be relied on to demonstrate good combustion practices and fuel combustion in the heaters.

***PM/PM$_{10}$/PM$_{2.5}$ Emissions* – Process Heaters**

In general, particulate matter (PM) is emitted from combustion processes as a result of the presence of inorganic constituents contained in the fuel, background PM in the combustion air, and incomplete combustion of the organic constituents in the fuel. Because the proposed heaters will fire only gaseous fuels (fuel gas or a fuel gas-natural gas blend), PM/PM_{10}/$PM_{2.5}$ emissions are expected to be extremely small and primarily due to any incomplete combustion of the fuel. Therefore, the use of fuel gas or a fuel gas-natural gas blend and good combustion practices to ensure fuel efficiency constitute BACT for PM/PM_{10}/$PM_{2.5}$.

M&G will demonstrate that BACT for PM/PM_{10}/$PM_{2.5}$ is achieved compliance with the CO limit which reflects good combustion and fuel efficiency and practices. As discussed earlier, initial CO stack testing will be relied on to demonstrate good combustion practices and fuel combustion in the heaters.

***Sulfur Compound Emissions* – Process Heaters**

Emissions of SO_2 will occur as a result of oxidation of sulfur in the gas-fired in the heaters, with the majority of the sulfur converted to SO_2. For BACT, M&G will minimize the formation of SO_2 by using pipeline-quality natural gas or a blend of biogas and pipeline-quality natural gas. The natural gas will have an annual average sulfur content not exceeding 26 grains sulfur per 100 standard cubic feet.

M&G will demonstrate that BACT for SO_2 is achieved through the continuous use of gaseous fuel and through valid purchase contracts tariff sheets for the fuel which show sulfur content.

3.0 BACT for Cooling Towers

The cooling tower will meet the 2011 BACT requirements established by the TCEQ (i.e., Tier I BACT). They will both be of non-contact design and will be outfitted with drift eliminators with a maximum design drift rate of 0.001%. The total dissolved solids (TDS) content will be monitored in the recirculated cooling water to control solids accumulation and to minimize PM emissions. Additionally, monthly monitoring of VOC content of the cooling water is planned in addition to a VOC leak detection system which will identify leaks of VOC into the cooling water.

4.0 BACT for Fugitive Emissions

The 2011 TCEQ guidance for BACT for equipment leak fugitives states that 28VHP is BACT for uncontrolled VOC emissions in excess of 25 tpy. M&G proposes to apply a 28VHP LDAR program to components in VOC service. Quarterly instrument monitoring of connectors at a 500 ppm leak detection limit will also be conducted. Control efficiency of 100% is taken for open ended lines, which are all capped or blinded. Control efficiency of 100% is taken for pressure relief valves (PRV) due to the use of rupture disks and pressure monitoring alarms upstream of each PRV. The proposed fugitive monitoring methods are BACT for control of fugitive equipment leak emissions.

5.0 BACT for Process Vent VOC Emissions

There is no TCEQ Tier I BACT published for PET plants. However, for purposes of a BACT demonstration, M&G is evaluating its proposed PET plant against current TCEQ-published BACT for polyethylene plants (Appendix B). The current BACT requirements state that all VOC-containing waste gas streams upstream of the extruder must be controlled or recycled. M&G's PET plant is designed to either recycle potential waste streams located upstream of the crystallization step (equivalent to extrusion in a polyethylene plant), or to route waste gas streams to the RTOs. The proposed design for process vents upstream of the crystallization meets TCEQ-published Tier I BACT.

The process vents located at, and downstream of, crystallization that emit VOC are the liquid ring vacuum pump vent (E78) and two heat transfer fluid vessel vents (E70 and E79).

Appendix B states that uncontrolled VOC emissions from low pressure HDPE processes is a VOC emission rate less than 80 lbs VOC/MMlb product. The proposed emissions from the uncontrolled process VOC emission sources (listed above), are considerably less than the TCEQ's published BACT emission limit for HDPE plants; the only VOC emissions from these sources result from heat transfer fluid emissions. Therefore, the proposed emissions are BACT for the proposed PET plant.

M&G identified one entry in EPA's RBLC database for PET manufacturing: the Dupont De Nemours entry from September 18, 2002 (see Appendix B). This permitting action identified a VOC reduction; therefore no specific VOC BACT was listed in the entry.

6.0 BACT for Process Vent Particulate Matter Emissions

TCEQ-published Tier I BACT dictates that bagfilters (or equivalent particulate control) are to be used to control particulate emissions and they must achieve an emission rate of 0.01 gr/scf or less at the outlet. The PET plant process vents emitting PM are designed with bagfilters or cyclones which are designed to achieve an emission rate of 0.01 gr/scf or less as shown in the Table 11s found in Appendix C. As such, the process vent PM emission sources satisfy BACT.

7.0 BACT for RTOs

The following paragraphs provide a discussion of the five BACT performance elements identified in TCEQ's Air Pollution Control manual (APDG 6110, dated January 2011) with respect to the RTOs.

1. Capture efficiency. The RTO vent header will achieve a capture efficiency consistent with industry standards for thermal oxidizer vent collection systems (estimated at 99+%).

2. Emission reduction efficiency. The RTOs will achieve between 98 and 99 percent VOC destruction efficiency during normal operation. This meets the published BACT requirement for vapor combustors at chemical sources.

3. Reliability. The RTOs' combustion chamber temperatures will be monitored continuously to ensure that a minimum temperature is met and effective VOC control is achieved when waste gases are routed to the unit.

4. On-stream time. The RTOs are designed to operate continuously without unit downtime. M&G will minimize RTO downtime via proper RTO operation and maintenance practices and implementation of process controls that promote consistent RTO operation and maximize on-stream time.

5. Enforceability. M&G will comply with the permit conditions that will ensure RTO performance levels will be achieved on an ongoing basis.

As discussed, the RTOs will satisfy the five BACT performance elements. Furthermore, the RTOs meet Tier I BACT by achieving equivalent to flare destruction or 99% destruction of VOCs, a level of performance equivalent with similar control devices (regenerative thermal oxidizers) operating in similar industry.

8.0 BACT for Flare

The flare is designed for a minimum VOC destruction efficiency of 98% and in the cases of compounds with three carbons or less, 99%; however, M&G does not expect the biogas to contain any VOC species. The flare will be designed and operated to meet the applicable requirements of 40 CFR 60.18 for steam-assisted flares (see Appendix A, flare calculations for 60.18 demonstrations).

The biogas is expected to have a heating value of at least 200 Btu/scf. The flare will be equipped with a monitoring system to ensure that there is a pilot at all times that waste gas may be directed to the flare. The flare will also be equipped with a waste gas flow rate monitor. The above design specifications satisfy current 2011 TCEQ BACT requirements for flares.

9.0 BACT for Storage Tanks

New fixed roof and floating roof storage tanks will be installed with this project. The fixed roof tanks will be white and will be equipped with submerged fill. All of the tanks will store materials with vapor pressures below 0.5 psia at the maximum storage temperature. The internal floating roof tanks are drain dry tanks and will be equipped with mechanical shoe primary seals and rim mounted secondary seals.

Emissions from all tank farm tanks will be routed to a water scrubber. The water scrubber will achieve a minimum 95% reduction of acetic acid and ethylene glycol, and 10% reduction of p-xylene. These reduction efficiencies are sufficient for the water scrubber as the acetic acid, ethylene glycol and p-xylene storage tanks satisfy TCEQ BACT requirements without the use of an additional control device.

The above design specifications meet or exceed the 2011 TCEQ BACT requirements for storage tanks.

10.0 BACT for Floating Roof Tank Landings

The internal floating roof tanks will be designed as drain dry tanks. After a roof has been landed, the liquid will be continuously lowered until the tank has been fully drained. The tanks will be designed as drain dry, so there will be no degassing emissions per the 2006 API document “Evaporative Loss from the Cleaning of Storage Tanks”. Upon completion of maintenance activities, the tank will be refilled as rapidly as practicable until the roof is refloated. The maximum refill rate will be determined by the air dispersion modeling impacts. Due to the low vapor pressure of p-xylene, no controls are necessary during floating roof tank landings and the landing activities will satisfy BACT.

11.0 BACT for Loading (solids loading, control via baghouse/enclosure, bagloading of PET)

The solids loading operations either occur within a closed loop pneumatic conveying system or will utilize filters and/or cyclones to meet the 2011 TCEQ BACT of < 0.01 grain/scf of PM emissions for process vents.

12.0 BACT for Emergency Diesel-fired Equipment

BACT for the emergency diesel fired generator and firewater pump will be achieved through the installation of engines which meet the vendor certification requirements of 40 CFR 60, Subpart IIII, through the proper operation and maintenance of the engines, and through the burning of ultra low sulfur diesel fuels meeting the sulfur requirements of 40 CFR 80.510.

13.0 BACT for Diesel Fuel Storage Tanks

Fixed roof tanks will store the diesel fuel for the emergency generator and the fire water pump. Because of the very low vapor pressure of this fuel and the resulting minimal emissions from the tanks, BACT is satisfied with the use of submerged filling and good management practices.

VIII.D. PERFORMANCE DEMONSTRATION

M&G will operate process and emissions control equipment according to instructions and recommendations provided by the equipment vendors and in compliance with applicable regulatory requirements and the terms of any TCEQ permit. TCEQ equipment tables in Appendix C provide detailed information about the critical design parameters for this equipment.

IX. FEDERAL REGULATORY REQUIREMENTS
IX.A. NEW SOURCE PERFORMANCE STANDARDS

The NSPS Subpart Db applies to the process heaters, Subpart IIII applies to the emergency engines, Subpart DDD applies to portions of the PET unit, and Subpart RRR applies to reactor vent streams in the PTA unit. The flare will meet the applicable design requirements of Subpart A.

IX.B. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

The PET Plant is not expected to be subject to National Emission Standard for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61.

IX.C. MAXIMUM ACHIEVABLE CONTROL TECHNOLOGIES FOR NESHAP SOURCE CATEGORIES

The PET plant will be subject to 40 CFR Part 63 Subpart JJJ. The emergency engines will be subject to 40 CFR Part 63, Subpart ZZZZ and the process heaters will be subject to Subpart DDDDD (the boiler MACT). Portions of the PTA unit (including the RTOs) are subject to the HON (Subparts F, G and H).

IX.D. NONATTAINMENT PERMITTING REQUIREMENTS

Nueces County is not classified as a nonattainment area for any pollutants; therefore, this section does not apply.

IX.E. PREVENTION OF SIGNIFICANT DETERIORATION PERMITTING REQUIREMENTS

Since Project Jumbo includes both the PET Plant and the NRG CHP Plant support facility, the PET Plant and CHP Plant will be considered to be one stationary source for PSD applicability purposes. Project Jumbo will be a "major source" under 40 CFR §52.21; thus, a PSD review is required for all PSD-regulated contaminants for which there will be a significant net emissions increase. Based on a comparison between the potentials to emit and the PSD thresholds, PSD review is triggered for NO_x, CO, PM, PM_{10}, $PM_{2.5}$, VOC (as a precursor to ozone), and greenhouse gas emissions (GHG). PSD netting tables for the PET Plant emissions are included in Tables 1F and 2F, provided in Appendix D. A separate GHG PSD application is being submitted to U.S. Environmental Protection Agency Region 6.

Aspects of the PSD analysis related to impacts on soils, vegetation, visibility, and Class I areas, as well as the demonstration that the proposed project will not cause exceedances of the NAAQS and the PSD increments will be included in the air quality analysis report (the dispersion modeling analysis) to be provided as a separate submittal.

APPENDIX A
EMISSION CALCULATIONS

BAGFILTER EMISSIONS

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Bag Filter/Solids Handling Particulate Emission Calculations

										PM Emissions			PM_{10} Emissions			$PM_{2.5}$ Emissions	
EPN	Source Name	Soure Type	Area	Control	Blower Fan Rating (acfm)	Annual Operation (hrs/yr)	Exhaust Temperature (deg F)	Particulate Grain Outlet Loading (gr/dscf)	Calculated Exhaust Flow Rate (dscfm) [1]	Hourly Emission Rate (lb/hr) [2]	Annual Emission Rate (tpy) [3]	Ratio of PM_{10} to PM [6]	Hourly Emission Rate (lb/hr) [4]	Annual Emission Rate (tpy) [5]	Ratio of $PM_{2.5}$ to PM_{10} [6]	Hourly Emission Rate (lb/hr) [6]	Annual Emission Rate (tpy) [7]
E4	Air from SSP FLUID BED COOLER 1	PET	PET	Cyclone	82,142	8,760	302	0.0087	56,910	4.263	18.67	0.09	0.375	1.64	1.00	0.375	1.64
E5	Air from SSP FLUID BED COOLER 2	PET	PET	Cyclone	82,142	8,760	302	0.0087	56,910	4.263	18.67	0.09	0.375	1.64	1.00	0.375	1.64
E20	Conveying air vent from MELT EVALUATION SILO 1	PET	PET	Filter 1	2,260	8,760	140	0.0087	1,989	0.149	0.65	0.03	0.004	0.02	1.00	0.004	0.02
E21	Conveying air vent from MELT EVALUATION SILO 2	PET	PET	Filter 1	2,260	8,760	140	0.0087	1,989	0.149	0.65	0.03	0.004	0.02	1.00	0.004	0.02
E22	Conveying air vent from MELT 1ST GRADE SILO 1A	PET	PET	Filter 1	1,836	4,380	140	0.0087	1,616	0.121	0.27	0.03	0.004	0.01	1.00	0.004	0.01
E23	Conveying air vent from MELT 1ST GRADE SILO 1B	PET	PET	Filter 1	1,836	4,380	140	0.0087	1,616	0.121	0.27	0.03	0.004	0.01	1.00	0.004	0.01
E24	Conveying air vent from MELT 1ST GRADE SILO 2A	PET	PET	Filter 1	1,836	4,380	140	0.0087	1,616	0.121	0.27	0.03	0.004	0.01	1.00	0.004	0.01
E25	Conveying air vent from MELT 1ST GRADE SILO 2B	PET	PET	Filter 1	1,836	4,380	140	0.0087	1,616	0.121	0.27	0.03	0.004	0.01	1.00	0.004	0.01
E26	Conveying air vent from EVALUATION SILO 1	PET	PET	Filter 1	1,483	8,760	140	0.0087	1,305	0.098	0.43	0.03	0.003	0.01	1.00	0.003	0.01
E27	Conveying air vent from EVALUATION SILO 2	PET	PET	Filter 1	1,483	8,760	140	0.0087	1,305	0.098	0.43	0.03	0.003	0.01	1.00	0.003	0.01
E36	Conveying air vent from BAGGING SILO	PET	PET	Filter 1	1,836	440	140	0.0087	1,616	0.121	0.03	0.03	0.004	0.00	1.00	0.004	0.00
E37	Conveying air vent from SSP SURGE BIN 1 SILO	PET	PET	Filter 1	2,048	8,760	140	0.0087	1,802	0.135	0.59	0.03	0.004	0.02	1.00	0.004	0.02
E38	Conveying air vent from SSP SURGE BIN 2 SILO	PET	PET	Filter 1	2,048	8,760	140	0.0087	1,802	0.135	0.59	0.03	0.004	0.02	1.00	0.004	0.02
E39	Conveying air vent from MELTER SILO	PET	PET	Filter 1	3,237	8,760	140	0.0087	2,849	0.213	0.93	0.03	0.006	0.03	1.00	0.006	0.03
E40	Air from MELT FLUID BED COOLER	PET	PET	Cyclone	42,378	440	302	0.0087	29,360	2.199	0.48	0.09	0.194	0.04	1.00	0.194	0.04
E41	Air from MELT FLUID BED HEATER	PET	PET	Filter 1	1,624	440	302	0.0087	1,125	0.084	0.02	0.03	0.003	0.00	1.00	0.003	0.00
E60	Drying air from CHIPPERS DRYER 1-5	PET	PET	Filter 1	4,238	8,760	302	0.0087	2,936	0.220	0.96	0.03	0.007	0.03	1.00	0.007	0.03
E61	Drying air from CHIPPERS DRYER 6-10	PET	PET	Filter 1	4,238	8,760	302	0.0087	2,936	0.220	0.96	0.03	0.007	0.03	1.00	0.007	0.03
E28 or E29	Conveying air vent from SSP FIRST 1A or 1B SILO	PET	Rail Yard	Filter 1	2,613	8,760	140	0.0087	2,300	0.172	0.75	0.03	0.005	0.02	1.00	0.005	0.02
E30	Conveying air vent from SSP FIRST 2A SILO	PET	Rail Yard	Filter 1	2,613	4,380	140	0.0087	2,300	0.172	0.38	0.03	0.005	0.01	1.00	0.005	0.01
E31	Conveying air vent from SSP FIRST 2B SILO	PET	Rail Yard	Filter 1	2,613	4,380	140	0.0087	2,300	0.172	0.38	0.03	0.005	0.01	1.00	0.005	0.01
E32	Conveying air vent from JOLLY SILO	PET	Rail Yard	Filter 1	2,613	440	140	0.0087	2,300	0.172	0.04	0.03	0.005	0.00	1.00	0.005	0.00
E33	Conveying air vent from SSP OFF SPEC	PET	Rail Yard	Filter 1	2,613	175	140	0.0087	2,300	0.172	0.02	0.03	0.005	0.00	1.00	0.005	0.00
E34	Conveying air vent from MELT OFF SPEC SILO 1	PET	Rail Yard	Filter 1	2,260	175	140	0.0087	1,989	0.149	0.01	0.03	0.004	0.00	1.00	0.004	0.00
E35	Conveying air vent from MELT OFF SPEC SILO 2	PET	Rail Yard	Filter 1	2,260	175	140	0.0087	1,989	0.149	0.01	0.03	0.004	0.00	1.00	0.004	0.00
E42	Conveying air vent from DEDUSTER SSP FIRST 1A	PET	Rail Yard	Filter 1	3,955	6,650	77	0.0087	3,889	0.291	0.97	0.03	0.009	0.03	1.00	0.009	0.03
E43	Conveying air vent from DEDUSTER SSP FIRST 1B SILO	PET	Rail Yard	Filter 1	3,955	6,650	77	0.0087	3,889	0.291	0.97	0.03	0.009	0.03	1.00	0.009	0.03

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Bag Filter/Solids Handling Particulate Emission Calculations

										PM Emissions			PM_{10} Emissions			$PM_{2.5}$ Emissions	
EPN	Source Name	Soure Type	Area	Control	Blower Fan Rating (acfm)	Annual Operation (hrs/yr)	Exhaust Temperature (deg F)	Particulate Grain Outlet Loading (gr/dscf)	Calculated Exhaust Flow Rate (dscfm) [1]	Hourly Emission Rate (lb/hr) [2]	Annual Emission Rate (tpy) [3]	Ratio of PM_{10} to PM [6]	Hourly Emission Rate (lb/hr) [4]	Annual Emission Rate (tpy) [5]	Ratio of $PM_{2.5}$ to PM_{10} [6]	Hourly Emission Rate (lb/hr) [6]	Annual Emission Rate (tpy) [7]
E44	Conveying air vent from DEDUSTER SSP FIRST 2A SILO	PET	Rail Yard	Filter 1	3,955	6,650	77	0.0087	3,889	0.291	0.97	0.03	0.009	0.03	1.00	0.009	0.03
E45	Conveying air vent from DEDUSTER SSP FIRST 2B SILO	PET	Rail Yard	Filter 1	3,955	6,650	77	0.0087	3,889	0.291	0.97	0.03	0.009	0.03	1.00	0.009	0.03
E46	Conveying air vent from DEDUSTER JOLLY SILO	PET	Rail Yard	Filter 1	3,955	880	77	0.0087	3,889	0.291	0.13	0.03	0.009	0.00	1.00	0.009	0.00
E47	Conveying air vent from DEDUSTER SSP OFF SPEC	PET	Rail Yard	Filter 1	3,955	440	77	0.0087	3,889	0.291	0.06	0.03	0.009	0.00	1.00	0.009	0.00
E80	Air from PET railcars loading filter system	PET	Rail Yard	Filter 1	1,766	8,760	77	0.0087	1,736	0.130	0.57	0.03	0.004	0.02	1.00	0.004	0.02
E81	Air from PET railcars unloading filter system	PET	Rail Yard	Filter 1	1,177	438	77	0.0087	1,157	0.087	0.02	0.03	0.003	0.00	1.00	0.003	0.00
E82	Air from PTA railcars loading filter system	PTA	Rail Yard	Filter 1	589	8,760	77	0.0087	579	0.043	0.19	0.03	0.001	0.01	1.00	0.001	0.01
E84	Air from COLD CC FEEDING SILO	PET	PET	Filter 1	1,766	440	140	0.0087	1,554	0.116	0.03	0.03	0.003	0.00	1.00	0.003	0.00

Notes:
[1] Exhaust flow rate (scfm, dry/dscfm) = blower fan rating (acfm) x (std temperature, 68 deg F + 45967)/(actual exhaust temperature, deg F + 45967)
[2] PM emission rate (lb/hr) = outlet grain loading (gr/dscf) x exhaust flow rate (dscfm) x 60 (min/hr) / 7000 (gr/lb)
[3] PM emission rate (tpy) = PM emission rate (lb/hr) x annual operation (hours/yr) / (2000 lb/ton)
[4] PM_{10} emission rate (lb/hr) = outlet grain loading (gr/dscf) x exhaust flow rate (dscfm) x 60 (min/hr) / 7000 (gr/lb) x Ratio of PM $_{10}$ to total PM
[5] PM_{10} emission rate (tpy) = PM_{10} emission rate (lb/hr) x annual operation (hours/yr) / (2000 lb/ton)
[6] PM25 emission rate (lb/hr) = PM10 emission rate (lb/hr) x Ratio of PM25 to PM10
[7] PM25 emission rate (tpy) = PM10 emission rate (tpy) x Ratio of PM25 to PM10
[8] PET sources have 1ppmv of Acetylaldehyde Acetylaldehyde emission rate (lb/hr) = Exhaust flow rate (dscfm) x 60 min/hr x 1/(10^6) / 379 lbmole/scf x 445 lbmole/mole
[9] Acetylaldehyde emission rate (tpy) = Acetylaldehyde emission rate (lb/hr) x annual operation (hours/yr) / (2000 lb/ton)
[10] PTA sources have 1000 ppmv of Acetic Acid Acetic Acid emission rate (lb/hr) = Exhaust flow rate (dscfm) x 60 min/hr x 1000/(10^6) / 379 lbmole/scf x 6005 lbmole/mole
[11] Acetic Acid emission rate (tpy) = Acetic Acid emission rate (lb/hr) x annual operation (hours/yr) / (2000 lb/ton)

Sample Calculations for EPN E4:
Exhaust Flow Rate (scfm, dry/dscfm) = 82141.922 (acfm) x 46035 deg R / 46269 deg R = 56910 (dscfm)
PM Emission Rate (lb/hr) = 0.009 (gr/dscf) x 56910 (dscfm) x 60 (min/hr) / 7000 (gr/lb) = 4.263 (lb/hr)
PM Emission Rate (tpy) = 4.263 (lb/hr) x 8760 (hours/year) / (2000 lb/ton) = 18.67 (tpy)
PM10 Emission Rate (lb/hr) = 0.009 (gr/dscf) x 56910 (dscfm) x 60 (min/hr) / 7000 (gr/lb) x 0.09 PM10/PM = 0.375 (lb/hr)
PM10 Emission Rate (tpy) = 0.375 (lb/hr) x 8760 (hours/year) / (2000 lb/ton) = 1.64 (tpy)
PM25 Emission Rate (lb/hr) = 0.375 (lb/hr) x 1 = 0.375 (lb/hr)
PM25 Emission Rate (tpy) = 1.64 (tpy) x 1 = 1.64 (tpy)
Acetylaldehyde Emission Rate (lb/hr) = 56909.54 (dscfm) x 60 (min/hr) x 1/(10^6) / 379 (scf/lbmole) x 28 (lb N2/lbmole) =0.25 (lb/hr)
Acetylaldehyde Emission Rate (tpy) = 0.252 (lb/hr) x 8760 (hours/year) / (2000 lb/ton) = 1.1 (tpy)
Acetic Acid Emission Rate (lb/hr) = 56909.54 (dscfm) x 60 (min/hr) x 1000/(10^6) / 379 (scf/lbmole) x 28 (lb N2/lbmole) =0 (lb/hr)
Acetic Acid Emission Rate (tpy) = 0 (lb/hr) x 8760 (hours/year) / (2000 lb/ton) = 0 (tpy)

COOLING TOWER CALCS

COOLING TOWER PM/PM_{10}/$PM_{2.5}$ EMISSION CALCULATIONS
M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

EPN	Water Circulation Rate	Drift	Drift Rate		Total Dissolved Solids	PM_{10} Fraction[2]	$PM_{2.5}$ Fraction[2]	PM Emissions		PM_{10} Emissions		$PM_{2.5}$ Emissions	
	gal/min	(%) [1]	gal/min	(liter/hr)	(mg/liter)			lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
E17	237,755	0.001%	2.38	540	6	100.0%	90.92%	0.0071	0.0313	0.0071	0.0313	0.0065	0.0284

CALCULATION METHODS

PM Emission Rate

PM Emission Rate = Water Circulation Rate X Drift X TDS

PM_{10} Emission Rate = PM Emission Rate X PM_{10} Fraction

$PM_{2.5}$ Emission Rate = PM Emission Rate X $PM_{2.5}$ Fraction

Annual Emission Rates (tons/yr) = Short-term Emission Rates (lbs/hr) X 8,760 hours/year / 2,000 lbs per ton

1. Estimated based on use of mist eliminators
2. PM10 and PM2.5 Fraction of PM Emissions (based on paper by Reisman and Frisbie, "Calculating Realistic PM10 Emissions from Cooling Tower"). See calculation in Table A-9B.

COOLING TOWER PM/PM_{10}/$PM_{2.5}$ EMISSION CALCULATIONS
M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Density of pure water (ρw) = 1.00E-06 $\mu g/m^3$

Density of solid particles = 2.2 g/cm^3 (assumed same density as sodium chloride)

TDS = 6 ppmw

EPRI Droplet Diameter[1] (µm)	Droplet Volume[2] (μm^3)	Droplet Mass[3] (µg)	Particle Mass (Solids)[4] (µg)	Solid Particle Volume[5] (μm^3)	Solid Particle Diameter[6] (µm)	EPRI %Mass Smaller[1]	Wt% of Particles <PM10	Wt% of Particles <PM2.5
10	524	5.24E-04	3.14E-09	0.00	0.140	0.000		
20	4,189	4.19E-03	2.51E-08	0.01	**0.279**	0.196		
30	14,137	1.41E-02	8.48E-08	0.04	**0.419**	0.226		
40	33,510	3.35E-02	2.01E-07	0.09	0.559	0.514		
50	65,450	6.54E-02	3.93E-07	0.18	0.699	1.816		
60	113,097	1.13E-01	6.79E-07	0.31	0.838	5.702		
70	179,594	1.80E-01	1.08E-06	0.49	0.978	21.348		
90	381,704	3.82E-01	2.29E-06	1.04	1.257	49.812		
110	696,910	6.97E-01	4.18E-06	1.90	**1.537**	70.509		
130	1,150,347	1.15E+00	6.90E-06	3.14	**1.816**	82.023		
150	1,767,146	1.77E+00	1.06E-05	4.82	2.096	88.012		
180	3,053,628	3.05E+00	1.83E-05	8.33	2.515	91.032		90.92%
210	4,849,048	4.85E+00	2.91E-05	13.22	2.934	92.468		
240	7,238,229	7.24E+00	4.34E-05	19.74	3.353	94.091		
270	10,305,995	1.03E+01	6.18E-05	28.11	3.772	94.689		
300	14,137,167	1.41E+01	8.48E-05	38.56	4.191	96.288		
350	22,449,298	2.24E+01	1.35E-04	61.23	4.890	97.011		
400	33,510,322	3.35E+01	2.01E-04	91.39	5.589	98.340		
450	47,712,938	4.77E+01	2.86E-04	130.13	6.287	99.071		
500	65,449,847	6.54E+01	3.93E-04	178.50	6.986	99.071		
600	113,097,336	1.13E+02	6.79E-04	308.45	8.383	100.000		
							100.00%	

1. Water droplet size distributions from a test conducted by Environmental Systems Corporation at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988, as reported in "Calculating Realistic PM10 Emissions From Cooling Towers", Joel Reismann and Gordon Frisbie
2. Droplet Volume = $(4/3)\pi(D_d/2)^3$
3. Droplet mass = (ρ_w)(Droplet Volume)
4. Particle mass (solids) = droplet mass * TDS / 1,000,000
5. Solid particle volume = particle mass / density of solid particles
6. Solid Particle diameter = $(\text{Solid Particle Volume}/(4/3)*\pi)^{1/3} * 2$

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Cooling Tower VOC Emission Calculations

Cooling Tower Specifications:

Variable	Value	Units
Cooling Water Flow	237,755	gpm
Density of Water	8.34	lb/gal
VOC Leak Limit	50	ppb

Cooling Tower VOC Emission Calculations:

Cooling Water Flow (gpm)	Min/hr	Water Density (lbs/gal)	VOC Concentration (ppb)	VOC Emission Rate (lbs/hr)	VOC Emission Rate (tpy)
237,755	60	8.34	50	5.95	26.05

Sample Calculations:

Cooling Tower VOC Emission Rates

Maximum Hourly Emission Rate(lb/hr) = 237755 gpm x 60 min/hr x 8.34 (lbs/gal) x 50 ppb / 1000000000 = 5.95

Annual Emission Rate (tpy) = 5.95 (lbs/hr) x 24 x 365/2000 = 26.05

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Corpus Christi
PET Plant
February 2013

Cooling Tower HOCl Emission Calculations

Calculation of HOCl Emissions:

Calculation of HOCl Emissions

EPN	Description	Drift (%)	Circulation Rate (gpm)	HOCl Concentration (ppmw)	Annual Chlorine Compounds (ppmw)	Hourly Emission Factor (lb/10^3 gal)	Annual Emission Factor (lb/10^3 gal)	Operating Hours (hr/yr)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (ton/yr)
E17	Cooling Tower	0.001	237,755	0.200	0.200	1.67E-08	1.67E-08	8,760	0.0002	0.0010

Note:
[1] - Chlorine (Cl_2) is added to the cooling water stream as a biocide and immediately reacts into hypochlorous acid (HOCl) and hydrochloric acid (HCl). The HCl is calculated as HOCl.

Example HOCl Calculation:

$Cl_2 + H_2O$ => HOCl + HCl(calculated as HOCl)

Hourly Emission Factor = Drift Rate x Water Density x Chlorine Concentration

$$= \frac{0.001}{100}\ \frac{\text{lb } H_2O \text{ drift}}{\text{lb } H_2O \text{ circ.}} \times \frac{8.34}{1}\ \frac{\text{lb } H_2O \text{ circ.}}{\text{gal } H_2O \text{ circ.}} \times \frac{1000 \text{ gal}}{10^3 \text{ gal}} \times \frac{0.200}{1{,}000{,}000}\ \frac{\text{lb HOCl}}{\text{lb } H_2O}$$

$$= 1.67E\text{-}08\ \frac{\text{lb HOCl}}{10^3 \text{ gal } H_2O \text{ circ.}}$$

Hourly Emission Rate = Emission Factor x Water Circulation Rate x A.D.Factor x 60 min/hr

$$= 1.67E\text{-}08\ \frac{\text{lb HOCl}}{10^3 \text{ gal } H_2O \text{ circ.}} \times \frac{237{,}755}{1}\ \frac{\text{gal } H_2O \text{ circ.}}{\text{minute}} \times \frac{60}{1}\ \frac{\text{min}}{\text{hour}} \times \frac{10^3 \text{ gal}}{1000 \text{ gal}}$$

$$= 2.38E\text{-}04\ \frac{\text{lb HOCl}}{\text{hour}}$$

Annual Emission Factor = Drift Rate x Water Density x Mass fraction HOCl

$$= \frac{0.001}{100}\ \frac{\text{lb } H_2O \text{ drift}}{\text{lb } H_2O \text{ circ.}} \times \frac{8.34}{1}\ \frac{\text{lb } H_2O \text{ circ.}}{\text{gal } H_2O \text{ circ.}} \times \frac{0.200}{1{,}000{,}000}\ \frac{\text{lb HOCl}}{\text{lb } H_2O}$$

$$= 1.67E\text{-}11\ \frac{\text{lb HOCl}}{\text{gal } H_2O \text{ circ.}}$$

Annual Emission Rate = Emission Factor x Water Circulation Rate x A.D.Factor x 60 min/hr x 8760 hours/yr / 2000 lb/ton

$$= 1.67E\text{-}11\ \frac{\text{lb HOCl}}{\text{gal } H_2O \text{ circ.}} \times \frac{237{,}755}{1}\ \frac{\text{gal } H_2O \text{ circ.}}{\text{minute}} \times \frac{60}{1}\ \frac{\text{min}}{\text{hour}} \times \frac{8760}{1}\ \frac{\text{hour}}{\text{year}} \times \frac{1}{2000}\ \frac{\text{ton}}{\text{lb}}$$

$$= 1.04E\text{-}03\ \frac{\text{ton HOCl}}{\text{year}}$$

EMERGENCY ENGINES

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
EMERGENCY ENGINE EMISSIONS CALCULATIONS

E85-A **4000 kW**

EPN	Pollutant	Emission Factor	Emission factor units	Emission Factor	Emission factor units	Max. Hourly Emissions (lbs/hr)	Max. Annual Operating Hours	Max. Annual Emissions (tpy)
E85-A	VOC		g/bhp-hr	0.97	g/kW-hr	8.6	100	0.43
	NO_X		g/bhp-hr	5.43	g/kW-hr	47.9		2.39
	CO		g/bhp-hr	3.5	g/kW-hr	30.9		1.54
	PM_{10}		g/bhp-hr	0.20000	g/kW-hr	1.764		0.09
	$PM_{2.5}$		g/bhp-hr	0.2	g/kW-hr	1.8		0.09
	SO_2	4.84E-03	g/bhp-hr	6.49E-03	g/kW-hr	0.057		0.003

E85-B **4000 kW**

EPN	Pollutant	Emission Factor	Emission factor units	Emission Factor	Emission factor units	Max. Hourly Emissions (lbs/hr)	Max. Annual Operating Hours	Max. Annual Emissions (tpy)
E85-B	VOC		g/bhp-hr	0.97	g/kW-hr	8.6	100	0.43
	NO_X		g/bhp-hr	5.43	g/kW-hr	47.9		2.39
	CO		g/bhp-hr	3.5	g/kW-hr	30.9		1.54
	PM_{10}		g/bhp-hr	0.20000	g/kW-hr	1.764		0.09
	$PM_{2.5}$		g/bhp-hr	0.2	g/kW-hr	1.8		0.09
	SO_2	4.84E-03	g/bhp-hr	6.49E-03	g/kW-hr	0.1		0.003

Notes:
[1] All emission factors based upon EPA Tier 2 standards at 40 CFR 89.112, except SO2 which is calculated for ULSD sulfur limit of 15 ppm (see below).
[2] The engine is subject to NSPS Subpart IIII. As such, engine maintenance and testing hours are limited to 100 hours per year per 40 CFR 60.4211(e).
[3] g/kW-hr = 0.7457 g/hp-hr

Emergency Firewater Pump Engine **420 hp**

EPN	Pollutant	Emission Factor	Emission factor units	Max. Hourly Emissions (lbs/hr)	Max. Annual Operating Hours	Max. Annual Emissions (tpy)	Number of Pump Engines	Max. Annual Emissions (tpy)
E87-A	VOC	0.16	lb/hp-hr	0.15	100	0.01	1	0.01
	NO_X	3.841	g/bhp-hr	3.56		0.18		0.18
	CO	0.746	g/bhp-hr	0.69		0.03		0.03
	PM_{10}	0.091	g/bhp-hr	0.084		0.004		0.004
	$PM_{2.5}$	0.091	g/bhp-hr	0.084		0.004		0.004
	SO_2	0.0045	g/bhp-hr	0.0042		0.0002		0.0002

Emergency Firewater Pump Engine **420 hp**

EPN	Pollutant	Emission Factor	Emission factor units	Max. Hourly Emissions (lbs/hr)	Max. Annual Operating Hours	Max. Annual Emissions (tpy)	Number of Pump Engines	Max. Annual Emissions (tpy)
E87-B	VOC	0.16	lb/hp-hr	0.15	100	0.01	1	0.01
	NO_X	3.841	g/bhp-hr	3.56		0.18		0.18
	CO	0.746	g/bhp-hr	0.69		0.03		0.03
	PM_{10}	0.091	g/bhp-hr	0.084		0.004		0.004
	$PM_{2.5}$	0.091	g/bhp-hr	0.084		0.004		0.004
	SO_2	0.0045	g/bhp-hr	0.0042		0.0002		0.0002

Notes:
[1] All emission factors based upon EPA Tier 2 standards at 40 CFR 89.112, except SO2 which is calculated for ULSD sulfur limit of 15 ppm (see below).
[2] The engine is subject to NSPS Subpart IIII. As such, engine maintenance and testing hours are limited to 100 hours per year per 40 CFR 60.4211(e).
[3] g/kW-hr = 0.7457 g/hp-hr

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
EMERGENCY ENGINE EMISSIONS CALCULATIONS

Emission Summary

EPN	E85-A		E85-B		E87-A		E87-B	
Pollutant	**Maximum Hourly Rate (lb/hr)**	**Annual Emission Rate (tpy)***	**Maximum Hourly Rate (lb/hr)**	**Annual Emission Rate (tpy)***	**Maximum Hourly Rate (lb/hr)**	**Annual Emission Rate (tpy)***	**Maximum Hourly Rate (lb/hr)**	**Annual Emission Rate (tpy)***
VOC	8.55	0.43	8.55	0.43	0.15	0.01	0.15	0.01
NOX	47.88	2.39	47.88	2.39	3.56	0.18	3.56	0.18
CO	30.86	1.54	30.86	1.54	0.69	0.03	0.69	0.03
PM_{10}	1.76	0.09	1.76	0.09	0.08	0.00	0.08	0.00
$PM_{2.5}$	1.76	0.09	1.76	0.09	0.08	0.00	0.08	0.00
SO2	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00

E85-A, E-85B

SO2 calculations Emergency Generator (ULSD Fuel)		
15	ppm S in fuel	(40 CFR 80.510(b)
6.94	Diesel density (lb/gal)	(typical)
275	Fuel Consumption (gal/hr)	(manuf. spec. for 4.0 MW)
2.86E-02	Sulfur consumed (lb/hr)	(calculated)
5.72E-02	SO_2 emitted (lb/hr)	(MW_S = 32, MW_{SO2} = 64)
1.340	hp/KW	at 1.0 pf
6.49E-03	SO_2 emitted (g/kW-hr)	(calculated)
4.84E-03	SO_2 emitted (g/hp-hr)	(calculated)

E87-A, E-87B

SO2 calculations Fire Engine (ULSD Fuel)		
15	ppm S in fuel	(40 CFR 80.510(b)
6.94	Diesel density (lb/gal)	(typical)
20	Fuel Consumption (gal/hr)	(manuf. spec. for 400 HP)
2.08E-03	Sulfur consumed (lb/hr)	(calculated)
4.17E-03	SO_2 emitted (lb/hr)	(MW_S = 32, MW_{SO2} = 64)
4.50E-03	SO_2 emitted (g/hp-hr)	(calculated)

FLARE CALCS

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Flare
Natural Gas Combustion Emission Factor Conversion

Heat Value of Natural Gas 1020 btu/scf

Combustion Emission Factors:

Pollutant	Emission Factor	Units	Reference	Emission Factor	Units
VOC	5.5	lb/MMscf	AP-42, Table 1.4-2	0.0054	lb/MMBtu
NOx	0.138	lb/MMBtu	Technical Guidance [3]	0.1380	lb/MMBtu
CO	0.5496	lb/MMBtu	Technical Guidance [3]	0.5496	lb/MMBtu
PM_{10}	7.6	lb/MMscf	AP-42 Table 1.4-2	0.0075	lb/MMBtu
$PM_{2.5}$	7.6	lb/MMscf	Note [1]	0.0075	lb/MMBtu
SO_2	0.6	lb/MMscf	AP-42 Table 1.4-2, basis of 2,000 gr/MMscf sulfur	0.0006	lb/MMBtu
	10,000	gr/MMscf	Plant Data		
SO_2 (Adjusted for M&G sulfur content)	3.00	lb/MMscf	Note [2]	0.0029	lb/MMBtu

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf, which is based on 2000 grains of sulfur per MMscf, by the actual sulfur content in M & G's purchased NG.

SO_2 (lb/MMscf) = 0.6 lb/MMscf * Actual Sulfur Content (gr/MMscf) / 2000 gr/MMscf

[3] Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Flare
Biogas Stream Composition

EPN	FLARE	
FIN	WWTP	
CIN	FLARE	
Source	Waste Water Treatment Plant	
Fuel Type	Bio Gas	
Volumetric Flowrate	13992.93	scf/hr
Heating Value	617.01	Btu/scf
Stream Heat content	8.63	MMBtu/hr
Stream Molecular Weight	24.59	lb/mole
Bio Gas Mass Flow Rate	907.88	lb/hr

Constituent	MW	Mole %	Weight%	Mass Flow Rate (lb/hr)	DRE %	Emission Mass Flow Rate (lb/hr)
Methane	16.0	67.70%	44.16%	400.92	99%	4.0
Hexamethyldisiloxane	162.4	0.0003%	0.00%	0.018	98%	0.0004
Carbon Dioxide	44.0	28.90%	51.71%	469.48	0%	469.5
Hydrogen Sulfide	34.1	0.15%	0.20%	1.84	98%	0.0367
Nitrogen (N2)	28.0	2.60%	2.96%	26.88	0%	26.9
Oxygen (O2)	32.0	0.74%	0.96%	8.74	0%	8.7
			100.00%	907.88		
			Total VOC	0.018		0.00037

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Flare
Bio Gas Combustion Emissions

Variables

EPN	FLARE	
FIN	WWTP	
CIN	FLARE	
Source	Combustion Emissions	
Fuel Type	Bio Gas	
Bio Gas Hourly Flow Rate to Flare	13,993	scf/hr
Heat Value of Bio Gas	617	btu/scf
Hourly Heat Release of Bio Gas	8.63	MMbtu/hr

Bio Gas Emission Factors:

Pollutant	Emission Factor	Units	Reference
NOx	0.1380	lb/MMBtu	Technical Guidance [4]
CO	0.5496	lb/MMBtu	Technical Guidance [4]
PM_{10}	0.0075	lb/MMBtu	AP-42 Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Notes [1]
SO_2	1.8824	lb SO2/lb H2S	Mass Balance
Inlet H2S Content of Bio Gas	1.8371	lb/hr H2S	Inlet Gas Composition Estimate

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Hourly Heat Release of Bio Gas (MMbtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 8.634 MMbtu/hr * 0.55 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 4.75

Emission Rate Summary

Pollutant	Hourly Emission Rate (lb/hr)
NOX	1.19
CO	4.75
PM_{10}	0.064
$PM_{2.5}$	0.064
SO2	3.46

Emissions From Bio Gas Combustion From Speciated Measured Values [3]

Pollutant	Species	Hourly Emission Rate (lb/hr)
Hyrdocarbon	Methane	4.0092
VOC	Hexamethyldisiloxane	0.0004

Notes:

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Flare
Natural Gas Combustion Emissions

Variables

EPN	FLARE	
FIN	FLARE	
CIN	FLARE	
Source	Combustion Emissions	
Fuel Type	Natural Gas	
Natural Gas Hourly Flow Rate to Flare	60	scf/hr
Heat Value of Natural Gas	1020	btu/scf
Hourly Heat Release of NG	0.061	MMBtu/hr

Natural Gas Emission Factors:

Pollutant	Emission Factor	Units	Reference
VOC	0.0054	lb/MMBtu	AP-42, Table 1.4-2
NOx	0.1380	lb/MMBtu	Technical Guidance [3]
CO	0.5496	lb/MMBtu	Technical Guidance [3]
PM_{10}	0.0075	lb/MMBtu	AP-42 Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Note [1]
SO_2 (Adjusted for M&G sulfur content)	0.0029	lb/MMBtu	The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf [2]

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Hourly Heat Release of NG (MMBtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 0.061 MMBtu/hr * 0.55 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 0.03

Emission Summary

Pollutant	Hourly Emission Rate (lb/hr)
VOC	0.0003
NOX	0.0084
CO	0.0336
PM_{10}	0.0005
$PM_{2.5}$	0.0005
SO2	0.0002

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf, which is based on 2000 grains of sulfur per MMscf, by the actual sulfur content in M & G's purchased NG.

SO_2 (lb/MMscf) = 0.6 lb/MMscf * Actual Sulfur Content (gr/MMscf) / 2000 gr/MMscf

[3] Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Flare
Bio Gas and Natural Gas Combustion Emissions

Maximum Flow Rates and Hourly Emisssions

	Hourly Emission Rate (lb/hr)					
	VOC	**NOX**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
Bio Gas, 8.634 MMbtu/hr	0.0004	1.19	4.75	0.06	0.06	3.46
Natural Gas, 0.061 MMbtu/hr	0.0003	0.01	0.03	0.0005	0.0005	0.0002

Hourly Emission Both Bio Gas and Natural Gas

	Maximum Hourly Emission Rate (lb/hr)					
Stream Source	**VOC**	**NOX**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
Bio Gas, 8.634 MMbtu/hr + Natural Gas, 0.061 MMbtu/hr	0.001	1.20	4.78	0.06	0.06	3.46

	VOC		**NOX**		**CO**		**PM_{10}**		**$PM_{2.5}$**		**SO_2**	
Stream Source	Hrs/ Yr, By Fuel Source	TPY	Hrs/ Yr, By Fuel Source	TPY	Hrs/ Yr, By Fuel Source	TPY	Hrs/ Yr, By Fuel Source	TPY	Hrs/ Yr, By Fuel Source	TPY	Hrs/ Yr, By Fuel Source	TPY
Bio Gas, 8.634 MMbtu/hr	1000.00	0.0002	1000.00	0.60	1000.00	2.37	1000.00	0.03	1000.00	0.03	1000.00	1.73
Natural Gas, 0.061 MMbtu/hr	8760.00	0.001	8760.00	0.04	8760.00	0.15	8760.00	0.002	8760.00	0.002	8760.00	0.001
Combined Annual Emissions (TPY)		**0.002**		**0.63**		**2.52**		**0.03**		**0.03**		**1.73**

Pollutant	**Hourly Emission Rate (lb/hr)**	**Annual Emission Rate (tpy)**
VOC	0.001	0.002
NOX	1.20	0.63
CO	4.78	2.52
PM_{10}	0.06	0.03
$PM_{2.5}$	0.06	0.03
SO2	3.46	1.73

FUGITIVE CALCS

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Fugitive Emissions

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 (%)	VOC Fraction	CO Fraction	VOC Emission Rate		CO Emission Rate	
								(lb/hr)	(tpy)	(lb/hr)	(tpy)
Valves	Gas/Vapor	730	0.0089	-	97	0.885	4.64E-04	0.1725	0.7557	0.000091	0.000396
	Light Liquid	899	0.0035	-	97	0.763	5.37E-07	0.0721	0.3156	0.000000	0.000000
	Heavy Liquid	2629	0.0007	-	0	0.985	0.00E+00	1.8125	7.9389	0.000000	0.000000
Flanges	Gas/Vapor	613	0.0029	A	97	0.853	2.42E-04	0.0455	0.1992	0.000013	0.000056
	Light Liquid	987	0.0005	A	97	0.573	3.68E-07	0.0085	0.0371	0.000000	0.000000
	Heavy Liquid	4739	0.00007	A	97	0.993	0.00E+00	0.0099	0.0433	0.000000	0.000000
Pumps	Light Liquid	86	0.0386	-	85	0.719	5.73E-05	0.3581	1.5687	0.000029	0.000125
	Heavy Liquid	73	0.0161	-	0	0.962	0.00E+00	1.1308	4.9531	0.000000	0.000000
Compressors	Gas/Vapor	0	0.5027	-	85	0.000	0.00E+00	0	0	0.000000	0.000000
Relief Valves	All	130	0.2293	C	100	0.881	7.48E-05	0	0	0.000000	0.000000
Open Ended Lines	All	0	0.004	B	100	0.000	0.00E+00	0	0	0.000000	0.000000
Sampling Connections	All	0	0.033	-	97	0.000	0.00E+00	0	0	0.000000	0.000000
TOTAL								**3.61**	**15.81**	**0.000132**	**0.000578**

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 (%)	VOC Fraction	CO Fraction	VOC Emission Rate		CO Emission Rate	
								(lb/hr)	(tpy)	(lb/hr)	(tpy)
Valves	Gas/Vapor	330	0.00029	-	0	0.002	0.00	0.0002	0.0009	0	0
	Light Liquid	0	0.00036	-	0	0.000	0.00	0	0	0	0
	Heavy Liquid	46	0.0005	-	0	0.078	0.00	0.0018	0.0079	0	0
Flanges	Gas/Vapor	1016	0.00018	-	0	0.002	0.00	0.0004	0.0018	0	0
	Light Liquid	0	0.00018	-	0	0.000	0.00	0	0	0	0
	Heavy Liquid	140	0.00018	-	0	0.078	0.00	0.0020	0.0086	0	0
Pumps	Light Liquid	0	0.0041	-	0	0.000	0.00	0	0	0	0
	Heavy Liquid	18	0.0046	-	0	0.020	0.00	0.0016	0.0071	0	0
Compressors	Gas/Vapor	0	0.1971	-	0	0.000	0.00	0	0	0	0
Relief Valves	All	27	0.0986	C	100	0.012	0.00	0	0	0	0
Open Ended Lines	All	0	0.0033	B	100	0.000	0.00	0	0	0	0
Sampling Connections	All	0	0.033	-	0	0.000	0.00	0	0	0	0
TOTAL								**0.01**	**0.03**	**0**	**0**

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 (%)	VOC Fraction	CO Fraction	VOC Emission Rate		CO Emission Rate	
								(lb/hr)	(tpy)	(lb/hr)	(tpy)
Valves	Gas/Vapor	132	0.0089	-	97	0.003	1.72E-03	0.0001	0.0004	0.000061	0.000266
	Light Liquid	0	0.0035	-	97	0.000	0.00E+00	0	0	0.000000	0.000000
	Heavy Liquid	1244	0.0007	-	97	0.651	3.21E-09	0.0170	0.0744	0.000000	0.000000
Flanges	Gas/Vapor	257	0.0029	-	97	0.003	1.78E-03	0.0001	0.0003	0.000040	0.000174
	Light Liquid	0	0.0005	-	97	0.000	0.00E+00	0	0	0.000000	0.000000
	Heavy Liquid	1735	0.00007	-	97	0.628	8.25E-10	0.0023	0.0100	0.000000	0.000000
Pumps	Light Liquid	0	0.0386	-	93	0.000	0.00E+00	0	0	0.000000	0.000000
	Heavy Liquid	85	0.0161	-	93	0.566	3.55E-04	0.0542	0.2374	0.000034	0.000149
Compressors	Gas/Vapor	2	0.5027	-	95	0.004	2.00E-03	0.0002	0.0008	0.000100	0.000440
Relief Valves	All	51	0.2293	C	100	0.432	8.60E-04	0	0	0.000000	0.000000
Open Ended Lines	All	0	0.004	B	100	0.000	0.00E+00	0	0	0.000000	0.000000
Sampling Connections	All	0	0.033	-	97	0.000	0.00E+00	0	0	0.000000	0.000000
TOTAL								**0.07**	**0.32**	**0.000235**	**0.001029**

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 or AVO walk through inspection unless otherwise noted as indicated below
A. Quarterly leak detection and repair program. Leak definition is 500 ppmv.
B. Open ended lines capped or blinded.
C. Relief valves are equipped with rupture discs and pressure monitoring alarms.

Total Emissions		
Pollutant	lb/hr	tpy
VOC	3.69	16.16
CO	0.000	0.002

HEATERS

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Heat Transfer Fluid Heaters
Natural Gas Combustion Emission Factor Conversion

Heating Value of Natural Gas 1020 btu/scf

Combustion Emission Factors:

Pollutant	Emission Factor	Units	Reference	Emission Factor	Units
VOC	5.5	lb/MMscf	AP-42, Table 1.4-2	0.0054	lb/MMBtu
NOx (hourly)			Low NOx burners	0.01	lb/MMBtu
NOx (annual average)			Low NOx burners, BACT	0.01	lb/MMBtu
CO	84	lb/MMscf	AP-42, Table 1.4-1	0.0824	lb/MMBtu
PM_{10}	7.6	lb/MMscf	AP-42, Table 1.4-2	0.0075	lb/MMBtu
$PM_{2.5}$	7.6	lb/MMscf	Note [1]	0.0075	lb/MMBtu
SO_2	0.6	lb/MMscf	AP-42 Table 1.4-2, basis of 2,000 gr/MMscf sulfur	0.0006	lb/MMBtu
	10,000	gr/MMscf	AP-42		
SO_2 (Adjusted for M&G sulfur content)	3.00	lb/MMscf	Note [2]	0.0029	lb/MMBtu

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf, which is based on 2000 grains of sulfur per MMscf, by the actual sulfur content in M & G's purchased NG.

SO_2 (lb/MMscf) = 0.6 lb/MMscf * Actual Sulfur Content (gr/MMscf) / 2000 gr/MMscf

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Heat Transfer Fluid Heaters
Natural Gas Combustion Emissions

Variables

EPN	E7	
FIN	WWTP	
CIN	E7	
Source	Waste Water Treatment Plant	
Fuel Type	Bio Gas	
Max Firing Rate of Each Heater	128	MMbtu/hr

Natural Gas Emission Factors:

Pollutant	Emission Factor	Units	Reference
VOC	0.0054	lb/MMBtu	AP-42, Table 1.4-2
NOx	0.0100	lb/MMBtu	Low NOx burners
CO	0.0824	lb/MMBtu	AP-42, Table 1.4-1
PM_{10}	0.0075	lb/MMBtu	AP-42, Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Note [1]
SO_2 (Adjusted for M&G sulfur content)	0.0029	lb/MMBtu	The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf [2]

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Max Firing Rate of Each Heater (MMbtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 128 MMbtu/hr * 0.082 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 10.54

Pollutant	Hourly Emission Rate Per Heater (lb/hr)	Hourly Emission Rate 4 Heaters Combined (lb/hr)
VOC	0.69	2.76
NOX	1.28	5.12
CO	10.54	42.16
PM_{10}	0.95	3.81
$PM_{2.5}$	0.95	3.81
SO2	0.38	1.51

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf, which is based on 2000 grains of sulfur per MMscf, by the actual sulfur content in M & G's purchased NG.
SO_2 (lb/MMscf) = 0.6 lb/MMscf * Actual Sulfur Content (gr/MMscf) / 2000 gr/MMscf

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Bio Gas Stream to Heaters
Biogas Stream Composition

EPN	E7	
FIN	WWTP	
CIN	E7	
Source	Waste Water Treatment Plant	
Fuel Type	Bio Gas	
Volumetric Flowrate	13992.93	scf/hr
Heating Value, LHV	617.01	Btu/scf
Stream Heat content	8.63	MMBtu/hr
Stream Molecular Weight	24.59	lb/mole
Bio Gas Mass Flow Rate	907.88	lb/hr

Constituent	MW	Mole %	Weight%	Mass Flow Rate (lb/hr)	DRE %	Mass Flow Rate (lb/hr)
Methane	16.0	67.70%	44.16%	400.92	99%	4.0
Hexamethyldisiloxane	162.4	0.00%	0.00%	0.018	99%	0.0002
Carbon Dioxide	44.0	28.90%	51.71%	469.48	0%	469.5
Hydrogen Sulfide	34.1	0.15%	0.20%	1.84	99%	0.0184
Nitrogen (N2)	28.0	2.60%	2.96%	26.88	0%	26.9
Oxygen (O2)	32.0	0.74%	0.96%	8.74	0%	8.7

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Bio Gas Stream to Heaters
Bio Gas Stream Emissions From Heaters

Variables

EPN	E7	
FIN	WWTP	
CIN	E7	
Source	Waste Water Treatment Plant	
Fuel Type	Bio Gas	
Bio Gas Hourly Flow Rate to Heater	13,993	scf/hr
Heat Value of Bio Gas	617	btu/scf
Hourly Heat Release of Bio Gas [2]	8.634	MMbtu/hr

Bio Gas Emission Factors

Pollutant	Emission Factor	Units	Reference
NOx	0.0100	lb/MMBtu	Low NOx burners
CO	0.0824	lb/MMBtu	AP-42, Table 1.4-1
PM_{10}	0.0075	lb/MMBtu	AP-42, Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Note [1]
SO_2	1.8824	lb SO2/lb H2S	Mass Balance
From Inlet H2S Content of Bio Gas	1.8371	lb/hr H2S	Inlet Gas Composition Estimate

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Hourly Heat Release of Bio Gas [2] (MMbtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 8.63 MMbtu/hr * 0.082 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 0.71

Emission From Bio Gas Combustion Emission Factors

Pollutant	Hourly Emission Rate (lb/hr)
NOX	0.0863
CO	0.7110
PM_{10}	0.0643
$PM_{2.5}$	0.0643
SO2	3.4580

Emissions From Bio Gas Combustion From Speciated Measured Values [3]

Pollutant	Species	Hourly Emission Rate (lb/hr)
Hydrocarbon	Methane	4.0092
VOC	Hexamethyldisiloxane	0.0002

Notes

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] Heat Release of the stream is determined by using a specified stream composition, stream flow rate and heating values

[3] Speciated Hourly Emission Rates for VOC constituents are determined from the composition and flow rate of inlet stream with a 99% DRE.

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Organic Stripping Column Stream to Heaters
OSC Stream Composition

EPN	E7	
FIN	PET	
CIN	E7-A, E7-B, E7-C, E7-D	
Source	PET	
Fuel Type	Organic Stripping Column Gas	
Heating Value, LHV	152.79	Btu/scf
Stream Heat content	12.22	MMBtu/hr
Stream Molecular Weight	20.58	lb/mole
Bio Gas Mass Flow Rate	10,364	lb/hr

Constituent	MW	Mole %	Weight%	Mass Flow Rate (lb/hr)	DRE %	Mass Flow Rate (lb/hr)
Acetaldehyde	44.1	4.49%	9.62%	997	99%	10.0
2-Methyl, 1,3-Dioxolane	88.1	1.75%	7.49%	776	99%	7.8
1,4-Dioxane	74.1	0.19%	0.69%	72	99%	0.72
Water	18.1	93.56%	82.20%	8,518	0%	8,518.5
		100%				
		totals =		10,364		8,537
		Total VOC		1,845		18

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Organic Stripping Column Stream to Heaters
OSC Stream Combustion Emissions From Heaters

Variables

EPN	E7	
FIN	PET	
CIN	E7-A, E7-B, E7-C, E7-D	
Source	PET	
Fuel Type	Organic Stripping Column Gas	
OSC Gas Hourly Flow Rate to Heater	10363.50	lb/hr
Heat Value of OSC Gas	4,784	btu/scf
Hourly Heat Release of OSC Gas [2]	12.22	MMbtu/hr

Organic Stripping Column Stream Emission Factors

Pollutant	Emission Factor	Units	Reference
NOx	0.0100	lb/MMBtu	Low NOx burners
CO	0.0824	lb/MMBtu	AP-42, Table 1.4-1
PM_{10}	0.0075	lb/MMBtu	AP-42, Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Note [1]

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Hourly Heat Release of OSC Gas [2] (MMbtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 12.22 MMbtu/hr * 0.082 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 1.01

Emission From OSC Gas Combustion Emission Factors

Pollutant	Hourly Emission Rate (lb/hr)
NOX	0.1222
CO	1.0062
PM_{10}	0.0910
$PM_{2.5}$	0.0910

Speciated Hourly Emission Rates for VOC [3]

Pollutant	Species	Hourly Emission Rate (lb/hr)
VOC	Acetaldehyde	9.9697
	2-Methyl, 1,3-Dioxalane	7.7623
	1,4-Dioxane	0.7151
	Ethylene glycol	0.0031

Notes

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] Heat Release of the stream is determined by using a specified stream composition, stream flow rate and heating values

[3] Speciated Hourly Emission Rates for VOC constituents is determined from the composition and flow rate of inlet stream with a 98% DRE.

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Esterification Column Stream to Heaters
Esterification Stream Composition

EPN	E7		
FIN	PET		
CIN	E7-A, E7-B, E7-C, E7-D		
Source	PET		
Fuel Type	Esterification Stream		
Heating Value, LHV	0.272	Btu/scf	
Stream Heat content	0.0128	MMBtu/hr	
Stream Molecular Weight	32.00	lb/mole	
Bio Gas Mass Flow Rate	5,720	lb/hr	(does not include combustion air)

Constituent	MW	Mole %	Weight%	Mass Flow Rate (lb/hr)	DRE %	Mass Flow Rate (lb/hr)
Acetaldehyde	44.1	0.01%	0.02%	1.144	99.00%	0.011
Ethylene glycol	62.1	0.00%	0.00%	0.0858	99.00%	0.001
Oxygen (O2)	32.0	99.96%	100.00%	5720.0858	0.00%	5,720
Water	18.1	0.03%	0.02%	0.858	0.00%	1
		100%				
					totals =	5,721
					Total VOC	0.01

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Esterfication Column Stream to Heaters
Esterfication Stream Composition

Variables

EPN	E7	
FIN	PET	
CIN	E7-A, E7-B, E7-C, E7-D	
Source	PET	
Fuel Type	Esterfication Stream	
EC Gas Hourly Flow Rate to Heater	5733.00	lb/hr
Heat Value of EC Gas	0.27	btu/scf
Hourly Heat Release of EC Gas [1]	0.0128	MMbtu/hr

Esterfication Stream Emission Factors

Pollutant	Emission Factor	Units	Reference
NOx	0.0100	lb/MMBtu	Low NOx burners
CO	0.0824	lb/MMBtu	AP-42, Table 1.4-1
PM_{10}	0.0075	lb/MMBtu	AP-42, Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	AP-42, Table 1.4-2

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Hourly Heat Release of EC Gas [1] (MMbtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 0.01 MMbtu/hr * 0.082 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 0.001

Emission From OSC Gas Combustion Emission Factors

Pollutant	Hourly Emission Rate (lb/hr)
NOX	0.0001
CO	0.0011
PM_{10}	0.0001
$PM_{2.5}$	0.0001

Speciated Hourly Emission Rates for VOC [2]

Pollutant	Species	Hourly Emission Rate (lb/hr)
VOC	Acetaldehyde	0.0114
	Ethylene glycol	0.0009

Note:
[1] Heat Release of the stream is determined by using a specified stream composition, stream flow rate and heating values
[2] Speciated Hourly Emission Rates for VOC constituents are determined from the composition and flow rate of inlet stream with a 99% DRE.

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Heat Transfer Fluid Heaters, E7-(A, B, C, D)
Waste Gas and Natural Gas Combustion Emissions

Maximum Flow Rates and Hours of Operation per Scenario

	Maximum Hourly Emission Rate (lb/hr)					
	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
124MMBTU NG	0.69	1.28	10.54	0.95	0.95	0.38
12.22MMBTU OSC	18.45	0.12	1.01	0.09	0.09	
11MMBTU Bio Gas	0.0002	0.09	0.71	0.06	0.06	3.46
0.0012MMBTU EC	1.23E-02	0.0001	0.0011	0.0001	0.0001	

Hourly Emission Calculations FIN E7-A:

	Maximum Hourly Emission Rate (lb/hr)					
Stream Source	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
124MMBTU NG EPN E7	0.69	1.28	10.54	0.95	0.95	0.38

Hourly Emission Calculations FIN E7-B:

	Maximum Hourly Emission Rate (lb/hr)					
Stream Source	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
124MMBTU NG EPN E7	0.69	1.28	10.54	0.95	0.95	0.38

Hourly Emission Calculations FIN E7-C:

	Maximum Hourly Emission Rate (lb/hr)					
Stream Source	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
124MMBTU NG EPN E7	0.69	1.28	10.54	0.95	0.95	0.38

Hourly Emission Calculations FIN E7-D Case 1:

	Maximum Hourly Emission Rate (lb/hr)					
Stream Source	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
124MMBTU NG EPN E7	0.69	1.28	10.54	0.95	0.95	0.38

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Heat Transfer Fluid Heaters, E7-(A, B, C, D)
Waste Gas and Natural Gas Combustion Emissions

Hourly Emission Calculations E7-D Case 2:

	Maximum Hourly Emission Rate (lb/hr)					
Stream Source	**VOC**	**NOX**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
103.14MMBTU NG FIN E7-d	0.57	1.06	8.77	0.79	0.79	0.31
12.22MMBTU OSC FIN PET	18.45	0.12	1.01	0.09	0.09	0
8.63MMBTU Bio Gas FIN WWTP	0.0002	0.09	0.71	0.06	0.06	3.46
0.0128MMBTU EC FIN PET	0.01	0.0001	0.001	0.0001	0.0001	0
Maximum Hourly Rate For Each Pollutant All Scenario Streams in E-7d Combined (lb/hr)	**19.04**	**1.27**	**10.49**	**0.95**	**0.95**	**3.77**

Note

Scenario 1 includes firing all 4 heaters exclusively on Natural Gas.

Scenario 2 includes firing one heater with alternative fuel streams and 3 burning natural gas. All 4 heaters are equipped to fire all streams. Typical operation will send alternative fuel streams to a single heater at a time.

E7-D Worst Case Emissions from Case 1 and 2	Maximum Hourly Rate For FIN E7-d (lb/hr)					
	VOC	**NOX**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
	19.04	**1.28**	**10.54**	**0.95**	**0.95**	**3.77**

E7-A Through E7-D Wost Case Emissions	Maximum Hourly Rate For E7-a Through E7-d Combined (lb/hr)[1]					
	VOC	**NOX**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
	21.11	**5.12**	**42.16**	**3.81**	**3.81**	**4.90**

E7-A Through E7-D Worst Case Tons Per Year Emissions	Maximum Tons Per Year For Each Pollutant based on the Maximum Hourly Emission Rate at 8760 hours per year (tpy)					
	VOC	**NOX**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
	92.45	**22.43**	**184.68**	**16.71**	**16.71**	**21.46**

Emission Summary E7-A Through E7-D

Pollutant	Maximum Hourly Rate (lb/hr)	Maximum Tons Per Year (tpy)
VOC	21.11	92.45
NOX	5.12	21.72
CO	42.16	184.68
PM_{10}	3.81	16.71
$PM_{2.5}$	3.81	16.71
SO2	4.90	21.46

1. Maximum Hourly Emission Rate is determined by summing E7-A,-B,-C emissions and the Worst Case Hourly Rate per Pollutant from either Case 1 or Case 2 for E7-D

RTO CALCS

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Regenerative Thermal Oxidizers E1 or E2
Natural Gas Combustion Emission Factor Conversion

Heat Value of Natural Gas 1020 btu/scf

Combustion Emission Factors:

Pollutant	Emission Factor	Units	Reference	Emission Factor	Units
VOC	5.5	lb/MMscf	AP-42, Table 1.4-2	0.0054	lb/MMBtu
NOx	0.1	lb/MMBtu	Technical Guidance [3]	0.1000	lb/MMBtu
CO	84	lb/MMscf	AP-42, Table 1.4-1	0.0824	lb/MMBtu
PM_{10}	7.6	lb/MMscf	AP-42 Table 1.4-2	0.0075	lb/MMBtu
$PM_{2.5}$	7.6	lb/MMscf	Note [1]	0.0075	lb/MMBtu
SO_2	0.6	lb/MMscf	AP-42 Table 1.4-2, basis of 2,000 gr/MMscf sulfur	0.0006	lb/MMBtu
	10,000	gr/MMscf	Plant Data		
SO_2 (Adjusted for M&G sulfur content)	3.00	lb/MMscf	Note [2]	0.0029	lb/MMBtu

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf, which is based on 2000 grains of sulfur per MMscf, by the actual sulfur content in M & G's purchased NG.

SO_2 (lb/MMscf) = 0.6 lb/MMscf * Actual Sulfur Content (gr/MMscf) / 2000 gr/MMscf

[3] Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Regenerative Thermal Oxidizers E1 or E2
Waste Gas Stream Composition

EPN	E1 or E2		
FIN	PTA		
CIN	E1 or E2		
Source	Process		
Fuel Type	Waste Gas		
Stream Heat content	17.0	MMBtu/hr	
Stream Molecular Weight	26.8	lb/mole	
Waste Gas Mass Flow Rate Inlet	455,974	lb/hr	(does not include combustion air)

		RTO Waste Gas Inlet				RTO Waste Gas Outlet	
Constituent	**MW**	**Mole %**	**Weight %**	**Mass Flow Rate (lb/hr)**	**DRE % from Combustion**	**Weight % (From RTO Vendor)**	**Mass Flow Rate (lb/hr)**
Nitrogen (N2)	28.0	80.63%	84.40%	384,842.19		83%	376,179
Carbon Monoxide	28.0	0.38%	0.40%	1,823.90	98.5%	0.005%	22.34
Oxygen (O2)	32.0	2.93%	3.50%	15,959.10		3%	12,767
Carbon Dioxide	44.0	0.73%	1.20%	5,471.69		2%	10,487
Methyl Bromide	94.9	0.0045%	0.02%	72.96		0.02%	72.96
Methyl Acetate	74.1	0.07%	0.20%	911.95	97.8%	0.004%	15.96
Acetic Acid	60.1	0.02%	0.04%	177.83	98.8%	0.0004%	1.78
p-Xylene	106.2	0.00%	0.00%	4.56	98.8%	0.00001%	0.05
Water	18.1	15.24%	10.30%	46,965.34		12%	56,085
NOx	46.0	0.00%	0.00%	0.00		0.001%	2.28
Sum		100.00%	100.00%	455,971.85			455,634
						Total VOC lb/hr	90.7
						Total CO lb/hr	22.3

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Regenerative Thermal Oxidizers E1 or E2
Waste Gas Combustion Emissions

Variables

EPN	E1 or E2	
FIN	PTA	
CIN	Scrubber	
Source	RTO 1 or RTO 2	
Fuel Type	Waste Gas	
Hourly Heat Release RTO-1, RTO-2	17.0	MMbtu/hr

Waste Gas Emission Factors:

Pollutant	Emission Factor	Units	Refrence
NOx	0.1000	lb/MMBtu	Technical Guidance [3]
PM_{10}	0.0075	lb/MMBtu	AP-42 Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Note [1]

Sample Calculation Nox:

NOx Hourly Emission Rate (lb/hr) = Hourly Heat Release RTO-1, RTO-2 (MMbtu/hr) * Emission Factor (lb/MMBtu)

NOx Hourly Emission Rate (lb/hr) = 16.97 MMbtu/hr * 0.1 lb/MMBtu

NOx Hourly Emission Rate (lb/hr) = 1.70

Emission Summary RTO 1 OR RTO 2

Pollutant	Species	Pre -Scrubber Control Hourly Emission Rate (lb/hr)	Control %	Post -Scrubber Control Hourly Emission Rate (lb/hr)
NOX		1.6973		1.6973
PM_{10}		0.1265	50%	0.0632
$PM_{2.5}$		0.1265	50%	0.0632
VOC	Methyl Bromide	73.0	98.4%	1.1348
	Methyl Acetate	16.0		15.9591
	Acetic Acid	1.8		1.7783
	p-Xylene	0.046		0.0456
CO		22.34		22.34

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[3] Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 20000

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Regenerative Thermal Oxidizers E1 or E2
Natural Gas Combustion Emissions

Variables

EPN	E1 or E2	
FIN	RTO 1 or RTO 2	
CIN	Scrubber	
Source	RTO 1 or RTO 2	
Fuel Type	Natural Gas	
Hourly Heat Release RTO-1 OR RTO-2	16.0	MMbtu/hr

Natural Gas Emission Factors:

Pollutant	Emission Factor	Units	Reference
VOC	0.0054	lb/MMBtu	AP-42, Table 1.4-2
NOx	0.1000	lb/MMBtu	Technical Guidance [3]
CO	0.0824	lb/MMBtu	Technical Guidance [3]
PM_{10}	0.0075	lb/MMBtu	AP-42 Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	Note [1]
SO_2 (Adjusted for M&G sulfur content)	0.0029	lb/MMBtu	The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf [2]

Sample Calculation CO:

CO Hourly Emission Rate (lb/hr) = Hourly Heat Release RTO-1 OR RTO-2 (MMbtu/hr) * Emission Factor (lb/MMBtu)

CO Hourly Emission Rate (lb/hr) = 16 MMbtu/hr * 0.082 lb/MMBtu

CO Hourly Emission Rate (lb/hr) = 1.32

Emission Summary E1 or E2

Pollutant	Hourly Emission Rate (lb/hr)	Control %	Post Control Hourly Emission Rate (lb/hr)
VOC	0.0863		0.0863
NOX	1.6000		1.6000
CO	1.3176		1.3176
PM_{10}	0.1192	50%	0.0596
$PM_{2.5}$	0.1192	50%	0.0596
SO2	0.0471		0.0471

Notes:

[1] All PM emissions are assumed to be 1 µm or smaller. Therefore, total PM = PM_{10} = $PM_{2.5}$

[2] The SO2 emission factor is calculated by adjusting the AP-42 emission factor of 0.6 lbs/MMscf, which is based on 2000 grains of sulfur per MMscf, by the actual sulfur content in M & G's purchased NG.

SO_2 (lb/MMscf) = 0.6 lb/MMscf * Actual Sulfur Content (gr/MMscf) / 2000 gr/MMscf

[3] Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Regenerative Thermal Oxidizers E1 or E2
Waste Gas, RTO Bypass to Scrubber, No Combustion Control

Variables

EPN	E1 or E2	
FIN	PTA	
CIN	Scrubber	
Source	RTO 1 or RTO 2	
Fuel Type	Waste Gas	
Total Flow Rate	455,974	lb/hr

This scenario is based on one RTO at a time being bypassed during startup of the PTA Plant.
Bypass will take place for 3 hours for each RTO 12 times per year, 72 hours total.

Waste Gas Stream Composition

Constituent	Weight %	Mass Flow Rate (lb/hr)	Scrubber Control Factors %	Hourly Emission Rate (lb/hr)
Nitrogen (N2)	0.84	384,842		384,842
Carbon Monoxide	0.0040	1,824		1,824
Oxygen (O2)	0.04	15,959		15,959
Carbon Dioxide	0.01	5,472		5,472
Methyl Bromide	0.0002	72.96	98.4%	1.13
Methyl Acetate	0.0020	912		912
Acetic Acid	0.0004	177.83		177.83
p-Xylene	0.000010	4.56		4.56
Water	0.10	46,965		46,965
NOx	0.000000	0.00		0.00
	Total Flow Rate (lb/hr)	456,230		456,158
	Total VOC Flow Rate (lb/hr)	1,167		1,095

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Regenerative Thermal Oxidizers E1 or E2
RTO Operating Scenarios and Emission Summary

	Device	Scenario	VOC		NOX		CO		PM_{10}		$PM_{2.5}$		SO_2	
Preheat, NG Only	Preheat, NG Only	Preheat, NG Only	0.09		1.60		1.32		0.06		0.06		0.05	
RTO Firing WG Only	RTO Firing WG Only	RTO Firing WG Only	18.92		1.70		22.34		0.06		0.06			

Hourly Scenario 1	Maximum Hourly Emission Rate (lb/hr)							
	Device	Scenario	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
Both RTOs burning Max rate of NG (16MMBTU) and 1MMBTU of Waste Gas, per RTO	RTO 1	Burn 1 MMBTU of WG Stream	1.11	0.10	1.31	0.00	0.00	0.00
		Burn Max NG Stream, 16 MMBTU	0.09	1.60	1.32	0.06	0.06	0.05
	RTO 2	Burn 1 MMBTU of WG Stream	1.11	0.10	1.31	0.00	0.00	0.00
		Burn Max NG Stream, 16 MMBTU	0.09	1.60	1.32	0.06	0.06	0.05
	Total per Scenario		**2.40**	**3.40**	**5.26**	**0.13**	**0.13**	**0.09**

WG Stream Max Rate 17.00 MMBTU/hr

Hourly Scenario 2	Maximum Hourly Emission Rate (lb/hr)							
	Device	Scenario	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
Both RTOs, Burning WG Only	RTO 1	Waste Gas, Burn	18.92	1.70	22.34	0.06	0.06	0.00
	RTO 2	Waste Gas, Burn	18.92	1.70	22.34	0.06	0.06	0.00
	Total per Scenario		**37.84**	**3.39**	**44.69**	**0.13**	**0.13**	**0.00**

Maximum Hourly Rate For Each Pollutant All Scenarios (lb/hr)	VOC	NOX	CO	PM_{10}	$PM_{2.5}$	SO_2
	37.84	**3.40**	**44.69**	**0.13**	**0.13**	**0.09**

Maximum Tons Per Year For Each Pollutant from the worst case combination of scenarios (tpy)[1]		VOC		NOX		CO		PM_{10}		$PM_{2.5}$		SO_2	
		Hours/ Year, By Scenario	TPY	Hours/ Year, By Scenario	TPY	Hours/ Year, By Scenario	TPY	Hours/ Year, By Scenario	TPY	Hours/ Year, By Scenario	TPY	Hours/ Year, By Scenario	TPY
Hourly Scenario 1 (Worst Case SO_2)	Both RTOs burning Max rate of NG (16MMBTU) and 1MMBTU of Waste Gas, per RTO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8760.00	0.41
Hourly Scenario 2 (Worst Case NO_x, PM_{10} and $PM_{2.5}$)	Both RTOs, Burning WG Only	8760.00	165.72	8760.00	14.87	8760.00	195.72	8760.00	0.55	8760.00	0.55	0.00	0.00
Maximum Tons Per Year For Each Pollutant			**165.72**		**14.87**		**195.72**		**0.55**		**0.55**		**0.41**

Note
1. Worst case of Scenario 1 or 2 chosen for annual hours of operation. (Scenario 1 for SO2, Scenario 2 for VOC, NOx, CO PM10 and PM2.5).

Emission Summary

Pollutant	Maximum Hourly Rate (lb/hr)	Annual Emission Rate (tpy)
VOC	37.84	165.72
NOX	3.40	14.87
CO	44.69	195.72
PM_{10}	0.13	0.55
$PM_{2.5}$	0.13	0.55
SO2	0.09	0.41

TANK CALCS

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Summary of Emissions from Tank Normal Operations - Detailed Summary by Tank

			Uncontrolled Emissions From Tanks		Control		Final Emissions from Tanks	
Tank ID	Tank Description	Contents	L_T (lb/hr)	L_T (ton/yr)	Method	Efficiency %	L_T (lb/hr)	L_T (ton/yr)
E48	GLYCOL HOTWELL (UFPP) 1	Ethylene Glycol	0.0055	0.0001			0.0055	0.00013
E49	GLYCOL HOTWELL (UFPP) 2	Ethylene Glycol	0.0055	0.0001			0.0055	0.00013
E50	GLYCOL HOTWELL (FINISHER) 1	Ethylene Glycol	0.0055	0.0001			0.0055	0.00013
E51	GLYCOL HOTWELL (FINISHER) 2	Ethylene Glycol	0.0055	0.0001			0.0055	0.00013
E52	GLYCOL COLDWELL (UFPP) 1	Ethylene Glycol	0.0014	0.000040			0.0014	0.000040
E53	GLYCOL COLDWELL (UFPP) 2	Ethylene Glycol	0.0014	0.000040			0.0014	0.000040
E54	GLYCOL COLDWELL (FINISHER) 1	Ethylene Glycol	0.0005	0.000011			0.0005	0.000011
E55	GLYCOL COLDWELL (FINISHER) 2	Ethylene Glycol	0.0005	0.000011			0.0005	0.000011
E56	GLYCOL SEAL TANK 1	Ethylene Glycol	0.0042	0.0001			0.0042	0.00011
E57	GLYCOL SEAL TANK 2	Ethylene Glycol	0.0042	0.0001			0.0042	0.00011
E58	GLYCOL OVERFLOW TANK 1	Ethylene Glycol	0.0016	0.000023			0.0016	0.000023
E59	GLYCOL OVERFLOW TANK 2	Ethylene Glycol	0.0016	0.000023			0.0016	0.000023
E62	INHYBITOR PREPARATION TANK	Ethylene Glycol	0.0344	0.0029			0.0344	0.0029
E63	CP RECYCLE TANK	Ethylene Glycol	0.0243	0.0015			0.0243	0.0015
E64	SMEG TANK	Ethylene Glycol	0.0011	0.000018			0.0011	0.000018
E65	IMPURE EG TANK	Ethylene Glycol	0.0237	0.0020			0.0237	0.0020
E66	DEG DAILY TANK	Diethylene Glycol	0.0038	0.0018			0.0038	0.0018
E67	ORGANIC STRIPPING COLUMN FEED TANK	Ethylene Glycol	0.0319	0.0021			0.0319	0.0021
E68	CATALYST SEAL POT	Ethylene Glycol	0.0009	0.000014			0.0009	0.000014
E69	FEP PREPARATION	Ethylene Glycol	0.0244	0.0021			0.0244	0.0021
E70	SSP HTF FEEDING VESSEL 1	Therminol 66	0.0053	0.000019			0.0053	0.000019
E71	EG TANK 1 (Fixed Roof)	Ethylene Glycol	0.5455	0.0581	E19	95	0.0273	0.0029
E72	EG TANK 2 (Fixed Roof)	Ethylene Glycol	0.5455	0.0581	E19	95	0.0273	0.0029
F6	EG TANK FUTURE (Fixed Roof)	Ethylene Glycol	0.5455	0.0581	E19	95	0.0273	0.0029
E73	DEG TANK (Fixed Roof)	Diethylene Glycol	0.0113	0.0002	E19	95	0.0006	0.000012
E74	Acetic Acid tank farm (Fixed Roof)	Acetic Acid	8.9078	2.7115	E19	95	0.4454	0.1356
E77	HFT Tank	Dowtherm A	0.1018	0.0051			0.1018	0.0051
E79	SSP HTF FEEDING VESSEL 2	Therminol 66	0.0053	0.000019			0.0053	0.000019
E83	Caustic Storage	Caustic	0.0001	0.0004	E19		0.0001	0.0004
E75	PARAXYLENE TANK 1	Paraxylene	0.3048	0.1441	E19	90	0.0305	0.0144
E76	PARAXYLENE TANK 2	Paraxylene	0.3048	0.1441	E19	90	0.0305	0.0144
F3	PARAXYLENE TANK 3	Paraxylene	0.3048	0.1441	E19	90	0.0305	0.0144
F4	PARAXYLENE TANK 4	Paraxylene	0.3048	0.1441	E19	90	0.0305	0.0144
F5	PARAXYLENE TANK 5	Paraxylene	0.3048	0.1441	E19	90	0.0305	0.0144
E86	Diesel Storage Tank	Diesel	0.3981	0.0014			0.3981	0.0014
E88	Diesel Storage Tank (Railyard)	Diesel	0.2488	0.00037			0.2488	0.00037

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Emissions from Fixed Roof Tanks

Reference: AP-42, Fifth Edition, Volume 1, Chapter 71 Liquid Storage Tanks - January 1995
Reference: TCEQ Technical Guidance - Storage Tanks - February 2001

Total Losses from a Fixed Roof Tank (Equation 1-1):

$L_T = L_S + L_W$

where: L_T = total losses
L_S = standing storage losses
L_W = working losses

Standing Losses from a Fixed Roof Tank (Equation 1-2):

$L_S = D\ V_V\ W_V\ K_E\ K_S$

where: L_S = standing storage losses
D = days
V_V = vapor space volume = $(\pi/4) * D^2 * H_{VO}$ (Equation 1-3)
D = tank diameter
H_{VO} = vapor space outage
W_V = vapor density = $(M_V\ P_{VA}) / (R\ T_{LA})$ (Equation 1-21)
M_V = vapor molecular weight
R = ideal gas constant = 10.731 (psia ft^3)/(lb-mole °R)
P_{VA} = vapor pressure at daily average liquid surface temperature
T_{LA} = daily average liquid surface temperature
K_E = vapor space expansion factor = $\Delta T_V / T_{LA} + (\Delta P_V - \Delta P_B) / (P_A - P_{VA})$ (Equation 1-7)
ΔT_V = daily vapor temperature range = $0.72 * \Delta TA + (0.028 * \alpha * I)$ (Equation (1-8)
ΔT_A = daily ambient temperature range = $T_{AX} - T_{AN}$ (Equation 1-12)
α = tank taint solar absorptance (Table 7.1-6)
I = daily total solar insolation factor (Table 7.1-7)

K_E continued

TLA = daily average liquid surface temperature = 0.44 TAA + 0.56 TB + 0.0079 a I (Equation 1-26)
T_{AA} = daily average ambient temperature = $(T_{AX} + T_{AN}) / 2$
T_{AX} = daily maximum ambient temperature (Table 7.1-7)
T_{AN} = daily minimum ambient temperature (Table 7.1-7)
$T_B = T_{AA} + 6\ \alpha$ -1)
ΔP_V = daily vapor pressure range = $P_{VX} - P_{VN}$ (Equation 1-9)
P_{VX} = vapor pressure at daily maximum liquid surface temperature (T_{LX}) $T_{LX} = T_{LA} + 0.25 * \Delta T_V$ (Figure 7.1-17)
P_{VN} = vapor pressure at daily minimum liquid surface temperature (T_{LN}) $T_{LN} = T_{LA} - 0.25 * \Delta T_V$ (Figure 7.1-17)
ΔP_B = breather vent pressure setting range = $P_{BP} - P_{BV}$
P_{BP} = breather vent pressure setting
P_{BV} = breather vent vacuum setting
P_A = atmospheric pressure
P_{VA} = vapor pressure at daily average liquid surface temperature (T_{LA})
K_S = vented vapor saturation factor = $1 / (1+ (0.053*P_{VA}*H_{VO}))$ (Equation 1-20)

Working Losses from a Fixed Roof Tank (Equation 1-29):

$L_W = (0.001) (M_V) (P_{VA}) (Q) (K_N) (K_P)$

where: L_W = working losses
M_V = vapor molecular weight
P_{VA} = vapor pressure at daily average liquid surface temperature
Q = annual net throughput
K_N = working loss turnover factor
For turnovers (N) >36 = (180 + N) / 6 N
For turnovers (N) <=36 = 1
K_P = working loss product factor
For crude oils = 0.75
For all other organic liquids = 1

Maximum Short-Term Working Losses calculated according to the TCEQ Guidance Document:

$L_{MAX} = (L_W\ FR_M) / (N\ T_{CG})$

where: L_{MAX} = maximum short term emission rate
L_W = working losses from AP-42 at maximum liquid surface temperature (P_{VAM})
P_{VAM} = true vapor pressure at daily maximum liquid surface temperature
L_{MAX} assumes a K_N value of 1, per TCEQ guidance document
FR_m = maximum filling rate
N = turnovers per day
TCg = tank working capacity

Data to be Entered for Calculation:						Data Looked Up on Tank Data Sheet:								Data Looked Up on Product Data Sheet:							Data Looked Up on Met Data Sheet:					Fixed Roof Tank Emissions Calculation																									
Tank ID	Month	Days per Month	Product	Product Temperature (°F)	Q (barrels/ mnth)	D or D_{eff} (ft)	Tank capacity (gal)	α (unitless)	FR_{max} (gal/hr)	Shell Height (ft)	Maximum Liquid Height (ft)	P_{BP} (psig)	P_{BV} (psig)	Product Type	M_v (lb/lb-mol)	Benzene Content (%)	Antoine Constant A	Antoine Constant B	Antoine Constant C	K_P (unitless)	Month for Met Data	Pa (psia)	T_{AX} (°F)	T_{AN} (°F)	I (Btu/ft²)	H_{VO} (ft)	T_{AA} (°R)	T_B (°R)	T_{LA} (°R)	ΔT_A (°R)	ΔP_B (psia)	ΔTv (°R)	T_{LX} (°R)	T_{LN} (°R)	P_{VA} (psia)	P_{VX} (psia)	P_{VN} (psia)	ΔP_V (psia)	V_V (ft^3)	W_V (lb/ft³)	K_E (unitless)	K_S (unitless)	L_S (ton/ month)	L_S (lb/hr)	Turnovers (unitless)	K_N (unitless)	L_W (ton/ month)	L_{WMAX} (lb/day)	L_{WMAXH} (lb/hr)	L_{TMAX} (lb/hr)	L_T (ton/ month)
E48	1	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.06	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03	9.77E-03	6.62E-03	3.16E-03	29.06	8.26E-05	0.030	1.000	1.11E-06	2.97E-06	0.8	1.00	6.57E-06	1.59E-02	3.01E-03	3.01E-03	7.68E-06
E48	2	28	Ethylene Glycol	140	23.74429	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.06	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03	1.06E-02	6.96E-03	3.67E-03	29.06	8.81E-05	0.033	1.000	1.18E-06	3.50E-06	0.8	1.00	6.35E-06	1.57E-02	3.28E-03	3.28E-03	7.53E-06
E48	3	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.06	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03	1.22E-02	7.91E-03	4.30E-03	29.06	1.00E-04	0.034	0.999	1.53E-06	4.12E-06	0.8	1.00	8.04E-06	1.99E-02	3.76E-03	3.76E-03	9.57E-06
E48	4	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.06	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02	1.39E-02	9.15E-03	4.73E-03	29.06	1.14E-04	0.033	0.999	1.63E-06	4.53E-06	0.8	1.00	8.92E-06	2.19E-02	4.28E-03	4.28E-03	1.05E-05
E48	5	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.06	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02	1.54E-02	1.01E-02	5.27E-03	29.06	1.26E-04	0.033	0.999	1.88E-06	5.06E-06	0.8	1.00	1.02E-05	2.51E-02	4.74E-03	4.74E-03	1.21E-05
E48	6	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.06	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02	1.70E-02	1.10E-02	5.99E-03	29.06	1.37E-04	0.035	0.999	2.08E-06	5.79E-06	0.8	1.00	1.08E-05	2.68E-02	5.23E-03	5.23E-03	1.29E-05
E48	7	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.06	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02	1.80E-02	1.13E-02	6.66E-03	29.06	1.43E-04	0.038	0.999	2.41E-06	6.48E-06	0.8	1.00	1.17E-05	2.93E-02	5.54E-03	5.54E-03	1.41E-05
E48	8	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.06	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02	1.76E-02	1.13E-02	6.28E-03	29.06	1.42E-04	0.036	0.999	2.26E-06	6.09E-06	0.8	1.00	1.15E-05	2.87E-02	5.43E-03	5.43E-03	1.38E-05
E48	9	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.06	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02	1.60E-02	1.07E-02	5.30E-03	29.06	1.32E-04	0.032	0.999	1.83E-06	5.07E-06	0.8	1.00	1.04E-05	2.53E-02	4.93E-03	4.93E-03	1.22E-05
E48	10	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.06	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02	1.40E-02	9.19E-03	4.77E-03	29.06	1.15E-04	0.033	0.999	1.70E-06	4.57E-06	0.8	1.00	9.26E-06	2.28E-02	4.31E-03	4.31E-03	1.10E-05
E48	11	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.06	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03	1.15E-02	7.78E-03	3.77E-03	29.06	9.67E-05	0.031	0.999	1.28E-06	3.57E-06	0.8	1.00	7.49E-06	1.82E-02	3.56E-03	3.56E-03	8.78E-06
E48	12	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.06	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03	1.02E-02	6.95E-03	3.26E-03	29.06	8.64E-05	0.029	1.000	1.14E-06	3.07E-06	0.8	1.00	6.89E-06	1.67E-02	3.15E-03	3.15E-03	8.03E-06
E49	1	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.06	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03	9.77E-03	6.62E-03	3.16E-03	29.06	8.26E-05	0.030	1.000	1.11E-06	2.97E-06	0.8	1.00	6.57E-06	1.59E-02	3.01E-03	3.01E-03	7.68E-06
E49	2	28	Ethylene Glycol	140	23.74429	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.06	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03	1.06E-02	6.96E-03	3.67E-03	29.06	8.81E-05	0.033	1.000	1.18E-06	3.50E-06	0.8	1.00	6.35E-06	1.57E-02	3.28E-03	3.28E-03	7.53E-06
E49	3	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.06	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03	1.22E-02	7.91E-03	4.30E-03	29.06	1.00E-04	0.034	0.999	1.53E-06	4.12E-06	0.8	1.00	8.04E-06	1.99E-02	3.76E-03	3.76E-03	9.57E-06
E49	4	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.06	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02	1.39E-02	9.15E-03	4.73E-03	29.06	1.14E-04	0.033	0.999	1.63E-06	4.53E-06	0.8	1.00	8.92E-06	2.19E-02	4.28E-03	4.28E-03	1.05E-05
E49	5	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.06	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02	1.54E-02	1.01E-02	5.27E-03	29.06	1.26E-04	0.033	0.999	1.88E-06	5.06E-06	0.8	1.00	1.02E-05	2.51E-02	4.74E-03	4.74E-03	1.21E-05
E49	6	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.06	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02	1.70E-02	1.10E-02	5.99E-03	29.06	1.37E-04	0.035	0.999	2.08E-06	5.79E-06	0.8	1.00	1.08E-05	2.68E-02	5.23E-03	5.23E-03	1.29E-05
E49	7	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.06	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02	1.80E-02	1.13E-02	6.66E-03	29.06	1.43E-04	0.038	0.999	2.41E-06	6.48E-06	0.8	1.00	1.17E-05	2.93E-02	5.54E-03	5.54E-03	1.41E-05
E49	8	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.06	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02	1.76E-02	1.13E-02	6.28E-03	29.06	1.42E-04	0.036	0.999	2.26E-06	6.09E-06	0.8	1.00	1.15E-05	2.87E-02	5.43E-03	5.43E-03	1.38E-05
E49	9	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.06	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02	1.60E-02	1.07E-02	5.30E-03	29.06	1.32E-04	0.032	0.999	1.83E-06	5.07E-06	0.8	1.00	1.04E-05	2.53E-02	4.93E-03	4.93E-03	1.22E-05
E49	10	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.06	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02	1.40E-02	9.19E-03	4.77E-03	29.06	1.15E-04	0.033	0.999	1.70E-06	4.57E-06	0.8	1.00	9.26E-06	2.28E-02	4.31E-03	4.31E-03	1.10E-05
E49	11	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.06	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03	1.15E-02	7.78E-03	3.77E-03	29.06	9.67E-05	0.031	0.999	1.28E-06	3.57E-06	0.8	1.00	7.49E-06	1.82E-02	3.56E-03	3.56E-03	8.78E-06
E49	12	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.06	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03	1.02E-02	6.95E-03	3.26E-03	29.06	8.64E-05	0.029	1.000	1.14E-06	3.07E-06	0.8	1.00	6.89E-06	1.67E-02	3.15E-03	3.15E-03	8.03E-06
E50	1	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.06	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03	9.77E-03	6.62E-03	3.16E-03	29.06	8.26E-05	0.030	1.000	1.11E-06	2.97E-06	0.8	1.00	6.57E-06	1.59E-02	3.01E-03	3.01E-03	7.68E-06
E50	2	28	Ethylene Glycol	140	23.74429	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.06	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03	1.06E-02	6.96E-03	3.67E-03	29.06	8.81E-05	0.033	1.000	1.18E-06	3.50E-06	0.8	1.00	6.35E-06	1.57E-02	3.28E-03	3.28E-03	7.53E-06
E50	3	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.06	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03	1.22E-02	7.91E-03	4.30E-03	29.06	1.00E-04	0.034	0.999	1.53E-06	4.12E-06	0.8	1.00	8.04E-06	1.99E-02	3.76E-03	3.76E-03	9.57E-06
E50	4	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.06	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02	1.39E-02	9.15E-03	4.73E-03	29.06	1.14E-04	0.033	0.999	1.63E-06	4.53E-06	0.8	1.00	8.92E-06	2.19E-02	4.28E-03	4.28E-03	1.05E-05
E50	5	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.06	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02	1.54E-02	1.01E-02	5.27E-03	29.06	1.26E-04	0.033	0.999	1.88E-06	5.06E-06	0.8	1.00	1.02E-05	2.51E-02	4.74E-03	4.74E-03	1.21E-05
E50	6	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.06	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02	1.70E-02	1.10E-02	5.99E-03	29.06	1.37E-04	0.035	0.999	2.08E-06	5.79E-06	0.8	1.00	1.08E-05	2.68E-02	5.23E-03	5.23E-03	1.29E-05
E50	7	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.06	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02	1.80E-02	1.13E-02	6.66E-03	29.06	1.43E-04	0.038	0.999	2.41E-06	6.48E-06	0.8	1.00	1.17E-05	2.93E-02	5.54E-03	5.54E-03	1.41E-05
E50	8	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.06	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02	1.76E-02	1.13E-02	6.28E-03	29.06	1.42E-04	0.036	0.999	2.26E-06	6.09E-06	0.8	1.00	1.15E-05	2.87E-02	5.43E-03	5.43E-03	1.38E-05
E50	9	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.06	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02	1.60E-02	1.07E-02	5.30E-03	29.06	1.32E-04	0.032	0.999	1.83E-06	5.07E-06	0.8	1.00	1.04E-05	2.53E-02	4.93E-03	4.93E-03	1.22E-05
E50	10	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.06	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02	1.40E-02	9.19E-03	4.77E-03	29.06	1.15E-04	0.033	0.999	1.70E-06	4.57E-06	0.8	1.00	9.26E-06	2.28E-02	4.31E-03	4.31E-03	1.10E-05
E50	11	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.06	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03	1.15E-02	7.78E-03	3.77E-03	29.06	9.67E-05	0.031	0.999	1.28E-06	3.57E-06	0.8	1.00	7.49E-06	1.82E-02	3.56E-03	3.56E-03	8.78E-06
E50	12	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.06	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03	1.02E-02	6.95E-03	3.26E-03	29.06	8.64E-05	0.029	1.000	1.14E-06	3.07E-06	0.8	1.00	6.89E-06	1.67E-02	3.15E-03	3.15E-03	8.03E-06
E51	1	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.06	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03	9.77E-03	6.62E-03	3.16E-03	29.06	8.26E-05	0.030	1.000	1.11E-06	2.97E-06	0.8	1.00	6.57E-06	1.59E-02	3.01E-03	3.01E-03	7.68E-06
E51	2	28	Ethylene Glycol	140	23.74429	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.06	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03	1.06E-02	6.96E-03	3.67E-03	29.06	8.81E-05	0.033	1.000	1.18E-06	3.50E-06	0.8	1.00	6.35E-06	1.57E-02	3.28E-03	3.28E-03	7.53E-06
E51	3	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.06	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03	1.22E-02	7.91E-03	4.30E-03	29.06	1.00E-04	0.034	0.999	1.53E-06	4.12E-06	0.8	1.00	8.04E-06	1.99E-02	3.76E-03	3.76E-03	9.57E-06
E51	4	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.06	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02	1.39E-02	9.15E-03	4.73E-03	29.06	1.14E-04	0.033	0.999	1.63E-06	4.53E-06	0.8	1.00	8.92E-06	2.19E-02	4.28E-03	4.28E-03	1.05E-05
E51	5	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.06	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02	1.54E-02	1.01E-02	5.27E-03	29.06	1.26E-04	0.033	0.999	1.88E-06	5.06E-06	0.8	1.00	1.02E-05	2.51E-02	4.74E-03	4.74E-03	1.21E-05
E51	6	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.06	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02	1.70E-02	1.10E-02	5.99E-03	29.06	1.37E-04	0.035	0.999	2.08E-06	5.79E-06	0.8	1.00	1.08E-05	2.68E-02	5.23E-03	5.23E-03	1.29E-05
E51	7	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.06	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02	1.80E-02	1.13E-02	6.66E-03	29.06	1.43E-04	0.038	0.999	2.41E-06	6.48E-06	0.8	1.00	1.17E-05	2.93E-02	5.54E-03	5.54E-03	1.41E-05
E51	8	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.06	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02	1.76E-02	1.13E-02	6.28E-03	29.06	1.42E-04	0.036	0.999	2.26E-06	6.09E-06	0.8	1.00	1.15E-05	2.87E-02	5.43E-03	5.43E-03	1.38E-05
E51	9	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.06	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02	1.60E-02	1.07E-02	5.30E-03	29.06	1.32E-04	0.032	0.999	1.83E-06	5.07E-06	0.8	1.00	1.04E-05	2.53E-02	4.93E-03	4.93E-03	1.22E-05
E51	10	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.06	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02	1.40E-02	9.19E-03	4.77E-03	29.06	1.15E-04	0.033	0.999	1.70E-06	4.57E-06	0.8	1.00	9.26E-06	2.28E-02	4.31E-03	4.31E-03	1.10E-05
E51	11	30	Ethylene Glycol	140	25.44031	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.06	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03	1.15E-02	7.78E-03	3.77E-03	29.06	9.67E-05	0.031	0.999	1.28E-06	3.57E-06	0.8	1.00	7.49E-06	1.82E-02	3.56E-03	3.56E-03	8.78E-06
E51	12	31	Ethylene Glycol	140	26.28832	5.904	1,300	0.17	208.6008	6.23	5.23	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.06	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03	1.02E-02	6.95E-03	3.26E-03	29.06	8.64E-05	0.029	1.000	1.14E-06	3.07E-06	0.8	1.00	6.89E-06	1.67E-02	3.15E-03	3.15E-03	8.03E-06
E52	1	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.06	516.0	545.7	533.8	20.4	0.06	19.0	538.5	529.1	2.15E-03	2.67E-03	1.72E-03	9.52E-04	25.84	2.33E-05	0.032	1.000	2.94E-07	7.89E-07	0.8	1.00	2.02E-06	5.03E-03	7.22E-04	7.22E-04	2.32E-06
E52	2	28	Ethylene Glycol	86	27.39726	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.06	519.0	545.7	535.5	21.2	0.06	20.7	540.6	530.3	2.32E-03	2.94E-03	1.82E-03	1.12E-03	25.84	2.51E-05	0.035	1.000	3.14E-07	9.36E-07	0.8	1.00	1.97E-06	5.00E-03	7.94E-04	7.94E-04	2.29E-06
E52	3	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.06	525.6	545.7	538.7	20.4	0.06	21.5	544.1	533.4	2.70E-03	3.43E-03	2.11E-03	1.33E-03	25.84	2.89E-05	0.036	1.000	4.16E-07	1.12E-06	0.8	1.00	2.54E-06	6.46E-03	9.28E-04	9.28E-04	2.95E-06
E52	4	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.06	532.7	545.7	542.2	18.2	0.06	20.9	547.4	536.9	3.14E-03	3.97E-03	2.48E-03	1.49E-03	25.84	3.35E-05	0.035	1.000	4.50E-07	1.25E-06	0.8	1.00	2.86E-06	7.23E-03	1.07E-03	1.07E-03	3.31E-06
E52	5	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.06	537.8	545.7	544.7	17.2	0.06	21.3	550.0	539.4	3.52E-03	4.45E-03	2.77E-03	1.68E-03	25.84	3.74E-05	0.035	1.000	5.25E-07	1.41E-06	0.8	1.00	3.32E-06	8.38E-03	1.20E-03	1.20E-03	3.84E-06
E52	6	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.06	542.3	545.7	547.0	17.1	0.06	22.3	552.6	541.4	3.90E-03	4.97E-03	3.04E-03	1.93E-03	25.84	4.13E-05	0.037	1.000	5.88E-07	1.63E-06	0.8	1.00	3.55E-06	9.06E-03	1.34E-03	1.34E-03	4.14E-06
E52	7	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.06	544.6	545.7	548.1	18.6	0.06	23.8	554.1	542.2	4.10E-03	5.30E-03	3.15E-03	2.15E-03	25.84	4.32E-05	0.039	1.000	6.83E-07	1.84E-06	0.8	1.00	3.86E-06	9.98E-03	1.43E-03	1.43E-03	4.54E-06
E52	8	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.06	544.6	545.7	547.9	18.3	0.06	22.7	553.5	542.2	4.05E-03	5.18E-03	3.15E-03	2.03E-03	25.84	4.28E-05	0.037	1.000	6.41E-07	1.72E-06	0.8	1.00	3.82E-06	9.76E-03	1.40E-03	1.40E-03	4.46E-06
E52	9	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.06	541.1	545.7	545.9	17.3	0.06	20.5	551.1	540.8	3.72E-03	4.66E-03	2.96E-03	1.70E-03	25.84	3.94E-05	0.034	1.000	5.13E-07	1.42E-06	0.8	1.00	3.39E-06	8.48E-03	1.26E-03	1.26E-03	3.90E-06
E52	10	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.06	533.7	545.7	542.3	19.8	0.06	21.0	547.5	537.0	3.16E-03	3.99E-03	2.49E-03	1.50E-03	25.84	3.37E-05	0.035	1.000	4.69E-07	1.26E-06	0.8	1.00	2.98E-06	7.52E-03	1.08E-03	1.08E-03	3.45E-06
E52	11	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.06	524.7	545.7	537.8	20.2	0.06	19.5	542.7	533.0	2.59E-03	3.22E-03	2.06E-03	1.16E-03	25.84	2.78E-05	0.032	1.000	3.48E-07	9.66E-07	0.8	1.00	2.36E-06	5.87E-03	8.72E-04	8.72E-04	2.70E-06
E52	12	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.06	518.7	545.7	534.9	20.5	0.06	18.8	539.6	530.3	2.26E-03	2.81E-03	1.82E-03	9.89E-04	25.84	2.45E-05	0.031	1.000	3.05E-07	8.20E-07	0.8	1.00	2.13E-06	5.29E-03	7.59E-04	7.59E-04	2.44E-06
E53	1	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.06	516.0	545.7	533.8	20.4	0.06	19.0	538.5	529.1	2.15E-03	2.67E-03	1.72E-03	9.52E-04	25.84	2.33E-05	0.032	1.000	2.94E-07	7.89E-07	0.8	1.00	2.02E-06	5.03E-03	7.22E-04	7.22E-04	2.32E-06
E53	2	28	Ethylene Glycol	86	27.39726	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.06	519.0	545.7	535.5	21.2	0.06	20.7	540.6	530.3	2.32E-03	2.94E-03	1.82E-03	1.12E-03	25.84	2.51E-05	0.035	1.000	3.14E-07	9.36E-07	0.8	1.00	1.97E-06	5.00E-03	7.94E-04	7.94E-04	2.29E-06
E53	3	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.06	525.6	545.7	538.7	20.4	0.06	21.5	544.1	533.4	2.70E-03	3.43E-03	2.11E-03	1.33E-03	25.84	2.89E-05	0.036	1.000	4.16E-07	1.12E-06	0.8	1.00	2.54E-06	6.46E-03	9.28E-04	9.28E-04	2.95E-06
E53	4	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.06	532.7	545.7	542.2	18.2	0.06	20.9	547.4	536.9	3.14E-03	3.97E-03	2.48E-03	1.49E-03	25.84	3.35E-05	0.035	1.000	4.50E-07	1.25E-06	0.8	1.00	2.86E-06	7.23E-03	1.07E-03	1.07E-03	3.31E-06
E53	5	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.06	537.8	545.7	544.7	17.2	0.06	21.3	550.0	539.4	3.52E-03	4.45E-03	2.77E-03	1.68E-03	25.84	3.74E-05	0.035	1.000	5.25E-07	1.41E-06	0.8	1.00	3.32E-06	8.38E-03	1.20E-03	1.20E-03	3.84E-06
E53	6	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.06	542.3	545.7	547.0	17.1	0.06	22.3	552.6	541.4	3.90E-03	4.97E-03	3.04E-03	1.93E-03	25.84	4.13E-05	0.037	1.000	5.88E-07	1.63E-06	0.8	1.00	3.55E-06	9.06E-03	1.34E-03	1.34E-03	4.14E-06
E53	7	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.06	544.6	545.7	548.1	18.6	0.06	23.8	554.1	542.2	4.10E-03	5.30E-03	3.15E-03	2.15E-03	25.84	4.32E-05	0.039	1.000	6.83E-07	1.84E-06	0.8	1.00	3.86E-06	9.98E-03	1.43E-03	1.43E-03	4.54E-06
E53	8	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.06	544.6	545.7	547.9	18.3	0.06	22.7	553.5	542.2	4.05E-03	5.18E-03	3.15E-03	2.03E-03	25.84	4.28E-05	0.037	1.000	6.41E-07	1.72E-06	0.8	1.00	3.82E-06	9.76E-03	1.40E-03	1.40E-03	4.46E-06
E53	9	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.06	541.1	545.7	545.9	17.3	0.06	20.5	551.1	540.8	3.72E-03	4.66E-03	2.96E-03	1.70E-03	25.84	3.94E-05	0.034	1.000	5.13E-07	1.42E-06	0.8	1.00	3.39E-06	8.48E-03	1.26E-03	1.26E-03	3.90E-06
E53	10	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.06	533.7	545.7	542.3	19.8	0.06	21.0	547.5	537.0	3.16E-03	3.99E-03	2.49E-03	1.50E-03	25.84	3.37E-05	0.035	1.000	4.69E-07	1.26E-06	0.8	1.00	2.98E-06	7.52E-03	1.08E-03	1.08E-03	3.45E-06
E53	11	30	Ethylene Glycol	86	29.35421	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.06	524.7	545.7	537.8	20.2	0.06	19.5	542.7	533.0	2.59E-03	3.22E-03	2.06E-03	1.16E-03	25.84	2.78E-05	0.032	1.000	3.48E-07	9.66E-07	0.8	1.00	2.36E-06	5.87E-03	8.72E-04	8.72E-04	2.70E-06
E53	12	31	Ethylene Glycol	86	30.33268	5.576	1,500	0.17	182.9268	8.20	7.20	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.06	518.7	545.7	534.9	20.5	0.06	18.8	539.6	530.3	2.26E-03	2.81E-03	1.82E-03	9.89E-04	25.84	2.45E-05	0.031	1.000	3.05E-07	8.20E-07	0.8	1.00	2.13E-06	5.29E-03	7.59E-04	7.59E-04	2.44E-06
E54	1	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.03	516.0	545.7	533.8	20.4	0.06	19.0	538.5	529.1	2.15E-03	2.67E-03	1.72E-03	9.52E-04	7.05	2.33E-05	0.032	1.000	8.02E-08	2.16E-07	0.8	1.00	5.39E-07	1.34E-03	2.41E-04	2.41E-04	6.19E-07
E54	2	28	Ethylene Glycol	86	7.305936	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.03	519.0	545.7	535.5	21.2	0.06	20.7	540.6	530.3	2.32E-03	2.94E-03	1.82E-03	1.12E-03	7.05	2.51E-05	0.035	1.000	8.58E-08	2.55E-07	0.8	1.00	5.26E-07	1.33E-03	2.65E-04	2.65E-04	6.12E-07
E54	3	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.03	525.6	545.7	538.7	20.4	0.06	21.5	544.1	533.4	2.70E-03	3.43E-03	2.11E-03	1.33E-03	7.05	2.89E-05	0.036	1.000	1.14E-07	3.05E-07	0.8	1.00	6.77E-07	1.72E-03	3.09E-04	3.09E-04	7.90E-07
E54	4	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.03	532.7	545.7	542.2	18.2	0.06	20.9	547.4	536.9	3.14E-03	3.97E-03	2.48E-03	1.49E-03	7.05	3.35E-05	0.035	1.000	1.23E-07	3.41E-07	0.8	1.00	7.64E-07	1.93E-03	3.58E-04	3.58E-04	8.87E-07
E54	5	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.03	537.8	545.7	544.7	17.2	0.06	21.3	550.0	539.4	3.52E-03	4.45E-03	2.77E-03	1.68E-03	7.05	3.74E-05	0.035	1.000	1.43E-07	3.86E-07	0.8	1.00	8.84E-07	2.23E-03	4.01E-04	4.01E-04	1.03E-06

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February 2013

Emissions from Fixed Roof Tanks

Reference: AP-42, Fifth Edition, Volume 1, Chapter 71 Liquid Storage Tanks - January 1995
Reference: TCEQ Technical Guidance - Storage Tanks - February 2001

Total Losses from a Fixed Roof Tank (Equation 1-1):

$L_T = L_S + L_W$

where: L_T = total losses
L_S = standing storage losses
L_W = working losses

Standing Losses from a Fixed Roof Tank (Equation 1-2):

$L_S = D\, V_V\, W_V\, K_E\, K_S$

where: L_S = standing storage losses
D = days
V_V = vapor space volume = $(\pi/4) * D^2 * H_{VO}$ (Equation 1-3)
D = tank diameter
H_{VO} = vapor space outage
W_V = vapor density = $(M_V P_{VA}) / (R\, T_{LA})$ (Equation 1-21)
M_V = vapor molecular weight
R = ideal gas constant = 10.731 (psia ft^3)/(lb-mole °R)
P_{VA} = vapor pressure at daily average liquid surface temperature
T_{LA} = daily average liquid surface temperature
K_E = vapor space expansion factor = $\Delta T_V / T_{LA} + (\Delta P_V - \Delta P_B) / (P_A - P_{VA})$ (Equation 1-7)
ΔT_V = daily vapor temperature range = $0.72 * \Delta TA + (0.028 * \alpha * I)$ (Equation (1-8)
ΔT_A = daily ambient temperature range = $T_{AX} - T_{AN}$ (Equation 1-12)
α = tank taint solar absorptance (Table 7.1-6)
I = daily total solar insolation factor (Table 7.1-7)

K_E continued

TLA = daily average liquid surface temperature = 0.44 TAA + 0.56 TB + 0.0079 a I (Equation 1-26)
T_{AA} = daily average ambient temperature = $(T_{AX} + T_{AN}) / 2$
T_{AX} = daily maximum ambient temperature (Table 7.1-7)
T_{AN} = daily minimum ambient temperature (Table 7.1-7)
$T_B = T_{AA} + 6\, \alpha$ -1)
ΔP_V = daily vapor pressure range = $P_{VX} - P_{VN}$ (Equation 1-9)
P_{VX} = vapor pressure at daily maximum liquid surface temperature (T_{LX}) $T_{LX} = T_{LA} + 0.25 * \Delta T_V$ (Figure 7.1-17)
P_{VN} = vapor pressure at daily minimum liquid surface temperature (T_{LN}) $T_{LN} = T_{LA} - 0.25 * \Delta T_V$ (Figure 7.1-17)
ΔP_B = breather vent pressure setting range = $P_{BP} - P_{BV}$
P_{BP} = breather vent pressure setting
P_{BV} = breather vent vacuum setting
P_A = atmospheric pressure
P_{VA} = vapor pressure at daily average liquid surface temperature (T_{LA})
K_S = vented vapor saturation factor = $1 / (1 + (0.053 * P_{VA} * H_{VO}))$ (Equation 1-20)

Working Losses from a Fixed Roof Tank (Equation 1-29):

$L_W = (0.001) (M_V) (P_{VA}) (Q) (K_N) (K_P)$

where: L_W = working losses
M_V = vapor molecular weight
P_{VA} = vapor pressure at daily average liquid surface temperature
Q = annual net throughput
K_N = working loss turnover factor
For turnovers (N) >36 = (180 + N) / 6 N
For turnovers (N) <=36 = 1
K_P = working loss product factor
For crude oils = 0.75
For all other organic liquids = 1

Maximum Short-Term Working Losses calculated according to the TCEQ Guidance Document:

$L_{MAX} = (L_W\, FR_M) / (N\, T_{CG})$

where: L_{MAX} = maximum short term emission rate
L_W = working losses from AP-42 at maximum liquid surface temperature (P_{VAM})
P_{VAM} = true vapor pressure at daily maximum liquid surface temperature
L_{MAX} assumes a K_N value of 1, per TCEQ guidance document
FR_m = maximum filling rate
N = turnovers per day
TCg = tank working capacity

Data to be Entered for Calculation: / Data Looked Up on Tank Data Sheet: / Data Looked Up on Product Data Sheet:

Tank ID	Month	Days per Month	Product	Product Temperature (°F)	Q (barrels/ mnth)	D or D_{eff} (ft)	Tank capacity (gal)	α (unitless)	FR_{max} (gal/hr)	Shell Height (ft)	Maximum Liquid Height (ft)	P_{BP} (psig)	P_{BV} (psig)	Product Type	M_v (lb/lb-mol)	Benzene Content (%)	Antoine Constant A	Antoine Constant B	Antoine Constant C	K_P (unitless)
E54	6	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E54	7	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E54	8	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E54	9	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E54	10	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E54	11	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E54	12	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	1	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	2	28	Ethylene Glycol	86	7.305936	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	3	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	4	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	5	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	6	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	7	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	8	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	9	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	10	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	11	30	Ethylene Glycol	86	7.827789	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E55	12	31	Ethylene Glycol	86	8.088715	2.952	400	0.17	60.97561	6.56	5.56	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	1	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	2	28	Ethylene Glycol	149	16.43836	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	3	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	4	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	5	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	6	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	7	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	8	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	9	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	10	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	11	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E56	12	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	1	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	2	28	Ethylene Glycol	149	16.43836	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	3	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	4	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	5	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	6	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	7	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	8	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	9	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	10	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	11	30	Ethylene Glycol	149	17.61252	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E57	12	31	Ethylene Glycol	149	18.19961	4.592	900	0.17	130.662	6.89	5.89	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	1	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	2	28	Ethylene Glycol	140	3.652968	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	3	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	4	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	5	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	6	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	7	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	8	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	9	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	10	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	11	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E58	12	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	1	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	2	28	Ethylene Glycol	140	3.652968	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	3	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	4	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	5	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	6	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	7	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	8	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	9	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	10	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	11	30	Ethylene Glycol	140	3.913894	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E59	12	31	Ethylene Glycol	140	4.044357	3.28	200	0.17	60.97561	3.28	2.28	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	1	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	2	28	Ethylene Glycol	ambient	3000	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	3	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	4	30	Ethylene Glycol	ambient	3214.286	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	5	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	6	30	Ethylene Glycol	ambient	3214.286	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	7	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	8	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	9	30	Ethylene Glycol	ambient	3214.286	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	10	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00

Data Looked Up on Met Data Sheet: / Fixed Roof Tank Emissions Calculation

Tank ID	Month	Month for Met Data	Pa (psia)	T_{AX} (°F)	T_{AN} (°F)	I (Btu/ft²)	H_{VO} (ft)	T_{AA} (°R)	T_B (°R)	T_{LA} (°R)	ΔT_A (°R)	ΔP_B (psia)	ΔTv (°R)	T_{LX} (°R)	T_{LN} (°R)	P_{VA} (psia)
E54	6	6	14.703	91.2	74.1	2094	1.03	542.3	545.7	547.0	17.1	0.06	22.3	552.6	541.4	3.90E-03
E54	7	7	14.703	94.2	75.6	2186	1.03	544.6	545.7	548.1	18.6	0.06	23.8	554.1	542.2	4.10E-03
E54	8	8	14.703	94.1	75.8	1991	1.03	544.6	545.7	547.9	18.3	0.06	22.7	553.5	542.2	4.05E-03
E54	9	9	14.703	90.1	72.8	1687	1.03	541.1	545.7	545.9	17.3	0.06	20.5	551.1	540.8	3.72E-03
E54	10	10	14.703	83.9	64.1	1416	1.03	533.7	545.7	542.3	19.8	0.06	21.0	547.5	537.0	3.16E-03
E54	11	11	14.703	75.1	54.9	1043	1.03	524.7	545.7	537.8	20.2	0.06	19.5	542.7	533.0	2.59E-03
E54	12	12	14.703	69.3	48.8	845	1.03	518.7	545.7	534.9	20.5	0.06	18.8	539.6	530.3	2.26E-03
E55	1	1	14.703	66.5	46.1	898	1.03	516.0	545.7	533.8	20.4	0.06	19.0	538.5	529.1	2.15E-03
E55	2	2	14.703	69.9	48.7	1147	1.03	519.0	545.7	535.5	21.2	0.06	20.7	540.6	530.3	2.32E-03
E55	3	3	14.703	76.1	55.7	1430	1.03	525.6	545.7	538.7	20.4	0.06	21.5	544.1	533.4	2.70E-03
E55	4	4	14.703	82.1	63.9	1642	1.03	532.7	545.7	542.2	18.2	0.06	20.9	547.4	536.9	3.14E-03
E55	5	5	14.703	86.7	69.5	1866	1.03	537.8	545.7	544.7	17.2	0.06	21.3	550.0	539.4	3.52E-03
E55	6	6	14.703	91.2	74.1	2094	1.03	542.3	545.7	547.0	17.1	0.06	22.3	552.6	541.4	3.90E-03
E55	7	7	14.703	94.2	75.6	2186	1.03	544.6	545.7	548.1	18.6	0.06	23.8	554.1	542.2	4.10E-03
E55	8	8	14.703	94.1	75.8	1991	1.03	544.6	545.7	547.9	18.3	0.06	22.7	553.5	542.2	4.05E-03
E55	9	9	14.703	90.1	72.8	1687	1.03	541.1	545.7	545.9	17.3	0.06	20.5	551.1	540.8	3.72E-03
E55	10	10	14.703	83.9	64.1	1416	1.03	533.7	545.7	542.3	19.8	0.06	21.0	547.5	537.0	3.16E-03
E55	11	11	14.703	75.1	54.9	1043	1.03	524.7	545.7	537.8	20.2	0.06	19.5	542.7	533.0	2.59E-03
E55	12	12	14.703	69.3	48.8	845	1.03	518.7	545.7	534.9	20.5	0.06	18.8	539.6	530.3	2.26E-03
E56	1	1	14.703	66.5	46.1	898	1.05	516.0	608.7	569.1	20.4	0.06	19.0	573.8	564.3	9.89E-03
E56	2	2	14.703	69.9	48.7	1147	1.05	519.0	608.7	570.7	21.2	0.06	20.7	575.9	565.6	1.06E-02
E56	3	3	14.703	76.1	55.7	1430	1.05	525.6	608.7	574.0	20.4	0.06	21.5	579.4	568.7	1.20E-02
E56	4	4	14.703	82.1	63.9	1642	1.05	532.7	608.7	577.4	18.2	0.06	20.9	582.7	572.2	1.38E-02
E56	5	5	14.703	86.7	69.5	1866	1.05	537.8	608.7	580.0	17.2	0.06	21.3	585.3	574.7	1.52E-02
E56	6	6	14.703	91.2	74.1	2094	1.05	542.3	608.7	582.3	17.1	0.06	22.3	587.9	576.7	1.66E-02
E56	7	7	14.703	94.2	75.6	2186	1.05	544.6	608.7	583.4	18.6	0.06	23.8	589.4	577.5	1.73E-02
E56	8	8	14.703	94.1	75.8	1991	1.05	544.6	608.7	583.2	18.3	0.06	22.7	588.8	577.5	1.72E-02
E56	9	9	14.703	90.1	72.8	1687	1.05	541.1	608.7	581.2	17.3	0.06	20.5	586.3	576.1	1.60E-02
E56	10	10	14.703	83.9	64.1	1416	1.05	533.7	608.7	577.6	19.8	0.06	21.0	582.8	572.3	1.38E-02
E56	11	11	14.703	75.1	54.9	1043	1.05	524.7	608.7	573.1	20.2	0.06	19.5	578.0	568.2	1.16E-02
E56	12	12	14.703	69.3	48.8	845	1.05	518.7	608.7	570.2	20.5	0.06	18.8	574.9	565.5	1.04E-02
E57	1	1	14.703	66.5	46.1	898	1.05	516.0	608.7	569.1	20.4	0.06	19.0	573.8	564.3	9.89E-03
E57	2	2	14.703	69.9	48.7	1147	1.05	519.0	608.7	570.7	21.2	0.06	20.7	575.9	565.6	1.06E-02
E57	3	3	14.703	76.1	55.7	1430	1.05	525.6	608.7	574.0	20.4	0.06	21.5	579.4	568.7	1.20E-02
E57	4	4	14.703	82.1	63.9	1642	1.05	532.7	608.7	577.4	18.2	0.06	20.9	582.7	572.2	1.38E-02
E57	5	5	14.703	86.7	69.5	1866	1.05	537.8	608.7	580.0	17.2	0.06	21.3	585.3	574.7	1.52E-02
E57	6	6	14.703	91.2	74.1	2094	1.05	542.3	608.7	582.3	17.1	0.06	22.3	587.9	576.7	1.66E-02
E57	7	7	14.703	94.2	75.6	2186	1.05	544.6	608.7	583.4	18.6	0.06	23.8	589.4	577.5	1.73E-02
E57	8	8	14.703	94.1	75.8	1991	1.05	544.6	608.7	583.2	18.3	0.06	22.7	588.8	577.5	1.72E-02
E57	9	9	14.703	90.1	72.8	1687	1.05	541.1	608.7	581.2	17.3	0.06	20.5	586.3	576.1	1.60E-02
E57	10	10	14.703	83.9	64.1	1416	1.05	533.7	608.7	577.6	19.8	0.06	21.0	582.8	572.3	1.38E-02
E57	11	11	14.703	75.1	54.9	1043	1.05	524.7	608.7	573.1	20.2	0.06	19.5	578.0	568.2	1.16E-02
E57	12	12	14.703	69.3	48.8	845	1.05	518.7	608.7	570.2	20.5	0.06	18.8	574.9	565.5	1.04E-02
E58	1	1	14.703	66.5	46.1	898	1.03	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03
E58	2	2	14.703	69.9	48.7	1147	1.03	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03
E58	3	3	14.703	76.1	55.7	1430	1.03	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03
E58	4	4	14.703	82.1	63.9	1642	1.03	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02
E58	5	5	14.703	86.7	69.5	1866	1.03	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02
E58	6	6	14.703	91.2	74.1	2094	1.03	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02
E58	7	7	14.703	94.2	75.6	2186	1.03	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02
E58	8	8	14.703	94.1	75.8	1991	1.03	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02
E58	9	9	14.703	90.1	72.8	1687	1.03	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02
E58	10	10	14.703	83.9	64.1	1416	1.03	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02
E58	11	11	14.703	75.1	54.9	1043	1.03	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03
E58	12	12	14.703	69.3	48.8	845	1.03	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03
E59	1	1	14.703	66.5	46.1	898	1.03	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03
E59	2	2	14.703	69.9	48.7	1147	1.03	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03
E59	3	3	14.703	76.1	55.7	1430	1.03	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03
E59	4	4	14.703	82.1	63.9	1642	1.03	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02
E59	5	5	14.703	86.7	69.5	1866	1.03	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02
E59	6	6	14.703	91.2	74.1	2094	1.03	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02
E59	7	7	14.703	94.2	75.6	2186	1.03	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02
E59	8	8	14.703	94.1	75.8	1991	1.03	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02
E59	9	9	14.703	90.1	72.8	1687	1.03	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02
E59	10	10	14.703	83.9	64.1	1416	1.03	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02
E59	11	11	14.703	75.1	54.9	1043	1.03	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03
E59	12	12	14.703	69.3	48.8	845	1.03	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03
E62	1	1	14.703	66.5	46.1	898	1.08	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04
E62	2	2	14.703	69.9	48.7	1147	1.08	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03
E62	3	3	14.703	76.1	55.7	1430	1.08	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03
E62	4	4	14.703	82.1	63.9	1642	1.08	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03
E62	5	5	14.703	86.7	69.5	1866	1.08	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03
E62	6	6	14.703	91.2	74.1	2094	1.08	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03
E62	7	7	14.703	94.2	75.6	2186	1.08	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03
E62	8	8	14.703	94.1	75.8	1991	1.08	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03
E62	9	9	14.703	90.1	72.8	1687	1.08	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03
E62	10	10	14.703	83.9	64.1	1416	1.08	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03

Fixed Roof Tank Emissions Calculation (continued)

Tank ID	Month	P_{VX} (psia)	P_{VN} (psia)	ΔP_V (psia)	V_V (ft^3)	W_V (lb/ft³)	K_E (unitless)	K_S (unitless)	L_S (ton/ month)	L_S (lb/hr)	Turnovers (unitless)	K_N (unitless)	L_W (ton/ month)	L_{WMAX} (lb/day)	L_{WMAXH} (lb/hr)	L_{TMAX} (lb/hr)	L_T (ton/ month)
E54	6	4.97E-03	3.04E-03	1.93E-03	7.05	4.13E-05	0.037	1.000	1.61E-07	4.46E-07	0.8	1.00	9.48E-07	2.42E-03	4.48E-04	4.48E-04	1.11E-06
E54	7	5.30E-03	3.15E-03	2.15E-03	7.05	4.32E-05	0.039	1.000	1.87E-07	5.02E-07	0.8	1.00	1.03E-06	2.66E-03	4.78E-04	4.78E-04	1.22E-06
E54	8	5.18E-03	3.15E-03	2.03E-03	7.05	4.28E-05	0.037	1.000	1.75E-07	4.70E-07	0.8	1.00	1.02E-06	2.60E-03	4.67E-04	4.67E-04	1.19E-06
E54	9	4.66E-03	2.96E-03	1.70E-03	7.05	3.94E-05	0.034	1.000	1.40E-07	3.89E-07	0.8	1.00	9.04E-07	2.26E-03	4.20E-04	4.20E-04	1.04E-06
E54	10	3.99E-03	2.49E-03	1.50E-03	7.05	3.37E-05	0.035	1.000	1.28E-07	3.45E-07	0.8	1.00	7.94E-07	2.01E-03	3.60E-04	3.60E-04	9.22E-07
E54	11	3.22E-03	2.06E-03	1.16E-03	7.05	2.78E-05	0.032	1.000	9.49E-08	2.64E-07	0.8	1.00	6.28E-07	1.57E-03	2.91E-04	2.91E-04	7.23E-07
E54	12	2.81E-03	1.82E-03	9.89E-04	7.05	2.45E-05	0.031	1.000	8.32E-08	2.24E-07	0.8	1.00	5.68E-07	1.41E-03	2.53E-04	2.53E-04	6.52E-07
E55	1	2.67E-03	1.72E-03	9.52E-04	7.05	2.33E-05	0.032	1.000	8.02E-08	2.16E-07	0.8	1.00	5.39E-07	1.34E-03	2.41E-04	2.41E-04	6.19E-07
E55	2	2.94E-03	1.82E-03	1.12E-03	7.05	2.51E-05	0.035	1.000	8.58E-08	2.55E-07	0.8	1.00	5.26E-07	1.33E-03	2.65E-04	2.65E-04	6.12E-07
E55	3	3.43E-03	2.11E-03	1.33E-03	7.05	2.89E-05	0.036	1.000	1.14E-07	3.05E-07	0.8	1.00	6.77E-07	1.72E-03	3.09E-04	3.09E-04	7.90E-07
E55	4	3.97E-03	2.48E-03	1.49E-03	7.05	3.35E-05	0.035	1.000	1.23E-07	3.41E-07	0.8	1.00	7.64E-07	1.93E-03	3.58E-04	3.58E-04	8.87E-07
E55	5	4.45E-03	2.77E-03	1.68E-03	7.05	3.74E-05	0.035	1.000	1.43E-07	3.86E-07	0.8	1.00	8.84E-07	2.23E-03	4.01E-04	4.01E-04	1.03E-06
E55	6	4.97E-03	3.04E-03	1.93E-03	7.05	4.13E-05	0.037	1.000	1.61E-07	4.46E-07	0.8	1.00	9.48E-07	2.42E-03	4.48E-04	4.48E-04	1.11E-06
E55	7	5.30E-03	3.15E-03	2.15E-03	7.05	4.32E-05	0.039	1.000	1.87E-07	5.02E-07	0.8	1.00	1.03E-06	2.66E-03	4.78E-04	4.78E-04	1.22E-06
E55	8	5.18E-03	3.15E-03	2.03E-03	7.05	4.28E-05	0.037	1.000	1.75E-07	4.70E-07	0.8	1.00	1.02E-06	2.60E-03	4.67E-04	4.67E-04	1.19E-06
E55	9	4.66E-03	2.96E-03	1.70E-03	7.05	3.94E-05	0.034	1.000	1.40E-07	3.89E-07	0.8	1.00	9.04E-07	2.26E-03	4.20E-04	4.20E-04	1.04E-06
E55	10	3.99E-03	2.49E-03	1.50E-03	7.05	3.37E-05	0.035	1.000	1.28E-07	3.45E-07	0.8	1.00	7.94E-07	2.01E-03	3.60E-04	3.60E-04	9.22E-07
E55	11	3.22E-03	2.06E-03	1.16E-03	7.05	2.78E-05	0.032	1.000	9.49E-08	2.64E-07	0.8	1.00	6.28E-07	1.57E-03	2.91E-04	2.91E-04	7.23E-07
E55	12	2.81E-03	1.82E-03	9.89E-04	7.05	2.45E-05	0.031	1.000	8.32E-08	2.24E-07	0.8	1.00	5.68E-07	1.41E-03	2.53E-04	2.53E-04	6.52E-07
E56	1	1.20E-02	8.15E-03	3.80E-03	17.35	1.01E-04	0.029	0.999	7.97E-07	2.14E-06	0.8	1.00	5.59E-06	1.35E-02	2.31E-03	2.31E-03	6.38E-06
E56	2	1.30E-02	8.57E-03	4.41E-03	17.35	1.07E-04	0.033	0.999	8.46E-07	2.52E-06	0.8	1.00	5.39E-06	1.32E-02	2.51E-03	2.51E-03	6.24E-06
E56	3	1.49E-02	9.72E-03	5.15E-03	17.35	1.21E-04	0.034	0.999	1.10E-06	2.96E-06	0.8	1.00	6.81E-06	1.68E-02	2.87E-03	2.87E-03	7.91E-06
E56	4	1.69E-02	1.12E-02	5.66E-03	17.35	1.38E-04	0.033	0.999	1.17E-06	3.24E-06	0.8	1.00	7.53E-06	1.84E-02	3.26E-03	3.26E-03	8.70E-06
E56	5	1.86E-02	1.24E-02	6.29E-03	17.35	1.52E-04	0.033	0.999	1.35E-06	3.62E-06	0.8	1.00	8.59E-06	2.11E-02	3.60E-03	3.60E-03	9.94E-06
E56	6	2.05E-02	1.34E-02	7.14E-03	17.35	1.65E-04	0.035	0.999	1.49E-06	4.13E-06	0.8	1.00	9.09E-06	2.25E-02	3.97E-03	3.97E-03	1.06E-05
E56	7	2.17E-02	1.38E-02	7.93E-03	17.35	1.72E-04	0.037	0.999	1.72E-06	4.63E-06	0.8	1.00	9.80E-06	2.45E-02	4.19E-03	4.19E-03	1.15E-05
E56	8	2.13E-02	1.38E-02	7.49E-03	17.35	1.70E-04	0.035	0.999	1.62E-06	4.34E-06	0.8	1.00	9.71E-06	2.41E-02	4.11E-03	4.11E-03	1.13E-05
E56	9	1.94E-02	1.31E-02	6.32E-03	17.35	1.59E-04	0.032	0.999	1.30E-06	3.62E-06	0.8	1.00	8.72E-06	2.12E-02	3.75E-03	3.75E-03	1.00E-05
E56	10	1.70E-02	1.13E-02	5.71E-03	17.35	1.39E-04	0.033	0.999	1.22E-06	3.27E-06	0.8	1.00	7.82E-06	1.92E-02	3.28E-03	3.28E-03	9.04E-06
E56	11	1.41E-02	9.55E-03	4.52E-03	17.35	1.17E-04	0.030	0.999	9.23E-07	2.56E-06	0.8	1.00	6.35E-06	1.54E-02	2.72E-03	2.72E-03	7.27E-06
E56	12	1.25E-02	8.56E-03	3.92E-03	17.35	1.05E-04	0.029	0.999	8.22E-07	2.21E-06	0.8	1.00	5.85E-06	1.41E-02	2.41E-03	2.41E-03	6.67E-06
E57	1	1.20E-02	8.15E-03	3.80E-03	17.35	1.01E-04	0.029	0.999	7.97E-07	2.14E-06	0.8	1.00	5.59E-06	1.35E-02	2.31E-03	2.31E-03	6.38E-06
E57	2	1.30E-02	8.57E-03	4.41E-03	17.35	1.07E-04	0.033	0.999	8.46E-07	2.52E-06	0.8	1.00	5.39E-06	1.32E-02	2.51E-03	2.51E-03	6.24E-06
E57	3	1.49E-02	9.72E-03	5.15E-03	17.35	1.21E-04	0.034	0.999	1.10E-06	2.96E-06	0.8	1.00	6.81E-06	1.68E-02	2.87E-03	2.87E-03	7.91E-06
E57	4	1.69E-02	1.12E-02	5.66E-03	17.35	1.38E-04	0.033	0.999	1.17E-06	3.24E-06	0.8	1.00	7.53E-06	1.84E-02	3.26E-03	3.26E-03	8.70E-06
E57	5	1.86E-02	1.24E-02	6.29E-03	17.35	1.52E-04	0.033	0.999	1.35E-06	3.62E-06	0.8	1.00	8.59E-06	2.11E-02	3.60E-03	3.60E-03	9.94E-06
E57	6	2.05E-02	1.34E-02	7.14E-03	17.35	1.65E-04	0.035	0.999	1.49E-06	4.13E-06	0.8	1.00	9.09E-06	2.25E-02	3.97E-03	3.97E-03	1.06E-05
E57	7	2.17E-02	1.38E-02	7.93E-03	17.35	1.72E-04	0.037	0.999	1.72E-06	4.63E-06	0.8	1.00	9.80E-06	2.45E-02	4.19E-03	4.19E-03	1.15E-05
E57	8	2.13E-02	1.38E-02	7.49E-03	17.35	1.70E-04	0.035	0.999	1.62E-06	4.34E-06	0.8	1.00	9.71E-06	2.41E-02	4.11E-03	4.11E-03	1.13E-05
E57	9	1.94E-02	1.31E-02	6.32E-03	17.35	1.59E-04	0.032	0.999	1.30E-06	3.62E-06	0.8	1.00	8.72E-06	2.12E-02	3.75E-03	3.75E-03	1.00E-05
E57	10	1.70E-02	1.13E-02	5.71E-03	17.35	1.39E-04	0.033	0.999	1.22E-06	3.27E-06	0.8	1.00	7.82E-06	1.92E-02	3.28E-03	3.28E-03	9.04E-06
E57	11	1.41E-02	9.55E-03	4.52E-03	17.35	1.17E-04	0.030	0.999	9.23E-07	2.56E-06	0.8	1.00	6.35E-06	1.54E-02	2.72E-03	2.72E-03	7.27E-06
E57	12	1.25E-02	8.56E-03	3.92E-03	17.35	1.05E-04	0.029	0.999	8.22E-07	2.21E-06	0.8	1.00	5.85E-06	1.41E-02	2.41E-03	2.41E-03	6.67E-06
E58	1	9.77E-03	6.62E-03	3.16E-03	8.74	8.26E-05	0.030	1.000	3.33E-07	8.94E-07	0.8	1.00	1.01E-06	2.45E-03	8.81E-04	8.81E-04	1.34E-06
E58	2	1.06E-02	6.96E-03	3.67E-03	8.74	8.81E-05	0.033	1.000	3.54E-07	1.05E-06	0.8	1.00	9.77E-07	2.41E-03	9.58E-04	9.58E-04	1.33E-06
E58	3	1.22E-02	7.91E-03	4.30E-03	8.74	1.00E-04	0.034	0.999	4.61E-07	1.24E-06	0.8	1.00	1.24E-06	3.06E-03	1.10E-03	1.10E-03	1.70E-06
E58	4	1.39E-02	9.15E-03	4.73E-03	8.74	1.14E-04	0.033	0.999	4.90E-07	1.36E-06	0.8	1.00	1.37E-06	3.37E-03	1.25E-03	1.25E-03	1.86E-06
E58	5	1.54E-02	1.01E-02	5.27E-03	8.74	1.26E-04	0.033	0.999	5.66E-07	1.52E-06	0.8	1.00	1.57E-06	3.86E-03	1.39E-03	1.39E-03	2.13E-06
E58	6	1.70E-02	1.10E-02	5.99E-03	8.74	1.37E-04	0.035	0.999	6.27E-07	1.74E-06	0.8	1.00	1.66E-06	4.12E-03	1.53E-03	1.53E-03	2.29E-06
E58	7	1.80E-02	1.13E-02	6.66E-03	8.74	1.43E-04	0.038	0.999	7.25E-07	1.95E-06	0.8	1.00	1.79E-06	4.51E-03	1.62E-03	1.62E-03	2.52E-06
E58	8	1.76E-02	1.13E-02	6.28E-03	8.74	1.42E-04	0.036	0.999	6.81E-07	1.83E-06	0.8	1.00	1.78E-06	4.42E-03	1.59E-03	1.59E-03	2.46E-06
E58	9	1.60E-02	1.07E-02	5.30E-03	8.74	1.32E-04	0.032	0.999	5.49E-07	1.52E-06	0.8	1.00	1.59E-06	3.89E-03	1.44E-03	1.44E-03	2.14E-06
E58	10	1.40E-02	9.19E-03	4.77E-03	8.74	1.15E-04	0.033	0.999	5.11E-07	1.37E-06	0.8	1.00	1.43E-06	3.51E-03	1.26E-03	1.26E-03	1.94E-06
E58	11	1.15E-02	7.78E-03	3.77E-03	8.74	9.67E-05	0.031	0.999	3.86E-07	1.07E-06	0.8	1.00	1.15E-06	2.80E-03	1.04E-03	1.04E-03	1.54E-06
E58	12	1.02E-02	6.95E-03	3.26E-03	8.74	8.64E-05	0.029	1.000	3.43E-07	9.23E-07	0.8	1.00	1.06E-06	2.56E-03	9.20E-04	9.20E-04	1.40E-06
E59	1	9.77E-03	6.62E-03	3.16E-03	8.74	8.26E-05	0.030	1.000	3.33E-07	8.94E-07	0.8	1.00	1.01E-06	2.45E-03	8.81E-04	8.81E-04	1.34E-06
E59	2	1.06E-02	6.96E-03	3.67E-03	8.74	8.81E-05	0.033	1.000	3.54E-07	1.05E-06	0.8	1.00	9.77E-07	2.41E-03	9.58E-04	9.58E-04	1.33E-06
E59	3	1.22E-02	7.91E-03	4.30E-03	8.74	1.00E-04	0.034	0.999	4.61E-07	1.24E-06	0.8	1.00	1.24E-06	3.06E-03	1.10E-03	1.10E-03	1.70E-06
E59	4	1.39E-02	9.15E-03	4.73E-03	8.74	1.14E-04	0.033	0.999	4.90E-07	1.36E-06	0.8	1.00	1.37E-06	3.37E-03	1.25E-03	1.25E-03	1.86E-06
E59	5	1.54E-02	1.01E-02	5.27E-03	8.74	1.26E-04	0.033	0.999	5.66E-07	1.52E-06	0.8	1.00	1.57E-06	3.86E-03	1.39E-03	1.39E-03	2.13E-06
E59	6	1.70E-02	1.10E-02	5.99E-03	8.74	1.37E-04	0.035	0.999	6.27E-07	1.74E-06	0.8	1.00	1.66E-06	4.12E-03	1.53E-03	1.53E-03	2.29E-06
E59	7	1.80E-02	1.13E-02	6.66E-03	8.74	1.43E-04	0.038	0.999	7.25E-07	1.95E-06	0.8	1.00	1.79E-06	4.51E-03	1.62E-03	1.62E-03	2.52E-06
E59	8	1.76E-02	1.13E-02	6.28E-03	8.74	1.42E-04	0.036	0.999	6.81E-07	1.83E-06	0.8	1.00	1.78E-06	4.42E-03	1.59E-03	1.59E-03	2.46E-06
E59	9	1.60E-02	1.07E-02	5.30E-03	8.74	1.32E-04	0.032	0.999	5.49E-07	1.52E-06	0.8	1.00	1.59E-06	3.89E-03	1.44E-03	1.44E-03	2.14E-06
E59	10	1.40E-02	9.19E-03	4.77E-03	8.74	1.15E-04	0.033	0.999	5.11E-07	1.37E-06	0.8	1.00	1.43E-06	3.51E-03	1.26E-03	1.26E-03	1.94E-06
E59	11	1.15E-02	7.78E-03	3.77E-03	8.74	9.67E-05	0.031	0.999	3.86E-07	1.07E-06	0.8	1.00	1.15E-06	2.80E-03	1.04E-03	1.04E-03	1.54E-06
E59	12	1.02E-02	6.95E-03	3.26E-03	8.74	8.64E-05	0.029	1.000	3.43E-07	9.23E-07	0.8	1.00	1.06E-06	2.56E-03	9.20E-04	9.20E-04	1.40E-06
E62	1	1.22E-03	7.61E-04	4.59E-04	52.66	1.08E-05	0.033	1.000	2.88E-07	7.73E-07	31.0	1.00	9.96E-05	2.52E-01	8.12E-03	8.12E-03	9.98E-05
E62	2	1.46E-03	8.81E-04	5.84E-04	52.66	1.27E-05	0.036	1.000	3.34E-07	9.93E-07	28.0	1.00	1.06E-04	2.73E-01	9.74E-03	9.74E-03	1.06E-04
E62	3	2.06E-03	1.23E-03	8.25E-04	52.66	1.75E-05	0.037	1.000	5.25E-07	1.41E-06	31.0	1.00	1.65E-04	4.24E-01	1.37E-02	1.37E-02	1.65E-04
E62	4	2.87E-03	1.77E-03	1.10E-03	52.66	2.44E-05	0.035	1.000	6.77E-07	1.88E-06	30.0	1.00	2.25E-04	5.72E-01	1.91E-02	1.91E-02	2.26E-04
E62	5	3.67E-03	2.27E-03	1.40E-03	52.66	3.09E-05	0.035	1.000	8.93E-07	2.40E-06	31.0	1.00	2.98E-04	7.56E-01	2.44E-02	2.44E-02	2.99E-04
E62	6	4.59E-03	2.80E-03	1.79E-03	52.66	3.81E-05	0.037	1.000	1.11E-06	3.09E-06	30.0	1.00	3.58E-04	9.15E-01	3.05E-02	3.05E-02	3.60E-04
E62	7	5.16E-03	3.06E-03	2.10E-03	52.66	4.21E-05	0.040	1.000	1.36E-06	3.65E-06	31.0	1.00	4.11E-04	1.06E+00	3.44E-02	3.44E-02	4.13E-04
E62	8	5.06E-03	3.07E-03	1.98E-03	52.66	4.18E-05	0.037	1.000	1.28E-06	3.43E-06	31.0	1.00	4.07E-04	1.04E+00	3.36E-02	3.36E-02	4.09E-04
E62	9	4.17E-03	2.64E-03	1.53E-03	52.66	3.54E-05	0.034	1.000	9.42E-07	2.62E-06	30.0	1.00	3.32E-04	8.32E-01	2.77E-02	2.77E-02	3.33E-04
E62	10	2.96E-03	1.83E-03	1.14E-03	52.66	2.52E-05	0.035	1.000	7.23E-07	1.94E-06	31.0	1.00	2.40E-04	6.11E-01	1.97E-02	1.97E-02	2.41E-04

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Emissions from Fixed Roof Tanks

Reference: AP-42, Fifth Edition, Volume 1, Chapter 71 Liquid Storage Tanks - January 1995
Reference: TCEQ Technical Guidance - Storage Tanks - February 2001

Total Losses from a Fixed Roof Tank (Equation 1-1):

$L_T = L_S + L_W$

where: L_T = total losses
L_S = standing storage losses
L_W = working losses

Standing Losses from a Fixed Roof Tank (Equation 1-2):

$L_S = D\, V_V\, W_V\, K_E\, K_S$

where: L_S = standing storage losses
D = days
V_V = vapor space volume = $(\pi/4) * D^2 * H_{VO}$ (Equation 1-3)
D = tank diameter
H_{VO} = vapor space outage
W_V = vapor density = $(M_V P_{VA}) / (R\, T_{LA})$ (Equation 1-21)
M_V = vapor molecular weight
R = ideal gas constant = 10.731 (psia ft^3)/(lb-mole °R)
P_{VA} = vapor pressure at daily average liquid surface temperature
T_{LA} = daily average liquid surface temperature
K_E = vapor space expansion factor = $\Delta T_V / T_{LA} + (\Delta P_V - \Delta P_B) / (P_A - P_{VA})$ (Equation 1-7)
ΔT_V = daily vapor temperature range = $0.72 * \Delta TA + (0.028 * \alpha * I)$ (Equation (1-8)
ΔT_A = daily ambient temperature range = $T_{AX} - T_{AN}$ (Equation 1-12)
α = tank taint solar absorptance (Table 7.1-6)
I = daily total solar insolation factor (Table 7.1-7)

K_E continued

TLA = daily average liquid surface temperature = 0.44 TAA + 0.56 TB + 0.0079 a I (Equation 1-26)
T_{AA} = daily average ambient temperature = $(T_{AX} + T_{AN}) / 2$
T_{AX} = daily maximum ambient temperature (Table 7.1-7)
T_{AN} = daily minimum ambient temperature (Table 7.1-7)
$T_B = T_{AA} + 6\,\alpha - 1)$
ΔP_V = daily vapor pressure range = $P_{VX} - P_{VN}$ (Equation 1-9)
P_{VX} = vapor pressure at daily maximum liquid surface temperature (T_{LX}) $T_{LX} = T_{LA} + 0.25 * \Delta T_V$ (Figure 7.1-17)
P_{VN} = vapor pressure at daily minimum liquid surface temperature (T_{LN}) $T_{LN} = T_{LA} - 0.25 * \Delta T_V$ (Figure 7.1-17)
ΔP_B = breather vent pressure setting range = $P_{BP} - P_{BV}$
P_{BP} = breather vent pressure setting
P_{BV} = breather vent vacuum setting
P_A = atmospheric pressure
P_{VA} = vapor pressure at daily average liquid surface temperature (T_{LA})
K_S = vented vapor saturation factor = $1 / (1 + (0.053 * P_{VA} * H_{VO}))$ (Equation 1-20)

Working Losses from a Fixed Roof Tank (Equation 1-29):

$L_W = (0.001)\,(M_V)\,(P_{VA})\,(Q)\,(K_N)\,(K_P)$

where: L_W = working losses
M_V = vapor molecular weight
P_{VA} = vapor pressure at daily average liquid surface temperature
Q = annual net throughput
K_N = working loss turnover factor
For turnovers (N) >36 = (180 + N) / 6 N
For turnovers (N) <=36 = 1
K_P = working loss product factor
For crude oils = 0.75
For all other organic liquids = 1

Maximum Short-Term Working Losses calculated according to the TCEQ Guidance Document:

$L_{MAX} = (L_W\, FR_M) / (N\, T_{CG})$

where: L_{MAX} = maximum short term emission rate
L_W = working losses from AP-42 at maximum liquid surface temperature (P_{VAM})
P_{VAM} = true vapor pressure at daily maximum liquid surface temperature
L_{MAX} assumes a K_N value of 1, per TCEQ guidance document
FR_m = maximum filling rate
N = turnovers per day
TCg = tank working capacity

Data to be Entered for Calculation:						Data Looked Up on Tank Data Sheet:								Data Looked Up on Product Data Sheet:						
Tank ID	Month	Days per Month	Product	Product Temperature (°F)	Q (barrels/ mnth)	D or D_{eff} (ft)	Tank capacity (gal)	α (unitless)	FR_{max} (gal/hr)	Shell Height (ft)	Maximum Liquid Height (ft)	P_{BP} (psig)	P_{BV} (psig)	Product Type	M_v (lb/lb-mol)	Benzene Content (%)	Antoine Constant A	Antoine Constant B	Antoine Constant C	K_P (unitless)
E62	11	30	Ethylene Glycol	ambient	3214.286	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E62	12	31	Ethylene Glycol	ambient	3321.429	7.872	4,500	0.17	4500	12.14	11.14	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	1	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	2	28	Ethylene Glycol	140	301.3699	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	3	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	4	30	Ethylene Glycol	140	322.8963	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	5	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	6	30	Ethylene Glycol	140	322.8963	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	7	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	8	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	9	30	Ethylene Glycol	140	322.8963	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	10	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	11	30	Ethylene Glycol	140	322.8963	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E63	12	31	Ethylene Glycol	140	333.6595	12.464	16,500	0.17	914.6341	18.04	17.04	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	1	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	2	28	Ethylene Glycol	ambient	14.61187	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	3	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	4	30	Ethylene Glycol	ambient	15.65558	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	5	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	6	30	Ethylene Glycol	ambient	15.65558	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	7	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	8	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	9	30	Ethylene Glycol	ambient	15.65558	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	10	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	11	30	Ethylene Glycol	ambient	15.65558	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E64	12	31	Ethylene Glycol	ambient	16.17743	4.92	800	0.17	143.472	5.58	4.58	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	1	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	2	28	Ethylene Glycol	ambient	1930.594	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	3	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	4	30	Ethylene Glycol	ambient	2068.493	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	5	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	6	30	Ethylene Glycol	ambient	2068.493	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	7	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	8	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	9	30	Ethylene Glycol	ambient	2068.493	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	10	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	11	30	Ethylene Glycol	ambient	2068.493	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E65	12	31	Ethylene Glycol	ambient	2137.443	22.96	105,700	0.17	3098.616	34.11	33.11	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E66	1	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	2	28	Diethylene Glycol	ambient	37333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	3	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	4	30	Diethylene Glycol	ambient	40000	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	5	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	6	30	Diethylene Glycol	ambient	40000	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	7	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	8	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	9	30	Diethylene Glycol	ambient	40000	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	10	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	11	30	Diethylene Glycol	ambient	40000	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E66	12	31	Diethylene Glycol	ambient	41333.33	19.68	56,000	0.17	8000	24.60	23.60	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00
E67	1	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	2	28	Ethylene Glycol	122	639.2694	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	3	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	4	30	Ethylene Glycol	122	684.9315	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	5	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	6	30	Ethylene Glycol	122	684.9315	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	7	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	8	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	9	30	Ethylene Glycol	122	684.9315	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	10	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	11	30	Ethylene Glycol	122	684.9315	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E67	12	31	Ethylene Glycol	122	707.7626	17.384	35,000	0.17	1778.455	19.68	18.68	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	1	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	2	28	Ethylene Glycol	104	5.479452	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	3	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	4	30	Ethylene Glycol	104	5.870841	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	5	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	6	30	Ethylene Glycol	104	5.870841	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	7	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	8	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	9	30	Ethylene Glycol	104	5.870841	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	10	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	11	30	Ethylene Glycol	104	5.870841	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E68	12	31	Ethylene Glycol	104	6.066536	3.28	300	0.17	76.21951	3.94	2.94	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E69	1	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00
E69	2	28	Ethylene Glycol	ambient	2133.333	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00

		Data Looked Up on Met Data Sheet:					Fixed Roof Tank Emissions Calculation																									
Tank ID	Month	Month for Met Data	Pa (psia)	T_{AX} (°F)	T_{AN} (°F)	I (Btu/ft²)	H_{VO} (ft)	T_{AA} (°R)	T_B (°R)	T_{LA} (°R)	ΔT_A (°R)	ΔP_B (psia)	ΔTv (°R)	T_{LX} (°R)	T_{LN} (°R)	P_{VA} (psia)	P_{VX} (psia)	P_{VN} (psia)	ΔP_V (psia)	V_V (ft^3)	W_V (lb/ft³)	K_E (unitless)	K_S (unitless)	L_S (ton/ month)	L_S (lb/hr)	Turnovers (unitless)	K_N (unitless)	L_W (ton/ month)	L_{WMAX} (lb/day)	L_{WMAXH} (lb/hr)	L_{TMAX} (lb/hr)	L_T (ton/ month)
E62	11	11	14.703	75.1	54.9	1043	1.08	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	52.66	1.64E-05	0.033	1.000	4.28E-07	1.19E-06	30.0	1.00	1.49E-04	3.75E-01	1.25E-02	1.25E-02	1.49E-04
E62	12	12	14.703	69.3	48.8	845	1.08	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	52.66	1.23E-05	0.032	1.000	3.21E-07	8.64E-07	31.0	1.00	1.14E-04	2.86E-01	9.22E-03	9.22E-03	1.14E-04
E63	1	1	14.703	66.5	46.1	898	1.13	516.0	599.7	564.0	20.4	0.06	19.0	568.8	559.3	8.05E-03	9.77E-03	6.62E-03	3.16E-03	137.85	8.26E-05	0.030	1.000	5.25E-06	1.41E-05	0.8	1.00	8.34E-05	2.02E-01	1.32E-02	1.32E-02	8.87E-05
E63	2	2	14.703	69.9	48.7	1147	1.13	519.0	599.7	565.7	21.2	0.06	20.7	570.9	560.5	8.62E-03	1.06E-02	6.96E-03	3.67E-03	137.85	8.81E-05	0.033	0.999	5.58E-06	1.66E-05	0.8	1.00	8.06E-05	1.99E-01	1.44E-02	1.44E-02	8.62E-05
E63	3	3	14.703	76.1	55.7	1430	1.13	525.6	599.7	569.0	20.4	0.06	21.5	574.4	563.6	9.85E-03	1.22E-02	7.91E-03	4.30E-03	137.85	1.00E-04	0.034	0.999	7.27E-06	1.95E-05	0.8	1.00	1.02E-04	2.53E-01	1.65E-02	1.65E-02	1.09E-04
E63	4	4	14.703	82.1	63.9	1642	1.13	532.7	599.7	572.4	18.2	0.06	20.9	577.6	567.2	1.13E-02	1.39E-02	9.15E-03	4.73E-03	137.85	1.14E-04	0.033	0.999	7.73E-06	2.15E-05	0.8	1.00	1.13E-04	2.78E-01	1.88E-02	1.88E-02	1.21E-04
E63	5	5	14.703	86.7	69.5	1866	1.13	537.8	599.7	574.9	17.2	0.06	21.3	580.3	569.6	1.25E-02	1.54E-02	1.01E-02	5.27E-03	137.85	1.26E-04	0.033	0.999	8.92E-06	2.40E-05	0.8	1.00	1.29E-04	3.18E-01	2.08E-02	2.08E-02	1.38E-04
E63	6	6	14.703	91.2	74.1	2094	1.13	542.3	599.7	577.2	17.1	0.06	22.3	582.8	571.7	1.37E-02	1.70E-02	1.10E-02	5.99E-03	137.85	1.37E-04	0.035	0.999	9.89E-06	2.75E-05	0.8	1.00	1.37E-04	3.40E-01	2.29E-02	2.29E-02	1.47E-04
E63	7	7	14.703	94.2	75.6	2186	1.13	544.6	599.7	578.4	18.6	0.06	23.8	584.3	572.4	1.43E-02	1.80E-02	1.13E-02	6.66E-03	137.85	1.43E-04	0.038	0.999	1.14E-05	3.08E-05	0.8	1.00	1.48E-04	3.72E-01	2.43E-02	2.43E-02	1.59E-04
E63	8	8	14.703	94.1	75.8	1991	1.13	544.6	599.7	578.1	18.3	0.06	22.7	583.8	572.5	1.42E-02	1.76E-02	1.13E-02	6.28E-03	137.85	1.42E-04	0.036	0.999	1.07E-05	2.89E-05	0.8	1.00	1.47E-04	3.65E-01	2.38E-02	2.38E-02	1.57E-04
E63	9	9	14.703	90.1	72.8	1687	1.13	541.1	599.7	576.2	17.3	0.06	20.5	581.3	571.1	1.31E-02	1.60E-02	1.07E-02	5.30E-03	137.85	1.32E-04	0.032	0.999	8.66E-06	2.40E-05	0.8	1.00	1.31E-04	3.21E-01	2.16E-02	2.16E-02	1.40E-04
E63	10	10	14.703	83.9	64.1	1416	1.13	533.7	599.7	572.5	19.8	0.06	21.0	577.8	567.3	1.14E-02	1.40E-02	9.19E-03	4.77E-03	137.85	1.15E-04	0.033	0.999	8.06E-06	2.17E-05	0.8	1.00	1.18E-04	2.89E-01	1.89E-02	1.89E-02	1.26E-04
E63	11	11	14.703	75.1	54.9	1043	1.13	524.7	599.7	568.1	20.2	0.06	19.5	572.9	563.2	9.49E-03	1.15E-02	7.78E-03	3.77E-03	137.85	9.67E-05	0.031	0.999	6.10E-06	1.69E-05	0.8	1.00	9.51E-05	2.31E-01	1.56E-02	1.56E-02	1.01E-04
E63	12	12	14.703	69.3	48.8	845	1.13	518.7	599.7	565.2	20.5	0.06	18.8	569.9	560.5	8.44E-03	1.02E-02	6.95E-03	3.26E-03	137.85	8.64E-05	0.029	0.999	5.42E-06	1.46E-05	0.8	1.00	8.74E-05	2.11E-01	1.38E-02	1.38E-02	9.28E-05
E64	1	1	14.703	66.5	46.1	898	1.05	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04	1.22E-03	7.61E-04	4.59E-04	19.99	1.08E-05	0.033	1.000	1.09E-07	2.93E-07	0.8	1.00	4.85E-07	1.23E-03	2.59E-04	2.59E-04	5.94E-07
E64	2	2	14.703	69.9	48.7	1147	1.05	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03	1.46E-03	8.81E-04	5.84E-04	19.99	1.27E-05	0.036	1.000	1.27E-07	3.77E-07	0.8	1.00	5.16E-07	1.33E-03	3.11E-04	3.11E-04	6.43E-07
E64	3	3	14.703	76.1	55.7	1430	1.05	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03	2.06E-03	1.23E-03	8.25E-04	19.99	1.75E-05	0.037	1.000	1.99E-07	5.35E-07	0.8	1.00	8.02E-07	2.07E-03	4.36E-04	4.36E-04	1.00E-06
E64	4	4	14.703	82.1	63.9	1642	1.05	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03	2.87E-03	1.77E-03	1.10E-03	19.99	2.44E-05	0.035	1.000	2.57E-07	7.14E-07	0.8	1.00	1.10E-06	2.79E-03	6.08E-04	6.08E-04	1.35E-06
E64	5	5	14.703	86.7	69.5	1866	1.05	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03	3.67E-03	2.27E-03	1.40E-03	19.99	3.09E-05	0.035	1.000	3.39E-07	9.12E-07	0.8	1.00	1.45E-06	3.68E-03	7.78E-04	7.78E-04	1.79E-06
E64	6	6	14.703	91.2	74.1	2094	1.05	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03	4.59E-03	2.80E-03	1.79E-03	19.99	3.81E-05	0.037	1.000	4.22E-07	1.17E-06	0.8	1.00	1.75E-06	4.46E-03	9.73E-04	9.73E-04	2.17E-06
E64	7	7	14.703	94.2	75.6	2186	1.05	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03	5.16E-03	3.06E-03	2.10E-03	19.99	4.21E-05	0.040	1.000	5.16E-07	1.39E-06	0.8	1.00	2.00E-06	5.19E-03	1.10E-03	1.10E-03	2.52E-06
E64	8	8	14.703	94.1	75.8	1991	1.05	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03	5.06E-03	3.07E-03	1.98E-03	19.99	4.18E-05	0.037	1.000	4.84E-07	1.30E-06	0.8	1.00	1.98E-06	5.08E-03	1.07E-03	1.07E-03	2.47E-06
E64	9	9	14.703	90.1	72.8	1687	1.05	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03	4.17E-03	2.64E-03	1.53E-03	19.99	3.54E-05	0.034	1.000	3.58E-07	9.94E-07	0.8	1.00	1.62E-06	4.05E-03	8.84E-04	8.84E-04	1.97E-06
E64	10	10	14.703	83.9	64.1	1416	1.05	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03	2.96E-03	1.83E-03	1.14E-03	19.99	2.52E-05	0.035	1.000	2.75E-07	7.38E-07	0.8	1.00	1.17E-06	2.97E-03	6.28E-04	6.28E-04	1.45E-06
E64	11	11	14.703	75.1	54.9	1043	1.05	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	19.99	1.64E-05	0.033	1.000	1.62E-07	4.51E-07	0.8	1.00	7.25E-07	1.83E-03	3.99E-04	3.99E-04	8.87E-07
E64	12	12	14.703	69.3	48.8	845	1.05	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	19.99	1.23E-05	0.032	1.000	1.22E-07	3.28E-07	0.8	1.00	5.54E-07	1.39E-03	2.94E-04	2.94E-04	6.76E-07
E65	1	1	14.703	66.5	46.1	898	1.24	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04	1.22E-03	7.61E-04	4.59E-04	513.05	1.08E-05	0.033	1.000	2.80E-06	7.53E-06	0.8	1.00	6.41E-05	1.62E-01	5.59E-03	5.59E-03	6.69E-05
E65	2	2	14.703	69.9	48.7	1147	1.24	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03	1.46E-03	8.81E-04	5.84E-04	513.05	1.27E-05	0.036	1.000	3.25E-06	9.68E-06	0.8	1.00	6.82E-05	1.76E-01	6.71E-03	6.71E-03	7.15E-05
E65	3	3	14.703	76.1	55.7	1430	1.24	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03	2.06E-03	1.23E-03	8.25E-04	513.05	1.75E-05	0.037	1.000	5.11E-06	1.37E-05	0.8	1.00	1.06E-04	2.73E-01	9.42E-03	9.42E-03	1.11E-04
E65	4	4	14.703	82.1	63.9	1642	1.24	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03	2.87E-03	1.77E-03	1.10E-03	513.05	2.44E-05	0.035	1.000	6.60E-06	1.83E-05	0.8	1.00	1.45E-04	3.68E-01	1.31E-02	1.31E-02	1.52E-04
E65	5	5	14.703	86.7	69.5	1866	1.24	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03	3.67E-03	2.27E-03	1.40E-03	513.05	3.09E-05	0.035	1.000	8.70E-06	2.34E-05	0.8	1.00	1.92E-04	4.86E-01	1.68E-02	1.68E-02	2.00E-04
E65	6	6	14.703	91.2	74.1	2094	1.24	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03	4.59E-03	2.80E-03	1.79E-03	513.05	3.81E-05	0.037	1.000	1.08E-05	3.01E-05	0.8	1.00	2.31E-04	5.89E-01	2.10E-02	2.10E-02	2.41E-04
E65	7	7	14.703	94.2	75.6	2186	1.24	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03	5.16E-03	3.06E-03	2.10E-03	513.05	4.21E-05	0.040	1.000	1.32E-05	3.56E-05	0.8	1.00	2.65E-04	6.85E-01	2.37E-02	2.37E-02	2.78E-04
E65	8	8	14.703	94.1	75.8	1991	1.24	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03	5.06E-03	3.07E-03	1.98E-03	513.05	4.18E-05	0.037	1.000	1.24E-05	3.34E-05	0.8	1.00	2.62E-04	6.71E-01	2.32E-02	2.32E-02	2.75E-04
E65	9	9	14.703	90.1	72.8	1687	1.24	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03	4.17E-03	2.64E-03	1.53E-03	513.05	3.54E-05	0.034	1.000	9.18E-06	2.55E-05	0.8	1.00	2.13E-04	5.35E-01	1.91E-02	1.91E-02	2.23E-04
E65	10	10	14.703	83.9	64.1	1416	1.24	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03	2.96E-03	1.83E-03	1.14E-03	513.05	2.52E-05	0.035	1.000	7.05E-06	1.89E-05	0.8	1.00	1.55E-04	3.93E-01	1.36E-02	1.36E-02	1.62E-04
E65	11	11	14.703	75.1	54.9	1043	1.24	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	513.05	1.64E-05	0.033	1.000	4.17E-06	1.16E-05	0.8	1.00	9.58E-05	2.41E-01	8.61E-03	8.61E-03	9.99E-05
E65	12	12	14.703	69.3	48.8	845	1.24	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	513.05	1.23E-05	0.032	1.000	3.13E-06	8.41E-06	0.8	1.00	7.32E-05	1.84E-01	6.35E-03	6.35E-03	7.63E-05
E66	1	1	14.703	66.5	46.1	898	1.21	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	1.72E-05	2.43E-05	1.21E-05	1.22E-05	366.54	3.30E-07	0.033	1.000	6.10E-08	1.64E-07	31.0	1.00	3.78E-05	1.07E-01	4.91E-04	4.91E-04	3.79E-05
E66	2	2	14.703	69.9	48.7	1147	1.21	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	2.20E-05	3.17E-05	1.51E-05	1.66E-05	366.54	4.17E-07	0.036	1.000	7.65E-08	2.28E-07	28.0	1.00	4.35E-05	1.26E-01	6.40E-04	6.40E-04	4.36E-05
E66	3	3	14.703	76.1	55.7	1430	1.21	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	3.59E-05	5.17E-05	2.46E-05	2.71E-05	366.54	6.73E-07	0.037	1.000	1.40E-07	3.77E-07	31.0	1.00	7.87E-05	2.27E-01	1.05E-03	1.05E-03	7.88E-05
E66	4	4	14.703	82.1	63.9	1642	1.21	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	5.91E-05	8.31E-05	4.16E-05	4.15E-05	366.54	1.09E-06	0.035	1.000	2.10E-07	5.84E-07	30.0	1.00	1.25E-04	3.53E-01	1.68E-03	1.68E-03	1.26E-04
E66	5	5	14.703	86.7	69.5	1866	1.21	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	8.40E-05	1.18E-04	5.94E-05	5.81E-05	366.54	1.54E-06	0.035	1.000	3.08E-07	8.28E-07	31.0	1.00	1.84E-04	5.16E-01	2.38E-03	2.38E-03	1.85E-04
E66	6	6	14.703	91.2	74.1	2094	1.21	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	1.14E-04	1.61E-04	8.02E-05	8.07E-05	366.54	2.07E-06	0.037	1.000	4.19E-07	1.16E-06	30.0	1.00	2.42E-04	6.83E-01	3.25E-03	3.25E-03	2.43E-04
E66	7	7	14.703	94.2	75.6	2186	1.21	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	1.32E-04	1.90E-04	9.12E-05	9.87E-05	366.54	2.39E-06	0.039	1.000	5.35E-07	1.44E-06	31.0	1.00	2.90E-04	8.33E-01	3.84E-03	3.84E-03	2.91E-04
E66	8	8	14.703	94.1	75.8	1991	1.21	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	1.31E-04	1.84E-04	9.16E-05	9.27E-05	366.54	2.36E-06	0.037	1.000	5.00E-07	1.35E-06	31.0	1.00	2.86E-04	8.08E-01	3.73E-03	3.73E-03	2.87E-04
E66	9	9	14.703	90.1	72.8	1687	1.21	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	1.02E-04	1.41E-04	7.38E-05	6.70E-05	366.54	1.86E-06	0.034	1.000	3.44E-07	9.57E-07	30.0	1.00	2.17E-04	5.97E-01	2.85E-03	2.85E-03	2.18E-04
E66	10	10	14.703	83.9	64.1	1416	1.21	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	6.19E-05	8.70E-05	4.36E-05	4.34E-05	366.54	1.14E-06	0.035	1.000	2.28E-07	6.13E-07	31.0	1.00	1.36E-04	3.81E-01	1.76E-03	1.76E-03	1.36E-04
E66	11	11	14.703	75.1	54.9	1043	1.21	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	3.25E-05	4.54E-05	2.31E-05	2.24E-05	366.54	6.11E-07	0.033	1.000	1.11E-07	3.08E-07	30.0	1.00	6.90E-05	1.93E-01	9.19E-04	9.19E-04	6.91E-05
E66	12	12	14.703	69.3	48.8	845	1.21	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	2.09E-05	2.93E-05	1.49E-05	1.44E-05	366.54	3.99E-07	0.032	1.000	7.26E-08	1.95E-07	31.0	1.00	4.59E-05	1.28E-01	5.91E-04	5.91E-04	4.60E-05
E67	1	1	14.703	66.5	46.1	898	1.18	516.0	581.7	554.0	20.4	0.06	19.0	558.7	549.2	5.28E-03	6.45E-03	4.30E-03	2.15E-03	280.33	5.51E-05	0.030	1.000	7.25E-06	1.95E-05	0.8	1.00	1.16E-04	2.83E-01	1.70E-02	1.70E-02	1.23E-04
E67	2	2	14.703	69.9	48.7	1147	1.18	519.0	581.7	555.6	21.2	0.06	20.7	560.8	550.4	5.66E-03	7.04E-03	4.53E-03	2.51E-03	280.33	5.90E-05	0.033	1.000	7.72E-06	2.30E-05	0.8	1.00	1.12E-04	2.79E-01	1.85E-02	1.85E-02	1.20E-04
E67	3	3	14.703	76.1	55.7	1430	1.18	525.6	581.7	558.9	20.4	0.06	21.5	564.3	553.5	6.51E-03	8.13E-03	5.18E-03	2.95E-03	280.33	6.73E-05	0.035	1.000	1.01E-05	2.72E-05	0.8	1.00	1.43E-04	3.57E-01	2.14E-02	2.14E-02	1.53E-04
E67	4	4	14.703	82.1	63.9	1642	1.18	532.7	581.7	562.3	18.2	0.06	20.9	567.5	557.1	7.50E-03	9.29E-03	6.03E-03	3.27E-03	280.33	7.71E-05	0.033	1.000	1.08E-05	3.00E-05	0.8	1.00	1.59E-04	3.95E-01	2.44E-02	2.44E-02	1.70E-04
E67	5	5	14.703	86.7	69.5	1866	1.18	537.8	581.7	564.9	17.2	0.06	21.3	570.2	559.5	8.33E-03	1.03E-02	6.68E-03	3.65E-03	280.33	8.53E-05	0.034	0.999	1.25E-05	3.37E-05	0.8	1.00	1.83E-04	4.54E-01	2.72E-02	2.72E-02	1.95E-04
E67	6	6	14.703	91.2	74.1	2094	1.18	542.3	581.7	567.2	17.1	0.06	22.3	572.7	561.6	9.15E-03	1.14E-02	7.28E-03	4.17E-03	280.33	9.33E-05	0.035	0.999	1.39E-05	3.87E-05	0.8	1.00	1.95E-04	4.87E-01	3.01E-02	3.01E-02	2.08E-04
E67	7	7	14.703	94.2	75.6	2186	1.18	544.6	581.7	568.3	18.6	0.06	23.8	574.2	562.3	9.57E-03	1.21E-02	7.50E-03	4.64E-03	280.33	9.74E-05	0.038	0.999	1.61E-05	4.33E-05	0.8	1.00	2.10E-04	5.34E-01	3.19E-02	3.19E-02	2.26E-04
E67	8	8	14.703	94.1	75.8	1991	1.18	544.6	581.7	568.0	18.3	0.06	22.7	573.7	562.4	9.48E-03	1.19E-02	7.52E-03	4.38E-03	280.33	9.65E-05	0.036	0.999	1.51E-05	4.07E-05	0.8	1.00	2.08E-04	5.23E-01	3.13E-02	3.13E-02	2.23E-04
E67	9	9	14.703	90.1	72.8	1687	1.18	541.1	581.7	566.1	17.3	0.06	20.5	571.2	561.0	8.76E-03	1.08E-02	7.09E-03	3.68E-03	280.33	8.95E-05	0.032	0.999	1.22E-05	3.38E-05	0.8	1.00	1.86E-04	4.58E-01	2.83E-02	2.83E-02	1.98E-04
E67	10	10	14.703	83.9	64.1	1416	1.18	533.7	581.7	562.5	19.8	0.06	21.0	567.7	557.2	7.54E-03	9.35E-03	6.06E-03	3.30E-03	280.33	7.76E-05	0.033	1.000	1.13E-05	3.03E-05	0.8	1.00	1.66E-04	4.11E-01	2.46E-02	2.46E-02	1.77E-04
E67	11	11	14.703	75.1	54.9	1043	1.18	524.7	581.7	558.0	20.2	0.06	19.5	562.9	553.1	6.26E-03	7.67E-03	5.09E-03	2.59E-03	280.33	6.49E-05	0.031	1.000	8.47E-06	2.35E-05	0.8	1.00	1.33E-04	3.26E-01	2.02E-02	2.02E-02	1.42E-04
E67	12	12	14.703	69.3	48.8	845	1.18	518.7	581.7	555.1	20.5	0.06	18.8	559.8	550.4	5.54E-03	6.75E-03	4.53E-03	2.23E-03	280.33	5.77E-05	0.030	1.000	7.50E-06	2.02E-05	0.8	1.00	1.22E-04	2.97E-01	1.78E-02	1.78E-02	1.29E-04
E68	1	1	14.703	66.5	46.1	898	1.03	516.0	563.7	543.9	20.4	0.06	19.0	548.6	539.1	3.40E-03	4.19E-03	2.75E-03	1.44E-03	8.74	3.61E-05	0.031	1.000	1.51E-07	4.06E-07	0.8	1.00	6.40E-07	1.58E-03	4.72E-04	4.72E-04	7.91E-07
E68	2	2	14.703	69.9	48.7	1147	1.03	519.0	563.7	545.5	21.2	0.06	20.7	550.7	540.4	3.66E-03	4.59E-03	2.90E-03	1.69E-03	8.74	3.88E-05	0.034	1.000	1.61E-07	4.80E-07	0.8	1.00	6.22E-07	1.56E-03	5.17E-04	5.17E-04	7.83E-07
E68	3	3	14.703	76.1	55.7	1430	1.03	525.6	563.7	548.8	20.4	0.06	21.5	554.2	543.5	4.23E-03	5.33E-03	3.33E-03	2.00E-03	8.74	4.45E-05	0.035	1.000	2.12E-07	5.71E-07	0.8	1.00	7.95E-07	2.01E-03	6.00E-04	6.00E-04	1.01E-06
E68	4	4	14.703	82.1	63.9	1642	1.03	532.7	563.7	552.2	18.2	0.06	20.9	557.5	547.0	4.90E-03	6.12E-03	3.90E-03	2.22E-03	8.74	5.13E-05	0.034	1.000	2.28E-07	6.34E-07	0.8	1.00	8.93E-07	2.23E-03	6.90E-04	6.90E-04	1.12E-06
E68	5	5	14.703	86.7	69.5	1866	1.03	537.8	563.7	554.8	17.2	0.06	21.3	560.1	549.5	5.46E-03	6.84E-03	4.34E-03	2.49E-03	8.74	5.70E-05	0.034	1.000	2.65E-07	7.14E-07	0.8	1.00	1.03E-06	2.57E-03	7.70E-04	7.70E-04	1.29E-06
E68	6	6	14.703	91.2	74.1	2094	1.03	542.3	563.7	557.1	17.1	0.06	22.3	562.7	551.5	6.03E-03	7.61E-03	4.75E-03	2.86E-03	8.74	6.26E-05	0.036	1.000	2.96E-07	8.22E-07	0.8	1.00	1.10E-06	2.77E-03	8.57E-04	8.57E-04	1.39E-06
E68	7	7	14.703	94.2	75.6	2186	1.03	544.6	563.7	558.2	18.6	0.06	23.8	564.2	552.3	6.32E-03	8.09E-03	4.90E-03	3.19E-03	8.74	6.54E-05	0.039	1.000	3.44E-07	9.23E-07	0.8	1.00	1.19E-06	3.05E-03	9.11E-04	9.11E-04	1.53E-06
E68	8	8	14.703	94.1	75.8	1991	1.03	544.6	563.7	558.0	18.3	0.06	22.7	563.6	552.3	6.25E-03	7.92E-03	4.91E-03	3.00E-03	8.74	6.48E-05	0.037	1.000	3.22E-07	8.66E-07	0.8	1.00	1.18E-06	2.98E-03	8.92E-04	8.92E-04	1.50E-06
E68	9	9	14.703	90.1	72.8	1687	1.03	541.1	563.7	556.0	17.3	0.06	20.5	561.1	550.9	5.76E-03	7.14E-03	4.62E-03	2.52E-03	8.74	5.99E-05	0.033	1.000	2.58E-07	7.18E-07	0.8	1.00	1.05E-06	2.60E-03	8.04E-04	8.04E-04	1.31E-06
E68	10	10	14.703	83.9	64.1	1416	1.03	533.7	563.7	552.4	19.8	0.06	21.0	557.6	547.1	4.93E-03	6.16E-03	3.92E-03	2.24E-03	8.74	5.16E-05	0.034	1.000	2.38E-07	6.40E-07	0.8	1.00	9.28E-07	2.32E-03	6.94E-04	6.94E-04	1.17E-06
E68	11	11	14.703	75.1	54.9	1043	1.03	524.7	563.7	547.9	20.2	0.06	19.5	552.8	543.0	4.06E-03	5.02E-03	3.27E-03	1.75E-03	8.74	4.29E-05	0.032	1.000	1.78E-07	4.94E-07	0.8	1.00	7.40E-07	1.83E-03	5.65E-04	5.65E-04	9.17E-07
E68	12	12	14.703	69.3	48.8	845	1.03	518.7	563.7	545.0	20.5	0.06	18.8	549.7	540.3	3.57E-03	4.39E-03	2.90E-03	1.50E-03	8.74	3.79E-05	0.030	1.000	1.57E-07	4.21E-07	0.8	1.00	6.73E-07	1.65E-03	4.95E-04	4.95E-04	8.30E-07
E69	1	1	14.703	66.5	46.1	898	1.08	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04	1.22E-03	7.61E-04	4.59E-04	48.21	1.08E-05	0.033	1.000	2.63E-07	7.08E-07	31.0	1.00	7.08E-05	1.79E-01	5.77E-03	5.77E-03	7.11E-05
E69	2	2	14.703	69.9	48.7	1147	1.08	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03	1.46E-03	8.81E-04	5.84E-04	48.21	1.27E-05	0.036	1.000	3.06E-07	9.09E-07	28.0	1.00	7.54E-05	1.94E-01	6.93E-03	6.93E-03	7.57E-05

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Emissions from Fixed Roof Tanks

Reference: AP-42, Fifth Edition, Volume 1, Chapter 71 Liquid Storage Tanks - January 1995
Reference: TCEQ Technical Guidance - Storage Tanks - February 2001

Total Losses from a Fixed Roof Tank (Equation 1-1):

$L_T = L_S + L_W$

where:
L_T = total losses
L_S = standing storage losses
L_W = working losses

Standing Losses from a Fixed Roof Tank (Equation 1-2):

$L_S = D\ V_V\ W_V\ K_E\ K_S$

where: L_S = standing storage losses
D = days
V_V = vapor space volume = $(\pi/4) * D^2 * H_{VO}$ (Equation 1-3)
D = tank diameter
H_{VO} = vapor space outage
W_V = vapor density = $(M_V\ P_{VA}) / (R\ T_{LA})$ (Equation 1-21)
M_V = vapor molecular weight
R = ideal gas constant = 10.731 (psia ft^3)/(lb-mole °R)
P_{VA} = vapor pressure at daily average liquid surface temperature
T_{LA} = daily average liquid surface temperature
K_E = vapor space expansion factor = $\Delta T_V / T_{LA} + (\Delta P_V - \Delta P_B) / (P_A - P_{VA})$ (Equation 1-7)
ΔT_V = daily vapor temperature range = $0.72 * \Delta TA + (0.028 * \alpha * I)$ (Equation (1-8)
ΔT_A = daily ambient temperature range = $T_{AX} - T_{AN}$ (Equation 1-12)
α = tank taint solar absorptance (Table 7.1-6)
I = daily total solar insolation factor (Table 7.1-7)

K_E continued
TLA = daily average liquid surface temperature = 0.44 TAA + 0.56 TB + 0.0079 a I (Equation 1-26)
T_{AA} = daily average ambient temperature = $(T_{AX} + T_{AN}) / 2$
T_{AX} = daily maximum ambient temperature (Table 7.1-7)
T_{AN} = daily minimum ambient temperature (Table 7.1-7)
$T_B = T_{AA} + 6\ \alpha - 1)$
ΔP_V = daily vapor pressure range = $P_{VX} - P_{VN}$ (Equation 1-9)
P_{VX} = vapor pressure at daily maximum liquid surface temperature (T_{LX}) $T_{LX} = T_{LA} + 0.25 * \Delta T_V$ (Figure 7.1-17)
P_{VN} = vapor pressure at daily minimum liquid surface temperature (T_{LN}) $T_{LN} = T_{LA} - 0.25 * \Delta T_V$ (Figure 7.1-17)
ΔP_B = breather vent pressure setting range = $P_{BP} - P_{BV}$
P_{BP} = breather vent pressure setting
P_{BV} = breather vent vacuum setting
P_A = atmospheric pressure
P_{VA} = vapor pressure at daily average liquid surface temperature (T_{LA})
K_S = vented vapor saturation factor = $1 / (1 + (0.053 * P_{VA} * H_{VO}))$ (Equation 1-20)

Working Losses from a Fixed Roof Tank (Equation 1-29):

$L_W = (0.001)\ (M_V)\ (P_{VA})\ (Q)\ (K_N)\ (K_P)$

where: L_W = working losses
M_V = vapor molecular weight
P_{VA} = vapor pressure at daily average liquid surface temperature
Q = annual net throughput
K_N = working loss turnover factor
For turnovers (N) >36 = (180 + N) / 6 N
For turnovers (N) <=36 = 1
K_P = working loss product factor
For crude oils = 0.75
For all other organic liquids = 1

Maximum Short-Term Working Losses calculated according to the TCEQ Guidance Document:

$L_{MAX} = (L_W\ FR_M) / (N\ T_{CG})$

where: L_{MAX} = maximum short term emission rate
L_W = working losses from AP-42 at maximum liquid surface temperature (P_{VAM})
P_{VAM} = true vapor pressure at daily maximum liquid surface temperature
L_{MAX} assumes a K_N value of 1, per TCEQ guidance document
FR_m = maximum filling rate
N = turnovers per day
TCg = tank working capacity

Data to be Entered for Calculation:						Data Looked Up on Tank Data Sheet:								Data Looked Up on Product Data Sheet:							Data Looked Up on Met Data Sheet:					Fixed Roof Tank Emissions Calculation																												
Tank ID	Month	Days per Month	Product	Product Temperature (°F)	Q (barrels/ mnth)	D or D_{eff} (ft)	Tank capacity (gal)	α (unitless)	FR_{max} (gal/hr)	Shell Height (ft)	Maximum Liquid Height (ft)	P_{BP} (psig)	P_{BV} (psig)	Product Type	M_v (lb/lb-mol)	Benzene Content (%)	Antoine Constant A	Antoine Constant B	Antoine Constant C	K_P (unitless)	Month for Met Data	Pa (psia)	T_{AX} (°F)	T_{AN} (°F)	I (Btu/ft²)	H_{VO} (ft)	T_{AA} (°R)	T_B (°R)	T_{LA} (°R)	ΔT_A (°R)	ΔP_B (psia)	ΔT_V (°R)	T_{LX} (°R)	T_{LN} (°R)	P_{VA} (psia)	P_{VX} (psia)	P_{VN} (psia)	ΔP_V (psia)	V_V (ft^3)	W_V (lb/ft³)	K_E (unitless)	K_S (unitless)	L_S (ton/ month)	L_S (lb/hr)	Turnovers (unitless)	K_N (unitless)	L_W (ton/ month)	L_{WMAX} (lb/day)	L_{WMAXH} (lb/hr)	L_{TMAX} (lb/hr)	L_T (ton/ month)
E69	3	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.08	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03	2.06E-03	1.23E-03	8.25E-04	48.21	1.75E-05	0.037	1.000	4.80E-07	1.29E-06	31.0	1.00	1.17E-04	3.02E-01	9.73E-03	9.73E-03	1.18E-04
E69	4	30	Ethylene Glycol	ambient	2285.714	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.08	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03	2.87E-03	1.77E-03	1.10E-03	48.21	2.44E-05	0.035	1.000	6.20E-07	1.72E-06	30.0	1.00	1.60E-04	4.07E-01	1.36E-02	1.36E-02	1.61E-04
E69	5	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.08	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03	3.67E-03	2.27E-03	1.40E-03	48.21	3.09E-05	0.035	1.000	8.18E-07	2.20E-06	31.0	1.00	2.12E-04	5.38E-01	1.73E-02	1.73E-02	2.13E-04
E69	6	30	Ethylene Glycol	ambient	2285.714	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.08	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03	4.59E-03	2.80E-03	1.79E-03	48.21	3.81E-05	0.037	1.000	1.02E-06	2.83E-06	30.0	1.00	2.55E-04	6.51E-01	2.17E-02	2.17E-02	2.56E-04
E69	7	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.08	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03	5.16E-03	3.06E-03	2.10E-03	48.21	4.21E-05	0.040	1.000	1.24E-06	3.35E-06	31.0	1.00	2.92E-04	7.57E-01	2.44E-02	2.44E-02	2.94E-04
E69	8	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.08	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03	5.06E-03	3.07E-03	1.98E-03	48.21	4.18E-05	0.037	1.000	1.17E-06	3.14E-06	31.0	1.00	2.90E-04	7.41E-01	2.39E-02	2.39E-02	2.91E-04
E69	9	30	Ethylene Glycol	ambient	2285.714	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.08	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03	4.17E-03	2.64E-03	1.53E-03	48.21	3.54E-05	0.034	1.000	8.63E-07	2.40E-06	30.0	1.00	2.36E-04	5.91E-01	1.97E-02	1.97E-02	2.37E-04
E69	10	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.08	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03	2.96E-03	1.83E-03	1.14E-03	48.21	2.52E-05	0.035	1.000	6.62E-07	1.78E-06	31.0	1.00	1.71E-04	4.34E-01	1.40E-02	1.40E-02	1.72E-04
E69	11	30	Ethylene Glycol	ambient	2285.714	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.08	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	48.21	1.64E-05	0.033	1.000	3.92E-07	1.09E-06	30.0	1.00	1.06E-04	2.67E-01	8.89E-03	8.89E-03	1.06E-04
E69	12	31	Ethylene Glycol	ambient	2361.905	7.544	3,200	0.17	3200	9.51	8.51	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.08	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	48.21	1.23E-05	0.032	1.000	2.94E-07	7.91E-07	31.0	1.00	8.08E-05	2.03E-01	6.56E-03	6.56E-03	8.11E-05
E70	1	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	1	14.703	66.5	46.1	898	1.13	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	1.98E-05	2.52E-05	1.55E-05	9.72E-06	134.05	8.99E-07	0.033	1.000	6.09E-08	1.64E-07	0.8	1.00	5.55E-07	1.41E-03	1.21E-03	1.21E-03	6.16E-07
E70	2	28	Therminol 66	ambient	200.9132	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	2	14.703	69.9	48.7	1147	1.13	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	2.35E-05	3.04E-05	1.80E-05	1.24E-05	134.05	1.06E-06	0.036	1.000	7.10E-08	2.11E-07	0.8	1.00	5.94E-07	1.54E-03	1.46E-03	1.46E-03	6.65E-07
E70	3	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	3	14.703	76.1	55.7	1430	1.13	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	3.32E-05	4.32E-05	2.55E-05	1.77E-05	134.05	1.48E-06	0.037	1.000	1.13E-07	3.03E-07	0.8	1.00	9.32E-07	2.42E-03	2.07E-03	2.07E-03	1.04E-06
E70	4	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	4	14.703	82.1	63.9	1642	1.13	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	4.75E-05	6.08E-05	3.69E-05	2.39E-05	134.05	2.09E-06	0.035	1.000	1.47E-07	4.08E-07	0.8	1.00	1.29E-06	3.30E-03	2.92E-03	2.92E-03	1.44E-06
E70	5	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	5	14.703	86.7	69.5	1866	1.13	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	6.13E-05	7.83E-05	4.77E-05	3.06E-05	134.05	2.66E-06	0.035	1.000	1.95E-07	5.25E-07	0.8	1.00	1.72E-06	4.39E-03	3.76E-03	3.76E-03	1.91E-06
E70	6	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	6	14.703	91.2	74.1	2094	1.13	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	7.67E-05	9.86E-05	5.93E-05	3.93E-05	134.05	3.30E-06	0.037	1.000	2.44E-07	6.79E-07	0.8	1.00	2.08E-06	5.35E-03	4.73E-03	4.73E-03	2.32E-06
E70	7	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	7	14.703	94.2	75.6	2186	1.13	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	8.54E-05	1.11E-04	6.50E-05	4.63E-05	134.05	3.66E-06	0.039	1.000	3.00E-07	8.06E-07	0.8	1.00	2.39E-06	6.24E-03	5.35E-03	5.35E-03	2.69E-06
E70	8	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	8	14.703	94.1	75.8	1991	1.13	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	8.46E-05	1.09E-04	6.53E-05	4.37E-05	134.05	3.63E-06	0.037	1.000	2.81E-07	7.56E-07	0.8	1.00	2.37E-06	6.11E-03	5.23E-03	5.23E-03	2.65E-06
E70	9	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	9	14.703	90.1	72.8	1687	1.13	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	7.08E-05	8.93E-05	5.58E-05	3.35E-05	134.05	3.06E-06	0.034	1.000	2.07E-07	5.74E-07	0.8	1.00	1.92E-06	4.85E-03	4.29E-03	4.29E-03	2.13E-06
E70	10	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	10	14.703	83.9	64.1	1416	1.13	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	4.91E-05	6.29E-05	3.82E-05	2.47E-05	134.05	2.15E-06	0.035	1.000	1.57E-07	4.23E-07	0.8	1.00	1.38E-06	3.52E-03	3.02E-03	3.02E-03	1.53E-06
E70	11	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	11	14.703	75.1	54.9	1043	1.13	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	3.10E-05	3.94E-05	2.43E-05	1.51E-05	134.05	1.38E-06	0.033	1.000	9.18E-08	2.55E-07	0.8	1.00	8.41E-07	2.13E-03	1.89E-03	1.89E-03	9.33E-07
E70	12	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	12	14.703	69.3	48.8	845	1.13	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	2.27E-05	2.87E-05	1.78E-05	1.09E-05	134.05	1.03E-06	0.032	1.000	6.83E-08	1.84E-07	0.8	1.00	6.36E-07	1.61E-03	1.38E-03	1.38E-03	7.05E-07
E71	1	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.89	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04	1.22E-03	7.61E-04	4.59E-04	10786.06	1.08E-05	0.033	1.000	5.89E-05	1.58E-04	0.6	1.00	1.93E-03	4.87E+00	1.29E-01	1.29E-01	1.99E-03
E71	2	28	Ethylene Glycol	ambient	58105.86	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.89	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03	1.46E-03	8.81E-04	5.84E-04	10786.06	1.27E-05	0.036	1.000	6.84E-05	2.03E-04	0.5	1.00	2.05E-03	5.28E+00	1.55E-01	1.55E-01	2.12E-03
E71	3	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.89	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03	2.06E-03	1.23E-03	8.25E-04	10786.06	1.75E-05	0.037	1.000	1.07E-04	2.89E-04	0.6	1.00	3.19E-03	8.21E+00	2.17E-01	2.17E-01	3.29E-03
E71	4	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.89	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03	2.87E-03	1.77E-03	1.10E-03	10786.06	2.44E-05	0.035	1.000	1.39E-04	3.85E-04	0.6	1.00	4.36E-03	1.11E+01	3.03E-01	3.03E-01	4.50E-03
E71	5	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.89	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03	3.67E-03	2.27E-03	1.40E-03	10786.06	3.09E-05	0.035	1.000	1.83E-04	4.92E-04	0.6	1.00	5.77E-03	1.46E+01	3.87E-01	3.87E-01	5.95E-03
E71	6	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.89	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03	4.59E-03	2.80E-03	1.79E-03	10786.06	3.81E-05	0.037	1.000	2.28E-04	6.32E-04	0.6	1.00	6.94E-03	1.77E+01	4.84E-01	4.84E-01	7.17E-03
E71	7	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.89	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03	5.16E-03	3.06E-03	2.10E-03	10786.06	4.21E-05	0.040	1.000	2.78E-04	7.48E-04	0.6	1.00	7.97E-03	2.06E+01	5.46E-01	5.46E-01	8.24E-03
E71	8	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.89	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03	5.06E-03	3.07E-03	1.98E-03	10786.06	4.18E-05	0.037	1.000	2.61E-04	7.03E-04	0.6	1.00	7.89E-03	2.02E+01	5.34E-01	5.34E-01	8.15E-03
E71	9	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.89	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03	4.17E-03	2.64E-03	1.53E-03	10786.06	3.54E-05	0.034	1.000	1.93E-04	5.36E-04	0.6	1.00	6.42E-03	1.61E+01	4.40E-01	4.40E-01	6.62E-03
E71	10	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.89	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03	2.96E-03	1.83E-03	1.14E-03	10786.06	2.52E-05	0.035	1.000	1.48E-04	3.98E-04	0.6	1.00	4.66E-03	1.18E+01	3.13E-01	3.13E-01	4.80E-03
E71	11	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.89	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	10786.06	1.64E-05	0.033	1.000	8.77E-05	2.44E-04	0.6	1.00	2.88E-03	7.27E+00	1.99E-01	1.99E-01	2.97E-03
E71	12	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.89	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	10786.06	1.23E-05	0.032	1.000	6.58E-05	1.77E-04	0.6	1.00	2.20E-03	5.54E+00	1.46E-01	1.46E-01	2.27E-03
E72	1	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.89	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04	1.22E-03	7.61E-04	4.59E-04	10786.06	1.08E-05	0.033	1.000	5.89E-05	1.58E-04	0.6	1.00	1.93E-03	4.87E+00	1.29E-01	1.29E-01	1.99E-03
E72	2	28	Ethylene Glycol	ambient	58105.86	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.89	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03	1.46E-03	8.81E-04	5.84E-04	10786.06	1.27E-05	0.036	1.000	6.84E-05	2.03E-04	0.5	1.00	2.05E-03	5.28E+00	1.55E-01	1.55E-01	2.12E-03
E72	3	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.89	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03	2.06E-03	1.23E-03	8.25E-04	10786.06	1.75E-05	0.037	1.000	1.07E-04	2.89E-04	0.6	1.00	3.19E-03	8.21E+00	2.17E-01	2.17E-01	3.29E-03
E72	4	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.89	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03	2.87E-03	1.77E-03	1.10E-03	10786.06	2.44E-05	0.035	1.000	1.39E-04	3.85E-04	0.6	1.00	4.36E-03	1.11E+01	3.03E-01	3.03E-01	4.50E-03
E72	5	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.89	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03	3.67E-03	2.27E-03	1.40E-03	10786.06	3.09E-05	0.035	1.000	1.83E-04	4.92E-04	0.6	1.00	5.77E-03	1.46E+01	3.87E-01	3.87E-01	5.95E-03
E72	6	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.89	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03	4.59E-03	2.80E-03	1.79E-03	10786.06	3.81E-05	0.037	1.000	2.28E-04	6.32E-04	0.6	1.00	6.94E-03	1.77E+01	4.84E-01	4.84E-01	7.17E-03
E72	7	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.89	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03	5.16E-03	3.06E-03	2.10E-03	10786.06	4.21E-05	0.040	1.000	2.78E-04	7.48E-04	0.6	1.00	7.97E-03	2.06E+01	5.46E-01	5.46E-01	8.24E-03
E72	8	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.89	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03	5.06E-03	3.07E-03	1.98E-03	10786.06	4.18E-05	0.037	1.000	2.61E-04	7.03E-04	0.6	1.00	7.89E-03	2.02E+01	5.34E-01	5.34E-01	8.15E-03
E72	9	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.89	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03	4.17E-03	2.64E-03	1.53E-03	10786.06	3.54E-05	0.034	1.000	1.93E-04	5.36E-04	0.6	1.00	6.42E-03	1.61E+01	4.40E-01	4.40E-01	6.62E-03
E72	10	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.89	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03	2.96E-03	1.83E-03	1.14E-03	10786.06	2.52E-05	0.035	1.000	1.48E-04	3.98E-04	0.6	1.00	4.66E-03	1.18E+01	3.13E-01	3.13E-01	4.80E-03
E72	11	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.89	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	10786.06	1.64E-05	0.033	1.000	8.77E-05	2.44E-04	0.6	1.00	2.88E-03	7.27E+00	1.99E-01	1.99E-01	2.97E-03
E72	12	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.89	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	10786.06	1.23E-05	0.032	1.000	6.58E-05	1.77E-04	0.6	1.00	2.20E-03	5.54E+00	1.46E-01	1.46E-01	2.27E-03
F6	1	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	1	14.703	66.5	46.1	898	1.89	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	9.66E-04	1.22E-03	7.61E-04	4.59E-04	10786.06	1.08E-05	0.033	1.000	5.89E-05	1.58E-04	0.6	1.00	1.93E-03	4.87E+00	1.29E-01	1.29E-01	1.99E-03
F6	2	28	Ethylene Glycol	ambient	58105.86	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	2	14.703	69.9	48.7	1147	1.89	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.14E-03	1.46E-03	8.81E-04	5.84E-04	10786.06	1.27E-05	0.036	1.000	6.84E-05	2.03E-04	0.5	1.00	2.05E-03	5.28E+00	1.55E-01	1.55E-01	2.12E-03
F6	3	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	3	14.703	76.1	55.7	1430	1.89	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.60E-03	2.06E-03	1.23E-03	8.25E-04	10786.06	1.75E-05	0.037	1.000	1.07E-04	2.89E-04	0.6	1.00	3.19E-03	8.21E+00	2.17E-01	2.17E-01	3.29E-03
F6	4	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	4	14.703	82.1	63.9	1642	1.89	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.26E-03	2.87E-03	1.77E-03	1.10E-03	10786.06	2.44E-05	0.035	1.000	1.39E-04	3.85E-04	0.6	1.00	4.36E-03	1.11E+01	3.03E-01	3.03E-01	4.50E-03
F6	5	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	5	14.703	86.7	69.5	1866	1.89	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	2.89E-03	3.67E-03	2.27E-03	1.40E-03	10786.06	3.09E-05	0.035	1.000	1.83E-04	4.92E-04	0.6	1.00	5.77E-03	1.46E+01	3.87E-01	3.87E-01	5.95E-03
F6	6	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	6	14.703	91.2	74.1	2094	1.89	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.59E-03	4.59E-03	2.80E-03	1.79E-03	10786.06	3.81E-05	0.037	1.000	2.28E-04	6.32E-04	0.6	1.00	6.94E-03	1.77E+01	4.84E-01	4.84E-01	7.17E-03
F6	7	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	7	14.703	94.2	75.6	2186	1.89	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	3.99E-03	5.16E-03	3.06E-03	2.10E-03	10786.06	4.21E-05	0.040	1.000	2.78E-04	7.48E-04	0.6	1.00	7.97E-03	2.06E+01	5.46E-01	5.46E-01	8.24E-03
F6	8	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	8	14.703	94.1	75.8	1991	1.89	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	3.95E-03	5.06E-03	3.07E-03	1.98E-03	10786.06	4.18E-05	0.037	1.000	2.61E-04	7.03E-04	0.6	1.00	7.89E-03	2.02E+01	5.34E-01	5.34E-01	8.15E-03
F6	9	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	9	14.703	90.1	72.8	1687	1.89	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.32E-03	4.17E-03	2.64E-03	1.53E-03	10786.06	3.54E-05	0.034	1.000	1.93E-04	5.36E-04	0.6	1.00	6.42E-03	1.61E+01	4.40E-01	4.40E-01	6.62E-03
F6	10	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	10	14.703	83.9	64.1	1416	1.89	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.33E-03	2.96E-03	1.83E-03	1.14E-03	10786.06	2.52E-05	0.035	1.000	1.48E-04	3.98E-04	0.6	1.00	4.66E-03	1.18E+01	3.13E-01	3.13E-01	4.80E-03
F6	11	30	Ethylene Glycol	ambient	62256.28	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	11	14.703	75.1	54.9	1043	1.89	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.49E-03	1.88E-03	1.18E-03	7.03E-04	10786.06	1.64E-05	0.033	1.000	8.77E-05	2.44E-04	0.6	1.00	2.88E-03	7.27E+00	1.99E-01	1.99E-01	2.97E-03
F6	12	31	Ethylene Glycol	ambient	64331.49	85.28	#######	0.17	71456.35	104.96	103.96	0.03	-0.03	Organic	62.07	0.00	8.79	2615.40	245.00	1.00	12	14.703	69.3	48.8	845	1.89	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.10E-03	1.39E-03	8.73E-04	5.13E-04	10786.06	1.23E-05	0.032	1.000	6.58E-05	1.77E-04	0.6	1.00	2.20E-03	5.54E+00	1.46E-01	1.46E-01	2.27E-03
E73	1	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	1	14.703	66.5	46.1	898	1.89	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	1.72E-05	2.43E-05	1.21E-05	1.22E-05	10786.06	3.30E-07	0.033	1.000	1.80E-06	4.83E-06	0.0	1.00	3.15E-06	8.86E-03	1.45E-03	1.45E-03	4.94E-06
E73	2	28	Diethylene Glycol	ambient	3104.632	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	2	14.703	69.9	48.7	1147	1.89	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	2.20E-05	3.17E-05	1.51E-05	1.66E-05	10786.06	4.17E-07	0.036	1.000	2.25E-06	6.70E-06	0.0	1.00	3.62E-06	1.04E-02	1.89E-03	1.89E-03	5.87E-06
E73	3	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	3	14.703	76.1	55.7	1430	1.89	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	3.59E-05	5.17E-05	2.46E-05	2.71E-05	10786.06	6.73E-07	0.037	1.000	4.12E-06	1.11E-05	0.0	1.00	6.55E-06	1.89E-02	3.08E-03	3.08E-03	1.07E-05
E73	4	30	Diethylene Glycol	ambient	3326.391	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	4	14.703	82.1	63.9	1642	1.89	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	5.91E-05	8.31E-05	4.16E-05	4.15E-05	10786.06	1.09E-06	0.035	1.000	6.19E-06	1.72E-05	0.0	1.00	1.04E-05	2.93E-02	4.96E-03	4.96E-03	1.66E-05
E73	5	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	5	14.703	86.7	69.5	1866	1.89	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	8.40E-05	1.18E-04	5.94E-05	5.81E-05	10786.06	1.54E-06	0.035	1.000	9.07E-06	2.44E-05	0.0	1.00	1.53E-05	4.29E-02	7.01E-03	7.01E-03	2.44E-05
E73	6	30	Diethylene Glycol	ambient	3326.391	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	6	14.703	91.2	74.1	2094	1.89	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	1.14E-04	1.61E-04	8.02E-05	8.07E-05	10786.06	2.07E-06	0.037	1.000	1.23E-05	3.43E-05	0.0	1.00	2.02E-05	5.68E-02	9.60E-03	9.60E-03	3.25E-05
E73	7	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	7	14.703	94.2	75.6	2186	1.89	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	1.32E-04	1.90E-04	9.12E-05	9.87E-05	10786.06	2.39E-06	0.039	1.000	1.57E-05	4.23E-05	0.0	1.00	2.41E-05	6.93E-02	1.13E-02	1.13E-02	3.99E-05
E73	8	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	8	14.703	94.1	75.8	1991	1.89	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	1.31E-04	1.84E-04	9.16E-05	9.27E-05	10786.06	2.36E-06	0.037	1.000	1.47E-05	3.96E-05	0.0	1.00	2.38E-05	6.72E-02	1.10E-02	1.10E-02	3.85E-05
E73	9	30	Diethylene Glycol	ambient	3326.391	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	9	14.703	90.1	72.8	1687	1.89	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	1.02E-04	1.41E-04	7.38E-05	6.70E-05	10786.06	1.86E-06	0.034	1.000	1.01E-05	2.81E-05	0.0	1.00	1.81E-05	4.97E-02	8.40E-03	8.40E-03	2.82E-05
E73	10	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	10	14.703	83.9	64.1	1416	1.89	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	6.19E-05	8.70E-05	4.36E-05	4.34E-05	10786.06	1.14E-06	0.035	1.000	6.71E-06	1.80E-05	0.0	1.00	1.13E-05	3.17E-02	5.19E-03	5.19E-03	1.80E-05
E73	11	30	Diethylene Glycol	ambient	3326.391	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	11	14.703	75.1	54.9	1043	1.89	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	3.25E-05	4.54E-05	2.31E-05	2.24E-05	10786.06	6.11E-07	0.033	1.000	3.26E-06	9.07E-06	0.0	1.00	5.74E-06	1.60E-02	2.71E-03	2.71E-03	9.01E-06
E73	12	31	Diethylene Glycol	ambient	3437.271	85.28	#######	0.17	23606.12	104.96	103.96	0.03	-0.03	Organic	106.12	0.00	7.70	2019.25	173.66	1.00	12	14.703	69.3	48.8	845	1.89	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	2.09E-05	2.93E-05	1.49E-05	1.44E-05	10786.06	3.99E-07	0.032	1.000	2.14E-06	5.74E-06	0.0	1.00	3.82E-06	1.07E-02	1.75E-03	1.75E-03	5.96E-06
E74	1	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	1	14.703	66.5	46.1	898	1.52	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	1.52E-01	1.80E-01	1.29E-01	5.14E-02	2988.95	1.65E-03	0.036	0.988	2.72E-03	7.32E-03	1.8	1.00	1.21E-01	2.85E+02	#######	3.22E+00	1.24E-01
E74	2	28	Acetic Acid	ambient	23860.6	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	2	14.703	69.9	48.7	1147	1.52	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	1.71E-01	2.05E-01	1.43E-01	6.22E-02	2988.95	1.84E-03	0.040	0.986	3.04E-03	9.04E-03	1.7	1.00	1.23E-01	2.94E+02	#######	3.67E+00	1.26E-01
E74	3	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	3	14.703	76.1	55.7	1430	1.52	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	2.18E-01	2.61E-01	1.81E-01	7.93E-02	2988.95	2.31E-03	0.042	0.983	4.43E-03	1.19E-02	1.8	1.00	1.73E-01	4.13E+02	#######	4.66E+00	1.77E-01
E74	4	30	Acetic Acid	ambient	25564.93	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	4	14.703	82.1	63.9	1642	1.52	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	2.78E-01	3.29E-01	2.34E-01	9.52E-02	2988.95	2.91E-03	0.042	0.978	5.30E-03	1.47E-02	1.8	1.00	2.14E-01	5.06E+02	#######	5.90E+00	2.19E-01
E74	5	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	5	14.703	86.7	69.5	1866	1.52	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	3.31E-01	3.91E-01	2.79E-01	1.12E-01	2988.95	3.43E-03	0.043	0.974	6.66E-03	1.79E-02	1.8	1.00	2.63E-01	6.21E+02	#######	7.01E+00	2.69E-01
E74	6	30	Acetic Acid	ambient	25564.93	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	6	14.703	91.2	74.1	2094	1.52	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	3.86E-01	4.58E-01	3.24E-01	1.34E-01	2988.95	3.96E-03	0.046	0.970	7.93E-03	2.20E-02	1.8	1.00	2.96E-01	7.03E+02	#######	8.20E+00	3.04E-01
E74	7	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	7	14.703	94.2	75.6	2186	1.52	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	4.15E-01	4.98E-01	3.45E-01	1.53E-01	2988.95	4.24E-03	0.050	0.968	9.50E-03	2.55E-02	1.8	1.00	3.29E-01	7.89E+02	#######	8.91E+00	3.39E-01

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February 2013

Emissions from Fixed Roof Tanks

Reference: AP-42, Fifth Edition, Volume 1, Chapter 71 Liquid Storage Tanks - January 1995
Reference: TCEQ Technical Guidance - Storage Tanks - February 2001

Total Losses from a Fixed Roof Tank (Equation 1-1):

$L_T = L_S + L_W$

where: L_T = total losses
L_S = standing storage losses
L_W = working losses

Standing Losses from a Fixed Roof Tank (Equation 1-2):

$L_S = D\, V_V\, W_V\, K_E\, K_S$

where: L_S = standing storage losses
D = days
V_V = vapor space volume = $(\pi/4) * D^2 * H_{VO}$ (Equation 1-3)
D = tank diameter
H_{VO} = vapor space outage
W_V = vapor density = $(M_V\, P_{VA}) / (R\, T_{LA})$ (Equation 1-21)
M_V = vapor molecular weight
R = ideal gas constant = 10.731 (psia ft^3)/(lb-mole °R)
P_{VA} = vapor pressure at daily average liquid surface temperature
T_{LA} = daily average liquid surface temperature
K_E = vapor space expansion factor = $\Delta T_V / T_{LA} + (\Delta P_V - \Delta P_B) / (P_A - P_{VA})$ (Equation 1-7)
ΔT_V = daily vapor temperature range = $0.72 * \Delta TA + (0.028 * \alpha * I)$ (Equation (1-8)
ΔT_A = daily ambient temperature range = $T_{AX} - T_{AN}$ (Equation 1-12)
α = tank taint solar absorptance (Table 7.1-6)
I = daily total solar insolation factor (Table 7.1-7)

K_E continued
TLA = daily average liquid surface temperature = 0.44 TAA + 0.56 TB + 0.0079 a I (Equation 1-26)
T_{AA} = daily average ambient temperature = $(T_{AX} + T_{AN}) / 2$
T_{AX} = daily maximum ambient temperature (Table 7.1-7)
T_{AN} = daily minimum ambient temperature (Table 7.1-7)
$T_B = T_{AA} + 6\, \alpha$ -1)
ΔP_V = daily vapor pressure range = $P_{VX} - P_{VN}$ (Equation 1-9)
P_{VX} = vapor pressure at daily maximum liquid surface temperature (T_{LX}) $T_{LX} = T_{LA} + 0.25 * \Delta T_V$ (Figure 7.1-17)
P_{VN} = vapor pressure at daily minimum liquid surface temperature (T_{LN}) $T_{LN} = T_{LA} - 0.25 * \Delta T_V$ (Figure 7.1-17)
ΔP_B = breather vent pressure setting range = $P_{BP} - P_{BV}$
P_{BP} = breather vent pressure setting
P_{BV} = breather vent vacuum setting
P_A = atmospheric pressure
P_{VA} = vapor pressure at daily average liquid surface temperature (T_{LA})
K_S = vented vapor saturation factor = $1 / (1+ (0.053*P_{VA}*H_{VO}))$ (Equation 1-20)

Working Losses from a Fixed Roof Tank (Equation 1-29):

$L_W = (0.001)\, (M_V)\, (P_{VA})\, (Q)\, (K_N)\, (K_P)$

where: L_W = working losses
M_V = vapor molecular weight
P_{VA} = vapor pressure at daily average liquid surface temperature
Q = annual net throughput
K_N = working loss turnover factor
For turnovers (N) >36 = (180 + N) / 6 N
For turnovers (N) <=36 = 1
K_P = working loss product factor
For crude oils = 0.75
For all other organic liquids = 1

Maximum Short-Term Working Losses calculated according to the TCEQ Guidance Document:

$L_{MAX} = (L_W\, FR_M) / (N\, T_{CG})$

where: L_{MAX} = maximum short term emission rate
L_W = working losses from AP-42 at maximum liquid surface temperature (P_{VAM})
P_{VAM} = true vapor pressure at daily maximum liquid surface temperature
L_{MAX} assumes a K_N value of 1, per TCEQ guidance document
FR_m = maximum filling rate
N = turnovers per day
TCg = tank working capacity

Data to be Entered for Calculation:						Data Looked Up on Tank Data Sheet:								Data Looked Up on Product Data Sheet:							Data Looked Up on Met Data Sheet:					Fixed Roof Tank Emissions Calculation																									
Tank ID	Month	Days per Month	Product	Product Temperature (°F)	Q (barrels/ mnth)	D or D_{eff} (ft)	Tank capacity (gal)	α (unitless)	FR_{max} (gal/hr)	Shell Height (ft)	Maximum Liquid Height (ft)	P_{BP} (psig)	P_{BV} (psig)	Product Type	M_v (lb/lb-mol)	Benzene Content (%)	Antoine Constant A	Antoine Constant B	Antoine Constant C	K_P (unitless)	Month for Met Data	Pa (psia)	T_{AX} (°F)	T_{AN} (°F)	I (Btu/ft²)	H_{VO} (ft)	T_{AA} (°R)	T_B (°R)	T_{LA} (°R)	ΔT_A (°R)	ΔP_B (psia)	ΔTv (°R)	T_{LX} (°R)	T_{LN} (°R)	P_{VA} (psia)	P_{VX} (psia)	P_{VN} (psia)	ΔP_V (psia)	V_V (ft^3)	W_V (lb/ft³)	K_E (unitless)	K_S (unitless)	L_S (ton/ month)	L_S (lb/hr)	Turnovers (unitless)	K_N (unitless)	L_W (ton/ month)	L_{WMAX} (lb/day)	L_{WMAXH} (lb/hr)	L_{TMAX} (lb/hr)	L_T (ton/ month)
E74	8	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	8	14.703	94.1	75.8	1991	1.52	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	4.13E-01	4.90E-01	3.46E-01	1.45E-01	2988.95	4.22E-03	0.047	0.968	8.95E-03	2.41E-02	1.8	1.00	3.27E-01	7.78E+02	#######	8.78E+00	3.36E-01
E74	9	30	Acetic Acid	ambient	25564.93	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	9	14.703	90.1	72.8	1687	1.52	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	3.65E-01	4.28E-01	3.11E-01	1.18E-01	2988.95	3.76E-03	0.042	0.971	6.84E-03	1.90E-02	1.8	1.00	2.80E-01	6.57E+02	#######	7.67E+00	2.87E-01
E74	10	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	10	14.703	83.9	64.1	1416	1.52	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	2.85E-01	3.37E-01	2.39E-01	9.75E-02	2988.95	2.97E-03	0.042	0.978	5.63E-03	1.51E-02	1.8	1.00	2.26E-01	5.35E+02	#######	6.03E+00	2.31E-01
E74	11	30	Acetic Acid	ambient	25564.93	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	11	14.703	75.1	54.9	1043	1.52	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	2.08E-01	2.45E-01	1.76E-01	6.90E-02	2988.95	2.21E-03	0.038	0.984	3.67E-03	1.02E-02	1.8	1.00	1.59E-01	3.75E+02	#######	4.38E+00	1.63E-01
E74	12	31	Acetic Acid	ambient	26417.1	50.02	602,700	0.17	12518.39	41.00	40.00	0.03	-0.03	Organic	60.05	0.00	7.30	1479.02	216.82	1.00	12	14.703	69.3	48.8	845	1.52	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	1.67E-01	1.97E-01	1.42E-01	5.52E-02	2988.95	1.80E-03	0.036	0.987	2.95E-03	7.93E-03	1.8	1.00	1.33E-01	3.13E+02	#######	3.53E+00	1.36E-01
E77	1	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	1	14.703	66.5	46.1	898	1.26	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	7.24E-04	8.94E-04	5.83E-04	3.11E-04	633.00	2.16E-05	0.033	1.000	6.92E-06	1.86E-05	0.8	1.00	1.87E-04	4.61E-01	2.83E-02	2.83E-02	1.94E-04
E77	2	28	Dowtherm A	ambient	2807.306	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	2	14.703	69.9	48.7	1147	1.26	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	8.40E-04	1.05E-03	6.66E-04	3.88E-04	633.00	2.50E-05	0.036	1.000	7.91E-06	2.35E-05	0.8	1.00	1.96E-04	4.91E-01	3.33E-02	3.33E-02	2.04E-04
E77	3	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	3	14.703	76.1	55.7	1430	1.26	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	1.14E-03	1.43E-03	9.02E-04	5.26E-04	633.00	3.34E-05	0.037	1.000	1.20E-05	3.23E-05	0.8	1.00	2.94E-04	7.37E-01	4.52E-02	4.52E-02	3.06E-04
E77	4	30	Dowtherm A	ambient	3007.828	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	4	14.703	82.1	63.9	1642	1.26	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	1.55E-03	1.92E-03	1.25E-03	6.71E-04	633.00	4.49E-05	0.035	1.000	1.49E-05	4.15E-05	0.8	1.00	3.87E-04	9.58E-01	6.07E-02	6.07E-02	4.02E-04
E77	5	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	5	14.703	86.7	69.5	1866	1.26	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	1.93E-03	2.38E-03	1.56E-03	8.27E-04	633.00	5.53E-05	0.035	1.000	1.92E-05	5.15E-05	0.8	1.00	4.98E-04	1.23E+00	7.54E-02	7.54E-02	5.18E-04
E77	6	30	Dowtherm A	ambient	3007.828	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	6	14.703	91.2	74.1	2094	1.26	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	2.34E-03	2.90E-03	1.88E-03	1.02E-03	633.00	6.64E-05	0.037	1.000	2.32E-05	6.46E-05	0.8	1.00	5.85E-04	1.45E+00	9.18E-02	9.18E-02	6.08E-04
E77	7	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	7	14.703	94.2	75.6	2186	1.26	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	2.57E-03	3.22E-03	2.03E-03	1.19E-03	633.00	7.25E-05	0.039	1.000	2.81E-05	7.55E-05	0.8	1.00	6.62E-04	1.66E+00	1.02E-01	1.02E-01	6.90E-04
E77	8	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	8	14.703	94.1	75.8	1991	1.26	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	2.55E-03	3.16E-03	2.04E-03	1.12E-03	633.00	7.20E-05	0.037	1.000	2.64E-05	7.10E-05	0.8	1.00	6.57E-04	1.63E+00	1.00E-01	1.00E-01	6.83E-04
E77	9	30	Dowtherm A	ambient	3007.828	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	9	14.703	90.1	72.8	1687	1.26	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	2.19E-03	2.67E-03	1.78E-03	8.87E-04	633.00	6.22E-05	0.034	1.000	1.99E-05	5.53E-05	0.8	1.00	5.46E-04	1.33E+00	8.44E-02	8.44E-02	5.66E-04
E77	10	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	10	14.703	83.9	64.1	1416	1.26	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	1.60E-03	1.97E-03	1.28E-03	6.91E-04	633.00	4.61E-05	0.035	1.000	1.59E-05	4.28E-05	0.8	1.00	4.12E-04	1.02E+00	6.24E-02	6.24E-02	4.28E-04
E77	11	30	Dowtherm A	ambient	3007.828	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	11	14.703	75.1	54.9	1043	1.26	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	1.07E-03	1.32E-03	8.66E-04	4.52E-04	633.00	3.15E-05	0.033	1.000	9.88E-06	2.74E-05	0.8	1.00	2.67E-04	6.58E-01	4.17E-02	4.17E-02	2.77E-04
E77	12	31	Dowtherm A	ambient	3108.089	25.26	153,700	0.17	8000	41.00	40.00	0.03	-0.03	Organic	166.00	0.00	5.95	1543.00	195.00	1.00	12	14.703	69.3	48.8	845	1.26	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	8.16E-04	1.00E-03	6.60E-04	3.42E-04	633.00	2.43E-05	0.032	1.000	7.64E-06	2.05E-05	0.8	1.00	2.10E-04	5.17E-01	3.17E-02	3.17E-02	2.18E-04
E79	1	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	1	14.703	66.5	46.1	898	1.13	516.0	516.0	517.2	20.4	0.06	19.0	521.9	512.4	1.98E-05	2.52E-05	1.55E-05	9.72E-06	134.05	8.99E-07	0.033	1.000	6.09E-08	1.64E-07	0.8	1.00	5.55E-07	1.41E-03	1.21E-03	1.21E-03	6.16E-07
E79	2	28	Therminol 66	ambient	200.9132	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	2	14.703	69.9	48.7	1147	1.13	519.0	519.0	520.5	21.2	0.06	20.7	525.7	515.3	2.35E-05	3.04E-05	1.80E-05	1.24E-05	134.05	1.06E-06	0.036	1.000	7.10E-08	2.11E-07	0.8	1.00	5.94E-07	1.54E-03	1.46E-03	1.46E-03	6.65E-07
E79	3	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	3	14.703	76.1	55.7	1430	1.13	525.6	525.6	527.5	20.4	0.06	21.5	532.9	522.1	3.32E-05	4.32E-05	2.55E-05	1.77E-05	134.05	1.48E-06	0.037	1.000	1.13E-07	3.03E-07	0.8	1.00	9.32E-07	2.42E-03	2.07E-03	2.07E-03	1.04E-06
E79	4	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	4	14.703	82.1	63.9	1642	1.13	532.7	532.7	534.9	18.2	0.06	20.9	540.1	529.7	4.75E-05	6.08E-05	3.69E-05	2.39E-05	134.05	2.09E-06	0.035	1.000	1.47E-07	4.08E-07	0.8	1.00	1.29E-06	3.30E-03	2.92E-03	2.92E-03	1.44E-06
E79	5	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	5	14.703	86.7	69.5	1866	1.13	537.8	537.8	540.3	17.2	0.06	21.3	545.6	535.0	6.13E-05	7.83E-05	4.77E-05	3.06E-05	134.05	2.66E-06	0.035	1.000	1.95E-07	5.25E-07	0.8	1.00	1.72E-06	4.39E-03	3.76E-03	3.76E-03	1.91E-06
E79	6	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	6	14.703	91.2	74.1	2094	1.13	542.3	542.3	545.1	17.1	0.06	22.3	550.7	539.6	7.67E-05	9.86E-05	5.93E-05	3.93E-05	134.05	3.30E-06	0.037	1.000	2.44E-07	6.79E-07	0.8	1.00	2.08E-06	5.35E-03	4.73E-03	4.73E-03	2.32E-06
E79	7	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	7	14.703	94.2	75.6	2186	1.13	544.6	544.6	547.5	18.6	0.06	23.8	553.5	541.6	8.54E-05	1.11E-04	6.50E-05	4.63E-05	134.05	3.66E-06	0.039	1.000	3.00E-07	8.06E-07	0.8	1.00	2.39E-06	6.24E-03	5.35E-03	5.35E-03	2.69E-06
E79	8	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	8	14.703	94.1	75.8	1991	1.13	544.6	544.6	547.3	18.3	0.06	22.7	553.0	541.6	8.46E-05	1.09E-04	6.53E-05	4.37E-05	134.05	3.63E-06	0.037	1.000	2.81E-07	7.56E-07	0.8	1.00	2.37E-06	6.11E-03	5.23E-03	5.23E-03	2.65E-06
E79	9	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	9	14.703	90.1	72.8	1687	1.13	541.1	541.1	543.4	17.3	0.06	20.5	548.5	538.3	7.08E-05	8.93E-05	5.58E-05	3.35E-05	134.05	3.06E-06	0.034	1.000	2.07E-07	5.74E-07	0.8	1.00	1.92E-06	4.85E-03	4.29E-03	4.29E-03	2.13E-06
E79	10	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	10	14.703	83.9	64.1	1416	1.13	533.7	533.7	535.6	19.8	0.06	21.0	540.8	530.3	4.91E-05	6.29E-05	3.82E-05	2.47E-05	134.05	2.15E-06	0.035	1.000	1.57E-07	4.23E-07	0.8	1.00	1.38E-06	3.52E-03	3.02E-03	3.02E-03	1.53E-06
E79	11	30	Therminol 66	ambient	215.2642	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	11	14.703	75.1	54.9	1043	1.13	524.7	524.7	526.1	20.2	0.06	19.5	531.0	521.2	3.10E-05	3.94E-05	2.43E-05	1.51E-05	134.05	1.38E-06	0.033	1.000	9.18E-08	2.55E-07	0.8	1.00	8.41E-07	2.13E-03	1.89E-03	1.89E-03	9.33E-07
E79	12	31	Therminol 66	ambient	222.4397	12.3	11,000	0.17	8000	12.30	11.30	0.03	-0.03	Organic	252.00	0.00	7.22	2595.00	240.00	1.00	12	14.703	69.3	48.8	845	1.13	518.7	518.7	519.9	20.5	0.06	18.8	524.6	515.2	2.27E-05	2.87E-05	1.78E-05	1.09E-05	134.05	1.03E-06	0.032	1.000	6.83E-08	1.84E-07	0.8	1.00	6.36E-07	1.61E-03	1.38E-03	1.38E-03	7.05E-07
E83	1	31	Caustic	ambient																																															
E83	2	28	Caustic	ambient																																															
E83	3	31	Caustic	ambient																																															
E83	4	30	Caustic	ambient																																															
E83	5	31	Caustic	ambient																																															
E83	6	30	Caustic	ambient																																															
E83	7	31	Caustic	ambient																																															
E83	8	31	Caustic	ambient																																															
E83	9	30	Caustic	ambient																																															
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M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Emissions from Floating Roof Tanks

Reference: AP-42, Fifth Edition, Volume 1, Chapter 71 Liquid Storage Tanks - January 1995
Reference: TCEQ Technical Guidance Package - Storage Tanks - February 2001

Total Losses from a Floating Roof Tank (Equation 2-1):

$L_T = L_R + L_{WD} + L_F + L_D$

where: L_T = total losses
L_R = rim seal losses losses
L_{WD} = withdrawal losses
L_F = deck fitting losses
L_{WD} = deck seam losses

Rim Seal Losses from a Floating Roof Tank (Equation 2-2):

$L_R = (K_{Ra} + K_{Rb} v^n) D P^* M_V K_C$

where: L_R = rim seal losses
K_{Ra} = zero wind speed rim seal loss factor, see Table 7.1-8
K_{Rb} = wind speed dependent rim seal loss factor, see Table 7.1-8
v = average ambient wind speed at tank site. For IFR or DEFR, v = 0.
n = seal-related wind speed exponent, see Table 7.1-8.
D = tank diameter
P* = vapor pressure function (Equation 2-3)
$P^* = (P_{VA} / P_A) / ([1 + (1 - [P_{VA} / P_A])^{0.5}]^2)$
P_A = atmospheric pressure
P_{VA} = vapor pressure at the daily average liquid surface temperature
M_v = average vapor molecular weight
K_c = product factor, = 0.4 for crude oils or = 1.0 for all other organic liquids

Withdrawal Losses from a Floating Roof Tank (Equation 2-4):

$L_{WD} = (0.943) Q C_S W_L / D * [1 + (N_C F_C / D)]$

where: L_{WD} = withdrawal losses
Q = annual throughput
C_S = shell clingage factor, see Table 7.1-10
W_L = average organic liquid density
D = tank diameter
N_C = number of fixed roof support columns, see Table 7.1-11
F_C = effective column diameter

Deck Fitting Losses from a Floating Roof Tank (Equation 2-5):

$L_F = F_F P^* M_V K_C$

where: L_F = deck fitting losses
F_F = deck fitting loss factor (Equation 2-6)
$F_F = [(N_{F1} K_{F1}) + (N_{F2} K_{F2}) + \ldots + (N_{Fnf} K_{Fnf})]$
N_{Fi} = number of fittings of a particular type
K_{Fi} = deck fitting loss factor for a particular type fitting = $K_{fai} + K_{fbi} (K_v v)^{mi}$ (Equation 2-7)
K_{Fai} = zero wind speed loss factor for a particular type of fitting
K_{Fbi} = wind speed dependent loss factor for a particular type fitting
K_V = fitting wind speed correction factor
v = average ambient wind speed at tank site. For IFR or DEFR, v = 0.
mi = loss factor for a particular type of fitting
n_f = total number of different types of fittings
P* = vapor pressure function (Equation 2-3)
M_v = average vapor molecular weight

Deck Seam Losses from a Floating Roof Tank (Equation 2-9):

$L_D = K_D S_D D^2 P^* M_V K_C$

where: L_D = deck seam losses
K_D = deck seam loss per unit seam length
S_D = deck seam length factor
D = tank diameter
P* = vapor pressure function (Equation 2-3)
M_v = average vapor molecular weight
K_c = product factor, = 0.4 for crude oils or = 1.0 for all other organic liquids

Total Short Term Losses from a Floating Roof Tank (Equation 2-1 and TCEQ Equation V-2):

$L_T = L_R + L_{WD} + L_F + L_D$

where: L_T = total short term losses
L_R = rim seal losses losses using P* max in lieu of P*

L_{WD} = withdrawal losses using Qmax in lieu of Q (Qmax = PR_M * 8760 where PR_M is the maximum pumping rate)

2 4 5 7 9 17 18 19 20 21 22 24 25 26 27

Data to be entered for calculation:																		Data Looked up on ProductData Sheet:							Data Looked up on MetData Sheet:					Data	Floating Roof Tank Emissions Calculation														
Tank ID	Month	Days per Month	Product	Q (barrels / month)	D (ft)	α (unitless)	FR_{max} (gal/hr)	Deck Welded (W) or Bolted (B)	Primary Seal	Secondary Seal	C (bbl / 1000 ft^2)	F_C (ft)	S_D (ft/ft^2)	K_{Ra} (lb-mole / ft yr)	K_{Rb} (lb-mole / ft yr mph^n)	n (unitless)	N_C	Product Type	M_v (lb/lb-mol)	W_L (lb/gal)	Antoine Constant A	Antoine Constant B	Antoine Constant C	K_C (unitless)	T_{AX} (°F)	T_{AN} (°F)	I (Btu/ft^2)	v (mph)	Pa (psia)	F_F (lb-mol / yr)	T_{AA} (°R)	T_{AX} (°R)	T_{Stock} (°R)	T_{Stock} max (°R)	P_{VA} (psia)	P_{VX} (psia)	P*	P* (max)	K_D	L_R (lb)	L_{WD} (lb)	L_F (lb)	L_D (lb)	L_T (lb/hr)	L_T (tons)
E75	1	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	66.5	46.1	898	0	14.7	364.61	516.0	526.2	516.0	526.2	0.085	0.12	0.001	0.002	0.000	0.7	14.7	4.8	0.000	0.29	0.010
E75	2	28	Paraxylene	103862.49	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.9	48.7	1147	0	14.7	364.61	519.0	529.6	519.0	529.6	0.095	0.14	0.002	0.002	0.000	0.7	13.2	4.8	0.000	0.29	0.009
E75	3	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	76.1	55.7	1430	0	14.7	364.61	525.6	535.8	525.6	535.8	0.119	0.17	0.002	0.003	0.000	0.9	14.7	6.7	0.000	0.29	0.011
E75	4	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	82.1	63.9	1642	0	14.7	364.61	532.7	541.8	532.7	541.8	0.151	0.20	0.003	0.003	0.000	1.1	14.2	8.2	0.000	0.30	0.012
E75	5	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	86.7	69.5	1866	0	14.7	364.61	537.8	546.4	537.8	546.4	0.177	0.23	0.003	0.004	0.000	1.4	14.7	10.0	0.000	0.30	0.013
E75	6	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	91.2	74.1	2094	0	14.7	364.61	542.3	550.9	542.3	550.9	0.205	0.27	0.004	0.005	0.000	1.6	14.2	11.2	0.000	0.30	0.013
E75	7	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.2	75.6	2186	0	14.7	364.61	544.6	553.9	544.6	553.9	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
E75	8	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.1	75.8	1991	0	14.7	364.61	544.6	553.8	544.6	553.8	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
E75	9	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	90.1	72.8	1687	0	14.7	364.61	541.1	549.8	541.1	549.8	0.197	0.26	0.003	0.004	0.000	1.5	14.2	10.7	0.000	0.30	0.013
E75	10	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	83.9	64.1	1416	0	14.7	364.61	533.7	543.6	533.7	543.6	0.155	0.21	0.003	0.004	0.000	1.2	14.7	8.7	0.000	0.30	0.012
E75	11	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	75.1	54.9	1043	0	14.7	364.61	524.7	534.8	524.7	534.8	0.115	0.16	0.002	0.003	0.000	0.9	14.2	6.3	0.000	0.29	0.011
E75	12	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.3	48.8	845	0	14.7	364.61	518.7	529.0	518.7	529.0	0.094	0.13	0.002	0.002	0.000	0.7	14.7	5.3	0.000	0.29	0.010
E76	1	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	66.5	46.1	898	0	14.7	364.61	516.0	526.2	516.0	526.2	0.085	0.12	0.001	0.002	0.000	0.7	14.7	4.8	0.000	0.29	0.010
E76	2	28	Paraxylene	103862.49	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.9	48.7	1147	0	14.7	364.61	519.0	529.6	519.0	529.6	0.095	0.14	0.002	0.002	0.000	0.7	13.2	4.8	0.000	0.29	0.009
E76	3	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	76.1	55.7	1430	0	14.7	364.61	525.6	535.8	525.6	535.8	0.119	0.17	0.002	0.003	0.000	0.9	14.7	6.7	0.000	0.29	0.011
E76	4	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	82.1	63.9	1642	0	14.7	364.61	532.7	541.8	532.7	541.8	0.151	0.20	0.003	0.003	0.000	1.1	14.2	8.2	0.000	0.30	0.012
E76	5	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	86.7	69.5	1866	0	14.7	364.61	537.8	546.4	537.8	546.4	0.177	0.23	0.003	0.004	0.000	1.4	14.7	10.0	0.000	0.30	0.013
E76	6	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	91.2	74.1	2094	0	14.7	364.61	542.3	550.9	542.3	550.9	0.205	0.27	0.004	0.005	0.000	1.6	14.2	11.2	0.000	0.30	0.013
E76	7	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.2	75.6	2186	0	14.7	364.61	544.6	553.9	544.6	553.9	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
E76	8	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.1	75.8	1991	0	14.7	364.61	544.6	553.8	544.6	553.8	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
E76	9	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	90.1	72.8	1687	0	14.7	364.61	541.1	549.8	541.1	549.8	0.197	0.26	0.003	0.004	0.000	1.5	14.2	10.7	0.000	0.30	0.013
E76	10	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	83.9	64.1	1416	0	14.7	364.61	533.7	543.6	533.7	543.6	0.155	0.21	0.003	0.004	0.000	1.2	14.7	8.7	0.000	0.30	0.012
E76	11	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	75.1	54.9	1043	0	14.7	364.61	524.7	534.8	524.7	534.8	0.115	0.16	0.002	0.003	0.000	0.9	14.2	6.3	0.000	0.29	0.011
E76	12	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.3	48.8	845	0	14.7	364.61	518.7	529.0	518.7	529.0	0.094	0.13	0.002	0.002	0.000	0.7	14.7	5.3	0.000	0.29	0.010
F3	1	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	66.5	46.1	898	0	14.7	364.61	516.0	526.2	516.0	526.2	0.085	0.12	0.001	0.002	0.000	0.7	14.7	4.8	0.000	0.29	0.010
F3	2	28	Paraxylene	103862.49	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.9	48.7	1147	0	14.7	364.61	519.0	529.6	519.0	529.6	0.095	0.14	0.002	0.002	0.000	0.7	13.2	4.8	0.000	0.29	0.009
F3	3	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	76.1	55.7	1430	0	14.7	364.61	525.6	535.8	525.6	535.8	0.119	0.17	0.002	0.003	0.000	0.9	14.7	6.7	0.000	0.29	0.011
F3	4	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	82.1	63.9	1642	0	14.7	364.61	532.7	541.8	532.7	541.8	0.151	0.20	0.003	0.003	0.000	1.1	14.2	8.2	0.000	0.30	0.012
F3	5	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	86.7	69.5	1866	0	14.7	364.61	537.8	546.4	537.8	546.4	0.177	0.23	0.003	0.004	0.000	1.4	14.7	10.0	0.000	0.30	0.013
F3	6	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	91.2	74.1	2094	0	14.7	364.61	542.3	550.9	542.3	550.9	0.205	0.27	0.004	0.005	0.000	1.6	14.2	11.2	0.000	0.30	0.013
F3	7	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.2	75.6	2186	0	14.7	364.61	544.6	553.9	544.6	553.9	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
F3	8	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.1	75.8	1991	0	14.7	364.61	544.6	553.8	544.6	553.8	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
F3	9	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	90.1	72.8	1687	0	14.7	364.61	541.1	549.8	541.1	549.8	0.197	0.26	0.003	0.004	0.000	1.5	14.2	10.7	0.000	0.30	0.013
F3	10	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	83.9	64.1	1416	0	14.7	364.61	533.7	543.6	533.7	543.6	0.155	0.21	0.003	0.004	0.000	1.2	14.7	8.7	0.000	0.30	0.012
F3	11	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	75.1	54.9	1043	0	14.7	364.61	524.7	534.8	524.7	534.8	0.115	0.16	0.002	0.003	0.000	0.9	14.2	6.3	0.000	0.29	0.011
F3	12	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.3	48.8	845	0	14.7	364.61	518.7	529.0	518.7	529.0	0.094	0.13	0.002	0.002	0.000	0.7	14.7	5.3	0.000	0.29	0.010
F4	1	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	66.5	46.1	898	0	14.7	364.61	516.0	526.2	516.0	526.2	0.085	0.12	0.001	0.002	0.000	0.7	14.7	4.8	0.000	0.29	0.010
F4	2	28	Paraxylene	103862.49	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.9	48.7	1147	0	14.7	364.61	519.0	529.6	519.0	529.6	0.095	0.14	0.002	0.002	0.000	0.7	13.2	4.8	0.000	0.29	0.009
F4	3	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	76.1	55.7	1430	0	14.7	364.61	525.6	535.8	525.6	535.8	0.119	0.17	0.002	0.003	0.000	0.9	14.7	6.7	0.000	0.29	0.011
F4	4	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	82.1	63.9	1642	0	14.7	364.61	532.7	541.8	532.7	541.8	0.151	0.20	0.003	0.003	0.000	1.1	14.2	8.2	0.000	0.30	0.012
F4	5	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	86.7	69.5	1866	0	14.7	364.61	537.8	546.4	537.8	546.4	0.177	0.23	0.003	0.004	0.000	1.4	14.7	10.0	0.000	0.30	0.013
F4	6	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	91.2	74.1	2094	0	14.7	364.61	542.3	550.9	542.3	550.9	0.205	0.27	0.004	0.005	0.000	1.6	14.2	11.2	0.000	0.30	0.013
F4	7	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.2	75.6	2186	0	14.7	364.61	544.6	553.9	544.6	553.9	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
F4	8	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.1	75.8	1991	0	14.7	364.61	544.6	553.8	544.6	553.8	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
F4	9	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	90.1	72.8	1687	0	14.7	364.61	541.1	549.8	541.1	549.8	0.197	0.26	0.003	0.004	0.000	1.5	14.2	10.7	0.000	0.30	0.013
F4	10	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	83.9	64.1	1416	0	14.7	364.61	533.7	543.6	533.7	543.6	0.155	0.21	0.003	0.004	0.000	1.2	14.7	8.7	0.000	0.30	0.012
F4	11	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	75.1	54.9	1043	0	14.7	364.61	524.7	534.8	524.7	534.8	0.115	0.16	0.002	0.003	0.000	0.9	14.2	6.3	0.000	0.29	0.011
F4	12	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.3	48.8	845	0	14.7	364.61	518.7	529.0	518.7	529.0	0.094	0.13	0.002	0.002	0.000	0.7	14.7	5.3	0.000	0.29	0.010
F5	1	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	66.5	46.1	898	0	14.7	364.61	516.0	526.2	516.0	526.2	0.085	0.12	0.001	0.002	0.000	0.7	14.7	4.8	0.000	0.29	0.010
F5	2	28	Paraxylene	103862.49	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.9	48.7	1147	0	14.7	364.61	519.0	529.6	519.0	529.6	0.095	0.14	0.002	0.002	0.000	0.7	13.2	4.8	0.000	0.29	0.009
F5	3	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	76.1	55.7	1430	0	14.7	364.61	525.6	535.8	525.6	535.8	0.119	0.17	0.002	0.003	0.000	0.9	14.7	6.7	0.000	0.29	0.011
F5	4	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	82.1	63.9	1642	0	14.7	364.61	532.7	541.8	532.7	541.8	0.151	0.20	0.003	0.003	0.000	1.1	14.2	8.2	0.000	0.30	0.012
F5	5	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	86.7	69.5	1866	0	14.7	364.61	537.8	546.4	537.8	546.4	0.177	0.23	0.003	0.004	0.000	1.4	14.7	10.0	0.000	0.30	0.013
F5	6	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	91.2	74.1	2094	0	14.7	364.61	542.3	550.9	542.3	550.9	0.205	0.27	0.004	0.005	0.000	1.6	14.2	11.2	0.000	0.30	0.013
F5	7	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.2	75.6	2186	0	14.7	364.61	544.6	553.9	544.6	553.9	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
F5	8	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	94.1	75.8	1991	0	14.7	364.61	544.6	553.8	544.6	553.8	0.220	0.29	0.004	0.005	0.000	1.7	14.7	12.4	0.000	0.30	0.014
F5	9	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	90.1	72.8	1687	0	14.7	364.61	541.1	549.8	541.1	549.8	0.197	0.26	0.003	0.004	0.000	1.5	14.2	10.7	0.000	0.30	0.013
F5	10	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	83.9	64.1	1416	0	14.7	364.61	533.7	543.6	533.7	543.6	0.155	0.21	0.003	0.004	0.000	1.2	14.7	8.7	0.000	0.30	0.012
F5	11	30	Paraxylene	111281.239	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	75.1	54.9	1043	0	14.7	364.61	524.7	534.8	524.7	534.8	0.115	0.16	0.002	0.003	0.000	0.9	14.2	6.3	0.000	0.29	0.011
F5	12	31	Paraxylene	114990.614	85.28	0.17	92121.42	W	Mechanical Shoe	Rim mounted	0.0015	1	0	0.6	0.4	1	6	Organic	106.17	7.18	7.02	1474.40	217.77	1.00	69.3	48.8	845	0	14.7	364.61	518.7	529.0	518.7	529.0	0.094	0.13	0.002	0.002	0.000	0.7	14.7	5.3	0.000	0.29	0.010

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Emissions from Floating Roof Tank Landings

Emissions are from standing idle and refill of drain dry tanks. Since the vapor pressure of paraxylene is less than 0.5 psia at 95 F, no control is required during landings.
Per API guidance, there are no degassing emissions as clingage emissions have already been accounted for in the standing idle emissions and there is no incoming liquid to generate more vapors
Reference: AP-42, Fifth Edition, Volume 1, Chapter 7: Liquid Storage Tanks - November 2006

Total Roof Landing Emissions (Equation 2-10):
$L_{TL} = L_{SL} + L_{FL}$
where: L_{SL} = standing idle loss, lb/episode
L_{FL} = filling loss, lb/episode

Standing Idle Loss Equation for All Drain Dry Tanks (Equation 2-22):
$L_{SL} = 0.0063\ W_l\ (\pi\ D^2 / 4)$
where: L_{SL} = standing idle loss, lb/episode
W_l = stock liquid density, lb/gal
D = tank diameter, ft

Standing Idle Loss Limit for Drain Dry Tanks (Equation 2-23):
$L_{SL} <= 0.60\ (P\ V_V / R\ T)\ M_v$
where: L_{SL} = standing idle loss limit, lb/episode
P = true vapor pressure of stock liquid, psia
V_V = volume of the vapor space, $ft^3 = (pi)\ D^2\ h_v / 4$
R = ideal gas constant
T = temperature, deg R
M_v = stock vapor molecular weight, lb/lb-mole

Filling Loss Equation (Equation 2-26):
$L_{FL} = (P\ Vv / R\ T)\ M_v S$
where: L_{FL} = filling loss, lb/episode
P = true vapor pressure of stock liquid, psia
V_V = volume of the vapor space, $ft^3 = (pi)\ D^2\ h_v / 4$
R = ideal gas constant
T = temperature, deg R
M_v = stock vapor molecular weight, lb/lb-mole
S = filling saturation factor (0.15 for drain dry tanks)

Tank ID	Tank Type	Heel Type	Product	Tank Diameter D (ft)	Heel Height h_{he} (ft)	Deck Leg Height h_d (ft)	Slope of Cone Bottom (in/ft)	h_v (ft)	V_v (ft^3)	α (unitless)	Saturation Factor S	Month for Met Data	I (Btu/ft^2)	T_{AX} (°F)	T_{AN} (°F)	T_{AA} (°F)	T_{AA} (°R)	T_B (°R)	T_{LA} (°R)	Product Type	M_v (lb/lb-mol)	W_L (lb/gal)	Antoine A	Antoine B	Antoine C	P_{VA} (psia)	L_{SL} max (lb/episode)	L_{SL} (lb/episode)	L_{FL} (lbs/episode)	Filling rate (gal/hr)	Time to Float (hr)	L_{TL} (lbs/hr)	L_{TL} (ton/episode)
E75	IFR	Drain Dry	Paraxylene	85.28	0	5.00	0	5.00	28,560	0.17	0.15	7	2186	94.2	75.6	84.90	544.6	544.6	547.52	Organic	106.17	7.18	7.0	1474.4	217.8	0.240	75	258.40	18.704	92,121	2.32	8.07	0.14
E76	IFR	Drain Dry	Paraxylene	85.28	0	5.00	0	5.00	28,560	0.17	0.15	7	2186	94.2	75.6	84.90	544.6	544.6	547.52	Organic	106.17	7.18	7.0	1474.4	217.8	0.240	75	258.40	18.704	92,121	2.32	8.07	0.14
F3	IFR	Drain Dry	Paraxylene	85.28	0	5.00	0	5.00	28,560	0.17	0.15	7	2186	94.2	75.6	84.90	544.6	544.6	547.52	Organic	106.17	7.18	7.0	1474.4	217.8	0.240	75	258.40	18.704	92,121	2.32	8.07	0.14
F4	IFR	Drain Dry	Paraxylene	85.28	0	5.00	0	5.00	28,560	0.17	0.15	7	2186	94.2	75.6	84.90	544.6	544.6	547.52	Organic	106.17	7.18	7.0	1474.4	217.8	0.240	75	258.40	18.704	92,121	2.32	8.07	0.14
F5	IFR	Drain Dry	Paraxylene	85.28	0	5.00	0	5.00	28,560	0.17	0.15	7	2186	94.2	75.6	84.90	544.6	544.6	547.52	Organic	106.17	7.18	7.0	1474.4	217.8	0.240	75	258.40	18.704	92,121	2.32	8.07	0.14
																														Total	**8.07**	**0.69**

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Tank Calculations
Product Properties for Site

Data to be entered for use in calculations:										Values calculated for use in calculations:					
Product Code (to be used on calculation sheets)	Product Type	RVP	S-Value	Antoine's Constants			M_V	W_L	% Benzene	Antoine's Constants as Calculated or Entered			K_C	K_P	CAS No.
				A	B	C				A	B	C			
Ethylene Glycol	Organic			8.8	2,615.4	245.0	62.07	9.26	0.00	8.8	2,615.4	245.0	1.00	1.00	107-21-1
Diethylene Glycol	Organic			7.7	2,019.3	173.7	106.12	9.34	0.00	7.7	2,019.3	173.7	1.00	1.00	111-46-6
Therminol 66	Organic			7.2	2,595.0	240.0	252	8.43	0.00	7.2	2,595.0	240.0	1.00	1.00	54578-28-8
Acetic Acid	Organic			7.3	1,479.0	216.8	60.05	8.81	0.00	7.3	1,479.0	216.8	1.00	1.00	64-19-7
Dowtherm A	Organic			6.0	1,543.0	195.0	166	8.76	0.00	6.0	1,543.0	195.0	1.00	1.00	8004-13-5
Caustic	Organic			7.7	2,050.0	260.0	18.02	12.68	0.00	7.7	2,050.0	260.0	1.00	1.00	1310-73-2
Diesel	Refined	0.02	2.0				130	7.10	0.00	14.6	10,379.6	0.0	1.00	1.00	68334-30-5
Paraxylene	Organic			7.0	1,474.4	217.8	106.17	7.18	0.00	7.0	1,474.4	217.8	1.00	1.00	106-42-3

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Tank Calculations
Meteorological Data

Select Location:	Corpus Christi

Location	Month Code	Daily Ambient Minimum Temperature (T_{AN}) (°F)	Daily Ambient Maximum Temperature (T_{AX}) (°F)	Solar Insolation Factor (I) (BTU/ ft^2 day)	Average Wind Speed (v) (mph)	Month	Days / Month	Atmospheric Pressure (psia)
Corpus Christi	1	46.1	66.5	898	12.0	JAN	31	14.703
Corpus Christi	2	48.7	69.9	1,147	12.0	FEB	29	
Corpus Christi	3	55.7	76.1	1,430	12.0	MAR	31	
Corpus Christi	4	63.9	82.1	1,642	12.0	APR	30	
Corpus Christi	5	69.5	86.7	1,866	12.0	MAY	31	
Corpus Christi	6	74.1	91.2	2,094	12.0	JUN	30	
Corpus Christi	7	75.6	94.2	2,186	12.0	JUL	31	
Corpus Christi	8	75.8	94.1	1,991	12.0	AUG	31	
Corpus Christi	9	72.8	90.1	1,687	12.0	SEP	30	
Corpus Christi	10	64.1	83.9	1,416	12.0	OCT	31	
Corpus Christi	11	54.9	75.1	1,043	12.0	NOV	30	
Corpus Christi	12	48.8	69.3	845	12.0	DEC	31	
Corpus Christi	365	62.5	81.6	1,520	12.0	YEAR	365	

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Tank Calculations
Tank Data

Data to be entered for all tanks:									Data to be entered for fixed roof tanks:					Calculated for Fixed Roof Tanks:		Data to be entered for floating roof tanks:							Calculated for FloatingRoof Tanks:					
Tank ID	Product	Roof Type	Q (barrels/ yr)	D / D_{eff} (ft)	Capacity (bbl)	α (unitless)	Slope of Cone Bottom (in/ft)	Maximum Filling Rate (F_{max}) (gal/hr)	Shell Height or Length (H_S) (ft)	Liquid Height (H_L) (ft)	P_{BP} (psig)	P_{BV} (psig)	Roof Type	Roof Outage (H_{RO}) (ft)	Vapor Space Outage (H_{VO}) (ft)	Deck Construction	Primary Seal	Secondary Seal	C	F_C	S_D	Landed Roof Height (ft)	K_{RA} (lb-mol / ft yr)	K_{RB} (lb-mol / mph^n ft yr)	n (unitless)	N_C	Deck Seam Length	Product Temperature (°C)
E48	Ethylene Glycol	VFR	309.5	5.9	30.95	0.17	0	209	6.2	5.2	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		60.0
E49	Ethylene Glycol	VFR	309.5	5.9	30.95	0.17	0	209	6.2	5.2	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		60.0
E50	Ethylene Glycol	VFR	309.5	5.9	30.95	0.17	0	209	6.2	5.2	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		60.0
E51	Ethylene Glycol	VFR	309.5	5.9	30.95	0.17	0	209	6.2	5.2	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		60.0
E52	Ethylene Glycol	VFR	357.1	5.6	35.71	0.17	0	183	8.2	7.2	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		30.0
E53	Ethylene Glycol	VFR	357.1	5.6	35.71	0.17	0	183	8.2	7.2	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		30.0
E54	Ethylene Glycol	VFR	95.2	3.0	9.52	0.17	0	61	6.6	5.6	0.03	-0.03	Cone	0.03	1.03								0	0	0	1.0		30.0
E55	Ethylene Glycol	VFR	95.2	3.0	9.52	0.17	0	61	6.6	5.6	0.03	-0.03	Cone	0.03	1.03								0	0	0	1.0		30.0
E56	Ethylene Glycol	VFR	214.3	4.6	21.43	0.17	0	131	6.9	5.9	0.03	-0.03	Cone	0.05	1.05								0	0	0	1.0		65.0
E57	Ethylene Glycol	VFR	214.3	4.6	21.43	0.17	0	131	6.9	5.9	0.03	-0.03	Cone	0.05	1.05								0	0	0	1.0		65.0
E58	Ethylene Glycol	VFR	47.6	3.3	4.76	0.17	0	61	3.3	2.3	0.03	-0.03	Cone	0.03	1.03								0	0	0	1.0		60.0
E59	Ethylene Glycol	VFR	47.6	3.3	4.76	0.17	0	61	3.3	2.3	0.03	-0.03	Cone	0.03	1.03								0	0	0	1.0		60.0
E62	Ethylene Glycol	VFR	39107.1	7.9	107.14	0.17	0	4,500	12.1	11.1	0.03	-0.03	Cone	0.08	1.08								0	0	0	1.0		amb
E63	Ethylene Glycol	VFR	3928.6	12.5	392.86	0.17	0	915	18.0	17.0	0.03	-0.03	Cone	0.13	1.13								0	0	0	1.0		60.0
E64	Ethylene Glycol	VFR	190.5	4.9	19.05	0.17	0	143	5.6	4.6	0.03	-0.03	Cone	0.05	1.05								0	0	0	1.0		amb
E65	Ethylene Glycol	VFR	25166.7	23.0	2,516.67	0.17	0	3,099	34.1	33.1	0.03	-0.03	Cone	0.24	1.24								0	0	0	1.0		amb
E66	Diethylene Glycol	VFR	486666.7	19.7	1,333.33	0.17	0	8,000	24.6	23.6	0.03	-0.03	Cone	0.21	1.21								0	0	0	1.0		amb
E67	Ethylene Glycol	VFR	8333.3	17.4	833.33	0.17	0	1,778	19.7	18.7	0.03	-0.03	Cone	0.18	1.18								0	0	0	1.0		50.0
E68	Ethylene Glycol	VFR	71.4	3.3	7.14	0.17	0	76	3.9	2.9	0.03	-0.03	Cone	0.03	1.03								0	0	0	1.0		40.0
E69	Ethylene Glycol	VFR	27809.5	7.5	76.19	0.17	0	3,200	9.5	8.5	0.03	-0.03	Cone	0.08	1.08								0	0	0	1.0		amb
E70	Therminol 66	VFR	2619.0	12.3	261.90	0.17	0	8,000	12.3	11.3	0.03	-0.03	Cone	0.13	1.13								0	0	0	1.0		amb
E71	Ethylene Glycol	VFR	757451.4	85.3	106,773.81	0.17	0	71,456	105.0	104.0	0.03	-0.03	Cone	0.89	1.89								0	0	0	6.0		amb
E72	Ethylene Glycol	VFR	757451.4	85.3	106,773.81	0.17	0	71,456	105.0	104.0	0.03	-0.03	Cone	0.89	1.89								0	0	0	6.0		amb
F6	Ethylene Glycol	VFR	757451.4	85.3	106,773.81	0.17	0	71,456	105.0	104.0	0.03	-0.03	Cone	0.89	1.89													amb
E73	Diethylene Glycol	VFR	40471.1	85.3	106,773.81	0.17	0	23,606	105.0	104.0	0.03	-0.03	Cone	0.89	1.89								0	0	0	6.0		amb
E74	Acetic Acid	VFR	311040.0	50.0	14,350.00	0.17	0	12,518	41.0	40.0	0.03	-0.03	Cone	0.52	1.52								0	0	0	1.0		amb
E77	Dowtherm A	VFR	36595.2	25.3	3,659.52	0.17	0	8,000	41.0	40.0	0.03	-0.03	Cone	0.26	1.26								0	0	0	1.0		amb
E79	Therminol 66	VFR	2619.0	12.3	261.90	0.17	0	8,000	12.3	11.3	0.03	-0.03	Cone	0.13	1.13								0	0	0	1.0		amb
E83	Caustic	VFR	36333.3	26.2	3,633.33	0.17	0	8,000	37.7	36.7	0.03	-0.03	Cone	0.27	1.27								0	0	0	1.0		amb
E86	Diesel	VFR	1904.8	16.8	952.38	0.17	0	8,000	24.0	23.0	0.03	-0.03	Cone	0.18	1.18								0	0	0	1.0		amb
E88	Diesel	VFR	595.2	6.0	119.05	0.17	0	5,000	24.0	23.0	0.03	-0.03	Cone	0.06	1.06								0	0	0	1.0		amb
E75	Paraxylene	IFR	1353921.7	85.3	106,773.81	0.17	0.00	92,121.42	105.0							W	Mechanical Shoe	Rim mounted	0.0015	1	0	5.0	0.6	0.4	1	6.0		
E76	Paraxylene	IFR	1353921.7	85.3	106,773.81	0.17	0.00	92,121.42	105.0							W	Mechanical Shoe	Rim mounted	0.0015	1	0	5.0	0.6	0.4	1	6.0		
F3	Paraxylene	IFR	1353921.7	85.3	106,773.81	0.17	0.00	92,121.42	105.0							W	Mechanical Shoe	Rim mounted	0.0015	1	0	5.0	0.6	0.4	1	6.0		
F4	Paraxylene	IFR	1353921.7	85.3	106,773.81	0.17	0.00	92,121.42	105.0							W	Mechanical Shoe	Rim mounted	0.0015	1	0	5.0	0.6	0.4	1	6.0		
F5	Paraxylene	IFR	1353921.7	85.3	106,773.81	0.17	0.00	92,121.42	105.0							W	Mechanical Shoe	Rim mounted	0.0015	1	0	5.0	0.6	0.4	1	6.0		

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013

Reference Tables

Table 7.1-8 Rim Seal Loss Factors

Construction	Primary Seal	Secondary Seal	K_{RA} (lb-mol / ft yr)	K_{RB} (lb-mol / mph^n ft yr)	n (unitless)
W	Mechanical Shoe	Primary only	5.8	0.3	2.1
W	Mechanical Shoe	Shoe mounted	1.6	0.3	1.6
W	Mechanical Shoe	Rim mounted	0.6	0.4	1
W	Liquid mounted	Primary only	1.6	0.3	1.5
W	Liquid mounted	Weather shield	0.7	0.3	1.2
W	Liquid mounted	Rim mounted	0.3	0.6	0.3
W	Vapor mounted	Primary only	6.7	0.2	3
W	Vapor mounted	Weather shield	3.3	0.1	3
W	Vapor mounted	Rim mounted	2.2	0.003	4.3
B	Mechanical Shoe	Primary only	10.8	0.4	2
B	Mechanical Shoe	Shoe mounted	9.2	0.2	1.9
B	Mechanical Shoe	Rim mounted	1.1	0.3	1.5

Table 7.1-12 Deck Fitting Loss Factors K_{Fa}, K_{Fb}, and m

Fitting Type	Construction Details	K_{Fa} (lb-mol/yr)	K_{Fb} (lb-mol/mph^m yr)	m (unitless)
Access Hatch (24-inch diameter well)	Bolted cover, gasketed	1.6	0	0
Access Hatch (24-inch diameter well)	Unbolted cover, ungasketed	36	5.9	1.2
Access Hatch (24-inch diameter well)	Unbolted cover, gasketed	31	5.2	1.3
Fixed roof support column well	Round pipe, ungasketed sliding cover	31	0	0
Fixed roof support column well	Round pipe, gasketed sliding cover	25	0	0
Fixed roof support column well	Round pipe, flexible fabric sleeve seal	10	0	0
Fixed roof support column well	Built up column, ungasketed sliding cover	51	0	0
Fixed roof support column well	Built up column, gasketed sliding cover	33	0	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)	Ungasketed sliding cover	31	150	1.4
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)	Ungasketed sliding cover with pole sleeve	25	2.2	2.1
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover	25	13	2.2
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with pole wiper	14	3.7	0.78
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with pole sleeve	8.6	12	0.81
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Ungasketed or gasketed sliding cover	43	270	1.4
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Ungasketed or gasketed sliding cover with float	31	36	2
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with pole wiper	41	48	1.4
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with pole sleeve	11	46	1.4
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with pole sleeve and pole wiper	8.3	4.4	1.6
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with float and pole wiper	21	7.9	1.8
Slotted guide pole / sample well (8-inch diameter unslotted pole, 21-inch diameter well)	Gasketed sliding cover with float, pole sleeve, and pole wiper	11	9.9	0.89
Gauge float well (automatic gauge)	Unbolted cover, ungasketed	14	5.4	1.1
Gauge float well (automatic gauge)	Unbolted cover, gasketed	4.3	17	0.38
Gauge float well (automatic gauge)	Bolted cover, gasketed	2.8	0	0
Gauge hatch / sample port	Weighted mechanical actuation, gasketed	0.47	0.02	0.97
Gauge hatch / sample port	Weighted mechanical actuation, ungasketed	2.3	0	0
Gauge hatch / sample port	Slit fabric seal, 10% open area	12	0	0
Vacuum breaker	Weighted mechanical actuation, ungasketed	7.8	0.01	4
Vacuum breaker	Weighted mechanical actuation, gasketed	6.2	1.2	0.94
Stub drain (1-inch diameter)	Stub Drain	1.2	0	0
Deck leg (3-inch diameter)	Adjustable, internal floating deck	7.9	0	0
Deck leg (3-inch diameter)	Adjustable, pontoon area - ungasketed	2	0.37	0.91
Deck leg (3-inch diameter)	Adjustable, pontoon area - gasketed	1.3	0.08	0.65
Deck leg (3-inch diameter)	Adjustable, pontoon area - sock	1.2	0.14	0.65
Deck leg (3-inch diameter)	Adjustable, center area - ungasketed	0.82	0.53	0.14
Deck leg (3-inch diameter)	Adjustable, center area - gasketed	0.53	0.11	0.13
Deck leg (3-inch diameter)	Adjustable, center area - sock	0.49	0.16	0.14
Deck leg (3-inch diameter)	Adjustable, double deck roofs	0.82	0.53	0.14
Deck leg (3-inch diameter)	Fixed	0	0	0
Rim vent	Weighted mechanical actuation, ungasketed	0.68	1.8	1
Rim vent	Weighted mechanical actuation, gasketed	0.71	0.1	1
Ladder well	Sliding cover, ungasketed	98	0	0
Ladder well	Sliding cover, gasketed	56	0	0
Deck drain	Open	1.5	0.21	1.7
Deck drain	90% closed	1.8	0.14	1.1

VACUUM PUMP

M&G Resins USA, LLC
Corpus Christi
PET Plant
February 2013
Vacuum Pump Emissions

EPN	Exhaust Emissions (kg/hr)	Exhaust Emissions (lb/hr)	VOC Wt Fraction	Hours Per Year (hrs)	VOC Emissions (lb/hr)	VOC Emissions (tpy)
E78	50	110.23	0.003	8760	0.33	1.45

Exhaust emission rate based on process design data from M & G Resins.
VOC is Dowtherm Heat Transfer Fluid.

Emission Summary:

EPN	FIN	CIN	VOC	
			lbs/hr	tpy
E78	**E78**		0.331	1.45

APPENDIX B
BACT SUPPORT DOCUMENTS

RBLC Search Results
Gas-Fired Process Heaters >50 MMBTU/hr,
<175 MMBTU/hr (10-year search)
NOx Emissions

FACILITY_NAME	FACILITY STATE	RBLC Entry Date	RBLC Update Date	Facility Description	Process Name	Fuel (primary)	Throughput	Units	Pollutant	Control Method (code)	Control Description	Emission Limit 1	Units	Averaging time	Case-by-case basis	Other Factors	% efficiency	Compliance Verified?	Emission Limit 2	Units	Avg time
LAKE CHARLES CHEMICAL COMPLEX - LAB UNIT	LA	3/29/2011	7/6/2011	Chemical Production Unit for Linear Alkyl Benzene (LAB)production.	EQT0029 - Hot Oil Heater H-601	natural gas	170	MMBTU/H	Nitrogen Oxides (NOx)	P	low nox burners	19.69	LB/H	HOURLY MAXIMUM	BACT-PSD	U	0	U	0.1158	lb/MMBUT	hourly maximum
HEARTLAND CORN PRODUCTS	MN	1/23/2006	3/9/2006		DDGS DRYING OPERATION #2	NATURAL GAS	150	MMBTU/H	Nitrogen Oxides (NOx)	N		0.04	LB/H			U	0	U	0		
IOWA FERTILIZER COMPANY	IA	11/1/2012	11/2/2012	Nitrogeneous Fertilizer Manufacturing	Startup Heater	Natural gas	110.12	MMBTU/hr	Nitrogen Oxides (NOx)	P	good combustion practices	0.119	LB/MMBTU	AVERAGE OF 3 STACK TEST RUNS	BACT-PSD	U	0	U	0.63	TONS/YR	ROLLING 12 MONTH TOTAL
HEARTLAND CORN PRODUCTS	MN	1/23/2006	3/9/2006		DDGS DRYING OPERATION #1	NATURAL GAS	100	MMBTU/H	Nitrogen Oxides (NOx)	N		0.04	LB/H		BACT-PSD	U	0	U	0		
SHINTECH PLAQUEMINE PLANT 2	LA	4/2/2009	4/20/2009	A PROPOSED 1.81 BILLION LBS/YR PVC PRODUCTION COMPLEX WHICH WILL CONSIST OF A CHLORALKALI PLANT, AN EDC/VCM PLANT, AND A PVC PLANT	EQT122-EQT125 - FOUR VCM CRACKING FURNACES	NATURAL GAS	90	MMBTU/H	Nitrogen Oxides (NOx)	B	LOW NOX BURNERS (LNB) IN COMBINATION WITH SELECTIVE CATALYTIC REDUCTION (SCR)	0.009	LB/MMBTU		BACT-PSD	U	0	U	0		
LAKE CHARLES CHEMICAL COMPLEX - LAB UNIT	LA	3/29/2011	7/6/2011	Chemical Production Unit for Linear Alkyl Benzene (LAB)production.	EQT0027 - PACOL CHARGE HEATER H-201	Natural Gas	87.3	MMBTU/H	Nitrogen Oxides (NOx)	P	Low NOX Burners	7.15	LB/H	HOURLY MAXIMUM	BACT-PSD	U	0	U	0.0819	lb/MMBUT	hourly maximum
SHINTECH PLAQUEMINE PLANT 2	LA	4/2/2009	4/20/2009	A PROPOSED 1.81 BILLION LBS/YR PVC PRODUCTION COMPLEX WHICH WILL CONSIST OF A CHLORALKALI PLANT, AN EDC/VCM PLANT, AND A PVC PLANT	EQT126, EQT127 - TWO THERMAL OXIDIZERS (2M-5, 2M-6)	NATURAL GAS	72	MMBTU/H	Nitrogen Oxides (NOx)	P	GOOD COMBUSTION PRACTICES	0.02	LB/MMBTU		BACT-PSD	U	0	U	0		
SUNOCO INC TULSA REFINERY	OK	12/31/2008	4/20/2009	SUNOCO INCORPORATED (SUNOCO) OWNS AND OPERATES A PETROLEUM REFINERY (SIC 2911, NAICS 32411) IN TULSA, OKLAHOMA (THE TULSA REFINERY).	PROCESS HEATER	REFINERY FUEL GAS/NATURAL GAS	53.7	MMBTU/H	Nitrogen Oxides (NOx)	P	ULTRA LOW-NOX BURNERS	0.03	LB/MMBTU	3 HOUR AVERAGE	BACT-PSD	Y	0	U	0		
CARGILL - BLAIR PLANT	NE	6/22/2004	1/5/2005	WET CORN MILLING, ETHANOL, FRUCTOSE, CORN OIL, CLUTEN MEAL AND OTHER CORN BY-PRODUCTS.	GERM DRYER	NATURAL GAS	50	MMBTU/H	Nitrogen Oxides (NOx)	N		10	LB/H	MAX	Other Case-by-Case		0		0.2	LB/MMBTU	MAX

RBLC Search Results
Gas-Fired Process Heaters >50 MMBTU/hr,
<175 MMBTU/hr (10-year search)
CO Emissions

FACILITY_NAME	FACILITY STATE	RBLC Entry Date	RBLC Update Date	Facility Description	Process Name	Fuel (primary)	Throughput	Units	Pollutant	Control Method (code)	Control Description	Emission Limit 1	Units	Averaging time	Case-by-case basis	Other Factors	% efficiency	Emission Limit 2	Units
IOWA FERTILIZER COMPANY	IA	11/1/2012	11/2/2012	Nitrogeneous Fertilizer Manufacturing	Startup Heater	Natural gas	110.12	MMBTU/hr	Carbon Monoxide	P	good combustion practices	0.0194	LB/MMBTU	AVERAGE OF 3 STACK TEST RUNS	BACT-PSD	U	0	0.1	TONS/YR
SHINTECH PLAQUEMINE PLANT 2	LA	4/2/2009	4/20/2009	A PROPOSED 1.81 BILLION LBS/YR PVC PRODUCTION COMPLEX WHICH WILL CONSIST OF A CHLORALKALI PLANT, AN EDC/VCM PLANT, AND A PVC PLANT	EQT122-EQT125 - FOUR VCM CRACKING FURNACES	NATURAL GAS	90	MMBTU/H	Carbon Monoxide	P	GOOD COMBUSTION PRACTICES	0.046	LB/MMBTU		BACT-PSD	U	0	0	
SHINTECH PLAQUEMINE PLANT 2	LA	4/2/2009	4/20/2009	A PROPOSED 1.81 BILLION LBS/YR PVC PRODUCTION COMPLEX WHICH WILL CONSIST OF A CHLORALKALI PLANT, AN EDC/VCM PLANT, AND A PVC PLANT	EQT126, EQT127 - TWO THERMAL OXIDIZERS (2M-5, 2M-6)	NATURAL GAS	72	MMBTU/H	Carbon Monoxide	P	GOOD COMBUSTION PRACTICES	0.08	LB/MMBTU		BACT-PSD	U	0	0	
HEARTLAND CORN PRODUCTS	MN	1/23/2006	3/9/2006		DDGS DRYING OPERATION #2	NATURAL GAS	150	MMBTU/H	Carbon Monoxide	N		19.4	LB/H		BACT-PSD	U	0	0.129	lb/MMBTU
HEARTLAND CORN PRODUCTS	MN	1/23/2006	3/9/2006		DDGS DRYING OPERATION #1	NATURAL GAS	100	MMBTU/H	Carbon Monoxide	N		11.3	LB/H		BACT-PSD	U	90	0.113	lb/MMBTU
CARGILL - BLAIR PLANT	NE	6/22/2004	1/5/2005	WET CORN MILLING, ETHANOL, FRUCTOSE, CORN OIL, CLUTEN MEAL AND OTHER CORN BY-PRODUCTS.	GERM DRYER	NATURAL GAS	50	MMBTU/H	Carbon Monoxide	N		3.65	LB/H	MAX	Other Case-by-Case		0	0.073	lb/MMBTU

APPENDIX C
TCEQ EQUIPMENT AND CONTROL DEVICE TABLES

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E71 4. Emission Point No. E19
5. FIN E71 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 104.96 ft.
   b. Diameter : 85.28 ft.
   c. Maximum Liquid Height : 103.96 ft.
   d. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 7.09
   e. Net Throughput : 31,812,959 gallons/year.
   f. Maximum Filling Rate : 71,456 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 2.67 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	E19
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E71

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Ethylene Glycol
   b. CAS Number: 107-21-1
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.00399 psia.
   e. Liquid Molecular Weight: 62.07
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E72 4. Emission Point No. E19
5. FIN E72 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 104.96 ft.
   b. Diameter : 85.28 ft.
   c. Maximum Liquid Height : 103.96 ft.
   d. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 7.09
   e. Net Throughput : 31,812,959 gallons/year.
   f. Maximum Filling Rate : 71,456 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 2.67 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	E19
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E72

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Ethylene Glycol
   b. CAS Number: 107-21-1
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.00399 psia.
   e. Liquid Molecular Weight: 62.07
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E73 4. Emission Point No. E19
5. FIN E73 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 104.96 ft.
   b. Diameter : 85.28 ft.
   c. Maximum Liquid Height : 103.96 ft.
   d. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 0.38
   e. Net Throughput : 1,699,786 gallons/year.
   f. Maximum Filling Rate : 23,606 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 2.67 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	E19
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E73

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Diethylene Glycol
   b. CAS Number: 111-46-6
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.00013 psia.
   e. Liquid Molecular Weight: 106.12
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E74 4. Emission Point No. E19
5. FIN E74 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 41.00 ft.
   b. Diameter : 50.02 ft.
   c. Maximum Liquid Height : 40.00 ft.
   d. Nominal Capacity or Tank Volume : 602,700 gallons.
   d. Turnovers per year : 21.68
   e. Net Throughput : 13,063,680 gallons/year.
   f. Maximum Filling Rate : 12,518 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 1.56 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	E19
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E74

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Acetic Acid
   b. CAS Number: 64-19-7
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.41528 psia.
   e. Liquid Molecular Weight: 60.05
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E83 4. Emission Point No. E19
5. FIN E83 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 37.72 ft.
   b. Diameter : 26.24 ft.
   c. Maximum Liquid Height : 36.72 ft.
   d. Nominal Capacity or Tank Volume : 152,600 gallons.
   d. Turnovers per year : 10.00
   e. Net Throughput : 1,526,000 gallons/year.
   f. Maximum Filling Rate : 8,000 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 0.82 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	E19
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E83

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Caustic
   b. CAS Number: 1310-73-2
   c. Average Liquid Surface Temperature: -460.00 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.00000 psia.
   e. Liquid Molecular Weight: 18.02
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. F6 4. Emission Point No. E19
5. FIN F6 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 104.96 ft.
   b. Diameter : 85.28 ft.
   c. Maximum Liquid Height : 103.96 ft.
   d. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 7.09
   e. Net Throughput : 31,812,959 gallons/year.
   f. Maximum Filling Rate : 71,456 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑ Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑ Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 2.67 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	E19
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. F6

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Ethylene Glycol
   b. CAS Number: 107-21-1
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.00399 psia.
   e. Liquid Molecular Weight: 62.07
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total Vapor	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E86 4. Emission Point No. E86
5. FIN E86 CIN 0
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 24.00 ft.
   b. Diameter : 16.84335628 ft.
   c. Maximum Liquid Height : 23.00 ft.
   d. Nominal Capacity or Tank Volume : 40,000 gallons.
   d. Turnovers per year : 2.00
   e. Net Throughput : 80,000 gallons/year.
   f. Maximum Filling Rate : 8,000 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 0.53 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	0
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E86

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ❑ Petroleum Distillates ■ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Diesel
   b. CAS Number: 68334-30-5
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.01311 psia.
   e. Liquid Molecular Weight: 130
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total Vapor	Molecular

TABLE 7(a)

02-95

VERTICAL FIXED ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E88 4. Emission Point No. E88
5. FIN E88 CIN 0
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 24.00 ft.
   b. Diameter : 5.955025722 ft.
   c. Maximum Liquid Height : 23.00 ft.
   d. Nominal Capacity or Tank Volume : 5,000 gallons.
   d. Turnovers per year : 5.00
   e. Net Throughput : 25,000 gallons/year.
   f. Maximum Filling Rate : 5,000 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*

2. Paint Characteristics
   a. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   b. Shell Condition : Good ■ Poor ❑
   c. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   d. Roof Condition : Good ■ Poor ❑

3. Roof Characteristics
   a. Roof Type: Dome ❑ Cone ■
   b. Roof Height: 0.19 ft. (not including shell height)
   c. Radius (Dome Roof Only): ft.
   d. Slope (Cone Roof Only): .0625 ft/ft.

4. Breather Vent Settings SPECIFY				SPECIFY "Atmosphere" or Discharging to: (name of abatement device)
Valve Type	Number	Pressure Setting (psig)	Vacuum Setting (psig)	
Combination Vent Valve	1	0.03	-0.03	0
Pressure Vent Valve				
Vacuum Vent Valve				
Open Vent Valve				

Table 7(a) VERTICAL FIXED ROOF TANK SUMMARY
Page 2

Permit No. TBD Tank No. E88

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ❑ Petroleum Distillates ■ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Diesel
   b. CAS Number: 68334-30-5
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.01311 psia.
   e. Liquid Molecular Weight: 130
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total Vapor	Molecular

TABLE 7(d)

02-95

INTERNAL FLOATING ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)* : See Plot Plan
3. Tank No. E75 4. Emission Point No. E19
5. FIN E75 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 105 ft.
   b. Diameter : 85.28 ft.
   c. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 12.68
   e. Net Throughput : 56,864,713 gallons/year.
   f. Maximum Pumping Rate : 92,121 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*
   g. Self-Supporting Roof ? Yes ❑ No ■
   h. Number of Columns : 6.00
   i. Column Diameter : 1 ft.

2. Shell/Roof and Paint Characteristics
   a. Shell Condition : Light Rust ■ Dense Rust ❑ Gunite Lining ❑
   b. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   c. Shell Condition : Good ■ Poor ❑
   d. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
   Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   e. Roof Condition : Good ■ Poor ❑

3. Rim-Seal System
   a. Primary Seal : Vapor Mounted ❑ Liquid-Mounted ❑ Mechanical Shoe ■
   b. Secondary Seal : Yes ■ No ❑

4. Deck Characteristics
   a. Deck Type: Bolted ❑ Welded ■
   b. Deck Construction (Bolted Tanks Only):
   Continuous Sheet Construction 5 ft. wide ❑
   Continuous Sheet Construction 6 ft. wide ❑
   Continuous Sheet Construction 7 ft. wide ❑
   Rectangular Panel Construction 5 X 7.5 ft. wide ❑
   Rectangular Panel Construction 5 X 12 ft. wide ❑
   c. Deck Seam Length *(Bolted Tanks Only)* : ft.

5. Roof Fitting Loss Factor: 364.61 lb-mole/year
   Based upon Typical ■ Controlled ❑ or Actual ❑ fittings
   Complete Section IV, Fittings Information, to record fittings count used to calculate the roof fitting loss factor.

Table 7(d) INTERNAL FLOATING ROOF TANK SUMMARY

Page 2

Permit No. TBD Tank No. E75

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Paraxylene
   b. CAS Number: 106-42-3
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.24 psia.
   e. Liquid Molecular Weight: 106.17

4. Multiple Component Information
   a. Mixture Name: _____
   b. Average Liquid Surface Temperature: _____ °F.
   c. Minimum Liquid Surface Temperature: _____ °F.
   d. Maximum Liquid Surface Temperature: _____ °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: _____ psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: _____ psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: _____ psia.
   h. Liquid Molecular Weight: _____ mol
   i. Vapor Molecular Weight: _____ mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total	Percent of Total	Molecular

Page 3

Permit No. TBD Tank No. E75

IV. *Fittings Information*

Fitting Type	Fitting Status	Quantity	Kf	Quantity X Kf
Access Hatch (24-inch diameter well)	Bolted cover, gasketed	1	1.6	1.6
Access Hatch (24-inch diameter well)*	Unbolted cover, ungasketed*	0	36	0
Access Hatch (24-inch diameter well)*	Unbolted cover, gasketed*	0	31	0
Fixed roof support column well*	Round pipe, ungasketed sliding cover*	0	31	0
Fixed roof support column well*	Round pipe, gasketed sliding cover*	0	25	0
Fixed roof support column well	Round pipe, flexible fabric sleeve seal	0	10	0
Fixed roof support column well*	Built up column, ungasketed sliding cover*	0	51	0
Fixed roof support column well*	Built up column, gasketed sliding cover*	6	33	198
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover**	0	31	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover with pole sleeve**	0	25	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover**	1	25	25
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole wiper**	0	14	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole sleeve**	0	8.6	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover**	0	43	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover with float**	0	31	0
Slotted guide pole / sample well**	Gasketed sliding cover with pole wiper**	1	41	41
Slotted guide pole / sample well**	Gasketed sliding cover with pole sleeve**	0	11	0
Slotted guide pole / sample well**	wiper**	0	8.3	0
Slotted guide pole / sample well**	Gasketed sliding cover with float and pole wiper**	0	21	0
Slotted guide pole / sample well**	pole wiper**	0	11	0
Gauge float well (automatic gauge)*	Unbolted cover, ungasketed*	0	14	0
Gauge float well (automatic gauge)*	Unbolted cover, gasketed*	0	4.3	0
Gauge float well (automatic gauge)*	Bolted cover, gasketed*	1	2.8	2.8
Gauge hatch / sample port**	Weighted mechanical actuation, gasketed**	0	0.47	0
Gauge hatch / sample port**	Weighted mechanical actuation, ungasketed**	0	2.3	0
Gauge hatch / sample port	Slit fabric seal, 10% open area	1	12	12
Vacuum breaker*	Weighted mechanical actuation, ungasketed*	0	7.8	0
Vacuum breaker*	Weighted mechanical actuation, gasketed*	1	6.2	6.2
Stub drain (1-inch diameter)	Stub Drain	0	1.2	0
Deck leg (3-inch diameter)	Adjustable, internal floating deck	0	7.9	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - ungasketed**	0	2	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - gasketed**	15	1.3	19.5
Deck leg (3-inch diameter)**	Adjustable, pontoon area - sock**	0	1.2	0
Deck leg (3-inch diameter)**	Adjustable, center area - ungasketed**	0	0.82	0
Deck leg (3-inch diameter)**	Adjustable, center area - gasketed**	0	0.53	0
Deck leg (3-inch diameter)**	Adjustable, center area - sock**	0	0.49	0
Deck leg (3-inch diameter)**	Adjustable, double deck roofs**	0	0.82	0
Deck leg (3-inch diameter)	Fixed	0	0	0
Rim vent**	Weighted mechanical actuation, ungasketed**	0	0.68	0
Rim vent**	Weighted mechanical actuation, gasketed**	1	0.71	0.71
Ladder well*	Sliding cover, ungasketed*	0	98	0
Ladder well	Sliding cover, gasketed	1	56	56
Deck drain**	Open**	0	1.5	0
Deck drain**	90% closed**	1	1.8	1.8
	Total deck fitting loss factor lb-mole/year			364.61

* Fitting Factors from AP-42 Table 7.1-12 , ammended original Kf factors that were in place on table 7(d) 02-95

** additional fitting factors added by Zephyr as referenced in AP-42 Table 7.1-12

TABLE 7(d)

02-95

INTERNAL FLOATING ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. E76 4. Emission Point No. E19
5. FIN E76 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 105 ft.
   b. Diameter : 85.28 ft.
   c. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 12.68
   e. Net Throughput : 56,864,713 gallons/year.
   f. Maximum Pumping Rate : 92,121 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*
   g. Self-Supporting Roof ? Yes ❑ No ■
   h. Number of Columns : 6.00
   i. Column Diameter : 1 ft.

2. Shell/Roof and Paint Characteristics
   a. Shell Condition : Light Rust ■ Dense Rust ❑ Gunite Lining ❑
   b. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   c. Shell Condition : Good ■ Poor ❑
   d. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   e. Roof Condition : Good ■ Poor ❑

3. Rim-Seal System
   a. Primary Seal : Vapor Mounted ❑ Liquid-Mounted ❑ Mechanical Shoe ■
   b. Secondary Seal : Yes ■ No ❑

4. Deck Characteristics
   a. Deck Type: Bolted ❑ Welded ■
   b. Deck Construction (Bolted Tanks Only):
      Continuous Sheet Construction 5 ft. wide ❑
      Continuous Sheet Construction 6 ft. wide ❑
      Continuous Sheet Construction 7 ft. wide ❑
      Rectangular Panel Construction 5 X 7.5 ft. wide ❑
      Rectangular Panel Construction 5 X 12 ft. wide ❑
   c. Deck Seam Length *(Bolted Tanks Only)* : ft.

5. Roof Fitting Loss Factor: 364.61 lb-mole/year
   Based upon Typical ■ Controlled ❑ or Actual ❑ fittings
   Complete Section IV, Fittings Information, to record fittings count used to calculate the roof fitting loss factor.

Table 7(d) INTERNAL FLOATING ROOF TANK SUMMARY

Permit No. TBD Tank No. E76

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Paraxylene
   b. CAS Number: 106-42-3
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.24 psia.
   e. Liquid Molecular Weight: 106.17
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total Liquid	Percent of Total	Molecular

Permit No. TBD Tank No. E76

IV. *Fittings Information*

Fitting Type	Fitting Status	Quantity	Kf	Quantity X Kf
Access Hatch (24-inch diameter well)	Bolted cover, gasketed	1	1.6	1.6
Access Hatch (24-inch diameter well)*	Unbolted cover, ungasketed*	0	36	0
Access Hatch (24-inch diameter well)*	Unbolted cover, gasketed*	0	31	0
Fixed roof support column well*	Round pipe, ungasketed sliding cover*	0	31	0
Fixed roof support column well*	Round pipe, gasketed sliding cover*	0	25	0
Fixed roof support column well	Round pipe, flexible fabric sleeve seal	0	10	0
Fixed roof support column well*	Built up column, ungasketed sliding cover*	0	51	0
Fixed roof support column well*	Built up column, gasketed sliding cover*	6	33	198
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover**	0	31	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover with pole sleeve**	0	25	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover**	1	25	25
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole wiper**	0	14	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole sleeve**	0	8.6	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover**	0	43	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover with float**	0	31	0
Slotted guide pole / sample well**	Gasketed sliding cover with pole wiper**	1	41	41
Slotted guide pole / sample well**	Gasketed sliding cover with pole sleeve**	0	11	0
Slotted guide pole / sample well**	wiper**	0	8.3	0
Slotted guide pole / sample well**	Gasketed sliding cover with float and pole wiper**	0	21	0
Slotted guide pole / sample well**	pole wiper**	0	11	0
Gauge float well (automatic gauge)*	Unbolted cover, ungasketed*	0	14	0
Gauge float well (automatic gauge)*	Unbolted cover, gasketed*	0	4.3	0
Gauge float well (automatic gauge)*	Bolted cover, gasketed*	1	2.8	2.8
Gauge hatch / sample port**	Weighted mechanical actuation, gasketed**	0	0.47	0
Gauge hatch / sample port**	Weighted mechanical actuation, ungasketed**	0	2.3	0
Gauge hatch / sample port	Slit fabric seal, 10% open area	1	12	12
Vacuum breaker*	Weighted mechanical actuation, ungasketed*	0	7.8	0
Vacuum breaker*	Weighted mechanical actuation, gasketed*	1	6.2	6.2
Stub drain (1-inch diameter)	Stub Drain	0	1.2	0
Deck leg (3-inch diameter)	Adjustable, internal floating deck	0	7.9	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - ungasketed**	0	2	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - gasketed**	15	1.3	19.5
Deck leg (3-inch diameter)**	Adjustable, pontoon area - sock**	0	1.2	0
Deck leg (3-inch diameter)**	Adjustable, center area - ungasketed**	0	0.82	0
Deck leg (3-inch diameter)**	Adjustable, center area - gasketed**	0	0.53	0
Deck leg (3-inch diameter)**	Adjustable, center area - sock**	0	0.49	0
Deck leg (3-inch diameter)**	Adjustable, double deck roofs**	0	0.82	0
Deck leg (3-inch diameter)	Fixed	0	0	0
Rim vent**	Weighted mechanical actuation, ungasketed**	0	0.68	0
Rim vent**	Weighted mechanical actuation, gasketed**	1	0.71	0.71
Ladder well*	Sliding cover, ungasketed*	0	98	0
Ladder well	Sliding cover, gasketed	1	56	56
Deck drain**	Open**	0	1.5	0
Deck drain**	90% closed**	1	1.8	1.8
	Total deck fitting loss factor lb-mole/year			364.61

* Fitting Factors from AP-42 Table 7.1-12 , ammended original Kf factors that were in place on table 7(d) 02-95

** additional fitting factors added by Zephyr as referenced in AP-42 Table 7.1-12

TABLE 7(d)

02-95

INTERNAL FLOATING ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. F3 4. Emission Point No. E19
5. FIN F3 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 105 ft.
   b. Diameter : 85.28 ft.
   c. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 12.68
   e. Net Throughput : 56,864,713 gallons/year.
   f. Maximum Pumping Rate : 92,121 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*
   g. Self-Supporting Roof ? Yes ❑ No ■
   h. Number of Columns : 6.00
   i. Column Diameter : 1 ft.

2. Shell/Roof and Paint Characteristics
   a. Shell Condition : Light Rust ■ Dense Rust ❑ Gunite Lining ❑
   b. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   c. Shell Condition : Good ■ Poor ❑
   d. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   e. Roof Condition : Good ■ Poor ❑

3. Rim-Seal System
   a. Primary Seal : Vapor Mounted ❑ Liquid-Mounted ❑ Mechanical Shoe ■
   b. Secondary Seal : Yes ■ No ❑

4. Deck Characteristics
   a. Deck Type: Bolted ❑ Welded ■
   b. Deck Construction (Bolted Tanks Only):
      Continuous Sheet Construction 5 ft. wide ❑
      Continuous Sheet Construction 6 ft. wide ❑
      Continuous Sheet Construction 7 ft. wide ❑
      Rectangular Panel Construction 5 X 7.5 ft. wide ❑
      Rectangular Panel Construction 5 X 12 ft. wide ❑
   c. Deck Seam Length *(Bolted Tanks Only)* : ft.

5. Roof Fitting Loss Factor: 364.61 lb-mole/year
   Based upon Typical ■ Controlled ❑ or Actual ❑ fittings
   Complete Section IV, Fittings Information, to record fittings count used to calculate the roof fitting loss factor.

Table 7(d) INTERNAL FLOATING ROOF TANK SUMMARY

Page 2

Permit No. TBD Tank No. F3

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Paraxylene
   b. CAS Number: 106-42-3
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.24 psia.
   e. Liquid Molecular Weight: 106.17
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total Liquid	Percent of Total	Molecular

Permit No. TBD Tank No. F3

IV. *Fittings Information*

Fitting Type	Fitting Status	Quantity	Kf	Quantity X Kf
Access Hatch (24-inch diameter well)	Bolted cover, gasketed	1	1.6	1.6
Access Hatch (24-inch diameter well)*	Unbolted cover, ungasketed*	0	36	0
Access Hatch (24-inch diameter well)*	Unbolted cover, gasketed*	0	31	0
Fixed roof support column well*	Round pipe, ungasketed sliding cover*	0	31	0
Fixed roof support column well*	Round pipe, gasketed sliding cover*	0	25	0
Fixed roof support column well	Round pipe, flexible fabric sleeve seal	0	10	0
Fixed roof support column well*	Built up column, ungasketed sliding cover*	0	51	0
Fixed roof support column well*	Built up column, gasketed sliding cover*	6	33	198
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover**	0	31	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover with pole sleeve**	0	25	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover**	1	25	25
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole wiper**	0	14	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole sleeve**	0	8.6	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover**	0	43	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover with float**	0	31	0
Slotted guide pole / sample well**	Gasketed sliding cover with pole wiper**	1	41	41
Slotted guide pole / sample well**	Gasketed sliding cover with pole sleeve**	0	11	0
Slotted guide pole / sample well**	wiper**	0	8.3	0
Slotted guide pole / sample well**	Gasketed sliding cover with float and pole wiper**	0	21	0
Slotted guide pole / sample well**	pole wiper**	0	11	0
Gauge float well (automatic gauge)*	Unbolted cover, ungasketed*	0	14	0
Gauge float well (automatic gauge)*	Unbolted cover, gasketed*	0	4.3	0
Gauge float well (automatic gauge)*	Bolted cover, gasketed*	1	2.8	2.8
Gauge hatch / sample port**	Weighted mechanical actuation, gasketed**	0	0.47	0
Gauge hatch / sample port**	Weighted mechanical actuation, ungasketed**	0	2.3	0
Gauge hatch / sample port	Slit fabric seal, 10% open area	1	12	12
Vacuum breaker*	Weighted mechanical actuation, ungasketed*	0	7.8	0
Vacuum breaker*	Weighted mechanical actuation, gasketed*	1	6.2	6.2
Stub drain (1-inch diameter)	Stub Drain	0	1.2	0
Deck leg (3-inch diameter)	Adjustable, internal floating deck	0	7.9	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - ungasketed**	0	2	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - gasketed**	15	1.3	19.5
Deck leg (3-inch diameter)**	Adjustable, pontoon area - sock**	0	1.2	0
Deck leg (3-inch diameter)**	Adjustable, center area - ungasketed**	0	0.82	0
Deck leg (3-inch diameter)**	Adjustable, center area - gasketed**	0	0.53	0
Deck leg (3-inch diameter)**	Adjustable, center area - sock**	0	0.49	0
Deck leg (3-inch diameter)**	Adjustable, double deck roofs**	0	0.82	0
Deck leg (3-inch diameter)	Fixed	0	0	0
Rim vent**	Weighted mechanical actuation, ungasketed**	0	0.68	0
Rim vent**	Weighted mechanical actuation, gasketed**	1	0.71	0.71
Ladder well*	Sliding cover, ungasketed*	0	98	0
Ladder well	Sliding cover, gasketed	1	56	56
Deck drain**	Open**	0	1.5	0
Deck drain**	90% closed**	1	1.8	1.8
	Total deck fitting loss factor lb-mole/year			364.61

* Fitting Factors from AP-42 Table 7.1-12 , ammended original Kf factors that were in place on table 7(d) 02-95

** additional fitting factors added by Zephyr as referenced in AP-42 Table 7.1-12

TABLE 7(d)

02-95

INTERNAL FLOATING ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. F4 4. Emission Point No. E19
5. FIN F4 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 105 ft.
   b. Diameter : 85.28 ft.
   c. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 12.68
   e. Net Throughput : 56,864,713 gallons/year.
   f. Maximum Pumping Rate : 92,121 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*
   g. Self-Supporting Roof ? Yes ❑ No ■
   h. Number of Columns : 6.00
   i. Column Diameter : 1 ft.

2. Shell/Roof and Paint Characteristics
   a. Shell Condition : Light Rust ■ Dense Rust ❑ Gunite Lining ❑
   b. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   c. Shell Condition : Good ■ Poor ❑
   d. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   e. Roof Condition : Good ■ Poor ❑

3. Rim-Seal System
   a. Primary Seal : Vapor Mounted ❑ Liquid-Mounted ❑ Mechanical Shoe ■
   b. Secondary Seal : Yes ■ No ❑

4. Deck Characteristics
   a. Deck Type: Bolted ❑ Welded ■
   b. Deck Construction (Bolted Tanks Only):
      Continuous Sheet Construction 5 ft. wide ❑
      Continuous Sheet Construction 6 ft. wide ❑
      Continuous Sheet Construction 7 ft. wide ❑
      Rectangular Panel Construction 5 X 7.5 ft. wide ❑
      Rectangular Panel Construction 5 X 12 ft. wide ❑
   c. Deck Seam Length *(Bolted Tanks Only)* : ft.

5. Roof Fitting Loss Factor: 364.61 lb-mole/year
   Based upon Typical ■ Controlled ❑ or Actual ❑ fittings
   Complete Section IV, Fittings Information, to record fittings count used to calculate the roof fitting loss factor.

Table 7(d) INTERNAL FLOATING ROOF TANK SUMMARY

Page 2

Permit No. TBD Tank No. F4

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Paraxylene
   b. CAS Number: 106-42-3
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.24 psia.
   e. Liquid Molecular Weight: 106.17
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total Liquid	Percent of Total	Molecular

Permit No. TBD Tank No. F4

IV. *Fittings Information*

Fitting Type	Fitting Status	Quantity	Kf	Quantity X Kf
Access Hatch (24-inch diameter well)	Bolted cover, gasketed	1	1.6	1.6
Access Hatch (24-inch diameter well)*	Unbolted cover, ungasketed*	0	36	0
Access Hatch (24-inch diameter well)*	Unbolted cover, gasketed*	0	31	0
Fixed roof support column well*	Round pipe, ungasketed sliding cover*	0	31	0
Fixed roof support column well*	Round pipe, gasketed sliding cover*	0	25	0
Fixed roof support column well	Round pipe, flexible fabric sleeve seal	0	10	0
Fixed roof support column well*	Built up column, ungasketed sliding cover*	0	51	0
Fixed roof support column well*	Built up column, gasketed sliding cover*	6	33	198
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover**	0	31	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover with pole sleeve**	0	25	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover**	1	25	25
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole wiper**	0	14	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole sleeve**	0	8.6	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover**	0	43	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover with float**	0	31	0
Slotted guide pole / sample well**	Gasketed sliding cover with pole wiper**	1	41	41
Slotted guide pole / sample well**	Gasketed sliding cover with pole sleeve**	0	11	0
Slotted guide pole / sample well**	wiper**	0	8.3	0
Slotted guide pole / sample well**	Gasketed sliding cover with float and pole wiper**	0	21	0
Slotted guide pole / sample well**	pole wiper**	0	11	0
Gauge float well (automatic gauge)*	Unbolted cover, ungasketed*	0	14	0
Gauge float well (automatic gauge)*	Unbolted cover, gasketed*	0	4.3	0
Gauge float well (automatic gauge)*	Bolted cover, gasketed*	1	2.8	2.8
Gauge hatch / sample port**	Weighted mechanical actuation, gasketed**	0	0.47	0
Gauge hatch / sample port**	Weighted mechanical actuation, ungasketed**	0	2.3	0
Gauge hatch / sample port	Slit fabric seal, 10% open area	1	12	12
Vacuum breaker*	Weighted mechanical actuation, ungasketed*	0	7.8	0
Vacuum breaker*	Weighted mechanical actuation, gasketed*	1	6.2	6.2
Stub drain (1-inch diameter)	Stub Drain	0	1.2	0
Deck leg (3-inch diameter)	Adjustable, internal floating deck	0	7.9	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - ungasketed**	0	2	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - gasketed**	15	1.3	19.5
Deck leg (3-inch diameter)**	Adjustable, pontoon area - sock**	0	1.2	0
Deck leg (3-inch diameter)**	Adjustable, center area - ungasketed**	0	0.82	0
Deck leg (3-inch diameter)**	Adjustable, center area - gasketed**	0	0.53	0
Deck leg (3-inch diameter)**	Adjustable, center area - sock**	0	0.49	0
Deck leg (3-inch diameter)**	Adjustable, double deck roofs**	0	0.82	0
Deck leg (3-inch diameter)	Fixed	0	0	0
Rim vent**	Weighted mechanical actuation, ungasketed**	0	0.68	0
Rim vent**	Weighted mechanical actuation, gasketed**	1	0.71	0.71
Ladder well*	Sliding cover, ungasketed*	0	98	0
Ladder well	Sliding cover, gasketed	1	56	56
Deck drain**	Open**	0	1.5	0
Deck drain**	90% closed**	1	1.8	1.8
	Total deck fitting loss factor lb-mole/year			364.61

* Fitting Factors from AP-42 Table 7.1-12 , ammended original Kf factors that were in place on table 7(d) 02-95

** additional fitting factors added by Zephyr as referenced in AP-42 Table 7.1-12

TABLE 7(d)

02-95

INTERNAL FLOATING ROOF STORAGE TANK SUMMARY

I. Tank Identification *(Use a separate form for each tank).*

1. Applicant's Name: M&G Resins USA, LLC
2. Location *(indicate on plot plan and provide coordinates)*: See Plot Plan
3. Tank No. F5 4. Emission Point No. E19
5. FIN F5 CIN E19
6. Status: New tank ■ Altered Tank ❑ Relocation ❑ Change of Service ❑

Previous permit or exemption number(s) N/A

II. Tank Physical Characteristics

1. Dimensions
   a. Shell Height : 105 ft.
   b. Diameter : 85.28 ft.
   c. Nominal Capacity or Tank Volume : 4,484,500 gallons.
   d. Turnovers per year : 12.68
   e. Net Throughput : 56,864,713 gallons/year.
   f. Maximum Pumping Rate : 92,121 gallons/hour. *(Use the higher of the maximum fill rate or maximum withdrawal rate.)*
   g. Self-Supporting Roof ? Yes ❑ No ■
   h. Number of Columns : 6.00
   i. Column Diameter : 1 ft.

2. Shell/Roof and Paint Characteristics
   a. Shell Condition : Light Rust ■ Dense Rust ❑ Gunite Lining ❑
   b. Shell Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   c. Shell Condition : Good ■ Poor ❑
   d. Roof Color/Shade : White/White ■ Aluminum/Specular ❑ Aluminum/Diffuse ❑
      Gray/Light ❑ Gray/Medium ❑ Red/Primer ❑ Other ❑ (Describe)
   e. Roof Condition : Good ■ Poor ❑

3. Rim-Seal System
   a. Primary Seal : Vapor Mounted ❑ Liquid-Mounted ❑ Mechanical Shoe ■
   b. Secondary Seal : Yes ■ No ❑

4. Deck Characteristics
   a. Deck Type: Bolted ❑ Welded ■
   b. Deck Construction (Bolted Tanks Only):
      Continuous Sheet Construction 5 ft. wide ❑
      Continuous Sheet Construction 6 ft. wide ❑
      Continuous Sheet Construction 7 ft. wide ❑
      Rectangular Panel Construction 5 X 7.5 ft. wide ❑
      Rectangular Panel Construction 5 X 12 ft. wide ❑
   c. Deck Seam Length *(Bolted Tanks Only)* : ft.

5. Roof Fitting Loss Factor: 364.61 lb-mole/year
   Based upon Typical ■ Controlled ❑ or Actual ❑ fittings
   Complete Section IV, Fittings Information, to record fittings count used to calculate the roof fitting loss factor.

Table 7(d) INTERNAL FLOATING ROOF TANK SUMMARY

Page 2

Permit No. TBD Tank No. F5

III. Liquid Properties of Stored Material

1. Chemical Category: Organic Liquids ■ Petroleum Distillates ❑ Crude Oils ❑
2. Single or Multi-Component Liquid
   Single ■ *Complete Section III.3*
   Multiple ❑ *Complete Section III.4*
3. Single Component Information
   a. Chemical Name: Paraxylene
   b. CAS Number: 106-42-3
   c. Average Liquid Surface Temperature: 87.52 °F.
   d. True Vapor Pressure at Average Liquid Surface Temperature: 0.24 psia.
   e. Liquid Molecular Weight: 106.17
4. Multiple Component Information
   a. Mixture Name:
   b. Average Liquid Surface Temperature: °F.
   c. Minimum Liquid Surface Temperature: °F.
   d. Maximum Liquid Surface Temperature: °F.
   e. True Vapor Pressure at Average Liquid Surface Temperature: psia.
   f. True Vapor Pressure at Minimum Liquid Surface Temperature: psia.
   g. True Vapor Pressure at Maximum Liquid Surface Temperature: psia.
   h. Liquid Molecular Weight: mol
   i. Vapor Molecular Weight: mol

j. Chemical Components Information

Chemical Name	CAS Number	Percent of Total Liquid	Percent of Total	Molecular

Permit No. TBD Tank No. F5

IV. *Fittings Information*

Fitting Type	Fitting Status	Quantity	Kf	Quantity X Kf
Access Hatch (24-inch diameter well)	Bolted cover, gasketed	1	1.6	1.6
Access Hatch (24-inch diameter well)*	Unbolted cover, ungasketed*	0	36	0
Access Hatch (24-inch diameter well)*	Unbolted cover, gasketed*	0	31	0
Fixed roof support column well*	Round pipe, ungasketed sliding cover*	0	31	0
Fixed roof support column well*	Round pipe, gasketed sliding cover*	0	25	0
Fixed roof support column well	Round pipe, flexible fabric sleeve seal	0	10	0
Fixed roof support column well*	Built up column, ungasketed sliding cover*	0	51	0
Fixed roof support column well*	Built up column, gasketed sliding cover*	6	33	198
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover**	0	31	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Ungasketed sliding cover with pole sleeve**	0	25	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover**	1	25	25
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole wiper**	0	14	0
Unslotted guide pole and well (8-inch diameter unslotted pole, 21-inch diameter well)**	Gasketed sliding cover with pole sleeve**	0	8.6	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover**	0	43	0
Slotted guide pole / sample well**	Ungasketed or gasketed sliding cover with float**	0	31	0
Slotted guide pole / sample well**	Gasketed sliding cover with pole wiper**	1	41	41
Slotted guide pole / sample well**	Gasketed sliding cover with pole sleeve**	0	11	0
Slotted guide pole / sample well**	wiper**	0	8.3	0
Slotted guide pole / sample well**	Gasketed sliding cover with float and pole wiper**	0	21	0
Slotted guide pole / sample well**	pole wiper**	0	11	0
Gauge float well (automatic gauge)*	Unbolted cover, ungasketed*	0	14	0
Gauge float well (automatic gauge)*	Unbolted cover, gasketed*	0	4.3	0
Gauge float well (automatic gauge)*	Bolted cover, gasketed*	1	2.8	2.8
Gauge hatch / sample port**	Weighted mechanical actuation, gasketed**	0	0.47	0
Gauge hatch / sample port**	Weighted mechanical actuation, ungasketed**	0	2.3	0
Gauge hatch / sample port	Slit fabric seal, 10% open area	1	12	12
Vacuum breaker*	Weighted mechanical actuation, ungasketed*	0	7.8	0
Vacuum breaker*	Weighted mechanical actuation, gasketed*	1	6.2	6.2
Stub drain (1-inch diameter)	Stub Drain	0	1.2	0
Deck leg (3-inch diameter)	Adjustable, internal floating deck	0	7.9	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - ungasketed**	0	2	0
Deck leg (3-inch diameter)**	Adjustable, pontoon area - gasketed**	15	1.3	19.5
Deck leg (3-inch diameter)**	Adjustable, pontoon area - sock**	0	1.2	0
Deck leg (3-inch diameter)**	Adjustable, center area - ungasketed**	0	0.82	0
Deck leg (3-inch diameter)**	Adjustable, center area - gasketed**	0	0.53	0
Deck leg (3-inch diameter)**	Adjustable, center area - sock**	0	0.49	0
Deck leg (3-inch diameter)**	Adjustable, double deck roofs**	0	0.82	0
Deck leg (3-inch diameter)	Fixed	0	0	0
Rim vent**	Weighted mechanical actuation, ungasketed**	0	0.68	0
Rim vent**	Weighted mechanical actuation, gasketed**	1	0.71	0.71
Ladder well*	Sliding cover, ungasketed*	0	98	0
Ladder well	Sliding cover, gasketed	1	56	56
Deck drain**	Open**	0	1.5	0
Deck drain**	90% closed**	1	1.8	1.8
	Total deck fitting loss factor lb-mole/year			364.61

* Fitting Factors from AP-42 Table 7.1-12 , ammended original Kf factors that were in place on table 7(d) 02-95

** additional fitting factors added by Zephyr as referenced in AP-42 Table 7.1-12

Table 10
Cyclone Separators

EPN		Manufacturer & Model No. (if available)			
E4		TBD			
Name of Abatement Device		Type of Air Contaminants Controlled			
E4		Particulates			
Gas Stream Characteristics					
Flow Rate (acfm)		Gas Stream Temperature (°F)		Particulate Grain Loading (grain/scf)	
Design Maximum	Average Expected	Inlet	Outlet	Inlet	Outlet
82141.92	TBD	TBD	302	TBD	0.0087
Particulate Distribution					
Micron Range		Inlet		Outlet	
0.0 - 1.0				8.80%	
1.0 - 3.0					
3.0 - 5.0					
5.0 - 10.0					
10.0 - 20.0				3.30%	
>20.0				87.90%	

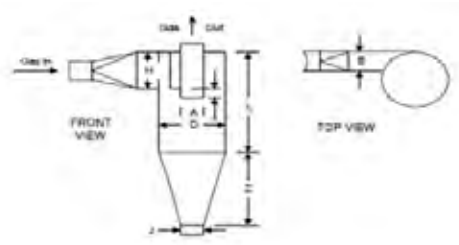
Cyclone Characteristics

Type of Cyclone:

- ❑ wet
- ❑ dry
- ❑ single
- ❑ dual
- ❑ quadruple
- ❑ multiclone

Give Dimensions of Cyclone (See example sketch):

1. B	in	5. Z	in
2. H	in	6. D	in
3. S	in	7. A	in
4. L	in	8. J	in



Method of Removal of Particulate from Cyclone

Pressure drop through cyclone (inches water):

Additional Information

On separate sheets attach the following:

A. Details regarding principle of operation

B. An assembly drawing (Front and Top View) of the abatement device dimensioned and to scale clearly showing the design, size and shape.
If the device has bypasses, safety valves, etc., include in the drawing and specify when such bypasses are to be used and under what conditions.

Table 10
Cyclone Separators

EPN		Manufacturer & Model No. (if available)			
E5		TBD			
Name of Abatement Device		Type of Air Contaminants Controlled			
E5		Particulates			
Gas Stream Characteristics					
Flow Rate (acfm)		Gas Stream Temperature (°F)		Particulate Grain Loading (grain/scf)	
Design Maximum	Average Expected	Inlet	Outlet	Inlet	Outlet
82141.92	TBD	TBD	302	TBD	0.0087

Particulate Distribution		
Micron Range	Inlet	Outlet
0.0 - 1.0		8.80%
1.0 - 3.0		
3.0 - 5.0		
5.0 - 10.0		
10.0 - 20.0		3.30%
>20.0		87.90%

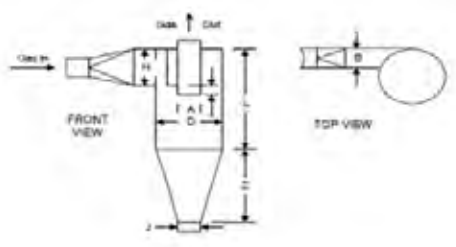
Cyclone Characteristics

Type of Cyclone:

❑ wet ❑ single ❑ quadruple
❑ dry ❑ dual ❑ multiclone

Give Dimensions of Cyclone (See example sketch):

1. B	in	5. Z	in
2. H	in	6. D	in
3. S	in	7. A	in
4. L	in	8. J	in



Method of Removal of Particulate from Cyclone

Pressure drop through cyclone (inches water):

Additional Information

On separate sheets attach the following:

A. Details regarding principle of operation

B. An assembly drawing (Front and Top View) of the abatement device dimensioned and to scale clearly showing the design, size and shape.
If the device has bypasses, safety valves, etc., include in the drawing and specify when such bypasses are to be used and under what conditions.

Table 10
Cyclone Separators

EPN		Manufacturer & Model No. (if available)			
E40		TBD			
Name of Abatement Device		Type of Air Contaminants Controlled			
E40		Particulates			
Gas Stream Characteristics					
Flow Rate (acfm)		Gas Stream Temperature (°F)		Particulate Grain Loading (grain/scf)	
Design Maximum	Average Expected	Inlet	Outlet	Inlet	Outlet
42377.60	TBD	TBD	302	TBD	0.0087

Particulate Distribution		
Micron Range	Inlet	Outlet
0.0 - 1.0		8.80%
1.0 - 3.0		
3.0 - 5.0		
5.0 - 10.0		
10.0 - 20.0		3.30%
>20.0		87.90%

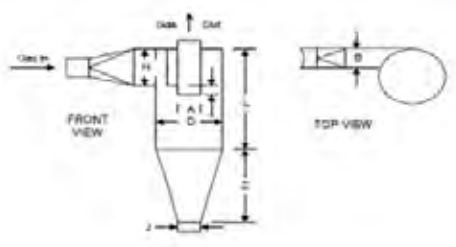
Cyclone Characteristics

Type of Cyclone:

❑ wet ❑ single ❑ quadruple
❑ dry ❑ dual ❑ multiclone

Give Dimensions of Cyclone (See example sketch):

1. B	in	5. Z	in
2. H	in	6. D	in
3. S	in	7. A	in
4. L	in	8. J	in



Method of Removal of Particulate from Cyclone

Pressure drop through cyclone (inches water):

Additional Information

On separate sheets attach the following:

A. Details regarding principle of operation

B. An assembly drawing (Front and Top View) of the abatement device dimensioned and to scale clearly showing the design, size and shape.
If the device has bypasses, safety valves, etc., include in the drawing and specify when such bypasses are to be used and under what conditions.

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E20			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT EVALUATION SILO 1			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2260	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E21			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT EVALUATION SILO 2			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2260	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

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Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E22			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT 1ST GRADE SILO 1A			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1836	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

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Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E23			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT 1ST GRADE SILO 1B			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1836	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E24			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT 1ST GRADE SILO 2A			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1836	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E25			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT 1ST GRADE SILO 2B			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1836	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E26			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from EVALUATION SILO 1			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1483	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E27			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from EVALUATION SILO 2			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1483	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E36			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from BAGGING SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1836	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E37			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from SSP SURGE BIN 1 SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2048	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E38			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from SSP SURGE BIN 2 SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2048	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E39			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELTER SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3237	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E41			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Air from MELT FLUID BED HEATER			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1624	TBD	302	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E60			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Drying air from CHIPPERS DRYER 1-5			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	4238	TBD	302	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E61			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Drying air from CHIPPERS DRYER 6-10			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	4238	TBD	302	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E28 or E29			
2.	Manufacturer and model number (if available):		TBD				
3.	Name of source(s) or equipment being controlled:		Conveying air vent from SSP FIRST 1A or 1B SILO				
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2613	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E30			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from SSP FIRST 2A SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2613	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E31			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from SSP FIRST 2B SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2613	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E32			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from JOLLY SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2613	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E33			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from SSP OFF SPEC			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2613	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E34			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT OFF SPEC SILO 1			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2260	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E35			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from MELT OFF SPEC SILO 2			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	2260	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E42			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from DEDUSTER SSP FIRST 1A			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3955	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E43			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from DEDUSTER SSP FIRST 1B SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3955	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E44			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from DEDUSTER SSP FIRST 2A SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3955	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E45			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from DEDUSTER SSP FIRST 2B SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3955	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E46			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from DEDUSTER JOLLY SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3955	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E47			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Conveying air vent from DEDUSTER SSP OFF SPEC			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	3955	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E80			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Air from PET railcars loading filter system			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1766	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

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1.	Emission Point Number and name (from Process Flow Diagram):			E81			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Air from PET railcars unloading filter system			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1177	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)		Bag Length (feet)		Total Number of Bags	
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD		TBD		TBD	
8.	Bag rows will be:	❑ Staggered		❑ Straight			
9.	Will walkways be provided between banks of bags?			❑ Yes		❑ No	
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:		$ TBD	Annual operating cost:		$ TBD	

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E82			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Air from PTA railcars loading filter system			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	589	TBD	77	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Comission on Environmental Quality
Table 11
Fabric Filters

Tables, checklists and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division (APD) Web stie at www.tnrcc.state.tx.us/permitting/airperm.

1.	Emission Point Number and name (from Process Flow Diagram):			E84			
2.	Manufacturer and model number (if available):			TBD			
3.	Name of source(s) or equipment being controlled:			Air from COLD CC FEEDING SILO			
4.	Type of particulate controlled:	Particulate					
5.	**GAS STREAM CHARACTERISTICS**						
	Design Maximum Flow Rate (acfm)	Average Expected Flow Rate (acfm)	Gas Stream Temperature (°F)	Particulate Grain Loading (grain/scf)			
	1766	TBD	140	Inlet:	TBD	Outlet:	0.008739915
	Pressure Drop (inches of H_2O)	Water Vapor Content of Effluent Stream (lb water/lb dry air)		Fan Requirements			
	TBD	TBD		hp:	TBD	ft^3/min:	TBD
6.	**PARTICULATE DISTRIBUTION (By Weight)**						
	Micron Range	Inlet (Percentage)		Outlet (Percentage)			
	0.0 - 1.0	3.00%		4.67%			
	1.0 - 3.0						
	3.0 - 5.0						
	5.0 - 10.0						
	10.0 - 20.0	97.00%		81.31%			
	>20.0						
7.	**FILTER CHARACTERISTICS**						
	Filtering Velocity (acfm/ft^2 of Cloth)	Bag Diameter (inches)	Bag Length (feet)	Total Number of Bags			
	Will meet 4 ft/min if mechanically cleaned or 7 ft/min if automatically air cleaned	TBD	TBD	TBD			
8.	Bag rows will be:	❑ Staggered	❑ Straight				
9.	Will walkways be provided between banks of bags?		❑ Yes		❑ No		
10.	Filtering material:	TBD					
11.	Describe bag cleaning method and cycle:	TBD					
12.	Capital installed cost:	$ TBD	Annual operating cost:	$ TBD			

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data			
Manufacturer: Caterpillar	Model No. C175-20 SCAC	Serial No.	Manufacture Date:
Rebuild Date:	No. of Cylinders 20	Compression Ratio: 15.3:1	EPN: E85-A

Application: ❑ Gas Compression ■ Electric Generation ❑ Refrigeration ❑ Emergency/Stand by

■ 4 Stroke Cycle ❑ 2 Stroke Cycle ❑ Carbureted ❑ Spark Ignited ❑ Dual Fuel ■ Fuel Injected

■ Diesel ❑ Naturally Aspirated ❑ Blower/Pump Scavenged ■ Turbo Charged and I.C. ❑ Turbo Charged

❑ Intercooled ❑ I.C. Water Temperature ■ Lean Burn ❑ Rich Burn

Ignition/Injection Timing:	Fixed:	Variable:
Manufacture Horsepower Rating:	5,361	Proposed Horsepower Rating: 5,361

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (°F)	Exit Velocity (FPS)

II. Fuel Data

Type of Fuel: ❑ Field Gas ❑ Landfill Gas ❑ LP Gas ❑ Natural Gas ❑ Digester Gas ■ Diesel

Fuel Consumption (BTU/bhp-hr): 5,894.05 Heat Value: 19,571.00 (HHV) 18,390.00 (LHV)

Sulfur Content (grains/100 scf - weight %): 15 PPM

III. Emission Factors (Before Control)

NOx		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	lb/ MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/ MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/ MMBtu	g/hp-hr	lb/ MMBtu
0.50		2.8		0.00E+00		1.4				0.149	

Source of Emission Factors: ■ Manufacturer Data ❑ AP-42 ❑ Other (specify): Tier 2 Standards

IV. Emission Factors (Post Control)

NOx		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	lb/ MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/ MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/ MMBtu	g/hp-hr	lb/ MMBtu

Method of Emission Control: ❑ NSCR Catalyst ■ Lean Operation ❑ Parameter Adjustment

❑ Stratified Charge ❑ JLCC Catalyst ❑ Other (specify): 0

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ❑ Yes ❑ No

V. Federal and State Standards (Check all that apply)

❑ NSPS JJJJ ■ MACT ZZZZ ■ NSPS IIII ❑ Title 30 Chapter 117 - List County:

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data.
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable).

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data

Manufacturer:	Model No.	Serial No.	Manufacture Date:
Caterpillar	3406 TA		
Rebuild Date:	No. of Cylinders:	Compression Ratio:	EPN:
	12	16.3:1	E87-A

Application: ❑ Gas Compression ❑ Electric Generation ❑ Refrigeration ■ Emergency/Stand by

■ 4 Stroke Cycle ❑ 2 Stroke Cycle ❑ Carbureted ❑ Spark Ignited ❑ Dual Fuel ■ Fuel Injected

■ Diesel ❑ Naturally Aspirated ❑ Blower/Pump Scavenged ■ Turbo Charged and I.C. ❑ Turbo Charged

❑ Intercooled ❑ I.C. Water Temperature ■ Lean Burn ❑ Rich Burn

Ignition/Injection Timing:	Fixed:	Variable:
Manufacture Horsepower Rating:	420	Proposed Horsepower Rating: 420

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (°F)	Exit Velocity (FPS)

II. Fuel Data

Type of Fuel: ❑ Field Gas ❑ Landfill Gas ❑ LP Gas ❑ Natural Gas ❑ Digester Gas ■ Diesel

Fuel Consumption (BTU/bhp-hr): 7,254.00 Heat Value: 19,571.00 (HHV) 18,390.00 (LHV)

Sulfur Content (grains/100 scf - weight %): 15 PPM

III. Emission Factors (Before Control)

NOx		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu
0.50		2.58		0.00E+00		2.4				0.149	

Source of Emission Factors: ■ Manufacturer Data ❑ AP-42 ■ Other (specify): Tier 2 Standards

IV. Emission Factors (Post Control)

NOx		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu	g/hp-hr	lb/MMBtu

Method of Emission Control: ❑ NSCR Catalyst ■ Lean Operation ❑ Parameter Adjustment

❑ Stratified Charge ❑ JLCC Catalyst ❑ Other (specify): 0

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ❑ Yes ❑ No

V. Federal and State Standards (Check all that apply)

❑ NSPS JJJJ ■ MACT ZZZZ ■ NSPS IIII ❑ Title 30 Chapter 117 - List County:

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data.
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable).

APPENDIX D
PSD NETTING TABLES

TABLE 1F
AIR QUALITY APPLICATION SUPPLEMENT

Permit No.:	TBD	Application Submittal Date:	February 2013
Company	M&G Resins USA, LLC		
RN:		Facility Location:	
City		County:	
Permit Unit I.D.:	Various	Permit Name:	PET Plant
Permit Activity:	☑ New Major Source	☐ Modification	
Project or Process Description: New PET plant, PTA plant, and new combined cycle turbines			

Complete for all pollutants with a project emission increase.	POLLUTANTS							
	Ozone		CO	PM	PM_{10}	$PM_{2.5}$	SO_2	H2SO4
	VOC	NOx						
Nonattainment?[1] (yes or no)	No	No	No	No	No	No	No	No
Existing site PTE (tpy)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Proposed project increases from M&G (tpy from 2F)[2]	286.78	43.07	386.08	69.11	21.25	21.25	23.61	0.00
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	Yes	Yes	Yes	Yes	No	No
If netting required, estimated start of construction:	N/A							
5 years prior to start of construction:	N/A	Contemporaneous						
Estimated start of operation:	8/1/14	Period						
Net contemporaneous change, including proposed project, from Table 3F (tpy)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FNSR applicable? (yes or no)	Yes	Yes	Yes	Yes	Yes	Yes	No	No

1. 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).
2. Sum of proposed emissions minus baseline emissions, increases only. Nonattainment thresholds are found in Table 1 in 30 TAC 116.12(11) and PSD thresholds in 40 CFR §51.166(b)(23).

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

Signature | MANUFACTURING DIRECTOR (Title) | 02/21/2013 (Date)

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	VOC	**Permit:**	TBD
Baseline Period:	N/A **to**		

	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]
				A	**B**					
1	PTA, E1 and E2	E1 and E2				165.7195		165.7195		165.7195
2	E4	E4				0.0000		0.0000		0.0000
3	E5	E5				0.0000		0.0000		0.0000
4	E7-A	E7-A				3.0231		3.0231		3.0231
5	E7-B	E7-B				3.0231		3.0231		3.0231
6	E7-C	E7-C				3.0231		3.0231		3.0231
7	E7-D, PET, WWTP	E7-D				83.3808		83.3808		83.3808
8	E17	E17				26.0550		26.0550		26.0550
9	E71	E19				0.0029		0.0029		0.0029
10	E72	E19				0.0029		0.0029		0.0029
11	F6	E19				0.0029		0.0029		0.0029
12	E73	E19				0.0000		0.0000		0.0000
13	E74	E19				0.1356		0.1356		0.1356
14	E75	E19				0.0144		0.0144		0.0144
15	E76	E19				0.0144		0.0144		0.0144
16	E83	E19				0.0000		0.0000		0.0000
17	F3	E19				0.0144		0.0144		0.0144
18	F4	E19				0.0144		0.0144		0.0144

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	VOC					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
19	F5	E19				0.0144		0.0144		0.0144
20	E20	E20				0.0000		0.0000		0.0000
21	E21	E21				0.0000		0.0000		0.0000
22	E22	E22				0.0000		0.0000		0.0000
23	E23	E23				0.0000		0.0000		0.0000
24	E24	E24				0.0000		0.0000		0.0000
25	E25	E25				0.0000		0.0000		0.0000
26	E26	E26				0.0000		0.0000		0.0000
27	E27	E27				0.0000		0.0000		0.0000
28	E28 or E29	E28 or E29				0.0000		0.0000		0.0000
29	E30	E30				0.0000		0.0000		0.0000
30	E31	E31				0.0000		0.0000		0.0000
31	E32	E32				0.0000		0.0000		0.0000
32	E33	E33				0.0000		0.0000		0.0000
33	E34	E34				0.0000		0.0000		0.0000
34	E35	E35				0.0000		0.0000		0.0000
35	E36	E36				0.0000		0.0000		0.0000
36	E37	E37				0.0000		0.0000		0.0000
37	E38	E38				0.0000		0.0000		0.0000
38	E39	E39				0.0000		0.0000		0.0000
39	E40	E40				0.0000		0.0000		0.0000
40	E41	E41				0.0000		0.0000		0.0000
41	E42	E42				0.0000		0.0000		0.0000

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	VOC					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
42	E43	E43				0.0000		0.0000		0.0000
43	E44	E44				0.0000		0.0000		0.0000
44	E45	E45				0.0000		0.0000		0.0000
45	E46	E46				0.0000		0.0000		0.0000
46	E47	E47				0.0000		0.0000		0.0000
47	E48	E48				0.0001		0.0001		0.0001
48	E49	E49				0.0001		0.0001		0.0001
49	E50	E50				0.0001		0.0001		0.0001
50	E51	E51				0.0001		0.0001		0.0001
51	E52	E52				0.0000		0.0000		0.0000
52	E53	E53				0.0000		0.0000		0.0000
53	E54	E54				0.0000		0.0000		0.0000
54	E55	E55				0.0000		0.0000		0.0000
55	E56	E56				0.0001		0.0001		0.0001
56	E57	E57				0.0001		0.0001		0.0001
57	E58	E58				0.0000		0.0000		0.0000
58	E59	E59				0.0000		0.0000		0.0000
59	E60	E60				0.0000		0.0000		0.0000
60	E61	E61				0.0000		0.0000		0.0000
61	E62	E62				0.0029		0.0029		0.0029
62	E63	E63				0.0015		0.0015		0.0015
63	E64	E64				0.0000		0.0000		0.0000
64	E65	E65				0.0020		0.0020		0.0020

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	VOC					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
65	E66	E66				0.0018		0.0018		0.0018
66	E67	E67				0.0021		0.0021		0.0021
67	E68	E68				0.0000		0.0000		0.0000
68	E69	E69				0.0021		0.0021		0.0021
69	E70	E70				0.0000		0.0000		0.0000
70	E77	E77				0.0048		0.0048		0.0048
71	E78	E78				1.4484		1.4484		1.4484
72	E79	E79				0.0000		0.0000		0.0000
73	E80	E80				0.0000		0.0000		0.0000
74	E81	E81				0.0000		0.0000		0.0000
75	E82	E82				0.0000		0.0000		0.0000
76	E84	E84				0.0000		0.0000		0.0000
77	E85-A	E85-A				0.4277		0.4277		0.4277
78	E85-B	E85-B				0.4277		0.4277		0.4277
79	E86	E86				0.0014		0.0014		0.0014
80	E87-A	E87-A				0.0074		0.0074		0.0074
81	E87-B	E87-B				0.0074		0.0074		0.0074
82	E88	E88				0.0004		0.0004		0.0004
83	FLARE, WWTP	FLARE				0.0016		0.0016		0.0016
84	FUGPTA and FUGPET	FUGPTA and FUGPET				16.1613		16.1613		16.1613
										302.94

TABLE 2F
PROJECT EMISSION INCREASE

ıtant[1]:	NOx	**Permit:**	TBD
line Period:	N/A **to**		

				A	B				
fected or Modified Facilities[2]		**Permit No.**	**Actual Emissions[3]**	**Baseline Emissions[4]**	**Proposed Emissions[5]**	**Projected Actual Emissions**	**Difference (B - A) [6]**	**Correction[7]**	**Project Increase[8]**
FIN	**EPN**								
PTA, E1 and E2	E1 and E2				14.8680		14.8680		14.8680
E4	E4				0.0000		0.0000		0.0000
E5	E5				0.0000		0.0000		0.0000
E7-A	E7-A				5.6064		5.6064		5.6064
E7-B	E7-B				5.6064		5.6064		5.6064
E7-C	E7-C				5.6064		5.6064		5.6064
E7-D, PET, WWTP	E7-D				5.6064		5.6064		5.6064
E17	E17				0.0000		0.0000		0.0000
E71	E19				0.0000		0.0000		0.0000
E72	E19				0.0000		0.0000		0.0000
F6	E19				0.0000		0.0000		0.0000
E73	E19				0.0000		0.0000		0.0000
E74	E19				0.0000		0.0000		0.0000
E75	E19				0.0000		0.0000		0.0000
E76	E19				0.0000		0.0000		0.0000
E83	E19				0.0000		0.0000		0.0000
F3	E19				0.0000		0.0000		0.0000
F4	E19				0.0000		0.0000		0.0000

TABLE 2F
PROJECT EMISSION INCREASE

ıtant[(1)]:	NOx				**Permit:**	TBD			
line Period:	N/A	**to**							
F5	E19				0.0000		0.0000		0.0000
E20	E20				0.0000		0.0000		0.0000
E21	E21				0.0000		0.0000		0.0000
E22	E22				0.0000		0.0000		0.0000
E23	E23				0.0000		0.0000		0.0000
E24	E24				0.0000		0.0000		0.0000
E25	E25				0.0000		0.0000		0.0000
E26	E26				0.0000		0.0000		0.0000
E27	E27				0.0000		0.0000		0.0000
E28 or E29	E28 or E29				0.0000		0.0000		0.0000
E30	E30				0.0000		0.0000		0.0000
E31	E31				0.0000		0.0000		0.0000
E32	E32				0.0000		0.0000		0.0000
E33	E33				0.0000		0.0000		0.0000
E34	E34				0.0000		0.0000		0.0000
E35	E35				0.0000		0.0000		0.0000
E36	E36				0.0000		0.0000		0.0000
E37	E37				0.0000		0.0000		0.0000
E38	E38				0.0000		0.0000		0.0000
E39	E39				0.0000		0.0000		0.0000
E40	E40				0.0000		0.0000		0.0000
E41	E41				0.0000		0.0000		0.0000
E42	E42				0.0000		0.0000		0.0000

TABLE 2F
PROJECT EMISSION INCREASE

ıtant[(1)]:	NOx				**Permit:**	TBD			
line Period:	N/A	**to**							
E43	E43				0.0000		0.0000		0.0000
E44	E44				0.0000		0.0000		0.0000
E45	E45				0.0000		0.0000		0.0000
E46	E46				0.0000		0.0000		0.0000
E47	E47				0.0000		0.0000		0.0000
E48	E48				0.0000		0.0000		0.0000
E49	E49				0.0000		0.0000		0.0000
E50	E50				0.0000		0.0000		0.0000
E51	E51				0.0000		0.0000		0.0000
E52	E52				0.0000		0.0000		0.0000
E53	E53				0.0000		0.0000		0.0000
E54	E54				0.0000		0.0000		0.0000
E55	E55				0.0000		0.0000		0.0000
E56	E56				0.0000		0.0000		0.0000
E57	E57				0.0000		0.0000		0.0000
E58	E58				0.0000		0.0000		0.0000
E59	E59				0.0000		0.0000		0.0000
E60	E60				0.0000		0.0000		0.0000
E61	E61				0.0000		0.0000		0.0000
E62	E62				0.0000		0.0000		0.0000
E63	E63				0.0000		0.0000		0.0000
E64	E64				0.0000		0.0000		0.0000
E65	E65				0.0000		0.0000		0.0000

TABLE 2F
PROJECT EMISSION INCREASE

ıtant[(1)]: NOx **Permit:** TBD

line Period: N/A **to**

E66	E66				0.0000		0.0000		0.0000
E67	E67				0.0000		0.0000		0.0000
E68	E68				0.0000		0.0000		0.0000
E69	E69				0.0000		0.0000		0.0000
E70	E70				0.0000		0.0000		0.0000
E77	E77				0.0000		0.0000		0.0000
E78	E78				0.0000		0.0000		0.0000
E79	E79				0.0000		0.0000		0.0000
E80	E80				0.0000		0.0000		0.0000
E81	E81				0.0000		0.0000		0.0000
E82	E82				0.0000		0.0000		0.0000
E84	E84				0.0000		0.0000		0.0000
E85-A	E85-A				2.3942		2.3942		2.3942
E85-B	E85-B				2.3942		2.3942		2.3942
E86	E86				0.0000		0.0000		0.0000
E87-A	E87-A				0.1778		0.1778		0.1778
E87-B	E87-B				0.1778		0.1778		0.1778
E88	E88				0.0000		0.0000		0.0000
FLARE, WWTP	FLARE				0.6327		0.6327		0.6327
FUGPTA and FUGPET	FUGPTA and FUGPET				0.0000		0.0000		0.0000
									43.07

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TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	CO	**Permit:**	TBD
Baseline Period:	N/A **to**		

						A	B				
	Affected or Modified Facilities[2]		**Permit No.**	**Actual Emissions[3]**	**Baseline Emissions[4]**	**Proposed Emissions[5]**	**Projected Actual Emissions**	**Difference (B - A) [6]**	**Correction[7]**	**Project Increase[8]**	
	FIN	**EPN**									
1	PTA, E1 and E2	E1 and E2				195.7223		195.7223		195.7223	
2	E4	E4				0.0000		0.0000		0.0000	
3	E5	E5				0.0000		0.0000		0.0000	
4	E7-A	E7-A				46.1704		46.1704		46.1704	
5	E7-B	E7-B				46.1704		46.1704		46.1704	
6	E7-C	E7-C				46.1704		46.1704		46.1704	
7	E7-D, PET, WWTP	E7-D				46.1704		46.1704		46.1704	
8	E17	E17				0.0000		0.0000		0.0000	
9	E71	E19				0.0000		0.0000		0.0000	
10	E72	E19				0.0000		0.0000		0.0000	
11	F6	E19				0.0000		0.0000		0.0000	
12	E73	E19				0.0000		0.0000		0.0000	
13	E74	E19				0.0000		0.0000		0.0000	
14	E75	E19				0.0000		0.0000		0.0000	
15	E76	E19				0.0000		0.0000		0.0000	
16	E83	E19				0.0000		0.0000		0.0000	
17	F3	E19				0.0000		0.0000		0.0000	
18	F4	E19				0.0000		0.0000		0.0000	

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	CO					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
19	F5	E19				0.0000		0.0000		0.0000
20	E20	E20				0.0000		0.0000		0.0000
21	E21	E21				0.0000		0.0000		0.0000
22	E22	E22				0.0000		0.0000		0.0000
23	E23	E23				0.0000		0.0000		0.0000
24	E24	E24				0.0000		0.0000		0.0000
25	E25	E25				0.0000		0.0000		0.0000
26	E26	E26				0.0000		0.0000		0.0000
27	E27	E27				0.0000		0.0000		0.0000
28	E28 or E29	E28 or E29				0.0000		0.0000		0.0000
29	E30	E30				0.0000		0.0000		0.0000
30	E31	E31				0.0000		0.0000		0.0000
31	E32	E32				0.0000		0.0000		0.0000
32	E33	E33				0.0000		0.0000		0.0000
33	E34	E34				0.0000		0.0000		0.0000
34	E35	E35				0.0000		0.0000		0.0000
35	E36	E36				0.0000		0.0000		0.0000
36	E37	E37				0.0000		0.0000		0.0000
37	E38	E38				0.0000		0.0000		0.0000
38	E39	E39				0.0000		0.0000		0.0000
39	E40	E40				0.0000		0.0000		0.0000
40	E41	E41				0.0000		0.0000		0.0000
41	E42	E42				0.0000		0.0000		0.0000

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	CO					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
42	E43	E43				0.0000		0.0000		0.0000
43	E44	E44				0.0000		0.0000		0.0000
44	E45	E45				0.0000		0.0000		0.0000
45	E46	E46				0.0000		0.0000		0.0000
46	E47	E47				0.0000		0.0000		0.0000
47	E48	E48				0.0000		0.0000		0.0000
48	E49	E49				0.0000		0.0000		0.0000
49	E50	E50				0.0000		0.0000		0.0000
50	E51	E51				0.0000		0.0000		0.0000
51	E52	E52				0.0000		0.0000		0.0000
52	E53	E53				0.0000		0.0000		0.0000
53	E54	E54				0.0000		0.0000		0.0000
54	E55	E55				0.0000		0.0000		0.0000
55	E56	E56				0.0000		0.0000		0.0000
56	E57	E57				0.0000		0.0000		0.0000
57	E58	E58				0.0000		0.0000		0.0000
58	E59	E59				0.0000		0.0000		0.0000
59	E60	E60				0.0000		0.0000		0.0000
60	E61	E61				0.0000		0.0000		0.0000
61	E62	E62				0.0000		0.0000		0.0000
62	E63	E63				0.0000		0.0000		0.0000
63	E64	E64				0.0000		0.0000		0.0000
64	E65	E65				0.0000		0.0000		0.0000

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	CO					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
65	E66	E66				0.0000		0.0000		0.0000
66	E67	E67				0.0000		0.0000		0.0000
67	E68	E68				0.0000		0.0000		0.0000
68	E69	E69				0.0000		0.0000		0.0000
69	E70	E70				0.0000		0.0000		0.0000
70	E77	E77				0.0000		0.0000		0.0000
71	E78	E78				0.0000		0.0000		0.0000
72	E79	E79				0.0000		0.0000		0.0000
73	E80	E80				0.0000		0.0000		0.0000
74	E81	E81				0.0000		0.0000		0.0000
75	E82	E82				0.0000		0.0000		0.0000
76	E84	E84				0.0000		0.0000		0.0000
77	E85-A	E85-A				1.5432		1.5432		1.5432
78	E85-B	E85-B				1.5432		1.5432		1.5432
79	E86	E86				0.0000		0.0000		0.0000
80	E87-A	E87-A				0.0345		0.0345		0.0345
81	E87-B	E87-B				0.0345		0.0345		0.0345
82	E88	E88				0.0000		0.0000		0.0000
83	FLARE, WWTP	FLARE				2.5199		2.5199		2.5199
84	FUGPTA and FUGPET	FUGPTA and FUGPET				0.0016		0.0016		0.0016
										386.08

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	PM10	**Permit:**	TBD
Baseline Period:	N/A **to**		

						A	B				
	Affected or Modified Facilities[2]		**Permit No.**	**Actual Emissions[3]**	**Baseline Emissions[4]**	**Proposed Emissions[5]**	**Projected Actual Emissions**	**Difference (B - A) [6]**	**Correction[7]**	**Project Increase[8]**	
	FIN	**EPN**									
1	PTA, E1 and E2	E1 and E2				0.5539		0.5539		0.5539	
2	E4	E4				1.6432		1.6432		1.6432	
3	E5	E5				1.6432		1.6432		1.6432	
4	E7-A	E7-A				4.1773		4.1773		4.1773	
5	E7-B	E7-B				4.1773		4.1773		4.1773	
6	E7-C	E7-C				4.1773		4.1773		4.1773	
7	E7-D, PET, WWTP	E7-D				4.1773		4.1773		4.1773	
8	E17	E17				0.0313		0.0313		0.0313	
9	E71	E19				0.0000		0.0000		0.0000	
10	E72	E19				0.0000		0.0000		0.0000	
11	F6	E19				0.0000		0.0000		0.0000	
12	E73	E19				0.0000		0.0000		0.0000	
13	E74	E19				0.0000		0.0000		0.0000	
14	E75	E19				0.0000		0.0000		0.0000	
15	E76	E19				0.0000		0.0000		0.0000	
16	E83	E19				0.0000		0.0000		0.0000	
17	F3	E19				0.0000		0.0000		0.0000	
18	F4	E19				0.0000		0.0000		0.0000	

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	PM10					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
19	F5	E19				0.0000		0.0000		0.0000
20	E20	E20				0.0196		0.0196		0.0196
21	E21	E21				0.0196		0.0196		0.0196
22	E22	E22				0.0080		0.0080		0.0080
23	E23	E23				0.0080		0.0080		0.0080
24	E24	E24				0.0080		0.0080		0.0080
25	E25	E25				0.0080		0.0080		0.0080
26	E26	E26				0.0128		0.0128		0.0128
27	E27	E27				0.0128		0.0128		0.0128
28	E28 or E29	E28 or E29				0.0226		0.0226		0.0226
29	E30	E30				0.0113		0.0113		0.0113
30	E31	E31				0.0113		0.0113		0.0113
31	E32	E32				0.0011		0.0011		0.0011
32	E33	E33				0.0005		0.0005		0.0005
33	E34	E34				0.0004		0.0004		0.0004
34	E35	E35				0.0004		0.0004		0.0004
35	E36	E36				0.0008		0.0008		0.0008
36	E37	E37				0.0177		0.0177		0.0177
37	E38	E38				0.0177		0.0177		0.0177
38	E39	E39				0.0280		0.0280		0.0280
39	E40	E40				0.0426		0.0426		0.0426
40	E41	E41				0.0006		0.0006		0.0006
41	E42	E42				0.0291		0.0291		0.0291

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]: PM10						**Permit:** TBD				
Baseline Period: N/A		**to**								
42	E43	E43				0.0291		0.0291		0.0291
43	E44	E44				0.0291		0.0291		0.0291
44	E45	E45				0.0291		0.0291		0.0291
45	E46	E46				0.0038		0.0038		0.0038
46	E47	E47				0.0019		0.0019		0.0019
47	E48	E48				0.0000		0.0000		0.0000
48	E49	E49				0.0000		0.0000		0.0000
49	E50	E50				0.0000		0.0000		0.0000
50	E51	E51				0.0000		0.0000		0.0000
51	E52	E52				0.0000		0.0000		0.0000
52	E53	E53				0.0000		0.0000		0.0000
53	E54	E54				0.0000		0.0000		0.0000
54	E55	E55				0.0000		0.0000		0.0000
55	E56	E56				0.0000		0.0000		0.0000
56	E57	E57				0.0000		0.0000		0.0000
57	E58	E58				0.0000		0.0000		0.0000
58	E59	E59				0.0000		0.0000		0.0000
59	E60	E60				0.0289		0.0289		0.0289
60	E61	E61				0.0289		0.0289		0.0289
61	E62	E62				0.0000		0.0000		0.0000
62	E63	E63				0.0000		0.0000		0.0000
63	E64	E64				0.0000		0.0000		0.0000
64	E65	E65				0.0000		0.0000		0.0000

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	PM10					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
65	E66	E66				0.0000		0.0000		0.0000
66	E67	E67				0.0000		0.0000		0.0000
67	E68	E68				0.0000		0.0000		0.0000
68	E69	E69				0.0000		0.0000		0.0000
69	E70	E70				0.0000		0.0000		0.0000
70	E77	E77				0.0000		0.0000		0.0000
71	E78	E78				0.0000		0.0000		0.0000
72	E79	E79				0.0000		0.0000		0.0000
73	E80	E80				0.0171		0.0171		0.0171
74	E81	E81				0.0006		0.0006		0.0006
75	E82	E82				0.0057		0.0057		0.0057
76	E84	E84				0.0008		0.0008		0.0008
77	E85-A	E85-A				0.0882		0.0882		0.0882
78	E85-B	E85-B				0.0882		0.0882		0.0882
79	E86	E86				0.0000		0.0000		0.0000
80	E87-A	E87-A				0.0042		0.0042		0.0042
81	E87-B	E87-B				0.0042		0.0042		0.0042
82	E88	E88				0.0000		0.0000		0.0000
83	FLARE, WWTP	FLARE				0.0342		0.0342		0.0342
84	FUGPTA and FUGPET	FUGPTA and FUGPET				0.0000		0.0000		0.0000
										21.26

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	PM 2.5	**Permit:**	TBD
Baseline Period:	N/A **to**		

					A	B				
	Affected or Modified Facilities[2]		**Permit No.**	**Actual Emissions[3]**	**Baseline Emissions[4]**	**Proposed Emissions[5]**	**Projected Actual Emissions**	**Difference (B - A) [6]**	**Correction[7]**	**Project Increase[8]**
	FIN	**EPN**								
1	PTA, E1 and E2	E1 and E2				0.5539		0.5539		0.5539
2	E4	E4				1.6432		1.6432		1.6432
3	E5	E5				1.6432		1.6432		1.6432
4	E7-A	E7-A				4.1773		4.1773		4.1773
5	E7-B	E7-B				4.1773		4.1773		4.1773
6	E7-C	E7-C				4.1773		4.1773		4.1773
7	E7-D, PET, WWTP	E7-D				4.1773		4.1773		4.1773
8	E17	E17				0.0284		0.0284		0.0284
9	E71	E19				0.0000		0.0000		0.0000
10	E72	E19				0.0000		0.0000		0.0000
11	F6	E19				0.0000		0.0000		0.0000
12	E73	E19				0.0000		0.0000		0.0000
13	E74	E19				0.0000		0.0000		0.0000
14	E75	E19				0.0000		0.0000		0.0000
15	E76	E19				0.0000		0.0000		0.0000
16	E83	E19				0.0000		0.0000		0.0000
17	F3	E19				0.0000		0.0000		0.0000
18	F4	E19				0.0000		0.0000		0.0000

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	PM 2.5					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
19	F5	E19				0.0000		0.0000		0.0000
20	E20	E20				0.0196		0.0196		0.0196
21	E21	E21				0.0196		0.0196		0.0196
22	E22	E22				0.0080		0.0080		0.0080
23	E23	E23				0.0080		0.0080		0.0080
24	E24	E24				0.0080		0.0080		0.0080
25	E25	E25				0.0080		0.0080		0.0080
26	E26	E26				0.0128		0.0128		0.0128
27	E27	E27				0.0128		0.0128		0.0128
28	E28 or E29	E28 or E29				0.0226		0.0226		0.0226
29	E30	E30				0.0113		0.0113		0.0113
30	E31	E31				0.0113		0.0113		0.0113
31	E32	E32				0.0011		0.0011		0.0011
32	E33	E33				0.0005		0.0005		0.0005
33	E34	E34				0.0004		0.0004		0.0004
34	E35	E35				0.0004		0.0004		0.0004
35	E36	E36				0.0008		0.0008		0.0008
36	E37	E37				0.0177		0.0177		0.0177
37	E38	E38				0.0177		0.0177		0.0177
38	E39	E39				0.0280		0.0280		0.0280
39	E40	E40				0.0426		0.0426		0.0426
40	E41	E41				0.0006		0.0006		0.0006
41	E42	E42				0.0291		0.0291		0.0291

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	PM 2.5					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
42	E43	E43				0.0291		0.0291		0.0291
43	E44	E44				0.0291		0.0291		0.0291
44	E45	E45				0.0291		0.0291		0.0291
45	E46	E46				0.0038		0.0038		0.0038
46	E47	E47				0.0019		0.0019		0.0019
47	E48	E48				0.0000		0.0000		0.0000
48	E49	E49				0.0000		0.0000		0.0000
49	E50	E50				0.0000		0.0000		0.0000
50	E51	E51				0.0000		0.0000		0.0000
51	E52	E52				0.0000		0.0000		0.0000
52	E53	E53				0.0000		0.0000		0.0000
53	E54	E54				0.0000		0.0000		0.0000
54	E55	E55				0.0000		0.0000		0.0000
55	E56	E56				0.0000		0.0000		0.0000
56	E57	E57				0.0000		0.0000		0.0000
57	E58	E58				0.0000		0.0000		0.0000
58	E59	E59				0.0000		0.0000		0.0000
59	E60	E60				0.0289		0.0289		0.0289
60	E61	E61				0.0289		0.0289		0.0289
61	E62	E62				0.0000		0.0000		0.0000
62	E63	E63				0.0000		0.0000		0.0000
63	E64	E64				0.0000		0.0000		0.0000
64	E65	E65				0.0000		0.0000		0.0000

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	PM 2.5					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
65	E66	E66				0.0000		0.0000		0.0000
66	E67	E67				0.0000		0.0000		0.0000
67	E68	E68				0.0000		0.0000		0.0000
68	E69	E69				0.0000		0.0000		0.0000
69	E70	E70				0.0000		0.0000		0.0000
70	E77	E77				0.0000		0.0000		0.0000
71	E78	E78				0.0000		0.0000		0.0000
72	E79	E79				0.0000		0.0000		0.0000
73	E80	E80				0.0171		0.0171		0.0171
74	E81	E81				0.0006		0.0006		0.0006
75	E82	E82				0.0057		0.0057		0.0057
76	E84	E84				0.0008		0.0008		0.0008
77	E85-A	E85-A				0.0882		0.0882		0.0882
78	E85-B	E85-B				0.0882		0.0882		0.0882
79	E86	E86				0.0000		0.0000		0.0000
80	E87-A	E87-A				0.0042		0.0042		0.0042
81	E87-B	E87-B				0.0042		0.0042		0.0042
82	E88	E88				0.0000		0.0000		0.0000
83	FLARE, WWTP	FLARE				0.0342		0.0342		0.0342
84	FUGPTA and FUGPET	FUGPTA and FUGPET				0.0000		0.0000		0.0000
										21.25

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	SO2	**Permit:**	TBD
Baseline Period:	N/A **to**		

	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]
				A	B					
1	PTA, E1 and E2	E1 and E2				0.4122		0.4122		0.4122
2	E4	E4				0.0000		0.0000		0.0000
3	E5	E5				0.0000		0.0000		0.0000
4	E7-A	E7-A				1.6489		1.6489		1.6489
5	E7-B	E7-B				1.6489		1.6489		1.6489
6	E7-C	E7-C				1.6489		1.6489		1.6489
7	E7-D, PET, WWTP	E7-D				16.5175		16.5175		16.5175
8	E17	E17				0.0000		0.0000		0.0000
9	E71	E19				0.0000		0.0000		0.0000
10	E72	E19				0.0000		0.0000		0.0000
11	F6	E19				0.0000		0.0000		0.0000
12	E73	E19				0.0000		0.0000		0.0000
13	E74	E19				0.0000		0.0000		0.0000
14	E75	E19				0.0000		0.0000		0.0000
15	E76	E19				0.0000		0.0000		0.0000
16	E83	E19				0.0000		0.0000		0.0000
17	F3	E19				0.0000		0.0000		0.0000
18	F4	E19				0.0000		0.0000		0.0000

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	SO2					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
19	F5	E19				0.0000		0.0000		0.0000
20	E20	E20				0.0000		0.0000		0.0000
21	E21	E21				0.0000		0.0000		0.0000
22	E22	E22				0.0000		0.0000		0.0000
23	E23	E23				0.0000		0.0000		0.0000
24	E24	E24				0.0000		0.0000		0.0000
25	E25	E25				0.0000		0.0000		0.0000
26	E26	E26				0.0000		0.0000		0.0000
27	E27	E27				0.0000		0.0000		0.0000
28	E28 or E29	E28 or E29				0.0000		0.0000		0.0000
29	E30	E30				0.0000		0.0000		0.0000
30	E31	E31				0.0000		0.0000		0.0000
31	E32	E32				0.0000		0.0000		0.0000
32	E33	E33				0.0000		0.0000		0.0000
33	E34	E34				0.0000		0.0000		0.0000
34	E35	E35				0.0000		0.0000		0.0000
35	E36	E36				0.0000		0.0000		0.0000
36	E37	E37				0.0000		0.0000		0.0000
37	E38	E38				0.0000		0.0000		0.0000
38	E39	E39				0.0000		0.0000		0.0000
39	E40	E40				0.0000		0.0000		0.0000
40	E41	E41				0.0000		0.0000		0.0000
41	E42	E42				0.0000		0.0000		0.0000

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[(1)]:	SO2					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
42	E43	E43				0.0000		0.0000		0.0000
43	E44	E44				0.0000		0.0000		0.0000
44	E45	E45				0.0000		0.0000		0.0000
45	E46	E46				0.0000		0.0000		0.0000
46	E47	E47				0.0000		0.0000		0.0000
47	E48	E48				0.0000		0.0000		0.0000
48	E49	E49				0.0000		0.0000		0.0000
49	E50	E50				0.0000		0.0000		0.0000
50	E51	E51				0.0000		0.0000		0.0000
51	E52	E52				0.0000		0.0000		0.0000
52	E53	E53				0.0000		0.0000		0.0000
53	E54	E54				0.0000		0.0000		0.0000
54	E55	E55				0.0000		0.0000		0.0000
55	E56	E56				0.0000		0.0000		0.0000
56	E57	E57				0.0000		0.0000		0.0000
57	E58	E58				0.0000		0.0000		0.0000
58	E59	E59				0.0000		0.0000		0.0000
59	E60	E60				0.0000		0.0000		0.0000
60	E61	E61				0.0000		0.0000		0.0000
61	E62	E62				0.0000		0.0000		0.0000
62	E63	E63				0.0000		0.0000		0.0000
63	E64	E64				0.0000		0.0000		0.0000
64	E65	E65				0.0000		0.0000		0.0000

TCEQ

TABLE 2F
PROJECT EMISSION INCREASE

Pollutant[1]:	SO2					**Permit:**	TBD			
Baseline Period:	N/A	**to**								
65	E66	E66				0.0000		0.0000		0.0000
66	E67	E67				0.0000		0.0000		0.0000
67	E68	E68				0.0000		0.0000		0.0000
68	E69	E69				0.0000		0.0000		0.0000
69	E70	E70				0.0000		0.0000		0.0000
70	E77	E77				0.0000		0.0000		0.0000
71	E78	E78				0.0000		0.0000		0.0000
72	E79	E79				0.0000		0.0000		0.0000
73	E80	E80				0.0000		0.0000		0.0000
74	E81	E81				0.0000		0.0000		0.0000
75	E82	E82				0.0000		0.0000		0.0000
76	E84	E84				0.0000		0.0000		0.0000
77	E85-A	E85-A				0.0029		0.0029		0.0029
78	E85-B	E85-B				0.0029		0.0029		0.0029
79	E86	E86				0.0000		0.0000		0.0000
80	E87-A	E87-A				0.0002		0.0002		0.0002
81	E87-B	E87-B				0.0002		0.0002		0.0002
82	E88	E88				0.0000		0.0000		0.0000
83	FLARE, WWTP	FLARE				1.7298		1.7298		1.7298
84	FUGPTA and FUGPET	FUGPTA and FUGPET				0.0000		0.0000		0.0000
										23.61